NATIONAL CONSERVATION LANDS

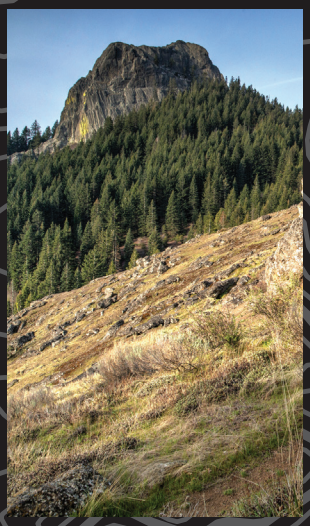
Volume 1

Proposed Resource Management Plan/ Final Environmental Impact Statement

Cascade-Siskiyou National Monument

October 2024






Our Mission

The Bureau of Land Management's mission is to sustain the health, diversity and productivity of public lands for the use and enjoyment of present and future generations.

NATIONAL CONSERVATION LANDS

Mission

Conserve, protect, and restore the nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations.

Cover photos by (clockwise from bottom right): Mardon skipper: *BLM*; Western juniper: *Bob Wick, BLM*; Buck Rock Tunnel: *Greg Shine, BLM*; Mariposa lily: *BLM*; Jenny Creek: *Michael Campbell, BLM*; Osprey: *Kyle Sullivan, BLM*; and Pilot Rock: *Bob Wick, BLM*.

Cascade-Siskiyou National Monument Proposed Resource Management Plan and Final Environmental Impact Statement

DOI-BLM-ORWA-M040-2023-0002-RMP-EIS

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

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

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

4. Abstract: This Proposed Resource Management Plan and Final Environmental Impact Statement (Proposed RMP/Final EIS) describes and analyzes the Proposed RMP and four additional alternatives for managing the approximately 113,500 acres of BLM-administered lands in the Cascade-Siskiyou National Monument (CSNM), located in Jackson and Klamath County in Oregon and Siskiyou County in California. The RMPs underlying purpose is to provide a framework that guides the management of BLM-administered lands in the decision area consistent with the protection and restoration of the CSNM objects and values identified in Proclamation Nos. 7318 and 9564. The plan alternatives are Alternative A (the "no action" alternative or continuation of the existing approved RMPs), Alternative B (the most active management alternative), Alternative C (the moderate active management, and preferred alternative identified in the Draft RMP/EIS), Alternative D (the least active management alternative), and Alternative E (the Proposed RMP, which is a variation of Alternative C, and includes some components from the range of alternatives). Planning issues identified for this RMP revision include, but are not limited to, climate change and ecosystem resiliency, wildlife habitat and ecosystem management, wildland fire and fuels management, livestock grazing, recreation and visitor services, land tenure and land use authorizations, and travel and transportation management.

5. Public Protest Period: The Proposed RMP/Final EIS is open for a 30-day protest period beginning with the date the U.S. Environmental Protection Agency publishes the Notice of Availability of the Proposed RMP/Final EIS in the Federal Register. Protests must be filed with the Director of the BLM as described in the Dear Reader letter.

6. For further information contact:

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

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Dear Reader:

The Cascade-Siskiyou National Monument Proposed Resource Management Plan and Final Environmental Impact Statement (Proposed RMP/Final EIS) for the Bureau of Land Management (BLM) is now open for a 30-day protest period.

On April 5, 2024, the BLM released a Draft RMP/Draft EIS for the Cascade-Siskiyou National Monument. During the three-month comment period that followed, the BLM received comments from Tribes, other government agencies, organizations, and members of the public. Thank you for your input; your participation has helped shape our analysis and decision-making at every step of the planning process. This Proposed RMP/Final EIS contains the Proposed RMP, a summary of changes that have occurred between the Draft and Final EIS, and an analysis of the impacts of the Proposed RMP and other alternatives.

The Proposed RMP does not constitute a final agency decision regarding the management of these BLM-administered lands. Anyone who participated in this RMP process and has an interest that is or may be adversely affected by the Proposed RMP may protest the BLM's approval of the planning decisions. A person who wishes to file a protest must do so in writing within 30 days from the date the U.S. Environmental Protection Agency publishes the Notice of Availability of the Final EIS in the *Federal Register*.

Detailed instructions for filing such a protest are available online at: www.blm.gov/programs/planning-and-nepa/public-participation/filing-a-plan-protest. All protests must be in writing and filed with the BLM Director, either as a hard copy or electronically via the BLM's ePlanning website, by the end of the protest period. To file a protest electronically, visit ePlanning and click the "Submit Protest" button to the right of the Final EIS document. Protests in hard copy must be mailed to one of the following addresses, postmarked by the end of the protest period:

Regular Mail:
Director (210)
Attn: Protest Coordinator
P.O. Box 7183
Washington, DC 20024-1383

Overnight Delivery:
Director (210)
Attn: Protest Coordinator
20 M Street SE, Room 2134LM
Washington, DC 20003

Before including your address, phone number, email address, or other personal identifying information in your protest, be advised that your entire protest—including your personal

identifying information—may be made publicly available at any time. You may request in your protest to withhold your personal identifying information from public review; however, the BLM cannot guarantee that we will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The BLM Director shall make the final decision for the Department of the Interior on each protest. Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report and made available following issuance of the decision. Following resolution of any protests and the completion of the consistency review by the Governor of Oregon, the Approved RMP and Record of Decision will be made available electronically on BLM's ePlanning site.

Thank you for your continued interest in the Cascade-Siskiyou National Monument.

Sincerely,

BARRY BUSHUE
Digitally signed by BARRY BUSHUE
Date: 2024.05.30 11:28:17 -07'00'

Barry R. Bushue
State Director
Oregon/Washington

GORDON TOEVS
Digitally signed by GORDON TOEVS
Date: 2024.05.23 16:58:49 -07'00'

Gordon R. Toevs
State Director
California

Executive Summary

This summary presents a brief description of the major elements of this document. This summary is necessarily neither comprehensive nor complete. Furthermore, this summary omits the citations, definitions, and explanations provided in the document. Therefore, the details in the four chapters of this document are essential to fully understanding the planning process, the alternatives and the Proposed RMP, and their effects.

INTRODUCTION

The Bureau of Land Management (BLM), Medford, Lakeview, and Northern California Districts are revising the current resource management plan (RMP) for the Cascade-Siskiyou National Monument (CSNM). This Proposed RMP/Final Environmental Impact Statement (Proposed RMP/Final EIS) provides a description of the various alternative management approaches the BLM is considering for the management of these lands along with an analysis of the potential effects of the alternatives and the Proposed RMP.

On June 13, 2000, President Clinton signed Presidential Proclamation No. 7318 (65 FR 37249) designating the Cascade-Siskiyou National Monument (CSNM) in southwest Oregon. The Proclamation identified the ecological wonders and unique biological diversity of the area as the primary reason for designation of the CSNM and included numerous objects of scientific and historic interest that warranted protection. At the time of designation, the CSNM included 52,947 acres of federal land administered by the BLM, Medford District.

The BLM completed the Cascade-Siskiyou National Monument Record of Decision and Resource Management Plan in August 2008 (CSNM ROD/RMP; USDI BLM, 2008). The ROD/ RMP provided land use planning decisions including goals, objectives, allowable uses, and management actions for the BLM-administered lands within the monument boundary.

In March 2009, Congress designated the now 24,707-acre Soda Mountain Wilderness (SMW) within the boundary of the CSNM (Public Law 111-11, Section 1405). The BLM completed the Soda Mountain Wilderness (SMW) Stewardship Plan in April 2012. The 2008 CSNM ROD/RMP does not recognize this designation.

In January 2017, President Obama signed Presidential Proclamation No. 9564 (82 FR 6145, January 18, 2017) nearly doubling the size of the CSNM. The current boundary now includes approximately 113,820 acres of federal lands, including BLM-administered lands in the Medford and Lakeview Districts in Oregon and the Northern California District in California, and approximately 320 acres of lands managed by the Bureau of Reclamation. Additionally, there are approximately 58,578 acres of state- and privately-owned land within the CSNM boundary. These state and private lands are not part of the monument.

The expanded CSNM is currently managed under three different RMPs: the 2008 Cascade-Siskiyou National Monument RMP; the 1993 Redding RMP; and the 2016 Southwestern Oregon RMP. At the conclusion of the planning process, the BLM would approve a Record of Decision (ROD) and RMP for the CSNM that would bring all the BLM-administered lands in the

monument under one ROD/RMP that is consistent with the proclamations that established and expanded the CSNM (USDI BLM, 2022d).

The purpose of this RMP is to protect and restore the objects of scientific and historic interest identified in Presidential Proclamations Nos. 7318 and 9564, by addressing the following:

- Protecting and restoring the diverse ecosystems that provide habitat for rare and endemic and special status wildlife and plant species.
- Protecting and restoring landscape-scale resilience for the area's critically important natural resources.
- Protecting intact habitats and undisturbed corridors that allow for animal migration and movement.
- Reducing fire risk both within the wildland urban interface and to CSNM objects and values.[1]
- Managing discretionary uses to protect CSNM objects and values.

THE ALTERNATIVES AND THE PROPOSED RMP

Alternative A (the No Action alternative) is the implementation of three existing RMPs as written. The action alternatives and the Proposed RMP include objectives (desired resource conditions and uses), management direction (actions to achieve the objectives), and the following management areas: Congressionally Designated Management Area, Administratively Designated Management Area, and Ecosystem Management Area. Within the action alternatives and the Proposed RMP, each management area has specific, mapped sub-management areas, sometimes with differing management direction.

The BLM designed a range of action alternatives in the Draft RMP/EIS to span the full spectrum of alternatives that would respond to the purpose and need for the action. The BLM developed the alternatives to represent a range of overall management approaches, including variations in administrative designations, land use allocations, and objectives and management direction. In the Draft RMP/EIS, the BLM analyzed in detail Alternative A (No Action alternative) and three action alternatives (Alternatives B, C, and D). The BLM is carrying forward the action alternatives as presented in the Draft RMP/EIS into the Proposed RMP/Final EIS.

The Congressionally Designated Management Area (CDMA) is comprised of the following sub-management areas: Wilderness Areas, Designated and Eligible Wild & Scenic River corridors, and National and Scenic Historic Trail management corridors. These areas were either

[1] Under the Antiquities Act of 1906, the President of the United States has the authority "to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments." The phrase "objects and values" is used throughout this draft RMP/EIS to refer to the "objects of scientific and historic interest" identified for the CSNM in Presidential Proclamations No. 7318 and 9564 (refer to Appendix B). The BLM has chosen to include the term "value" in this RMP to better describe to the public the Monument's less tangible objects, such as "ecological integrity."

designated by Congress (e.g., Wilderness Areas) or are associated with designations made by Congress (i.e. eligible Wild & Scenic Rivers). These are the same across all alternatives.

The Administratively Designated Management Area (ADMA) is comprised of the following sub-management areas: Herd Management Areas, Lands to be Managed for Their Wilderness Characteristics, Areas of Critical Environmental Concern, Research Natural Areas, and Special Recreation Management Areas. Administratively designated areas are created by the BLM through a land use planning process. These varied across alternatives based primarily on the degree of active management the BLM would employ.

The Ecosystem Management Area (EMA) is a geographic area where multiple resources are managed with complementary objectives and management direction. Similar to the approach in the 2008 CSNM RMP, the BLM created the EMAs during this land use planning process using plant communities to develop the following sub-management areas: Riparian Habitat, Old-Growth Emphasis, and Diversity Emphasis. The EMA includes all remaining lands in the decision area that are not in one of the above management areas. EMA-Riparian Habitat includes lands within 170 feet of a stream or waterbody; EMA-Old-Growth Emphasis includes all conifer forest plant communities; and EMA-Diversity Emphasis includes nonforest plant community types, such as grasslands, shrublands, and oak communities The EMA varies slightly across the action alternatives in response to changes in administrative designations that are proposed under the various alternatives. In addition, the BLM explored variations in management direction for the EMA in the action alternatives.

The BLM explored variations in geographic extents where the management approach would vary to address wildfire risk to people and property (i.e., wildland urban interface/fuels emphasis area) and to CSNM objects and values.

The BLM explored variations in management approaches for recreation and visitor services by varying the designation of special recreation management areas (SMRAs) and extensive recreation management areas (ERMAs).

The BLM varied the availability of lands available for grazing with 27,820 acres available under Alternatives A, B, C, and E (Proposed RMP); and 0 acres available under Alternative D.

Alternative A (No Action)

The BLM-administered lands in the planning area are currently managed under three different RMPs as follows:

- 2008 Cascade Siskiyou National Monument RMP – 65,846 acres.
- 2016 Southwestern Oregon RMP – 42,320 acres.
- 1993 Redding RMP – 5,340 acres

The 2008 CSNM RMP included the following vegetation management areas:

- Diversity Emphasis Area (maintain, protect, and restore habitat and ecological processes), and
- Old-Growth Emphasis Area (maintain, protect, and restore historic conditions of late-successional and old-growth forest ecosystems).

The 2016 SWO RMP includes 39,852 acres (94 percent) of Oregon & California (O&C) lands with the remainder being Public Domain lands. The O&C lands are managed per the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act of 1937 (O&C Act; 43 U.S.C. 1181a *et seq*.) for "permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities." The SWO RMP includes the following unique land use allocations within the CSNM boundary:

- District-Designated Reserves (reserved from sustained yield timber harvest),
- Harvest Land Base (available for sustained yield timber production), and
- Riparian Reserve (areas next to streams managed for fish/aquatic species and their habitats and water quality/quantity).

The 1993 Redding RMP includes Public Domain lands in Siskiyou County, California. Relevant decisions for lands within the CSNM boundary include:

- Determination that lands in the planning area are part of the Klamath Management Area.
- Management objectives for Horseshoe Ranch, an area managed in cooperation with the California Department of Fish and Wildlife and the BLM Medford District.
- Management objectives for Jenny Creek, designated as a Research Natural Area/Area of Critical Environmental Concern.

Alternative B – Most Active Management

Alternative B emphasizes flexibility in planning-level direction and promotes the most active management for the purposes of protection and restoration of CSNM objects and values using a variety of management tools. The BLM would designate Areas of Critical Environmental Concern (ACEC) to protect relevant and important values and would designate Research Natural Areas (RNA) to provide opportunities for scientific research and education.

Alternative B promotes the most active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the Wildland Urban Interface (WUI). The BLM would establish the WUI (Fuels Emphasis Area) as one-quarter mile from private property boundaries where structures are present and one-quarter mile around an identified community at risk and use all management tools.

The BLM would maximize the potential for an array of discretionary actions that are compatible with the protection of CSNM objects and values. Recreation and visitor services would be maximized through the designation of Special Recreation Management Areas (SRMAs) and Extensive Recreation Management Areas (ERMAs). The BLM would designate all lands as a right-of-way avoidance area, except for the Soda Mountain Wilderness, which would be a right-of-way exclusion area. The BLM would continue to make active grazing allotment lands available for livestock grazing so long as they're compatible with protection of CSNM objects and values.

Alternative C – Moderate Active Management

Alternative C, identified as the BLM's preferred alternative in the Draft RMP/EIS, emphasizes flexibility in planning-level direction but promotes a moderate level of active management for protection and restoration of CSNM objects and values and sets some limitations on management actions and tools available. The BLM would designate two ACECs to protect relevant and important values. The BLM also proposes to seasonally restrict use of natural surfaced roads (December to May).

Compared to Alternative B, Alternative C promotes a more moderate approach to active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the WUI. The BLM would establish the WUI, or Fuels Emphasis Area, as one-quarter mile around an identified community at risk. The BLM would use all management tools available but would set limits on allowable activities within portions of the WUI.

Recreation and visitor services would be accommodated to a lesser extent than under Alternative B, while protecting CSNM objects and values. The BLM would reduce certain types of recreation activities (e.g., cross-country snowmobile use) under this alternative, which would result in one less ERMA designated, and another ERMA reduced in size compared to Alternative B. The BLM would designate all lands as a right-of-way avoidance area, except for the Soda Mountain Wilderness and lands managed as wilderness characteristics, which would be right-of-way exclusion areas.

Alternative D – Least Active Management

Alternative D promotes the least active management for protection and restoration of CSNM objects and values. The BLM would rely primarily on natural ecosystem processes that would allow plant community dynamics to unfold without active intervention. Exceptions include the management of young conifer stands (plantations) that are a product of past timber harvest and thinning around legacy trees and along wildfire evacuation routes. The BLM would not designate any ACECs or RNAs.

Alternative D promotes the least intensive approach to active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the WUI. Alternative D establishes the WUI, or Fuels Emphasis Area, as 120 feet from private property boundaries where structures are present The BLM would limit management tools available for use, such as prohibiting machine piling, mastication, targeted grazing, or herbicide use.

The BLM would provide the least accommodation for discretionary uses. Recreation and visitor services management would focus on targeted areas and would be minimally accommodated while still meeting legal requirements for visitor health and safety and mitigating resource user conflicts. For example, the designation of SRMAs would remain the same as in Alternatives B and C; however, only ERMAs associated with existing recreation developments, such as trails, and trailheads, would be designated to provide high-quality recreation opportunities at those sites. The BLM would allocate all lands in the CSNM as a right-of-way exclusion area. As such, no new land use authorizations would be granted, except when mandated by law, including as

necessary for the administration of valid existing rights, and providing reasonable legal access. The BLM would allocate all lands as unavailable for livestock grazing and all existing grazing leases would be phased out (not renewed).

The Proposed RMP (Alternative E)

The BLM has developed the Proposed RMP as a variation on Alternative C, which the BLM identified in the Draft RMP/EIS as the preferred alternative. Notable differences from Alternative C include:

- The BLM has added management direction throughout Appendix E to clarify that all future projects would be reviewed for compatibility with protecting CSNM objects and values during implementation-level NEPA and decision-making processes; and has clarified that the BLM would provide opportunities for public and Tribal input.
- The BLM has added management direction to Appendix E, Section 4.G, that "For allotments with unprotected sensitive aquatic and riparian habitats, prior to beginning the next livestock season of use, implement grazing management practices to provide interim protections of these areas until a long-term/permanent solution is implemented." The BLM identifies in the management direction the standards to be applied until appropriate site-specific analysis determines otherwise.
- The BLM would not designate any areas of critical environmental concern (ADMA-ACEC) or research natural areas (ADMA-RNA) (same as Alternative D). The relevant and important values of ACECs and scientific research values are also CSNM objects and values identified in the Proclamations, and as such are designed be protected consistent with the purpose and need for this plan.
- Management direction for CDMA-Wilderness has been included to provide clear guidelines regarding the restrictions for vegetation management actions in this area:
    - Limit vegetation management actions in Wilderness Areas to only occur for the purposes of removing non-native vegetation or to reduce wildfire risk to life, property, or wilderness character. All vegetation management actions must be consistent with the Wilderness Act and the direction provided in BLM Manual 6340.
- Manage the CDMA-National Scenic and Historic Trail Management Corridor the same as under Alternative C, with added clarification that invasive plant management activities would be allowed within 250-feet of the Pacific Crest Trail.
- The BLM's management objective for ADMA-lands to be managed for their wilderness characteristics is the same as Alternative D, which is to protect wilderness characteristics while providing for compatible uses. Management direction for these lands is similar to Alternatives C and D but was modified to better align with other components of BLM's management approach for the Proposed RMP:
    - These lands would be managed as a right-of-way exclusion area (same as Alternative C and D), which would restrict development of new facilities, including structures and roads, except when mandated by law, necessary for the administration of valid existing rights, or to allow reasonable access to non-federal lands.

  - For existing roads and trails that abut lands with wilderness characteristics, maintenance would be allowed within 30 to 100 feet of the edge of the right-of-way or centerline of road, depending on the road's maintenance level.
- The geographic extent of the EMA is intermediate between Alternatives C and D, and management direction is similar to Alternative C, but also draws upon the other alternatives.
- The WUI/fuels emphasis area combines elements of Alternatives C and D and consists of lands within ¼ mile of a Community at Risk and within 120 feet of private property boundaries where structures are present, excluding lands in CDMA-Wilderness. Management activities within the WUI would be modified where necessary to comply with other management direction (for management areas and resources). The BLM would determine what modifications would be needed on a case-by-case basis when conducting a compatibility review during the implementation-level NEPA and decision-making process.
- New management direction (no similar direction for Alternatives B, C, or D, but included for Alternative A) for Travel and Transportation Management:
  - Maintain existing roads to provide access for resource management and casual use while protecting water quality and facilities and providing user safety. Apply road maintenance and wet weather road use BMPs as needed.
  - Fully decommission/obliterate roads (permanent closure) with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that would be used in the future. Apply road closure BMPs as needed (Appendix I). Close roads only where consistent with valid existing rights and not necessary for reasonable access to non-federal lands.
- New management direction (no similar direction for Alternatives B, C, or D, but included for Alternative A) for Recreation & Visitor Services:
  - Do not allow groups larger than 25 people and groups no larger than 12 people within the Soda Mountain Wilderness without prior authorization. Group size limits within the Soda Mountain Wilderness may be reduced as necessary to ensure protection of wilderness character.
- Buck Prairie Extensive Recreation Management Area is reduced by 124 acres compared to Alternative C to eliminate overlap with the Table Mountain Snow Play Area SRMA and the Cottonwood Glades area.
- The BLM would manage most of the CSNM as visual resource management (VRM) class I or II, which provide the highest levels of scenic quality protection. The only exceptions of differing VRM classes of management include where highly developed recreation sites would be managed as VRM Class III (378 acres), and transmission lines would be managed as VRM Class IV (1,709 acres).
- For right-of-way (ROW) avoidance areas, the BLM has incorporated new management direction to clarify additional restrictions on how and where ROWs would be authorized, including conducting compatibility reviews during the implementation-level NEPA process, and providing opportunities for public and Tribal input. Additionally, in closed old refugia forests, the BLM would prohibit new ROW authorizations that would include

new road construction or development of new linear features outside the boundaries of existing authorizations or road prisms, except when mandated by law, including as necessary for the administration of valid existing rights, or providing reasonable access to non-federal lands.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section summarizes the existing conditions and environmental consequences for each resource that the RMP would affect. Throughout this document, the BLM uses the term 'planning area' to refer to the CSNM boundary as identified by Proclamation 9564 and uses the term 'decision area' to refer to the approximately 113,500 acres of BLM-administered lands within the planning area.

The BLM used a science-based approach to develop alternatives and analyze their effects. Resource specialists drew on recent scientific literature from peer-reviewed journals, publications from the Forest Service and US Geological Survey, Joint Fire Science final reports, US Fish and Wildlife Threatened and Endangered Species Recovery Plans, along with local surveys and studies conducted by BLM staff and contracted local scientists. In cases of conflicting scientific findings, the BLM carefully evaluated the evidence and made informed decisions on which studies to rely on. Research by established scientists in relevant fields and a higher number of consistent studies were prioritized over less reliable sources. The BLM adhered to the Department of the Interior's Scientific Integrity Policy (305 DM 3), emphasizing that all scientific information used for developing management direction and analyzing effects must be robust, high-quality, derived from rigorous scientific processes, and ultimately trustworthy.

Aquatic and Riparian Habitat

All alternatives would protect key riparian and aquatic habitat features through management direction that would provide sediment filtering, shade, and large wood producing vegetation adjacent to aquatic habitat. The action alternatives would provide additional protections to intermittent streams in the Jenny Creek and Spencer Creek Watersheds since more riparian features, such as meadows adjacent to intermittent streams, fall under management direction for riparian areas compared with the No Action Alternative.

Alternative D would phase out livestock grazing which would reduce the potential for adverse effects to 137 acres of sensitive aquatic and riparian habitats compared to the other alternatives. The Proposed RMP would also ensure interim protection of sensitive riparian areas until a long-term/permanent solution is implemented.

Alternative C and the Proposed RMP would result in the highest reduction in road sediment inputs to aquatic habitats by restricting vehicular uses of natural surfaced roads during the wet season. The Proposed RMP would result in the greatest reduction in sediment delivery to aquatic habitat within the Buck Prairie Extensive Recreation Management Area by closing roads during the shoulder season when roads may be wet but still accessible to traffic.

Areas of Critical Environmental Concern and Research Natural Areas

None of the alternatives would have adverse effects to the relevant and important values of ACECs and the scientific research and education purposes of RNAs primarily due to the management direction for these lands. For example, the BLM would allow prescribed fire treatments to reduce fire risk in areas, such as Mariposa Lily ACEC, but prior to applying prescribed fire, the BLM would take necessary mitigation actions to reduce impacts to Bureau Special Status Species wildlife and plants and their habitats. Additionally, the BLM would

conduct a compatibility review during implementation-level NEPA processes to ensure the proposed action would protect CSNM objects and values.

Managing natural ignitions when conditions are compatible to meet resource objectives would have a beneficial effect under Alternatives B, C, and the Proposed RMP.

Relevant and important values in ACECs and scientific research and education values in RNAs would be protected regardless of whether a given ACEC or RNA is designated or not primarily due to the requirements of Proclamation Nos. 7318 and 9564 and BLM policy for management of National Conservation Lands. The relevant and important values of ACECs and scientific research values are also CSNM objects and values identified in the Proclamations. The BLM designed all actions alternatives to protect CSNM objects and values consistent with the purpose and need for this plan.

Climate Change

Fire in the CSNM, whether prescribed or natural, is the dominant source of GHGs currently, comprising 99 percent of quantifiable total GHG emissions in the CSNM.

Annual greenhouse gas emissions and the social costs associated with them on BLM-administered lands would increase under all alternatives, with the largest increase under Alternative B and the least increase under Alternative D; however, annual greenhouse gas emissions associated with management of BLM-administered lands would remain less than one percent of the 2021 statewide and national greenhouse gas emissions.

Hydrology

All alternatives would maintain and protect water quality due to management direction and Best Management Practices that maintain shade and riparian vegetation that filters sediment. Alternative C and the Proposed RMP would provide additional benefit to water quality via a reduction in road sediment by restricting vehicular use of naturally surfaced roads during the wet season.

Water availability is an increasing concern for CSNM objects and values. Alternative B provides the most potential to improve or maintain summer low flows using vegetation treatments, due to the largest decadal target for ecological restoration treatments in the current snow zone.

Alternative D and the Proposed RMP would result in a reduction of adverse effects to water quality on 137 acres of sensitive riparian meadows and wetlands, benefit riparian conditions, and improve summer stream flows due to the elimination of grazing (Alternative D), or the interim protections provided for sensitive riparian areas (Proposed RMP). Sensitive areas would continue to be impacted in the short term until adjustments or modifications to practices are made under the No Action Alternative, Alternative B, and Alternative C.

Lands and Realty

The No Action Alternative has the fewest acres, and Alternative D has the most acres in Land Tenure Zone 1 (not available for exchange). Designated and eligible Wild and Scenic River corridors; wilderness areas; National Scenic and Historic Trail management corridors; lands

managed for their wilderness characteristics; and lands acquired with Land and Water Conservation Funds (LWCF) would not be available for exchange under any action alternative. Alternative D has the fewest acres, and the No Action Alternative has the most acres in Land Tenure Zone 2 (available for exchange only if it furthers the purposes of the CSNM).

Under all alternatives, BLM-administered lands would generally be available for Rights of Way (ROWs) for administration of valid existing rights, to provide reasonable access to non-federally owned lands when no feasible alternate route is available, or subject to applicable laws. Alternative D would most constrain the BLM's ability to grant ROWs. Alternative D would phase out all discretionary land use authorizations that do not meet those criteria.

Lands with Wilderness Characteristics

Although there would be no areas managed for their wilderness characteristics under the No Action Alternative and Alternative B, wilderness characteristics would still receive some protection from other existing management decisions such as VRM Class II allocation and limiting public motorized access to existing and designated routes. Alternatives C, D, and the Proposed RMP would provide more protection of wilderness characteristics than the No Action Alternative and Alternative B. Alternatives C, D, and the Proposed RMP would designate lands with wilderness characteristics as closed to OHV use, which would increase opportunities for solitude and reduce impacts to naturalness.

Alternative D would have the least impact to wilderness characteristics as a result of WUI treatments compared to the other alternatives, since those treatments would be available to occur over the smallest area (73 acres, or 0.9 percent of lands with wilderness characteristics). However, all action alternatives would have minimal impacts to lands with wilderness characteristics from treatments in the WUI; Alternative C would impact 221 acres (2.6 percent); Alternative E (Proposed RMP) would impact 294 acres (3.4 percent); and Alternative B would impact 1,319 acres (15 percent). In addition, the BLM assumes not all lands would require treatments to reduce fire risk on every acre. Lastly, WUI treatments would have short-term negative impacts on apparent naturalness and solitude and primitive and unconfined recreation; over time, however, they would enhance naturalness by creating forest stands that more closely mimic the appearance and function of forests in which natural fire has not been suppressed.

Livestock Grazing

Availability of authorized livestock grazing would be the same under the No Action Alternative, Alternative B, Alternative C, and the Proposed RMP. Alternative D would have the greatest impact to availability of authorized grazing since it eliminates grazing in the CSNM.

The No Action Alternative would not affect forage availability for livestock grazing. Alternatives B, C, and the Proposed RMP, the BLM would integrate adaptive, flexible, and out-come based grazing management. This would alter annual livestock forage availability but would not exceed current authorized AUMs.

Under the No Action Alternative, rangeland health would remain stable. Alternatives B, C and the Proposed RMP would improve overall rangeland conditions by using an adaptive, flexible, out-come based grazing, along with maintaining protective features and non-structural range improvements. Alternative D would rely on passive management of rangelands.

Minerals – Existing Rock Quarries

Under the No Action Alternative and Alternative B, all existing quarries would be available for BLM administrative use, resulting in the greatest availably of quarry rock. Alternative D would reclaim all existing quarries, resulting in no availability of quarry rock from these sites. Under Alternative C and the Proposed RMP, half of the quarries would be available for administrative use and half are reclaimed, resulting in a decrease in rock availability.

National Scenic and Historic Trails

The scenic values and recreational experiences for the Pacific Crest National Scenic Trail (PCT) would be protected under all action alternatives, including the Proposed RMP.

Recreation and Visitor Services

The No Action Alternative allocates the most acres as Recreation Management Areas (RMAs) but expenditure of funding for Recreation & Visitor Services would not be prioritized. Alternative D would allocate the least number of acres as RMAs and recreation and visitor services would be minimally accommodated. Alternatives B, C, and the Proposed RMP would diversify and increase recreational opportunities through designating two ERMAs in areas of existing recreational use (disc golf at Shale City and recreation at Buck Rock Tunnel) and one new ERMA that would offer recreation and interpretation opportunities for a unique geologic feature. By diversifying and increasing recreational opportunities and experiences Alternatives B, C, and E are expected to better meet anticipated recreation demand than the No Action and Alternative D.

There would no long-term change to the desired Recreation Setting Characteristics (RSC) in SRMAs or targeted RSCs in ERMAs from WUI treatments under any alternative. The effects of WUI treatments are short-term since the noise and limited access during WUI treatments subside once the work is completed and overtime WUI treatments create more natural stands.

Livestock grazing would have the most effect on the naturalness RSC in RMAs under the No Action Alternative. Alternatives B, C, D, and the Proposed RMP do not designate any RMAs with a Primitive or Back Country naturalness RSC; therefore, there would be no effects to the targeted RSCs under these alternatives.

Across all the alternatives there would be adequate opportunities for the issuance of SRPs since greater than 90 percent of the CSNM would be open to the issuance of SRPs.

Socioeconomics

Alternative D has the greatest potential for negative social and economic impacts due to phasing out of existing facilities through changes in rights-of-way management. It would decrease recreational opportunities, eliminate livestock grazing opportunities, increase wildfires risk to private lands and properties, and prevent the active management needed to protect and restore CSNM objects and values (although these would continue to be protected as required by the Proclamations). The other alternatives vary in their effects, but the social and economic impacts would not be significant.

The impacts of Alternative D would fall on many sectors of society but especially on low-income populations in the adjacent counties. Therefore, Alternative D would have negative, disproportionate impacts on this environmental justice population. The other alternatives would not have environmental justice impacts.

The inclusion of O&C Act lands in the CSNM would impact revenue, and thereby counties and communities, due to restrictions on sustained yield commercial timber harvest. However, since the proclamations prohibited sustained yield commercial timber harvest, none of the action alternatives included it. Therefore, any associated social and economic (and other) conditions are not affected by any of the alternatives.

Soils

Current BLM actions are designed to restore degraded soils to a healthy and functional state while also safeguarding against adverse impacts from high-severity wildfires. Under all action alternatives, restoration treatments (thinning and under burning) in the ecosystem management areas would temporarily increase the overall detrimental soil disturbance on the landscape. However, management direction limits detrimental soil disturbance to less than 20 percent of the operational area. Alternative B would have the greatest short-term detrimental soil disturbance (3,326 acres), but the greatest long-term benefit. Alternative C and the Proposed RMP would have short-term soil disturbance of 1,452 acres. Alternative D would have the least short-term detrimental soil disturbance (520 acres), but would forgo long-term gains of soil functionality, and would have higher risk of high-intensity wildfire-related soil disturbance.

Travel and Transportation Management

Alternative C and the Proposed RMP provide the most restrictions on public motorized access with more than 35,000 acres allocated as closed to public motorized access. The Proposed RMP provides slightly more seasonal restrictions on road use than Alternative C (5,887 acres compared to 5,801acres). Alternative B is the only alternative that would allow for cross-country snowmobile use in the Surveyor Mountain ERMA.

Visitation to the CSNM, development on private lands in the area, and vehicle traffic, are expected to increase over the next 20 years. Future travel management planning completed during RMP implementation would reduce road mileage open to motorized use within the CSNM. A reduction in public motorized use would benefit monument objects and values while still allowing public access. Opportunities for mechanized use (bicycle) as well as pedestrian and equestrian use would increase.

Vegetation

Dry Forest: Landscape resiliency and ability to resist large-scale, high-severity disturbance at the stand-level.

Considering climate change, restoring forests closer to the Natural Range of Variability would improve both stand-level resistance and landscape-level resilience. The effects of disturbance such as insects and disease, drought-based mortality, and density dependent mortality have altered forest characteristics from historic levels. Managing and maintaining forest stands within a desired range of conditions specific to forest type to reduce dense forest stands would mitigate

damage from disturbance at both the stand-level and landscape-level. All action alternatives propose restoration treatments that would set forest stands on trajectories toward conditions better suited for warmer and dryer climate conditions by reducing stand density, accelerating the development of heterogeneous stand structure, and increasing species diversity. However, Alternative B would provide the most flexibility to promote and maintain stand conditions more resilient to disturbance (based on types of treatments and amount of acres treated) followed by Alternatives C and E (Proposed RMP), and Alternative D. In the long term, these treatments would foster greater resilience to natural disturbances, protect a range of habitats, and provide better protection from large-scale, high-severity disturbances in the CSNM. The BLM's Proposed RMP incorporates science-based diameter limits for tree retention would increase the success of restoration efforts aimed at shifting species composition to more fire-resistant species, while still retaining important legacy trees on the landscape.

Protection and development of late-successional forests

Under all alternatives, the amount of late-successional forest would increase, primarily via growth rather than from proposed management activities. Alternative D would result in the least amount of open canopy late-successional forest, indicating low species and spatial heterogeneity. The BLM's management approach would aid in creating more open canopy late-successional forest than would otherwise occur without management. Under Alternatives B, C, and E (the Proposed RMP), the management approach would provide for nearly equal proportions of open and closed canopy late-successional forest suggesting enhanced species diversity within these forests and lower density-related stress. Alternative D would be dominated by closed canopy late-successional forest.

Protecting and restoring ecological functioning of nonforest plant communities

Invasive plants are to remain a permanent part of the CSNM plant communities given the high rates of sustained treatment needed. Expected treatment rates are expected to be lower than spread rates. The No Action Alternative and the Proposed RMP would come closest to at least maintaining the status quo.

Alternative B, followed closely by the Proposed RMP (Alternative E), would enhance ecological functioning across nonforest vegetation apart from chaparral, where no treatment is allowed under the Proposed RMP. With its generally passive approach to management, Alternative D would result in declining ecological functioning except in riparian areas where removal of livestock grazing is expected to increase ecological functioning.

Chaparral, which comprises nearly half of the nonforest vegetation, would see improved ecological functioning under the Alternative A (No Action), Alternative B, and Alternative C with restoration treatments.

Visual Resources

All action alternatives, including the Proposed RMP, are very similar in the degree of scenic quality protection (within 2 percent). Every action alternative manages more lands, at a more protective VRM class, then the VRI class, with ranges of 3.2 to 5.3 percent of more protection than less protection. This means that every action alternative would see a beneficial change of

scenic quality over time within the planning area. However, the Proposed RMP (Alternative E) would provide the highest amount of scenic quality protections.

Wildland Fire Management

Alternatives A and B would contribute the greatest amount toward wildfire risk reduction to the WUI and CSNM objects and values achieving a 20 percent wildfire risk reduction within either the local or landscape areas. Alternative C and the Proposed RMP would achieve nearly 20 percent wildfire risk reduction within the local area and greater than 10 percent within the landscape area. Alternative D would not satisfy minimum thresholds for wildfire risk reduction

Alternatives A and B would provide the greatest localized wildfire risk reduction to important legacy tree CSNM objects followed by Alternatives C and the Proposed RMP and then Alternative D.

Common to all action alternatives, applying ecological restoration treatments that achieve reduced wildfire hazard only within strategic linear features optimally placed to disrupt large fire growth would fall short of the minimum 10 percent of the CSNM planning area needed for effective wildfire risk reduction.

Terrestrial Wildlife

Overall, effects to Bureau Sensitive and ESA listed species from the objectives and management direction under the action alternatives are anticipated to be minimal. Management directions provide many protective guidelines that would limit impacts. Alternative B would target the largest number of acres for restoration, allowing more long-term habitat altering actions to take place.

Under Alternatives B, C, D, and the Proposed RMP, the habitat restoration proposed under the Ecosystem Management Area objectives, combined with management direction for Ecosystem Management Area (EMA) – Old Growth Emphasis Areas, EMA – Diversity Emphasis Areas, and terrestrial wildlife, would have short-term adverse effects, but would have beneficial effects by improving wildlife habitat quality and resiliency in the long-term.

Northern Spotted Owl (NSO)

Management direction under all alternatives would contribute to NSO Recovery Action 10 (conserve spotted owl sites and high value spotted owl habitat) and Recovery Action 32 (maintain older, more structurally complex multi-layered forests) through a targeted treatment strategy that conserves high value northern spotted owl habitat, including nesting-roosting and closed old refugia (COR), while also addressing risk of loss to habitat from severe wildfire.

Alternatives B, C, and the Proposed RMP would contribute the most toward NSO Recovery Action 6 (implement silvicultural treatments in younger stands for development of structural complexity) because they provide EMA management direction with the highest restoration targets and footprint.

Alternative D would result in the highest overall increase (20 percent) in nesting, roosting, foraging habitat within the decision area over 50 years, followed by Alternative C (17 percent), the Proposed RMP (16 percent), Alternative A (7 percent), and Alternative B (6 percent).

Management direction in Alternatives A and B would contribute the greatest amount toward wildfire risk reduction to CSNM objects and values (including NSO NRF habitat), followed by the Proposed RMP, Alternative C, and Alternative D.

Dispersal-quality habitat increased in Alternatives A, C, D and the Proposed RMP over 50 years. The increase was highest in Alternative C (up to 5 percent), followed by the Proposed RMP and Alternative D (up to 4 percent), and the least in Alternative A (up to 2 percent).

CONSULTATION AND COORDINATION

On April 5, 2024, the BLM released the Draft RMP/EIS for a 90-day comment period. The BLM received comments from Tribes, other government agencies, organizations, and members of the public. During the comment period, the Bureau of Land Management (BLM) hosted three in person public meetings in May 2024. The BLM answered questions, provided information, and encouraged meeting attendees to submit comments. In addition to the public meetings, the BLM hosted a virtual meeting in May 2024, which presented an overview of the Draft RMP/EIS as well as information on how to comment. A total of 103 people attended the meetings. The BLM received a total of 348 unique comment submissions that included 1,092 comment letters, and nearly 4,000 comments. Livestock grazing, vegetation, and wildland fire management received the most comments.

The BLM honors its legally affirmed Nation-to-Nation relationship with American Indian and Alaska Native Tribal Nations, protects and supports Tribal sovereignty and self-governance, and strives to uphold this unique trust responsibility with Tribes. The BLM is consulting on a government-to-government level with the nine federally recognized Tribes located within, or that have interests within, the planning area. Two non-federally recognized tribes were also involved in the planning process. The BLM has been conducting traditional Nation-to-Nation consultation and integrating staff-to-staff outreach methods such as emails, virtual meetings, and phone calls since the planning effort was initiated.

A cooperating agency is a qualified governmental entity—whether local, state, Tribal, or federal—that has entered into a formal agreement with the Bureau of Land Management (BLM) to offer input and expertise during the planning and environmental analysis stages. For the Resource Management Plan (RMP), invitations were extended to fifteen federal agencies, nine state agencies (four in Oregon and five in California), five local governments (four in Oregon and one in California), and the eleven previously mentioned Tribes. Ultimately, the BLM established ten cooperating agencies for this RMP. The BLM followed applicable regulations for consulting with other agencies about ecologically and culturally sensitive aspects of the Proposed RMP/Final EIS. Specifically, consultations were undertaken to ensure the plan's compliance with Section 7 of the Endangered Species Act as well as Section 106 of the National Historic Preservation Act.

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Chapter 1. Introduction

The Bureau of Land Management (BLM), Medford, Lakeview, and Northern California Districts are revising the current resource management plan (RMP) for the Cascade-Siskiyou National Monument (CSNM). This Proposed RMP/Final Environmental Impact Statement (EIS) provides a description and analysis of the management approach that the BLM is proposing for the BLM-administered lands in the CSNM, along with the various alternative management approaches that the BLM analyzed in the Draft RMP/EIS. A summary of the notable changes made to this chapter are provided in Appendix T, Summary of Notable Changes from the Draft RMP/EIS.

1.1. BACKGROUND

On June 13, 2000, President Clinton signed Presidential Proclamation No. 7318 (65 FR 37249) designating the Cascade-Siskiyou National Monument (CSNM) in southwest Oregon near the communities of Medford and Ashland (Appendix A, CSNM Presidential Proclamations). The Proclamation identified the ecological wonders and unique biological diversity of the area as the primary reason for designation of the CSNM and included numerous objects of scientific and historic interest that warranted protection (Appendix B, CSNM Objects of Scientific and Historic Interest).

At the time of designation, the CSNM included 52,947 acres of federal land administered by the BLM, Medford District. Additionally, there were approximately 32,000 acres of privately owned land within the CSNM boundary. Nonfederal lands, including private and state lands, within the CSNM boundary are not part of the monument (Section 1.2, Planning and Decision Area). In the fall of 2000, the BLM began the planning process to develop an RMP for the CSNM. In August 2008, the BLM approved the Cascade-Siskiyou National Monument Record of Decision and Resource Management Plan (CSNM ROD/RMP; USDI BLM, 2008).

In March 2009, Congress designated the now 24,707-acre Soda Mountain Wilderness (SMW) within the boundary of the CSNM (Public Law 111-11, Section 1405). The BLM prepared the Soda Mountain Wilderness Stewardship Plan and Environmental Assessment (DOI-BLM-ORWA-M040-2011-0001-EA) in September 2011. The BLM completed the Final SMW Stewardship Plan in April 2012. The 2008 CSNM ROD/RMP does not recognize this designation.

In January 2017, President Obama signed Presidential Proclamation No. 9564 (82 FR 6145, January 18, 2017) nearly doubling the size of the CSNM. The current boundary now includes approximately 113,820 acres of federal lands, including approximately 113,500 acres of BLM-administered lands in the Medford and Lakeview Districts in Oregon and the Northern California District in California, and approximately 320 acres of lands managed by the Bureau of Reclamation (Appendix C, Map 1-1. Planning Area and Decision Area). The expanded Monument now includes "Horseshoe Ranch[1], [most of] the Jenny Creek watershed, the Grizzly Peak area, Lost Lake, the Rogue Valley foothills, the Southern Cascades area, and the area surrounding Surveyor Mountain…" The expansion created a "Cascade-Siskiyou landscape that

[1] The California State lands in the Horseshoe Ranch Wildlife Area are not part of the CSNM.

provides vital habitat connectivity, watershed protection, and landscape-scale resilience for the area's critically important natural resources" (Presidential Proclamation No. 9564). The expansion bolsters resource protection within the original Monument boundaries and protects the important biological and historic resources within the expansion area. The BLM currently manages the lands in the expanded CSNM under three different RMPs: the 2008 Cascade-Siskiyou National Monument RMP; the 1993 Redding RMP; and the 2016 Southwestern Oregon RMP. Refer to Section 2.2, Alternative A – No Action for more details.

In March 2019, Congress designated the Jenny Creek and Spring Creek Wild and Scenic Rivers, primarily in the CSNM (Public Law 116-9). These designated rivers are classified as scenic and are managed as part of the National Wild and Scenic Rivers System. The BLM has not started the process to develop a comprehensive river management plan for these rivers. In the interim, the BLM follows the requirements of the Wild and Scenic Rivers Act, BLM policy, and direction for interim management. Refer to the 2022 CSNM RMP Evaluation Report for more information and maps (USDI BLM, 2022d).

1.2. PLANNING AREA AND DECISION AREA

The CSNM boundary, as identified by Presidential Proclamation No. 9564, constitutes the planning area for this RMP process (Table 1-1, Land ownership in the planning area and Appendix C, Map 1-1. Planning Area and Decision Area). The planning area is in the states of Oregon and California and includes lands within Jackson and Klamath Counties in Oregon, and Siskiyou County in California.

Lands within the planning area reflect a checkerboard pattern of ownership; this is more the case in the CSNM expansion area than in the original boundary because the BLM has acquired from willing sellers, primarily through Land and Water Conservation Funds, an additional 13,131 acres that were once private lands within the original boundary. An exception to the checkerboard pattern of ownership is the Soda Mountain Wilderness, located in the southern portion of the planning area. All lands within the Soda Mountain Wilderness are managed by the BLM. The BLM currently manages approximately 113,500 acres (67 percent) of the lands in the planning area.

The Bureau of Reclamation administers approximately 320 acres (< 1 percent) (Table 1-1) around Hyatt Reservoir within the planning area. The State of California owns approximately 4,900 acres (3 percent) of land within the planning area, which are managed primarily as the Horseshoe Ranch Wildlife Area. The remaining approximately 51,900 acres (30 percent) of land in the planning area are privately owned.

The BLM manages recreational facilities and lands adjacent to Hyatt Prairie Reservoir pursuant to a March 17, 1964, Memorandum of Understanding with the Bureau of Reclamation. The Bureau of Reclamation retains authority to operate the Reservoir for the purposes for which it was authorized, including controlling the submerged lands and the water surface and level. Where BLM-administered recreational facilities and lands adjacent to the Reservoir fall within the CSNM boundaries, the BLM would apply the direction in this RMP to BLM activities.

Split estate lands occur when the surface and mineral (subsurface) estates have different ownership. The mineral estate may be owned by entities such as the federal government (managed by BLM), State of Oregon, counties, private individuals, or corporations. Please refer to Table 1-1 below and Map 1-2 in Appendix C for surface and mineral ownership.

Table 1-1. Land ownership in the planning area

Land ownership	Acres	Percent of Planning Area
Bureau of Land Management	113,506	67
BLM-administered surface and mineral estate	110,568	--
BLM-administered surface, non-federal mineral estate	2,692	--
BLM-administered surface, restricted mineral estate	245*	--
Private surface, BLM-administered mineral estate	165	--
Bureau of Reclamation	323	<1
State	4,915	3
Private	51,663	30
Planning Area Total	**170,407**	**100**

Based on BLM Geographic Information System (GIS) 2022, 2024
[*Mineral estate restrictions described in General Warranty Deed 93-37969]

The CSNM's decision area is the approximately 113,500 acres[2] of BLM-administered lands within the planning area. This is the specific area for which the BLM has authority to make land use and management decisions (Table 1-2, Land status of BLM-administered lands in the decision area).

Table 1-2. Land status of BLM-administered lands in the decision area

Land Status	Acres
O&C	80,007
Public Domain	20,368
Acquired	13,131
TOTAL	**113,506**

Based on BLM Geographic Information System (GIS) 2023

[2] Any lands acquired by the BLM within the planning area would become part of the decision area and would be managed under the revised RMP.

1.3. DECISION TO BE MADE

At the conclusion of the planning process the BLM would approve a revised RMP for the CSNM. The BLM's planning regulations make clear that RMPs are a preliminary step in the overall process of managing public lands and are "designed to guide and control future management actions and the development of subsequent, more detailed and limited scope plans for resources and uses" (43 CFR 1601.0-2). The decisions made through this process would meet the purpose and need for the planning effort (Section 1.4, Purpose and Need) as well as the BLM's legal and policy mandates (Appendix D, Relevant Laws, Regulations, Policy, and Plans), to the extent consistent with Presidential Proclamation Nos. 7318 and 9564.

The revised RMP would include the following land use plan decisions:

- **Objectives** are descriptions of specific and measurable desired outcomes for BLM-administered lands and resources in an RMP; the resource conditions that the BLM envisions, or desires would eventually result from implementation of actions consistent with the RMP.
- **Management direction** identifies where future actions may or may not be allowed and what restrictions or requirements may be placed on those future actions to achieve the objectives set for the BLM-administered lands and resources.
- **Land use allocations** identify allowed, prohibited, and restricted uses for all or part of the BLM-administered lands in the CSNM.
- **Administrative designations**, from BLM or Department of the Interior program-specific policies or regulations, are established through the BLM's land use planning process to achieve RMP objectives.

These land use plan decisions would guide the BLM's administration of the CSNM over the life of the plan (typically 15 to 20 years). After the plan is completed, the BLM would develop and implement site-specific actions that meet the RMP's objectives and direction. The BLM calls decisions to undertake such actions project- or implementation-level decisions.

1.4. PURPOSE AND NEED

The purpose and need statement describes the underlying problem or opportunity to which the BLM is responding with the action (need) and the outcomes the BLM intends the RMP to achieve (purpose) (H-1790-1, BLM National Environmental Policy Act, Section 6.2). The purpose and need statement dictates the range of alternatives, because action alternatives are not "reasonable" if they do not respond to the purpose and need for action (H-1790-1, BLM National Environmental Policy Act, Section 6.2.1).

The purpose of this RMP is to provide a framework that guides the management of BLM-administered lands in the decision area to protect and restore the resources, objects, and values for which the area was designated.

The need for the action is to revise the 2008 CSNM RMP to encompass all the BLM-administered lands in the CSNM under one Record of Decision and RMP that is consistent with the proclamations that established and expanded the CSNM (USDI BLM, 2022d).

The Federal Land Policy and Management Act of 1976 (FLPMA) and Presidential Proclamation Nos. 7318 and 9564 establish the direction to conduct planning for the CSNM RMP revision. FLPMA requires the BLM to develop RMPs that provide, by areas, for the use of public lands. The Presidential proclamations direct the Secretary to manage the area as a National Landscape Conservation System unit (hereafter "National Conservation Lands").

The BLM's current RMPs for lands in the decision area do not address all the legal mandates related to management of the congressionally designated National Conservation Lands (i.e., Soda Mountain Wilderness; the Jenny Creek and Spring Creek Wild and Scenic Rivers; the Applegate Trail, which is part of the California National Historic Trail; and the Pacific Crest National Scenic Trail). The same goes for the lands included in President Obama's enlargement of the CSNM boundary. In addition, some aspects of the existing RMPs covering the planning area need to be updated to be consistent with current BLM policies (USDI BLM, 2022d).

Through the following purposes, the BLM would accomplish this overarching purpose.

The purpose of this RMP is to protect and restore the objects of scientific and historic interest identified in Presidential Proclamation Nos. 7318 and 9564, by addressing the following:

- Protecting and restoring the diverse ecosystems that provide habitat for rare and endemic and special status wildlife and plant species.
- Protecting and restoring landscape-scale resilience for the area's critically important natural resources.
- Protecting intact habitats and undisturbed corridors that allow for animal migration and movement.
- Reducing fire risk both within the wildland urban interface and to CSNM objects and values.[3]
- Managing discretionary uses to protect CSNM objects and values.

Protect and restore a diversity of ecosystems that provide habitat for the rare and endemic and special status wildlife and plant species.

Need: Habitat fragmentation and loss from uses such as timber harvest, road building, livestock grazing, and fire suppression have led to degraded ecosystems. That, in combination with climate change, threatens rare, endemic, and special status wildlife and plants species in some locations (Corlett and Tomlinson, 2020).

The CSNM proclamations provide opportunities for the BLM to manage ecosystem components as an integral part of the larger landscape on behalf of rare, endemic, and special status species. Keystone species, such as beavers, may be returned to restore the ecosystem integrity of healthy

[3] Under the Antiquities Act of 1906, the President of the United States has the authority "to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments." The phrase "objects and values" is used throughout this Proposed RMP/Final EIS to refer to the "objects of scientific and historic interest" identified for the CSNM in Presidential Proclamations No. 7318 and 9564 (refer to Appendix B). The BLM has chosen to include the term "value" in this RMP to better describe to the public the Monument's less tangible objects, such as "ecological integrity."

riparian systems (USDI BLM, 2011b). The BLM has an opportunity to integrate Indigenous Knowledge to support protection and restoration of the CSNM's ecosystems.

Protect and restore landscape-scale resilience for the area's critically important natural resources.

Need: Climate change, which is predicted to increase the frequency and severity of disturbances (Peterson et al., 2011; Pickrell, 2019), intensifies the risk of large-scale, high-severity disturbances that can adversely impact CSNM objects and values. The post-disturbance change in environmental conditions may also prevent species from successfully reestablishing and persisting (Cartwright, 2019; Vincent, Bornand, Kempel, & Fischer, 2020; Corlett & Tomlinson, 2020). Drought and insect damage has resulted in substantial mortality within some forest ecosystems in the planning area, increasing fuel loadings and reducing resilience to fire (USDI BLM, 2023a, Section 6.22). Long-term drought has led to declining stream flows and historically low reservoir levels, which affect aquatic habitats and species (USDI BLM, 2023a, Sections 6.5 and 6.7). Hydrologic changes have resulted in loss of floodplain function, and reduced riparian habitats negatively impact fish and wildlife populations (ODFW, 2016). The BLM has the opportunity to prioritize protection and restoration of a range of ecosystems distributed across the landscape to increase their resistance and resilience to large-scale disturbance events. Additional opportunities include restoring riparian habitats, managing discretionary uses to protect special status species, control invasive species, prevent habitat degradation, and actively manage fire-dependent habitats (such as grasslands and oak savanna). The planning area provides scientists, educators, and land managers with an opportunity for learning while incorporating the uncertainties of climate change into long-term planning in an ecologically important area.

Protect intact habitats and undisturbed corridors and restore degraded habitats that allow for animal migration and movement.

Need: Checkerboard ownership patterns increase the challenge of maintaining habitat connectivity. Habitat fragmentation from timber harvest and road building reduces habitat size, isolates plant and animal populations, limits their movement, and diminishes ecological processes. Rivers and streams throughout the planning area have lost connections to their floodplains through beaver trapping, water diversion, road construction, timber harvest, and livestock grazing (USDI BLM, 2005, pp. 64–70; ODFW, 2016). The BLM has the opportunity to restore upland and riparian habitat connectivity in the planning area using corridors or linkages between existing protected areas and restoring ecosystems.

Reduce fire risk within the wildland urban interface and to CSNM objects and values.

Need: The lack of fire (from fire suppression) has increased the risk of uncharacteristically severe wildfire that threatens CSNM objects and values. Managing fire risk in an area with a checkerboard ownership pattern is challenging and complex. Challenges in the wildland urban interface (WUI) stem from differences in private landowners' financial capabilities and objectives. Complexity of fuel reduction efforts, particularly prescribed burning and managing wildfires, increases because of the risk of affecting adjacent lands (USDI BLM, 2008). Treating only BLM-administered lands to reduce wildfire risks may require treating a larger area within the decision area to achieve the desired level of risk reduction to both CSNM objects and values and the adjoining private land.

Manage discretionary uses to protect CSNM objects and values.

Need: Discretionary uses in the CSNM, including recreation and visitor services, livestock grazing, and other land use authorizations, are important to the economic opportunities and quality of life of local communities surrounding the CSNM. This RMP provides objectives and management direction to ensure that discretionary uses occur only in a manner consistent with the protection of CSNM objects and values. Since the designation of the CSNM in 2000 and expansion in 2017, controversy and disputes among interested parties have increased. Interests range from supporting a wide variety of uses and activities to minimizing uses and promoting preservation. The checkerboard land ownership pattern within the planning area generates many of the challenges of managing discretionary uses, such as the need to cross public lands to reach intermingled private lands and the need to determine the appropriate amount and location of discretionary uses. Using recreation management as a tool to build a sense of public stewardship and appreciation could aid in protecting CSNM objects and values.

1.5. EXISTING DECISIONS

The following existing decisions, which are valid for continued implementation and are supported by an EIS, would be carried forward in the revised CSNM RMP. The BLM would restate or summarize these decisions to incorporate them into the RMP without additional analysis. These decisions would be common to all alternatives and include the following:

- Pokegama Wild Horse Herd Management Area Plan (Klamath Falls Field Office, USDI BLM, 2002b).
- Vegetation Treatments using Herbicides on BLM lands in Oregon Record of Decision (USDI BLM, 2010).
- Record of Decision for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron (USDI BLM, 2016e).
- Best Management Practices from Appendix C of the Southwestern Oregon ROD/RMP (USDI BLM, 2016c).
- Record of Decision for Addressing Vegetation Treatments Using Herbicides (USDI BLM, 2024b).

The following existing decisions incorporated in the 2008 CSNM RMP would not be carried forward. Refer to Section 2.4, Alternatives Considered but not Analyzed in Further Detail for more information.

- The Northwest Forest Plan (USDA FS & USDI BLM, 1994) as amended, Survey and Manage and Aquatic Conservation Strategy components.

Chapter 2. Alternatives

2.1. INTRODUCTION

This chapter describes the alternatives and the Proposed RMP. The range of alternatives considered in this Proposed RMP/Final EIS builds on the alternatives considered in the Draft RMP/EIS. The BLM is carrying forward the No Action alternative and action alternatives as presented in the Draft RMP/EIS. The BLM developed the Proposed RMP as a variation on Alternative C, the preferred alternative in the Draft RMP/EIS. The BLM developed the Proposed RMP using input from the public, cooperating agencies, consulting Tribes, and BLM staff.

As required by 40 CFR 1502.14(f), the BLM identifies the Proposed RMP as the environmentally preferable alternative as it would provide the best balance of meeting national environmental policy, such as by addressing climate-related effects while protecting, preserving, and enhancing historic, cultural, Tribal, and natural resources, including CSNM objects and values. However, the BLM designed all action alternatives to address these important national environmental policies as they are closely tied to the purpose and need identified for this plan.

Management approaches that meet the purpose and need for the RMP, are technically or economically feasible, and are at an appropriate scale for a long-term management plan are included in the range of action alternatives. Each action alternative describes an overarching approach that would guide the BLM's management actions for the life of the plan (typically 20 years).

For an RMP, there are potentially numerous variations in design features or combinations of different plan components. The BLM designed the range of alternatives in the Draft RMP/EIS to span a full spectrum of alternatives that would respond to the purpose and need for the action. The BLM has developed the Proposed RMP from the alternatives considered in the Draft RMP/EIS and the Proposed RMP represents a management approach that is within the spectrum of the alternatives analyzed in detail in the Draft RMP/EIS.

This chapter also discusses alternatives the BLM considered but did not analyze in detail.

Implementation-level Plans and Administrative Actions

After completion of the RMP, the BLM would work with its partners to develop implementation-level plans and undertake on-the-ground projects to achieve RMP objectives. Under all alternatives, the BLM would also continue to implement administrative actions. Administrative actions are routine transactions and activities that are required to serve the public and to provide optimum management of resources. All actions would be taken only in conformity with the Approved RMP.

Implementation and Effectiveness Monitoring

The BLM developed a monitoring plan for the Proposed RMP (Appendix R, Monitoring Plan for the Proposed RMP). Monitoring is an essential component of an RMP. Monitoring provides information to determine whether the BLM is following the RMP management direction (implementation monitoring) and to verify if the implementation of the RMP is achieving plan-level desired outcomes, or objectives (effectiveness monitoring).

An RMP monitoring plan is also an implementation monitoring strategy designed to collect a portion of the data and information necessary for the BLM to be able to conduct RMP evaluations. The RMP's monitoring plan provides the context to an RMP evaluation to know if the BLM is implementing the RMP as written.

2.2. ALTERNATIVE A – NO ACTION

The No Action alternative (Alternative A) for land use planning, such as this RMP revision, is to continue to implement the management direction as written in the plans, including any previously approved amendments (BLM NEPA Handbook, section 6.6.2). The No Action alternative is to carry out management consistent with applicable presidential proclamations, court rulings, laws, and executive orders. The No Action alternative for this planning process does not meet the purpose and need (USDI BLM, 2022d); however, it serves the following functions:

- Acts as the alternative for analysis of effects that are occurring in the absence of a revised RMP (baseline of effects); and
- Provides the basis for development of action alternatives and demonstrates the consequences of not meeting the need for the action.

Presidential Proclamation

As described in Section 1.1 Background, President Obama's Presidential Proclamation No. 9564 enlarged the boundary of the CSNM and appropriated and withdrew "all federal lands and interests in lands within the enlarged boundary all forms of entry, location, selection, sale, or other disposition under the public land laws from location, entry and patent under the mining laws and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument" (82 FR 6145, January 18, 2017).

Proclamation No. 9564 also states that "The Secretary of the Interior (Secretary) shall manage the area being added to the monument through the Bureau of Land Management as a unit of the National Landscape Conservation System, under the same laws and regulations that apply to the rest of the monument, except that the Secretary may issue a travel management plan that authorizes snowmobile and non-motorized mechanized use off of roads in the area being added by this proclamation, so long as such use is consistent with the care and management of the objects identified above."

Current Management

The BLM-administered lands in the planning area are divided between, and currently managed under, three different RMPs (Table 2-1 and Map 2-1 Current Resource Management Plan Boundaries, in Appendix C).

Table 2-1. Current resource management plans

Resource Management Plan	Decision Area Acres (BLM-administered lands)
Cascade-Siskiyou National Monument RMP (2008)	65,846
Southwestern Oregon RMP (2016)	42,320
Redding RMP (1993)	5,340
TOTAL	**113,506**

Cascade-Siskiyou National Monument RMP

Currently, 65,846 acres of BLM-administered lands are managed by the BLM under the Cascade-Siskiyou National Monument Resource Management Plan (USDI BLM, 2008). These lands are within the original boundary of the CSNM created on June 9, 2000, through Presidential Proclamation No. 7318. Management decisions made in this RMP included:

- Land tenure zoning classifications.
- Designations of vegetation management areas, including:
    - Diversity Emphasis Area
    - Old-growth Emphasis Area.
- Visual resource management classifications.
- Programmatic and site-specific decisions related to livestock grazing.
- Decisions regarding transportation and access (except those mandated by Proclamation No. 7318).
- Wildland fire management.
- Recreation management.
- Management of linear rights-of-way and communication sites.

Specific management decisions and objectives for lands in the original CSNM RMP decision area are presented in Chapter 2 of the RMP (USDI BLM, 2008).

In 2013, the BLM amended the CSNM RMP, revoking the land tenure adjustment decision LAND-1 on page 103 of the CSNM RMP and revising LAND-5 on page 103 to state:

LAND-5: Lands may be acquired by exchange where the public land involved in the exchange is located outside the CSNM or where the public land involved is located within the boundaries of the CSNM, as long as in either case the exchange “furthers the protective purposes of the monument” (USDI BLM, 2013).

Southwestern Oregon RMP

Currently, 42,320 acres of BLM-administered lands are managed under the Southwestern Oregon (SWO) RMP (USDI BLM, 2016c). These lands became part of the CSNM on January 12, 2017, through Presidential Proclamation No. 9564. Of the 42,320 acres, 39,852 acres (94 percent) of those lands are O&C lands. The remainder of lands are Public Domain lands and are managed by the BLM under the 2016 SWO RMP to the extent possible consistent with Proclamation No. 9564 (refer to USDI BLM, 2023a, Chapter 3). The SWO RMP included the following decisions:

- Objectives for the management of BLM-administered lands and resources.
- Land use allocations relative to future uses for the purposes of achieving the various objectives, including:
    - Congressionally Reserved Lands and National Conservation Lands
    - District-Designated Reserves
    - Eastside Management Area
    - Harvest Land Base
    - Late-Successional Reserve
    - Riparian Reserve
- Management direction that identifies where future actions may or may not be allowed and what restrictions or requirements may be placed on those future actions to achieve the objectives set for the BLM-administered lands and resources.

In addition, the SWO RMP includes appendices addressing RMP implementation, a monitoring plan, Best Management Practices, land tenure information and land withdrawals, stipulations on leasable fluid mineral exploration and development activity, designated Areas of Critical Environmental Concern, designated Recreation Management Areas, public motorized access guidelines, and available livestock grazing allotments.

Redding RMP

The approximately 5,340 acres of BLM-administered lands (Public Domain lands) in the planning area in Siskiyou County, California, are currently managed under the 1993 Redding RMP (USDI BLM, 1993). The Redding RMP addressed management concerns regarding land tenure adjustments, recreation management, access, and forest management. Relevant decisions for the lands in the planning area included:

- Determination that lands in the planning area are part of the Klamath Management Area (USDI BLM, 1993, p. 31);
- Management objectives for Horseshoe Ranch, an area managed in cooperation with the California Department of Fish and Wildlife and the BLM Oregon/Washington, Medford District, Ashland Field Office (USDI BLM 1993, 33, 34); and
- Management objectives for Jenny Creek, designated as a Research Natural Area/Area of Critical Environmental Concern (USDI BLM, 1993, pp. 34, 35).

Non-Discretionary Designations

In addition to the existing RMPs, there are several non-discretionary designations established by Congress that apply to lands in the planning area and are not reflected in the current RMPs.

Soda Mountain Wilderness

In March 2009, Congress designated the now 24,707-acre Soda Mountain Wilderness in the original boundary of the CSNM (Public Law 111-11, Section 1405). The BLM manages this area in accordance with the Wilderness Act of 1964 (as amended) and BLM Manual 6340, Management of Designated Wilderness Areas.

In September 2011, the BLM published the Soda Mountain Wilderness Stewardship Plan and Environmental Assessment (DOI-BLM-ORWA-M040-2011-0001-EA). The Final SMW Stewardship Plan was completed in April 2012.

Voluntary Grazing Lease Donation Program

In 2009, Congress also authorized the Secretary to accept any grazing lease that is donated by a lessee and to terminate any grazing lease acquired (Public Law 111-11, Section 1402(a)(1)(A-B). Congress directed that the Secretary also not issue any new grazing leases on those lands and ensure a permanent end to livestock grazing on those lands (Public Law 111-11, Section 1402(a)(1)(C)). Additional provisions were described related to donations of portions of grazing leases and modifications to authorized levels of grazing, as well as identifying the permanent end to livestock grazing in the Agate, Emigrant Creek, and Siskiyou allotments in and near the planning area (Public Law 111-11, Section 1402(a)(2-3) and (b)). Refer to Appendix Q, Livestock Grazing Compatibility and Voluntary Permit Relinquishment Processes, for more information.

Wild and Scenic Rivers

In March 2019, Congress designated 17.6 miles of Jenny Creek and 1.1 miles of Spring Creek as scenic rivers under the Wild and Scenic Rivers Act (WSRA) (Public Law 116-9). Both streams are primarily in the CSNM but also cross into the decision area for the SWO RMP (refer to Map 2-2 Congressionally Designated Management Areas).

In addition to the three Outstandingly Remarkable Values (ORVs) identified by the BLM during its eligibility assessment (resident fish, wildlife, and historic), the Congressional Record provided a description of Jenny Creek as having recreational, scenic, and ecological/biological diversity ORVs. Spring Creek was described as having scenery, wildlife, and fish ORVs in the Congressional Record.

The BLM has not completed a comprehensive river management plan for these rivers which, would make final ORV determinations and define the goals and desired conditions for protecting river values. In the interim, the BLM follows the requirements of the WSRA and BLM policy and direction for designated Wild and Scenic River (WSR) management.

The WSRA and BLM Manual 6400, Wild and Scenic Rivers for Identification, Evaluation, Planning and Management require that the BLM, subject to valid existing rights, protect and enhance the free-flowing condition, water quality, and ORVs of each designated WSR.

Interim Management Guidance

The October 31, 2022, Memorandum (memo) "Interim Management of the Cascade-Siskiyou National Monument" established the intent of the overall leaders of the BLM for the CSNM RMP revision planning effort. The memo also provides interim guidance for managing the CSNM while the agency develops a cohesive long-term RMP.

2.3. Proposed RMP and Other Action Alternatives

This section summarizes the Proposed RMP (Alternative E), as well as the other three action alternatives (Alternatives B, C, and D) that are analyzed in Chapter 3. Each alternative presents various ways activities could be managed in the CSNM to meet the purpose and need. Each alternative has a different emphasis, primarily defined in terms of the amount of management intervention and restrictions on allowable uses to meet the purpose and need (Section 1.4).

Action Alternative Descriptions

Alternative B – Most Active Management

Protecting and restoring ecosystems, landscape-level resilience, and intact habitats and undisturbed corridors.

Alternative B emphasizes flexibility in planning-level direction and promotes the most active management for the purposes of protection and restoration of CSNM objects and values using a variety of management tools. The BLM would designate Areas of Critical Environmental Concern (ACEC) to protect relevant and important values (MS-1613, Areas of Critical Environmental Concern) and would designate Research Natural Areas (RNA) to provide opportunities for scientific research and education while protecting the natural characteristics for which the area is designated.

Reducing fire risk in the wildland urban interface (WUI) and to CSNM Objects and Values.

Alternative B promotes the most active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the WUI. The BLM would establish the WUI, or Fuels Emphasis Area, as one-quarter mile from private property boundaries where structures are present and one-quarter mile around an identified community at risk (**Map 2-35**, Wildland Urban Interface/Fuels Emphasis Area – Alternative B) The BLM would use all management tools.

Managing discretionary uses to protect the CSNM objects and values.

The BLM would maximize the potential for an array of discretionary actions that are compatible with the protection of CSNM objects and values. Management of recreation and visitor services would be accommodated to the fullest extent possible, while protecting CSNM objects and values, through the designation of Special Recreation Management Areas (SRMAs) and Extensive Recreation Management Areas (ERMAs).

The BLM would manage the transportation system to accommodate public use, where feasible, while ensuring safety and providing opportunity for future road closures and decommissioning to protect and restore CSNM objects and values. The BLM would designate all lands as a right-of-way avoidance area, except for the Soda Mountain Wilderness, which would be a right-of-way

exclusion area. As such, the BLM would provide needed rights-of-way permits, leases, and easements over BLM-administered lands only when no feasible alternative route is available, except in the Soda Mountain Wilderness where they would be provided only where required by law or in accordance with a valid existing right.

The BLM would continue to make active grazing allotment lands available for livestock grazing so long as they're compatible with protection of CSNM objects and values.

Alternative C – Moderate Active Management (Draft RMP/EIS Preferred Alternative)

Protecting and restoring ecosystems, landscape-level resilience, and intact habitats and undisturbed corridors.

Alternative C emphasizes flexibility in planning-level direction but promotes a moderate level of active management for protection and restoration of CSNM objects and values and sets some limitations on management actions and tools available. The BLM would designate two ACECs to protect relevant and important values. The BLM also proposes to seasonally restrict public motorized use of natural surfaced roads (December to May) (Map 2-38, Seasonally restricted roads in the CSNM – Alternatives C and E (Proposed RMP) in Appendix C).

Reducing fire risk in the wildland urban interface (WUI) and to CSNM objects and values.

Compared to Alternative B, Alternative C promotes a more moderate approach to active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the WUI. The BLM would establish the WUI, or Fuels Emphasis Area, as one-quarter mile around an identified community at risk (**Map 2-36**, Wildland Urban Interface/Fuels Emphasis Area – Alternative C). The BLM would use all management tools available but would set limits on allowable activities within portions of the WUI.

Managing discretionary uses to protect the CSNM objects and values.

Recreation and visitor services would be accommodated to a lesser extent than under Alternative B, while protecting CSNM objects and values. The BLM would reduce certain types of recreation activities (e.g., cross-country snowmobile use) under this alternative, which would result in one less ERMA designated, and another ERMA reduced in size compared to Alternative B. The BLM would manage the transportation system in the same manner as Alternative B; to accommodate public use, where feasible, while ensuring safety and providing opportunity for future road closures and decommissioning to protect and restore CSNM objects and values. The BLM would designate all lands as a right-of-way avoidance area, except for the Soda Mountain Wilderness and lands managed as wilderness characteristics, which would be right-of-way exclusion areas.

Alternative D – Least Active Management

Protecting and restoring ecosystems, landscape-level resilience, and intact habitats and undisturbed corridors.

Alternative D promotes the least active management for protection and restoration of CSNM objects and values. The BLM would rely primarily on natural ecosystem processes that would allow plant community dynamics to unfold without active intervention. Exceptions include the management of young conifer stands (plantations) that are a product of past timber harvest and

thinning around legacy trees and along wildfire evacuation routes. The BLM would not designate any ACECs or RNAs.

Reducing Fire Risk in the Wildland Urban Interface and to CSNM objects and values.

Alternative D promotes the least intensive approach to active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the WUI. Alternative D establishes the WUI, or Fuels Emphasis Area, as 120 feet from private property boundaries where structures are present (**Map 2-37**, Wildland Urban Interface/Fuels Emphasis Area – Alternative D). The BLM would limit management tools available for use, such as prohibiting machine piling, mastication, targeted grazing, or herbicide use.

Managing Discretionary Uses to protect the CSNM objects and values.

The BLM would provide the least accommodation for discretionary uses. Recreation and visitor services management would focus on targeted areas and would be minimally accommodated while still meeting legal requirements for visitor health and safety and mitigating resource user conflicts. For example, the designation of SRMAs would remain the same as in Alternatives B and C; however, only ERMAs associated with existing recreation developments, such as trails, and trailheads, would be designated to provide high-quality recreation opportunities at those sites.

The BLM would manage the transportation system to accommodate existing public use, where feasible, while ensuring safety and providing opportunity for future road closures and decommissioning to protect and restore CSNM objects and values. The BLM would allocate all lands in the CSNM as a right-of-way exclusion area. As such, no new land use authorizations would be granted, except when mandated by law, including as necessary for the administration of valid existing rights, and providing reasonable legal access.

The BLM would allocate all lands as unavailable for livestock grazing and all existing grazing leases would be phased out (not renewed).

Alternative E - Proposed RMP

The Proposed RMP is a variation on Alternative C, which the BLM identified in the Draft RMP/EIS as the preferred alternative. The Proposed RMP also draws upon components of the other alternatives and is within the range of what was analyzed in those alternatives. The following describes some of the main components of the Proposed RMP. To get a detailed picture of the Proposed RMP, refer to Tables 2-2, 2-3, and 2-4 and Appendix E, Objectives and Management Direction.

Congressionally Designated Management Area

The BLM would manage Congressionally designated areas, which comprise the Congressionally Designated Management Area (CDMA), consistent with applicable laws and BLM policy. Land use allocations establish allowable uses and restrictions consistent with mandated direction. Refer to Table 2-4 for a complete list of land use allocation decisions for the Proposed RMP. For example, CDMA – Wilderness is also allocated as Closed to public motorized access (OHV area allocation), as a right-of-way exclusion area, and as a VRM Class I area.

The BLM would manage vegetation in CDMA-Wilderness as allowed by the Wilderness Act. Refer to Appendix E, Section 2.A.1. The BLM would manage the CDMA-Wild and Scenic Rivers and CDMA-National Scenic and Historic Trail Management Corridors the same as under Alternative C, with added clarification that invasive plant management activities would be allowed within 250-feet of the Pacific Crest Trail.

Administratively Designated Management Area

The BLM would manage administratively designated areas, which comprise the Administratively Designated Management Area (ADMA), consistent with applicable laws and BLM policy. The BLM would continue to manage the Pokegama Herd Management Area (ADMA-HMA) as described in Alternative A (No Action), which carries forward direction from the SWO RMP (USDI BLM, 2016b).

The BLM would designate lands to be managed for their wilderness characteristics (ADMA-Lands to be Managed for Wilderness Characteristics) similar to Alternatives C and D but with minor modifications to the management direction. For example, the BLM clarifies that the area would be managed as a right-of-way exclusion area (same as Alternatives C and D), which would restrict development of new facilities, including structures and roads, except when mandated by law, necessary for the administration of valid existing rights, or to allow reasonable access to non-federal lands (Appendix E, Section 2.B.2).

The BLM would not designate any areas of critical environmental concern (ADMA-ACEC) or research natural areas (ADMA-RNA) (same as Alternative D). The relevant and important values of ACECs and scientific research values are also CSNM objects and values identified in the Proclamations, and as such would be protected consistent with the purpose and need for this plan. Refer to the analysis in Section 3.3, Areas of Critical Environmental Concern and Research Natural Areas, Appendix G, ACEC and RNA Report, and Appendix S, Response to Comments for more information.

The BLM would designate three Special Recreation Management Areas (ADMA-SRMA), as proposed under all action alternatives. Additional details regarding the approach for recreation and visitor services, including the designation of Extensive Recreation Management Areas (ERMAs) is described below under *Managing Discretionary Uses to Protect CSNM Objects and Values*.

Protecting and restoring ecosystems, landscape-level resilience, and intact habitats and undisturbed corridors.

The BLM would manage the Ecosystem Management Area (all lands outside CDMA and ADMA) to protect and restore the monument's diverse ecosystems, landscape-level resilience, and protect intact habitats and undisturbed corridors, and facilitate active management to restore degraded habitats through ecological restoration activities. Ecological restoration activities would include, but are not limited to, restoring native species to disturbed sites through seeding and planting; implementing ecologically based integrated pest management techniques to prevent invasive plant spread; conducting vegetation management activities to promote growing space for pines, hardwoods, a diverse understory, and the development of structural heterogeneity; and restoring degraded channels. Refer to Appendix E, Section 2.C. for additional management direction for the EMA.

The BLM would protect intact habitats by prohibiting activities in closed old refugia areas and restricting activities in late-successional forest habitat that provides nesting and roosting habitat for the northern spotted owl. The BLM would provide restrictions to ensure ecological restoration activities protect late-successional forest characteristics, such as retaining legacy trees, and appropriate levels of snags and down woody material. The BLM would consider restoration in areas such as stands with dense, continuous canopy, ladder, and surface fuels; in young stands (<60 years old); in areas that would support development of late-successional forest; and in areas to enhance and restore habitat that would allow for the presence of beaver, where their associated dams would improve fish and aquatic habitat (refer to Appendix E, Section 2.C for additional information).

The BLM would seasonally restrict use of natural surfaced roads (generally December 1 to May 1) (Map 2-38 Seasonally restricted roads in the CSNM – Alternatives C and E (Proposed RMP) in Appendix C) to avoid turbid runoff to aquatic habitats and minimize impacts to road surfaces. Refer to Appendix E, Section 4.N for more information.

Reducing Fire Risk in the Wildland Urban Interface and to CSNM objects and values

The BLM would reduce fire risk to CSNM objects and values and to people and property in the wildland urban interface (WUI) on lands within one-quarter mile of a Community at Risk and within 120 feet of private property boundaries where structures are present, excluding lands in CDMA-Wilderness. Management activities within the WUI would be modified where necessary to comply with other management direction (for management areas and resources).

Managing Discretionary Uses to protect CSNM objects and values.

The BLM would ensure that discretionary uses, such as livestock grazing, recreation and visitor services, travel and transportation management, lands and realty actions, and quarry use occur in a manner compatible with protecting CSNM objects and values. The BLM would continue to allocate lands currently available for livestock grazing and would integrate adaptive, flexible, and outcome-based management techniques into leases to protect CSNM objects and values (same as Alternatives A, B, and C). The BLM would carry forward the existing process from the 2008 CSNM RMP (Alternative A) for determining if livestock grazing is compatible with "protecting the objects of biological interest" and evaluating the allotments prior to lease renewal to ensure that livestock grazing is consistent with current laws, regulations, and Proclamations 7318 and 9564. Refer to Appendix E, Section 4.G and Appendix Q, Livestock Grazing Compatibility and Voluntary Permit Relinquishment Processes for more information.

The BLM would designate recreation management areas (refer to Table 2-4 and Map 2-41 Recreation Management Areas – Alternative E (Proposed RMP) in Appendix C to provide and manage for a diversity of quality recreational opportunities that do not conflict with the protection of CSNM objects and values. The BLM would continue current management direction from the 2008 CSNM RMP and Alternative A (No Action) to limit group sizes both within CDMA-Wilderness and the CSNM to reduce the potential for impacts to wilderness character and to CSNM objects and values. Refer to Appendix E, Section 4.I for more information.

The BLM would allocate lands as limited to existing roads and trails and identifies additional seasonal restrictions in some areas and closes other areas to public motorized access (refer to Table 2-4). The BLM would maintain existing roads to BLM maintenance standards and

decommission roads with no future resource management need.[4] Refer to Appendix E, Section 4.N for more information.

The BLM would allocate most lands as Land Tenure Zone 1 (not available for exchange). This includes all Congressionally designated lands (CDMA), most administratively designated areas (ADMA), and lands that have been acquired with Land and Water Conservation Funds. Any other lands may only be exchanged when the exchange furthers the purposes of the CSNM. The BLM would allocate CDMA-Wilderness and ADMA-Lands to be Managed for Wilderness Characteristics as right-of-way (ROW) exclusion areas and allocate the remainder of lands in the CSNM as ROW avoidance areas.

Lastly, the BLM would continue to make available eight rock quarries for administrative use. This includes expansion and development if determined compatible with the protection of CSNM objects and values and requires that the remaining eight rock quarries be reclaimed[5]. Refer to Appendix E, Section 4.H for more information.

Key Features Common to All Action Alternatives, including the Proposed RMP

This section contains a summary of those key features that are common to all action alternatives, including the Proposed RMP (Alternative E).

The BLM uses management areas to present complementary objectives and management direction for the various designations, resources or groups of resources, and land use allocations and are unique to a defined geographic area (maps that are new or changed since the Draft RMP/EIS was published can be found in Appendix C, maps that are unchanged are hyperlinked to their location in the BLM National NEPA Register site for the Draft RMP/EIS Maps). The following three types of management areas are distinct and generally do not overlap with each other[6]. In some cases, however, lands within one management area may overlap with each other. For example, within the CDMA, CDMA-Wilderness and CDMA-Wild and Scenic Rivers may overlap. However, no lands in the CDMA or ADMA overlap with lands in the Ecosystem Management Area (EMA).

- **Congressionally Designated Management Area** comprises areas designated by Congress, including Wilderness Areas, designated and eligible Wild and Scenic River corridors, and National Scenic and Historic Trail corridors (refer to Table 2-2**,** Map 2-2 Congressionally Designated Management Areas – Alternatives A through D, and Map 2-39 Congressionally Designated Management Areas – Alternative E (Proposed RMP) in Appendix C).
- **Administratively Designated Management Area** comprises areas designated by the BLM through a land use plan as lands to manage for their wilderness characteristics, areas of critical environmental concern, research natural areas, special recreation

[4] The BLM would close roads only where consistent with valid existing rights and is not necessary for providing reasonable access to non-federal lands.

[5] Quarry reclamation may include recontouring, adding growth medium, planting native vegetation, or using the site for dispersed camping, parking areas, and fire safety zones.

[6] One exception is that some CDMA-Eligible Wild and Scenic River corridors overlap with ADMA-SRMAs and ADMA-ACEC/RNAs. Where overlap occurs with a SRMA, refer to Appendix M, RMA Frameworks for more information on proposed management guidance for that area.

management areas[7], and herd management areas (refer to Table 2-2, Map 2-2, Maps 2-3 through 2-6 Administratively Designated Management Areas – Alternatives A through D, and Map 2-40 Administratively Designated Management Areas – Alternative E (Proposed RMP) in Appendix C).

- **Ecosystem Management Area** includes all remaining lands in the decision area not in the above management areas and comprises three sub-management areas that are delineated based on plant community type. EMA-Riparian Habitat includes lands within 170 feet of a stream or waterbody (refer to Appendix E); EMA-Old-Growth Emphasis includes all conifer forest plant communities; and EMA-Diversity Emphasis area includes nonforest plant community types, such as grasslands, shrublands, and oak communities (refer to Table 2-3, Maps 2-7 through 2-10 Ecosystem Management Areas – Alternatives A through D, and Map 2-42 Ecosystem Management Area – Alternative E (Proposed RMP) in Appendix C).

Objectives and management direction are also presented by resource program and would apply across the decision area, including within the management areas. For the following resources or resource uses, specific management direction has been already provided for through Presidential Proclamation Nos. 7318 and 9564, previous decisions supported by other NEPA documents, or other laws and regulations. Since the proposed management of these areas do not differ by alternative, they are not discussed further in this chapter. Refer to Appendix E for a complete list of objectives and management direction for these resources and resource uses; also refer to Appendix F, Issues Not Analyzed in Further Detail.

Management of the following management areas and resource programs would be the same across all action alternatives, including the Proposed RMP.

Management Areas

- Congressionally Designated Management Area - Wilderness
- Congressionally Designated Management Area - Designated and Eligible Wild and Scenic Rivers[8]
- Congressionally Designated Management Area – Applegate Trail, California Historical National Trail
- Ecosystem Management Area – Riparian Habitat

Resource Programs

- Air Quality
- Collections / Special Forest Products

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[7] Extensive Recreation Management Areas (ERMAs) are designed to be managed commensurate and considered in context with the management of other resources and resource uses; therefore, the BLM did not include this designation in a management area, but rather it would be considered as an overlay to the management areas and managed in accordance with both the direction provided in the RMA Frameworks (Appendix M) and the management direction for the underlying management area and any applicable resources (Appendix E).

[8] Note that objectives and management direction would apply within a one-quarter mile from the ordinary high-water mark on either side of the river interim management corridor until final boundaries have been determined, and surveyed and marked were necessary. Once final boundaries for designated rivers have been published in the Federal Register, objectives and direction would apply within those boundaries.

- Cultural Resources
- Geology and Paleontology
- Invasive Plants (refer also to Appendix O)
- Lands and Realty – Land Tenure
- Livestock Grazing – Framework for Making Future Decisions Regarding Livestock Grazing and Complying with Presidential Proclamations (refer also to Appendix Q)
- Minerals
- Special Status Plants, Lichen, and Fungi
- Terrestrial Wildlife
- Travel and Transportation Management – Travel Management Areas[9]
- Tribal Uses and Values
- Visual Resource Management

Comparison of the Key Features that Differ by Action Alternative

This section describes how the alternatives would vary in proposed management, including changes in administrative designations, land use allocations, and management direction. Table 2-2 Designations by Alternative, provides a summary of all existing and proposed designations, including Congressionally designated and administratively designated, and how they would vary by alternative.

Table 2-3, Maps 2-8 to 2-10 Ecosystem Management Areas – Alternatives B through D, and Map 2-42 Ecosystem Management Areas – Alternative E (Proposed RMP) in Appendix C, present the Ecosystem Management Areas (EMAs) by alternative. The EMA varies slightly in response to changes in administrative designations that occur (refer to Table 2-2).

For Alternative A, the No Action alternative, the acres represent where a similar management area or land use allocation currently exists but are not equivalent to the EMA under the action alternatives. For example, the 2008 CSNM RMP divided the lands in the original CSNM boundary into two plant community emphasis areas: Diversity Emphasis Area and Old-Growth Emphasis Area (USDI BLM, 2008, p. 24). These same plant communities were used to develop the EMAs for the entire decision area. In comparison, the 2016 SWO RMP divided the lands in the expansion area by land use allocation, such as Harvest Land Base, Late-Successional Reserve, and Riparian Reserve. Refer to Section 2.2 for more details on the No Action Alternative.

[9] Areas are subject to change based on data collection.

Table 2-2. Designations by alternative

Designation	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Congressionally Designated					
Wilderness					
Soda Mountain Wilderness	~ 24,700 ac.	~ 24,700 ac.	~ 24,700 ac.	~ 24,700 ac.	~24,700 ac.
Wild and Scenic Rivers					
Wild & Scenic River – Designated	2, 084 ac.	2, 084 ac.	2, 084 ac.	2, 084 ac.	2,084 ac.
Wild & Scenic River – Eligible	0 ac.	11,802 ac.	11,802 ac.	11,802 ac.	10,561 ac.
National Scenic and Historic Trails					
Pacific Crest National Scenic Trail (PCT) Corridor	8,515 ac.[10]	¼ mi.	¼ mi.	¼ mi.[11]	¼ mi.
Applegate Trail, California National Historic Trail Corridor	500 ft.[12]	500 ft.	500 ft.	500 ft.[13]	500 ft.
Administratively Designated					
Herd Management Area					
Pokegama Herd Management Area	3,926 ac.[14]	3,926 ac.	3,926 ac.	3,926 ac.	3,926 ac.

[10] Acreage encompasses the trail footprint within the decision area; there is currently no designated corridor.

[11] The one-quarter mile is the centerline from the trail. Under Alternatives B, C, D, and E (Proposed RMP) the corridor is designated as a National Trail Management Corridor.

[12] Under the 2008 CSNM RMP, there was a 500-foot-wide corridor for the Applegate Trail, but not a designated National Trail Management Corridor.

[13] Under Alternatives B, C, D, and E (Proposed RMP) the corridor is designated as a National Trail Management Corridor.

[14] Acreage reflects the area of the Pokegama HMA within the CSNM RMP decision area; the entire HMA is 85,855 acres.

Designation	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Lands Managed for Wilderness Characteristics					
Lands Managed for Their Wilderness Characteristics	0 ac. (0 units)	0 ac. (0 units)	8,548 ac. (8 units)	8,548 ac. (8 units)	8,548 ac. (8 units)
Areas of Critical Environmental Concern					
Cottonwood Glades ACEC	0 ac.	115 ac.	115 ac.	0 ac.	0 ac.
Mariposa Lily ACEC	0 ac. [15]	253 ac.	253 ac.	0 ac.	0 ac.
Moon Prairie ACEC	26 ac.	26 ac.	0 ac.	0 ac.	0 ac.
Tunnel Creek ACEC	79 ac.	79 ac.	0 ac.	0 ac.	0 ac.
Jenny Creek RNA ACEC	269 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Lost Lake RNA ACEC	385 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Old Baldy RNA ACEC	470 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Oregon Gulch RNA ACEC	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Scotch Creek RNA ACEC	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Research Natural Areas					
Jenny Creek RNA	0 ac.	269 ac.	0 ac.	0 ac.	0 ac.
Lost Lake RNA	0 ac.	385 ac.	0 ac.	0 ac.	0 ac.
Old Baldy RNA	0 ac.	470 ac.	0 ac.	0 ac.	0 ac.
Oregon Gulch RNA	1,047 ac.	1,047 ac.	0 ac.	0 ac.	0 ac.
Scotch Creek RNA	1,797 ac.	1,797 ac.	0 ac.	0 ac.	0 ac.

[15] The Mariposa Lily Botanical Area is not currently designated as an area of critical environmental concern but is recognized as a special area. The area is recognized and protected for its special ecological characteristics in the 2008 CSNM RMP (USDI BLM, 2008, pp. 14, 99, 104).

Designation	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Special Recreation Management Areas					
Grizzly Peak Trail	2,912 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Hyatt Lake Campground/Recreation Area	52 ac.[16]	394 ac.	394 ac.	394 ac.	394 ac.
Pacific Crest Trail 1 and 2	6,070 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Pacific Crest Trail Corridor	659 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Surveyor Mountain Campground	28 ac.	28 ac.	28 ac.	28 ac.	28 ac.
Table Mountain Snow Play Area	9 ac.	9 ac.	9 ac.	9 ac.	9 ac.
Extensive Recreation Management Areas					
Buck Prairie	9,369 ac.	10,054 ac.	5,525 ac.	0 ac.	5,401 ac.
Buck Rock	0 ac.	266 ac.	266 ac.	0 ac.	266 ac.
Dragon Spine/ Vulture Rock	0 ac.	316 ac.	400 ac.	0 ac.	400 ac.
Green Springs Mountain Trail	0 ac.	23 ac.	23 ac.	23 ac.	23 ac.
Grizzly Peak Trail	0 ac.	90 ac.	90 ac.	90 ac.	90 ac.
Hobart Bluff Trail	0 ac.	8 ac.	8 ac.	8 ac.	8 ac.
Pilot Rock Trail	0 ac.	26 ac.	26 ac.	26 ac.	26 ac.
Shale City	0 ac.	76 ac.	76 ac.	0 ac.	76 ac.
Surveyor Mountain	11,104 ac.	11,133 ac.	0 ac.	0 ac.	0 ac.
Watchable Wildlife Site	0 ac.	2 ac.	2 ac.	2 ac.	2 ac.

[16] The SWO RMP designated the 52-acre Hyatt Lake Campground SRMA, which includes the portion of the Hyatt Lake campground, in the expansion area. The remainder of the Hyatt Lake campground is in the original boundary of the monument as part of the Hyatt Lake Recreation Area (USDI BLM, 2008, p. 97).

Table 2-3. Ecosystem Management Area acres by alternative

Management Area / Sub-Management Area	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Ecosystem Management Area (EMA)	67,841	67,571	61,549	61,823	62,827
EMA- Riparian Habitat	11,083[17]	10,188	8,811	8,882	9,241
EMA - Old-Growth Emphasis	47,936[18]	44,778	41,422	41,436	42,012
EMA -Diversity Emphasis[19]	8,822	12,606	11,316	11,505	11,574

Table 2-4, Land Use Allocations by Alternative, provides a summary of the existing and proposed land use allocations, which describe whether specific uses are allowed, restricted, or prohibited. Land use allocations by alternative are displayed in the following maps. The maps for Alternatives A through D that did not change are hyperlinked to their location in the BLM National NEPA Register site for the Draft RMP/EIS Maps. Most maps for Alternatives A through D that did change since publication of the Draft RMP/EIS, new maps for Alternative E (Proposed RMP), and other new maps can be found in Appendix C:

- Maps 2-11 through 2-14 Wildfire Response – Alternatives A through D, and Map 2-43 Wildfire Response – Alternative E (Proposed RMP)
- Map 2-15 Livestock Grazing – Alternatives A, B, and C; Map 2-16 Livestock Grazing Alternative D; and Map 2-44 Livestock Grazing – Alternative E (Proposed RMP) in Appendix C;
- Maps 2-17 through 2-20 Land Tenure – Alternatives A through D, and Map 2-45 Land Tenure – Alternative E (Proposed RMP) in Appendix C
- Maps 2-21 and 2-22 Land Use Authorizations – Alternatives A, B, and C; and Alternative D; and Map 2-46 Land Use Authorizations – Alternative E (Proposed RMP) in Appendix C
- Maps 2-23 through 2-26 Off-Highway Vehicle Designations – Alternatives A through D, and Map 2-47 Off-Highway Vehicle Designations – Alternative E (Proposed RMP) in Appendix C
- Maps 2-27 through 2-29 Rock Quarries – Alternatives A and B, Alternative C, and Alternative D; and Map 2-48 Rock Quarries – Alternative E (Proposed RMP) in Appendix C

[17] Acreage includes lands designated as Riparian Reserve under the 2008 CSNM RMP and the 2016 SWO RMP.

[18] Acreage includes lands designated as Old-Growth Emphasis Area (2008 CSNM RMP) and Harvest Land Base and Late-Successional Reserve (2016 SWO RMP).

[19] Acreage includes lands designated as Diversity Emphasis Area (2008 CSNM RMP) and District Designated Reserve – Timber Production Capability Classification (2016 SWO RMP).

- Map 2-30 Visual Resource Management – Alternative A; and Maps 2-31 through 2-33 Visual Resource Management – Alternatives B through D and Map 2-49 Visual Resource Management (Proposed RMP) in Appendix C
- Maps 2-34 to 2-37 Wildland Urban Interface / Fuels Emphasis Area – Alternatives A through D, and Map 2-50 Wildland Urban Interface / Fuels Emphasis Area – Alternative E (Proposed RMP) in Appendix C

Appendix E provides a detailed list of objectives and management direction for the various management areas and resource programs by alternative.

Table 2-4. Land use allocations by alternative

Land Use Allocation	Alternative A - No Action	Alternative B	Alternative C	Alternative D	Alternative E - Proposed RMP
Wildfire Response – Multiple Objectives	42,320 ac.	113,506 ac.	102,562 ac.	0 ac.	102,134 ac.
Wildfire Response – Suppression	71,186 ac.	0 ac.	10,944 ac.	113,506 ac.	11,371 ac.
Timber Harvest – Unavailable for sustained-yield timber harvest	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.
Timber Harvest – Available for sustained-yield timber harvest	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Timber Harvest – Available for special products harvest	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Livestock Grazing – Available[20]	27,820 ac.	27,820 ac.	27,820 ac.	0 ac.	27,820 ac.
Livestock Grazing – Unavailable	85,686 ac.	85,686 ac.	85,686 ac.	113,506 ac.	85,686 ac.
Land Tenure– Available for disposal via sale	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Land Tenure (Zone 2) – Available for exchange	76,993 ac.	58,987 ac.	55,777 ac.	0 ac.	56,783 ac.
Land Tenure (Zone 1) – Identified for retention	36,523 ac.	54,529 ac.	57,737 ac.	113,506 ac.	56,735 ac.
Land Use Authorizations – Rights-of-Way Avoidance Area	88,799 ac.	88,799 ac.	80,258 ac.	0 ac.	80,258 ac.
Land Use Authorizations – Rights-of-Way Exclusion Area	24,700 ac.	24,700 ac.	33,248 ac.	113,506 ac.	33,248 ac.
Public Motorized Access[21] **– Closed**	32,043 ac.	27,819 ac.	35,516 ac.	33,792 ac.	35,256 ac.

[20] For lands that continue to be available for livestock grazing and where allotments would be retained, the voluntary relinquishment process would apply to those lands (refer to Appendix Q).

[21] Referred to as Off-Highway Vehicle (OHV) area allocation in the Draft RMP/EIS.

Land Use Allocation	Alternative A - No Action	Alternative B	Alternative C	Alternative D	Alternative E - Proposed RMP
Public Motorized Access – Limited to Existing[22] – Seasonally Restricted	72,094 ac.	10,342 ac.	5,801 ac.	0 ac.	5,887 ac.
Public Motorized Access – Limited to Existing[22]	9,368 ac.	75,346 ac.	72,190 ac.	79,715 ac.	72,365 ac.
Public Motorized Access – Open	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Cross-Country Snowmobile Use Allowed	0 ac.	11,133 ac.	0 ac.	0 ac.	0 ac.
Mineral Leasing – Closed	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.
Mineral Leasing – Open	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Locatable Minerals – Withdrawn	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.
Locatable Minerals – Not Withdrawn	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Mineral Materials – Closed to public sales	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.	113,506 ac.
Mineral Materials – Open to public sales	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Rock Quarries –Open to Administrative Use	54 ac. (16 sites)	54 ac. (16 sites)	26 ac. (8 sites)	0 ac. (0 sites)	26 ac. (8 sites)
Rock Quarries –Closed to Administrative Use	0 ac. (0 sites)	0 ac. (0 sites)	28 ac. (8 sites)	54 ac. (16 sites)	28 ac. (8 sites)
Visual Resource Management – Class I	24,700 ac.	26,231 ac.	26,231 ac.	26,231 ac.	26,784 ac.
Visual Resource Management – Class II	53,606 ac.	82,780 ac.	83,439 ac.	82,717 ac.	81,459 ac.
Visual Resource Management – Class III	14,081 ac.	2,771 ac.	2,113 ac.	2,836 ac.	3,536 ac.
Visual Resource Management – Class IV	21,112 ac.	1,725 ac.	1,725 ac.	1,725 ac.	1,729 ac.

[22] Limited to Existing refers to routes shown on Map 3-4 Existing Travel and Transportation Network.

2.4. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Apply the Northwest Forest Plan, specifically the Survey and Manage measures and Aquatic Conservation Strategy, to all action alternatives.

Implementation of the Northwest Forest Plan (NWFP) (USDA FS and USDI BLM, 1994) was not analyzed in detail for the action alternatives, including the Proposed RMP (Alternatives B-E). The goal of the Northwest Forest Plan was founded on a U.S. Forest Service organic statute and planning regulation, which did not and does not apply to the BLM and is not a part of the purpose of this RMP revision. However, the BLM did analyze for the continued application of the NWFP's survey and manage and aquatic conservation strategy on the lands in the original monument boundary under the No Action Alternative (Alternative A).

Survey & Manage

The Survey and Manage measures were included in the NWFP to respond to a goal of ensuring viable, well-distributed populations of all species associated with late-successional and old-growth forests. The purpose of the revised CSNM RMP is to protect and restore a diversity of ecosystems that provide habitat for the rare and endemic and special status wildlife and plant species, including species associates with late-successional and old-growth forests. The BLM's range of action alternatives provides objectives, management direction, and land use allocation decisions for many of the formerly Survey and Manage species as Bureau Sensitive species through implementation of policy set forth in the BLM's policy for special status species management (BLM Manual 6840, Special Status Species Management). The BLM can achieve the purpose of this RMP revision and fulfill the BLM's statutory authorities and mandates without the Survey and Manage measures.

Aquatic Conservation Strategy

The Aquatic Conservation Strategy (ACS) was developed in the NWFP and includes four components: Riparian Reserves, Watershed Assessment, Key Watersheds, and Watershed Restoration. It was developed to respond to a goal of protecting aquatic resources across a wide range of landscapes and management activities, but primarily from sustained yield timber harvest. However, this does not apply to the BLM's CSNM, where commercial timber harvest is prohibited under Presidential Proclamations 7318 and 9564, except for authorized science-based ecological restoration projects. These projects must align with the monument's protection and old-growth enhancement goals. The area is not designated for timber production, and any tree removal is only permitted for ecological restoration or public safety purposes.

The science behind the ACS widths in the NWFP has undergone further examination and updates since its initial implementation. These sources illustrate a growing consensus that the NWFP and ACS, established in the 1990s, does not fully address the complexities and evolving challenges of forest management in today's context. Researchers and practitioners are advocating for updated frameworks that incorporate modern ecological science, socio-economic considerations, and adaptive management practices to better serve both ecosystems and communities. (USDA FS & USDI BLM, 2004; Spies, Stine, Gravenmier, Long, & Reilly, 2018; USDA FS, 2018). Ongoing research continues to reshape our understanding of the best practices for managing riparian buffers. While the initial standards of the Northwest Forest Plan established broad guidelines, the latest studies indicate a trend toward more nuanced, adaptable

buffer strategies. Specific widths may vary based on ecological context and species needs, emphasizing the importance of localized scientific input in land management practices.

The NWFP Riparian Reserves were designed to protect aquatic and riparian habitats from sustained yield timber harvest and associated activities, such as road work. They established interim buffer widths on fish bearing streams of two site potential tree heights or 300 feet (whichever is greater) and one site potential tree height or 150 feet on intermittent, non-fish-bearing streams (whichever is greater).

Overall, the body of research supports the notion that the one site potential trees play a crucial role in protecting streams by regulating temperature, preventing erosion, filtering nutrients, and providing wildlife habitat. Research on the importance of the second site potential tree highlights its critical role in supporting wildlife species.

With the range of action alternatives, the BLM would manage riparian areas as part of the Ecosystem Management Area - Riparian Habitat (EMA-RH). The proposed objectives and management direction for the EMA-RH incorporates the intent of the ACS and is designed to effectively contribute to the protection of water quality, aquatic habitat, and conservation of native aquatic organisms within the CSNM. The BLM delineated the EMA-RH based on the largest site potential tree buffer width across the entire CSNM, in contrast to the ACS, which delineated Riparian Reserve widths based on varying widths by watershed. The BLM would manage all lands in the decision area for the protection and restoration of ecosystems and would not authorize sustained yield timber harvest. Therefore, all watersheds and associated aquatic resources would be treated as high priority for protection and restoration, and in effect are "key." Watershed assessment is an ongoing process, and the BLM would continue to incorporate this process into all implementation-level actions, including restoration plans and activities. Under the current range of alternatives, the BLM includes specific management direction for active and passive watershed restoration. Furthermore, the alternatives provide management direction to ensure that essential riparian features, such as stream side shade, inputs of large wood, and sediment filtering vegetation, are protected during future management activities. The area outside of the EMA-RH (170 feet) would still be part of the Ecosystem Management Area (EMA-Old-Growth Emphasis or EMA-Diversity Emphasis), which would be managed to protect and restore ecosystems, landscape-level resilience, and intact habitats and undisturbed corridors.

Active Conservation Management Alternative for the Cascade-Siskiyou National Monument submitted by Forest Bridges

The BLM considered an alternative submitted by Forest Bridges, a nonprofit that formed in 2015 to build consensus and trust representing voices across the spectrum of forest interests — conservation and environmentalism, forest industry, recreation, and wildlife — specifically on the management of the O&C Lands of western Oregon. Forest Bridges submitted the alternative during the public scoping period, titled *Forest Bridges Active Conservation Management Alternative for the Cascade-Siskiyou National Monument*.

In summary, specific proposals included a very aggressive, watershed-scale thinning program to achieve a 95 percent reduction in the probability of surface fires becoming crown fires. Proposed management prescriptions included:

- Within the first 3-5 years and with the first entry, thin and then maintain within the target density 60-75 percent of the dry forests in the planning area. Retain 15-25 percent basal area generally. In moist areas retain 25-35 percent basal area.
- Add variable-sized skips and gaps on the remaining 25-40 percent of the forest unit.
- Conserve a mix of tree species and sizes, favoring legacy trees and species that can withstand fire.
- After thinning, pile and burn near property boundaries to decrease liability risk; broadcast burn centers of sections (aim is to contain fire on public lands).
- Snag placement should also align with the broadcast burn area to reduce the risk of fire spread.
- Repeat burning every 6-15 years between commercial thinning entries (note: additional funding is needed).

The entirety of the Forest Bridges Active Conversation Management Alternative was not analyzed in detail because as a stand-alone alternative, it did not meet the purpose and need and would not be feasible. The proposed alternative focuses on intense active management across the landscape but does not allow for any reserves. Given the purpose and need of the CSNM to protect and restore the objects and values for which the area was designated (which includes the objects of scientific and historic interest identified in Proclamation Nos. 7318 and 9564, as well as the Soda Mountain Wilderness, two Wild and Scenic Rivers, and two National Scenic and Historic Trails), the BLM must manage these areas consistent with the designating language and applicable laws, regulations, and policy. Therefore, it is not feasible, nor does it meet the purpose and need to treat the landscape without regard for reserves.

In some cases, components of the *Forest Bridges Active Conversation Management Alternative* that met the purpose and need were integrated into the Alternatives. For example, under all action alternatives, including the Proposed RMP (Alternatives B, C, D, and E), the BLM incorporates the following objectives (refer also to Appendix E, Section 2.C., Ecosystem Management Areas):

- Support the persistence, resilience, and health of natural communities, including fire dependent species, and the ecological processes and disturbance mechanisms that provide a range of seral conditions. Where appropriate, allow natural processes to dominate.
- Increase the ability of species and natural communities to recover from past management activities and persist through climate-driven stresses such as drought, wildfire, and insect and disease outbreaks.
- Maintain, enhance, and restore a mosaic landscape consisting of a mix of native plant communities, seral stages, structural diversity, species compositions, and stand densities.

Alternative B contains the majority of the recommendations, while Alternatives C and D contain varying levels and intensities of those treatments. For example, both Alternatives B and C include management direction to leave portions of a treatment area in untreated skips and to created variably sized and spaced opening for a variety of reasons (refer to Appendix E, section 2.C., EMA-Old-Growth Emphasis management direction). Under Alternative B, the openings

may be up to 4 acres in size, depending on the objective, but under Alternative C and the Proposed RMP (Alternative E), the openings would be limited to no more than 2 acres in size. Refer to Appendix E, Objectives and Management Direction for a full list of objectives and management direction.

After review of the analysis presented in the Draft RMP/EIS, Forest Bridges provided additional comments which offer support for Alternative B, which they concluded embraces many of their proposed concepts. Their comments state that the BLM's Alternative B could be "improved in terms of its treatment pace, frequency, and extent" (Forest Bridges Comments on the Draft RMP/EIS, p. 14).

Consider an alternative that designates Lands with Wilderness Characteristics as Wilderness Study Areas per Section 202 of Federal Land Policy Management Act.

The BLM is not considering an alternative that would designate the inventoried area with wilderness characteristics as a Wilderness Study Area (WSA) under Section 202 of the Federal Land Policy and Management Act (FLPMA) because it has already identified and analyzed an alternative that would offer substantially similar management protection for those wilderness characteristics. Consistent with FLPMA, the BLM has discretion in how it manages wilderness characteristics; FLPMA does not require BLM to consider designating an area as a WSA in a land use plan or mandate specific forms of protection. Further, BLM's NEPA Handbook (H-1790-1), acknowledges that the BLM may eliminate an alternative from detailed analysis if it is substantially similar in design or would have substantially similar effects to an alternative that is analyzed.

Here, Alternative D proposes to manage lands with wilderness characteristics to "Protect wilderness characteristics while providing for compatible uses" (Draft RMP/EIS, Appendix E, p. E-4 and Proposed RMP/Final EIS, Appendix E, Section 2.B.2). Management of lands with wilderness characteristics to meet this objective is consistent with BLM Manual 6320. While not identical to the non-impairment standard for WSAs under BLM Manual 6330, the protection offered for wilderness characteristics under Alternative D are substantially similar, i.e., protection of those characteristics (size, naturalness, opportunities for solitude or primitive and unconfined recreation, and supplemental values), while also providing for compatible uses. Only discretionary actions that protect the roadless size, apparent naturalness, and opportunities for solitude or primitive and unconfined recreation would be allowed.

Specific allocation decisions and associated management direction under Alternative D would protect wilderness characteristics as follows:

- Allocating all 8,548 acres of lands with wilderness characteristics as ROW exclusions areas. As such, the BLM would only grant ROWs in lands with wilderness characteristics when mandated by law, necessary for the administration of valid existing rights, or to allow for reasonable access to non-federal lands.
- All 8,548 acres of lands with wilderness characteristics would be allocated as closed to motorized use. Closing lands with wilderness characteristics to motorized use increases opportunities for solitude or primitive and unconfined recreation and reduces potential impacts to naturalness by unauthorized OHV use.

- All 8,548 acres of lands with wilderness characteristics would be designated as VRM Class II. VRM Class II, aims to retain the existing character of the landscape and any management activities must be designed so that they have low levels of change to the characteristic landscape. Retaining the existing character of the landscape under VRM Class II would limit management actions that would negatively impact the apparent naturalness of lands with wilderness characteristics.
- Proposed Wildland Urban Interface (WUI) treatments would only occur in lands with wilderness characteristics that are 120 feet from private property boundaries where structures are present, which would allow for up to approximately 73 acres to be treated if needed to reduce fire risk. However, the BLM assumes not all lands would require treatments to reduce fire risk on every acre. The BLM's analysis in Section 3.8 discloses that WUI treatments would have short-term negative impacts on apparent naturalness and solitude and primitive and unconfined recreation; however, over time they would enhance naturalness by creating forest stands that more closely mimic the appearance and function of forests in which natural fire has not been suppressed.
- Where lands with wilderness characteristics overlaps with CDMA-NSHT (~400 acres), vegetation and fuels management actions may occur in NSHT corridors (except for within 250 feet of the trail). However, these treatments must be designed in a manner that meets NSHT objectives enhance, promote, and protect High Potential Historic Sites and the Scenic, Natural, and Cultural resource values associated with current and future designated trails. In addition, the likelihood that these areas are degraded and would be prioritized for restoration treatment is very low, primarily due to limited access. Therefore, no adverse effects to wilderness characteristics are expected (refer to analysis in Section 3.8).

These management parameters would result in the protection of wilderness characteristics on all 8,548 acres of identified lands with wilderness characteristics. With this management direction wilderness characteristics (size, naturalness, opportunities for solitude or primitive and unconfined recreation, and any supplemental values) that have been identified for these areas would remain in an unimpaired condition and would maintain the suitability for preservation as wilderness. Consequently, BLM concludes that Alternative D's proposed management for the protection of the inventoried wilderness characteristics is substantially similar and would have similar effects to a WSA designation and thus has determined not to consider and analyze such designation in detail.

Consider an alternative that modifies management of the Pokegama Herd Management Area

The BLM did not analyze an alternative that would modify management of the Pokegama Herd Management Area (HMA) because it is outside the scope of the CSNM RMP's decision space to do so. The current management and direction for the Pokegama HMA lies within the Southwestern Oregon Resource Management Plan (USDI BLM, 2016b). Only a portion (< 5 percent) of the HMA falls within the CSNM. Any management actions or concerns of impacts on CSNM objects and values would be addressed during RMP implementation of that plan.

Chapter 3. Affected Environment and Environmental Consequences

3.1. INTRODUCTION

This chapter describes the environment that the RMP is likely to affect and the environmental consequences of the alternatives. The BLM has combined these two topics into this single chapter to provide all of the relevant information on a resource in a single discussion.

This chapter includes sections on each resource that the RMP is likely to affect. Each resource section includes one or more subsections that address a particular question about how the alternatives would affect the resource (i.e., Issues). For each issue, the BLM, summarizes the analytical methods used, describes the affected environment, and then answers the question by describing the environmental consequences to the resource of the Proposed RMP and all alternatives analyzed in detail, including the No Action Alternative. Issues that the BLM did not analyze in detail, and the supporting rationale, are described in Appendix F, Issues Considered but not Analyzed in Detail.

Spatial and Temporal Scales of Analysis

The spatial and temporal scales of analyses vary by resource and by issue. Consistent with the BLM NEPA Handbook (H-1790-1), the spatial and temporal scale of analysis should be bounded by the extent and duration of the direct and indirect effects of the proposed action. For some issues in this Proposed RMP/Final EIS, the spatial extent is broader than the planning area. For other issues, the spatial extent is highly limited because of the nature of the resource and potential effects of the proposed RMP on the resource. The individual resource sections of this chapter and accompanying appendices include descriptions of the spatial scales of analysis that are specific to that resource or program.

Specifying the temporal scale of analysis for an RMP/EIS is more challenging than for a discrete, site-specific action. Analysis of the effects of an RMP includes projecting future implementation actions. Because it is not possible to forecast the duration of the RMP itself, it is not possible to determine the duration of the effects of implementing the RMP. Instead, most analyses in this Proposed RMP/Final EIS set the temporal scale of analysis based on a time frame that illuminates differences in the outcomes under the alternatives. For most analyses, this temporal scope extends beyond any reasonable anticipation of RMP implementation, because analysis of effects of different land management on many resources must be extended for many decades to show any discernable differences. Limiting the temporal scope of analysis to the anticipated duration of the RMP, such as one or two decades, would obscure differences in effects among the alternatives and thus fail to provide a clear basis for choice among alternatives. The individual resource sections of this chapter include descriptions of the temporal scales of analysis that are specific to that resource or program.

Data Used in Analysis

The analyses in this Proposed RMP/Final EIS use multiple data sources. Acreage totals for the planning and area and decision area may vary based on how the BLM assembles the data to address the specific issue in question. In addition, the differing data sources for BLM-administered lands and other lands complicate combining acreage totals across ownerships. Because of these varying acreages from various data sources, the acreage totals are not precisely the same in all resource sections of this analysis. The data summaries in the analyses in the Proposed RMP/Final EIS do not always reflect the precision of the underlying data. In many of the analyses, the BLM rounded acreage numbers to ensure that the precision of analytical results does not exceed the accuracy associated with the analytical assumptions. The BLM only requires sufficient precision of the analytical results to illustrate the comparative effects caused by the alternatives to support reasoned decision-making.

Science-based Approach

The BLM used a science-based approach to develop alternatives and analyze their effects. Resource specialists drew on recent scientific literature from peer-reviewed journals, publications from the Forest Service and US Geological Survey, Joint Fire Science final reports, US Fish and Wildlife Threatened and Endangered Species Recovery Plans, along with local surveys and studies conducted by BLM staff and contracted local scientists. In cases of conflicting scientific findings, the BLM carefully evaluated the evidence and made informed decisions on which studies to rely on. Research by established scientists in relevant fields and a higher number of consistent studies were prioritized over less reliable sources. The BLM adhered to the Department of the Interior's Scientific Integrity Policy (305 DM 3), emphasizing that all scientific information used for developing management direction and analyzing effects must be robust, high-quality, derived from rigorous scientific processes, and ultimately trustworthy.

3.2. AQUATIC AND RIPARIAN HABITAT

Key Points

- Selection of any of the proposed alternatives would simplify the riparian management strategy, provide consistent management direction, provide additional protections to intermittent streams in the Jenny Creek and Spencer Creek Watersheds, and would retain all protection to aquatic and riparian resources provided by the current Riparian Reserve strategy (Alternative A).
- Selection of any of the action alternatives would have beneficial effects to aquatic and riparian habitats compared to Alternative A (No Action), and all action alternatives would result in some site-level benefits to habitat.
- Selection of Alternative D would provide the greatest benefit to aquatic and riparian habitats through phasing out of livestock grazing in the decision area.
- The Proposed RMP (Alternative E) includes both interim and long-term/permanent management direction that would provide protections to sensitive aquatic and riparian habitats by requiring modifications to grazing practices where impacts continue to occur, including in unprotected sensitive areas prior to next livestock season of use.
- Selection of Alternative C or the Proposed RMP (Alternative E) would result in the highest reduction in road sediment inputs to aquatic habitats throughout the decision area by restricting vehicular uses of natural surfaced roads during the wet season.
- Within the Buck Prairie ERMA, the Proposed RMP (Alternative E) would result in the greatest reduction in potential sediment delivery to aquatic habitat by closing these roads during much of the shoulder seasons, when roads may be wet but still accessible to traffic.

Analysis Issue

1. How would the alternatives affect aquatic and riparian habitats and aquatic species?

Aquatic and Riparian Habitat Issue 1

How would the alternatives affect aquatic and riparian habitats and aquatic species?

Summary of Analytical Methods

Temporal scale, unless otherwise noted for individual plan components, is for the life of this RMP, which is assumed to be 20 years.

Water quantity would continue to be the primary stressor to aquatic habitats as reservoir operations and diversions of water out of decision-area streams would continue. Climate change predictions including rising snow lines, declining summer streams flow, and increasing temperatures as described in the AMS (USDI BLM, 2023a, Section 6.7.2, Planning Area Profile, trends, water quantity and quality, pp. 109–111) would further exacerbate this.

For the purposes of this analysis, the BLM's analysis of the potential impacts to riparian and aquatic habitat assumes the management direction for Ecosystem Management Area – Riparian Habitat (EMA-RH) would be applied throughout the decision area and does not take into account the additional objectives and management direction that would apply to riparian and aquatic

areas in other management areas. For example, riparian and aquatic areas within Congressionally Designated Management Areas (CDMAs), such as CDMA-Wilderness and CDMA-Wild and Scenic Rivers are assumed to be within an EMA-RH for analytical purposes, and management direction for the EMA-RH would be applied to the degree the overarching designation allows (e.g. restoration could still occur in a WSR corridor but must be consistent with management direction for the WSR). The EMA-RH dataset was chosen as the base layer to use for aquatic and riparian habitat analysis rather than the Riparian Reserve (RR) dataset, because it better represents the extent of riparian areas within the entire CSNM. For example, the RR dataset includes widths as narrow as 50 feet and as wide as 340 feet; these extents are either too narrow to capture some features, such as wet meadows, or are so wide as to be well beyond the area of riparian influence. The differences between the RR and the EMA-RH are presented below under the Ecosystem Management Area discussion. The spatial scale of analysis for the EMA is the decision area (refer to Section 1.2).

For analysis of the effects from livestock grazing management decisions, the BLM assumed that meadows and wetlands are more susceptible to the physical impacts of livestock grazing (Oestreich, 2006), and that cattle do not use all areas equally (Kauffman & Krueger, 1984). The analysis compares acres of meadows and wetlands within the EMA-RH and within active allotments, by alternative. Monitoring data was used to estimate the percentage of these areas impacted by livestock grazing by applying observations from riparian areas from one allotment to all other active allotments within the decision area where observations are not available. Known and mapped (GIS) exclosures were considered in the analysis and assumed to be functional and effective at excluding cattle from sensitive areas. Spatial scale of analysis is the planning area (refer to Section 1.2).

For analysis of travel and transportation management decisions, the BLM assumed that areas designated as seasonally limited and closed to public use would correlate to reduced road surface erosion and reduced sediment transport to aquatic habitat, as hydrological connectivity between any given road segment and aquatic habitats is increased during the wet season (Furniss, Flanagan, & Mcfadin, 2000), and wet-season use of native surfaced roads can lead to rutting and increased hydrological connectivity. Analysis compares miles of riparian roads within areas designated as closed or seasonally limited among alternatives, and degree of hydrological connectivity (stream crossings). The BLM assumed that decommissioning roads under future travel and transportation management planning would lead to removal of chronic sediment sources (Luce et al., 2001). Specific routes are not identified for decommissioning under this plan, precluding quantitative analysis of potential reductions of sediment input to aquatic and riparian habitats. Spatial scale of analysis is the planning area.

For analysis of quarry management decisions, the BLM evaluated acres of quarries within riparian areas by alternative. This analysis assumed the entire footprint of the quarry represented by available data is disturbed, and that quarries within 60 feet of aquatic habitat have potential to impact stream shade and sediment input to aquatic habitat, because this is within the primary shade zone, and in close enough proximity to potentially allow for sediment to delivery to water ways from disturbed ground in the quarry (USDA FS & USDI BLM, 2004; Rashin, Clishe, Loch, & Bell, 2006). Spatial scale of analysis is the decision area.

For analysis of recreation management decisions, the BLM evaluated where recreation site development would be possible (in designated ERMAs and SRMAs) within or near riparian and aquatic habitats. Spatial scale of analysis is the decision area.

Affected Environment

Aquatic and riparian habitats and the species they support, and how they have been impacted by past and ongoing activities, is described in detail in the Analysis of the Management Situation (USDI BLM, 2023a, Section 6.5, Planning Area Profile, Fish and Aquatic Habitat) and is incorporated here by reference. Key points from that analysis are presented here.

The CSNM includes diverse aquatic features which support aquatic organisms, some of which are endemic to the area. Aquatic habitats include seasonal and perennial streams and springs (lotic habitats), and wetlands and wet meadow complexes, natural ponds and lakes, reservoirs, and small impoundments (lentic habitats). The decision area includes portions of seven large fifth-field watersheds (Appendix C, Map 3-1); Jenny Creek, Cottonwood Creek, Spencer Creek, Bogus Creek, and the Klamath-Iron Gate Watersheds, the streams of which flow south from the area and are within the Klamath River Basin; and the Bear Creek and Little Butte Creek Watersheds, the streams of which flow generally north and are in the Rogue River Basin. The Rogue and Klamath Rivers support populations of economic, recreational, and culturally important anadromous fish including salmon and steelhead. Most of the decision area is located above anadromous fish use, and fish populations within the CSNM are primarily resident, native, and introduced fish. Within the decision area there are 57 miles of fish bearing streams and 789 acres of other aquatic habitat, including lakes, reservoirs, and wetlands (Table 3-1).

Table 3-1. Fifth-field watersheds in the decision area

Watershed	Decision Area Acres	Total Stream Miles	Fish Stream Miles	Lentic Habitat Acres
Bear Creek	20,029	174.1	5.5	74.0
Bogus Creek	635	4.6	0	0
Cottonwood Creek	5,885	26.3	1.1	1.5
Jenny Creek	60,297	356.7	34.8	522.8
Klamath-Irongate	16,964	107.6	12.8	10.7
Little Butte Creek	7,122	49.2	2.3	86.6
Spencer Creek	2,571	5.2	0.5	93.0
TOTAL	**113,503**	**723.7**	**57**	**788.6**

Note: Fish bearing stream miles and acres of ponded or slow water habitats and wetland within the decision area. Fish use of lentic habitats is primarily limited to the larger reservoirs, which are the least numerous lentic features but the largest percent of acres of lentic habitat.

Lotic aquatic habitats range from low gradient stream channels found predominantly on the Dead Indian Plateau to higher gradient, topographically constrained channels which feature cascades and waterfalls, common in areas draining from the plateau to the north and south and west.

Riparian habitats include mature conifer forests; hardwood stands, which include aspen, maple, ash, and alder; and open meadow and wetland complexes where willow, riparian shrubs, grasses, and forbs comprise most of the riparian vegetation. The meadow/wetland systems historically provided high quality habitat for beaver, which through the construction and maintenance of dams maintained high floodplain connectivity and water capture and storage. Though their population is much diminished presently, they are still important ecosystem engineers in the lower gradient streams, where remnants of old beaver dams are still apparent in some areas. Stream channel large wood serves a similar function to the forested stream reaches and contributes to important habitat diversity for native aquatic organisms. The meadow/wetland habitats, though making up less than 4 percent of all riparian habitats identified in the decision area (Table 3-2), are critical components of the watersheds; these aquatic areas are where natural water capture and storage are greatest. They are also usually less resistant to physical disturbances than forested riparian areas due to lack of hard substrates in their bed and banks, and therefore are more prone to erosion and channel incision (Oestreich, 2006).

Table 3-2. Riparian area acres by watershed in the decision area

Watershed	Riparian Acres	
	Meadow/Wetland	Forest/Woodland
Bear Creek	99	4,405
Bogus Creek	0	158
Cottonwood Creek	1	793
Jenny Creek	495	8,895
Klamath-Irongate	14	4,101
Little Butte Creek	103	1,290
Spencer Creek	66	222
TOTAL	**778**	**19,864**

Note: This table does not include acres of open water associated with the large reservoirs.

Current conditions vary widely across the decision area and are reflective of past and ongoing land and water use practices, including construction and operation of reservoirs, diversion of water between watersheds and basins, forest and range-land management practices, and geologic and topographic considerations (e.g. soil types and their inherent water holding capacities, elevation, aspect, precipitation regime, and plant communities). Changes in climate and fire return intervals have also altered aquatic and riparian habitat conditions, as described in the AMS (USDI BLM, 2023a, Section 6.5.2, pp. 95–96). In general, water is more prevalent at higher elevations and in northern and western portions of the decision area, though all areas have been negatively impacted by a prolonged and ongoing drought that has affected the entire region, resulting in reduced stream flows and reservoir levels. Across all watersheds, notable ongoing and/or historic uses with impacts to aquatic resources include beaver trapping, cattle grazing, water capture and transfer (such as reservoir operations and water withdrawals), and timber harvest and associated road construction and maintenance. Impacts to aquatic and riparian habitat from these practices include degraded channels that have down-cut and incised and

become disconnected from their historic floodplains, resulting in reduced water capture and storage; altered hydrologic regimes through capture and diversion of surface and ground water; aquatic organism passage barriers; direct physical disturbance to aquatic and riparian habitats; and increased inputs of sediment. Construction and operation of the large reservoirs, legacy effects of beaver trapping, drought, and livestock grazing are the most significant stressors to aquatic habitat and species currently occurring within the decision area at present.

Native fish species in the CSNM include the endemic Jenny Creek sucker (*Catostumus rimiculus*), speckled dace (*Rhinichthys osculus*), and redband trout (*Oncorhynchus mykiss spp*.). These populations were left isolated by the formation of Jenny Creek falls, which allowed the eventual expression of the unique dwarf form of the Jenny Creek sucker to be expressed. Redband trout are also present in the Spencer and Klamath Irongate watersheds. Other native fish present in the CSNM include rainbow and cutthroat trout (*O. clarkia clarkii*), sculpin (*Cottus sp*), steelhead trout *(O. mykiss iridium*) (limited to Cottonwood Creek only), and tui chub (*Siphateles bicolor*, limited to Spencer Creek only).

There are currently no federally listed threatened or endangered fish species within the decision area. However, removal of the Klamath River dams (currently ongoing) may allow for listed (threatened) coho (*O. kisutch*) and chinook (*O. tshawytscha*, petitioned for listing and under status review) salmon to access lower reaches of Jenny Creek and perhaps the lower reaches of Scotch and Camp Creeks in the Klamath-Irongate Watershed.

Environmental Consequences

Vegetation Management Decisions

The management direction for EMA-RH is designed to protect key aquatic and riparian functions and aquatic species from potential effects resulting from vegetation management and to further enhance aquatic and riparian values. The strategy incorporates many of the features crafted for the Riparian Reserve (RR) and the Aquatic Conservation Strategy (ACS), which guide current management direction in riparian areas within the decision area of the 2008 CSNM RMP. Current management direction for RRs and proposed management direction for EMA-RH includes allowing active and passive restoration activities such as instream habitat improvement; maintenance/improvement of stream side shade and future sources of large wood; disconnecting aquatic habitats from upland sources of sediment, such as roads; and addressing aquatic organism passage barriers. Both management approaches allow for vegetative treatment to varying degrees for ecological restoration or hazardous fuels reduction.

Alternative A (No Action)

Under the No Action alternative, within the original Monument boundary, riparian areas are managed under the Aquatic Conservation Strategy (ACS), a strategy carried forward from the Northwest Forest Plan, as amended (USDA FS & USDI BLM, 2004) into the 2008 CSNM RMP (USDI BLM, 2008). The ACS strategy includes the designation of Riparian Reserves (RR). RR widths vary by stream type and watershed or sub-watershed and site potential tree heights associated with each watershed. Widths range from 50 feet to 340 feet. RR widths are widest for portions of the CSNM currently managed under NWFP guidance, which includes two site potential tree height widths for fish-bearing streams, and one site potential tree height for all other streams. These areas do not identify individual zones within the RRs. Widths in the portion of the CSNM within the decision area of the SWO RMP (i.e., CSNM expansion area lands in

Oregon), include the application of one site potential tree height to fish-bearing and perennial streams, but only a 50-foot width to intermittent streams within designated class III sub-watersheds, which include the Jenny Creek and Spencer Creek watersheds within the expansion area. Inner, middle, and outer zones are identified and include specific management direction for each zone. Management direction varies between these two existing RMPs, but both allow for vegetative treatments within the RR for ecological or fuel reduction purposes. RRs in the Oregon portion of the CSNM expansion area impose diameter limits on trees that may be cut, include additional guidance on how close to stream channels activities may occur, and include retention levels for trees per acre and canopy cover, that vary by zone. RR guidance for the original monument and the portion of the expansion area in California did not include this level of specificity, and instead utilizes the ACS (key points described in the AMS, Section 6.5) to ensure that certain objectives are met or improved when implementing actions within the RR. The RR was developed with sustained yield timber harvest in mind and was designed to protect riparian habitats from effects associated with timber harvest in upland areas. Protective features include widths sufficient to preclude sediment mobilization to aquatic habitat from upslope areas that might be disturbed by management actions such as timber yarding corridors, and to maintain stream shade levels and future sources of large wood input to streams. RR management directions across all areas of the CSNM include and encourage restoration of instream and riparian habitats. Table 2-3 displays acres of RR within the decision area under the No Action Alternative.

The variable widths, numerous zones, and different guidance for management of RRs is currently complex, difficult to implement, and in some cases insufficient to adequately address riparian and aquatic values. For example, along intermittent streams within designated class 3-subwatershed in many areas within the CSNM expansion area, the current RR width is only 50 feet, which does not encompass all riparian meadows adjacent to streams. And while shade and sediment filtering requirements are met adjacent to streams under the current strategy, canopy cover requirements of 30 percent in middle or outer zones may be low enough to affect important micro-climate habitats and terrestrial organisms that benefit from increased shade and humidity. Under the No Action Alternative these issues would continue to exist.

Management direction for upland areas also varies across the CSNM by RMP. Most direction has little potential to influence the aquatic and riparian habitats because the RR were implemented expressly to preclude negative impacts from upland treatments to aquatic and riparian habitats, and the efficacy of RR to preclude impacts from upland treatments has been well documented (Rashin et al., 2006; Sweeney & Newbold, 2014). Current direction does allow for fuels treatments adjacent to intermittent channels. Prescribed burns are typically conducted during the spring, when conditions favor light to moderate burn severity, and when live vegetation, especially adjacent to stream channels, would have high moisture content. Under such conditions large areas adjacent to channels would not be barred of all vegetation, and sediment filtering vegetation would remain after the treatment, reducing the likelihood and magnitude of any sediment or ash delivery to aquatic habitat. Fire is a natural landscape disturbance in the decision area, and historically burned through riparian areas at regular intervals. Prescribed fire in riparian areas would be within the natural range of disturbance expected for the area and would reduce the potential for high severity fire within treated riparian areas. Thinning is also allowed in portions of the RR to reduce tree densities and to encourage the growth of large trees. Currently, thinning prescriptions in RR must retain canopy levels of 30

percent or greater and must not reduce shade afforded to stream channels or must meet ACS objectives which ultimately would provide similar protections. Potential effects to hydrological processes from upland treatments are described in the hydrology discussion.

Alternatives B, C, D

The proposed management strategy for EMA-RH would be the same across all action alternatives and is described in detail in Appendix E. Table 2-3 displays acres of EMA-RH within the decision area under the action alternatives.

Primary differences between the EMA-RH and the RR (Alternative A) include:

- Applying one width to all streams rather than varying widths by watershed or sub-watershed and by RMP as is currently the case. The tallest site potential tree height (170 feet) present in the decision area was selected as the width to apply to streams in the EMA-RH.
- The ACS was not carried forward, but many elements of it were incorporated into management objectives and management decision for the EMA-RH. See section 2.4, Alternatives Considered but Not Analyzed in Detail.
- Zones within the EMA-RH include only an inner and outer zone, and do not recognize a middle zone, as is the case for some RRs currently managed in the expansion area under Alternative A, and canopy cover requirements are increased from 30 percent to 50 percent for thinning projects in outer zones to better protect micro-climate conditions.
- Includes management direction to explore closing areas to beaver trapping, and specific direction for restoring degraded channels to increase flood plain connectivity and increase water capture and storage.

The action alternatives would reduce the width of the riparian management zone to one site potential tree versus two (under Alternative A) for fish-bearing streams in portions of the CSNM. This would not affect stream temperature or sediment delivery to aquatic habitat as areas beyond one site potential tree height are too far distant from aquatic features to influence these metrics (USDA FS & USDI BLM, 2006; Rashin et al., 2006). The Western Oregon Final EIS analyzed in detail the difference to potential large wood delivery from reducing the RR width and found no discernible differences to wood recruitment would result (USDI BLM, 2016b, p. 289). The action alternatives would increase the riparian management zone by 1,138 acres adjacent to intermittent streams within the decision area and would require higher canopy cover retention (50 percent) compared to Alternative A (No Action) for these areas.

Management direction in all EMAs includes enhancing the capture and storage of water across the landscape through thinning and creation of small openings to increase capture and storage of snow in appropriate areas based on elevation, soil type, and proximity to streams, in upland areas. As discussed in the hydrology section, these activities may result in small increases of water to aquatic habitats and would be beneficial to aquatic organisms. Within EMA-RH, activities that encourage restoration of degraded channels, such as large wood additions and installation of beaver dam analogs, can be implemented to increase floodplain connectivity to increase water capture, storage, and release during the dry season. Across all EMAs, direction also includes decadal targets for thinning and prescribed fire as describe in Appendix E. Alternative B sets the highest targets and would include an estimated 2,038 acres of small

diameter thinning and prescribed fire in the EMA-RH. Alternative C would include 1,132 acres, and Alternative D, which does not set a target, assumes 578 acres of treatments. All treatments applied within the EMA-RH would be consistent with management direction for the EMA-RH (e.g. no thinning in inner zones, retention of at least 50 percent canopy cover in outer zones, 60-foot setbacks adjacent to fish and perennial streams for prescribed fire, etc.).

Alternative E (Proposed RMP)

The anticipated effects of Alternative E (Proposed RMP) are the same as described for Alternatives B, C, and D, except that it includes additional management direction to prohibit the cutting of riparian hardwood and brushy species within the EMA-RH when conducting any vegetative treatments. This would provide additional protection to these species. These species include suitable browse for beaver as well as nesting and foraging habitat for riparian-associated birds and other wildlife and are a natural component of many riparian areas.

Conclusion and Cumulative Effects

Key riparian and aquatic habitat features would be protected under all alternatives, as the RR and EMA-RH both include direction that would retain sediment filtering and shade and large wood producing vegetation adjacent to aquatic habitat. Both strategies include management direction for active restoration activities to benefit riparian and aquatic habitats, and the species that depend on them. Selection of any of the action alternatives would simplify the riparian and aquatic habitat management strategy by applying one width and consistent management direction across the entire CSNM. It would ensure that more riparian values, such as meadows adjacent to intermittent streams, fell under management direction for riparian areas as compared with the Alternative A (No Action), and provide more specific direction regarding beaver restoration. Alternative E (Proposed RMP) provides additional management direction to retain hardwood species when implementing vegetative treatments within the EMA-RH.

Per management direction common to all action alternatives, the BLM would "[e]xplore opportunities to close areas to beaver trapping to improve riparian habitat conditions" (Appendix E – EMA-RH). Closing areas to beaver trapping, if implemented in the future, would allow for their populations to rebound. Increased beaver presence and associated dam building would facilitate increased storage of water in stream channels and on adjacent floodplains. This stored water would be available for release to downstream aquatic habitats during summer low flow periods, benefitting aquatic and terrestrial organisms, and would increase aquatic, riparian, and landscape resilience to drought (Fouty, 2021). Active restoration of degraded channels has been proven to be an effective tool to restore low summer stream flows in the area (Pollock, Heim, & Werner, 2003). Opportunities to implement these activities are limited spatially by the relatively small area available within the decision area where such actions would yield measurable benefits: less than 4 percent of the EMA-RH includes wetlands and wet-meadows. Therefore, any increases would only be measurable at the site and reach levels. At the sub-watershed and watershed scales, continued diversion and transfer of water would still occur under all alternatives, reducing water availability to Jenny Creek during both high and low water periods and reducing summer low flows to Latgawa Creek, as described in the AMS (USDI BLM, 2023a, Section 6.5.3). These activities would continue to reduce habitat quantity and quality for aquatic organisms.

Existing notable disturbances within riparian areas that are expected to continue in the foreseeable future include road use and livestock grazing in open allotments. These disturbances would continue to occur regardless of which strategy (RR vs. EMA-RH) is selected but would vary by alternative (see livestock grazing and travel and transportation below). Disturbances from some past actions would continue to slowly recover in areas where riparian timber harvest occurred and in areas where grazing is no longer authorized.

Past restoration activities implemented in the decision area in the past 15 years have improved riparian and aquatic habitat conditions of approximately 6 miles of stream. These activities include placement of large wood in streams, installation of beaver dam analogs, and approximately one acre of lotic habitat improvement for the northwestern pond turtle. The BLM has decommissioned (obliterated) approximately 7 miles of roads within riparian areas, primarily in the Soda Mountain Wilderness area, which has reduced road densities and eliminated chronic sources of sediment inputs, restoring natural hydrological processes and allowing for eventual full recovery of riparian vegetation on approximately 26 acres. These beneficial activities would continue into the foreseeable future. Beaver habitat restoration for approximately 5 miles of streams is being planned, as is approximately ½ mile of riparian road decommissioning.

Livestock Grazing Management Decisions

Livestock use in sensitive riparian and aquatic habitats can result in degradation of habitat through stream bed and bank trampling and browse of stream adjacent vegetation (Dauwalter, Miller, & Porter, 2018). Cattle often concentrate in riparian areas due to water and forage availability (Kauffman & Krueger, 1984), resulting in disproportionate use and impact to riparian habitats. Bank destabilization, though removal of stream-side vegetation and direct trampling of banks, may result in stream incision as erosion is increased and streams cut down and disconnect from their floodplains. Stream incision is most likely to occur in reaches not armored by rocky substrates (Oestreich, 2006), such as are typical of low gradient meadow stream reaches, while higher gradient and forested reaches typically include rocky substrates more resistant to direct impact to banks and stream beds. Degraded streams lose connectivity with their associated floodplains, and more efficiently transport water during periods of high flow through and away from the landscape, resulting in diminished capacity for the floodplain to capture and store water. Loss of streamside vegetation can result in higher summer water temperatures and destabilized banks, which are prone to erosion and result in sediment and turbidity inputs to aquatic habitats. Channel degradation and reduction of riparian vegetation can lead to a loss of suitable habitat and forage for beaver (Small, Frey, & Gard, 2016), and reduced cover for aquatic and terrestrial organisms. Bank trampling results in increased sediment input to aquatic habitats and increased turbidity to downstream habitats, further reducing aquatic habitat quality. Cattle droppings adjacent to or in aquatic habitat affect water quality parameters such as nutrient and bacteria levels. These all result in adverse impacts to aquatic species. These effects, particularly channel degradation, may persist for many years, even after cessation of grazing, and may require active restoration to repair. Effects are most apparent at the site level, where banks and vegetation are directly disturbed in riparian areas, but effects to water quality and quantity may be transported to and detectable in downstream environments, resulting in impacts to aquatic habitats at the stream-reach or drainage level scales.

Wild and feral horse use occurs in the planning area. Animals and physical impacts to stream beds and banks have been noted in stream reaches in the Jenny Creek and Klamath-Iron Gate

watershed (primarily in the portion in California). Observed impacts from horses are similar as those described for cattle. The BLM has not completed an assessment of the extent of use. In general, stream channels in this area are rocky and resistant to degradation, though physical disturbances to stream adjacent banks is occurring, resulting in sediment inputs to aquatic habitat. No changes to wild or feral horse management are proposed under any alternatives. Under all alternatives, the BLM would continue to manage the Pokegama Herd Management Area consistent with the direction provided in this plan, as well as in the SWO RMP (USDI BLM, 2016c, pp. 121–122). This includes monitoring of herd populations and taking actions to maintain appropriate management levels; conducting repair and maintenance of fences to protect riparian areas from concentrated use by horses; and removing or returning horses straying from outside the herd management area. The BLM removes feral horses in accordance with BLM Trespass Regulation (43 CFR 4150).

Active restoration strategies to address grazing impacts on aquatic and riparian habitats include exclosure fencing; instream restoration, such as installation of beaver dam analogs; riparian planting of site appropriate vegetation; and changes to livestock grazing management such as those described in Appendix Q.

Alternative A (No Action)

Current management direction authorizes grazing on 27,820 acres of lands within the decision area. Within active allotments, there are 2,706 acres within riparian areas, including 243 acres (9 percent of all riparian acres within active allotments) identified as having wetland or meadow characteristics. All riparian areas within one allotment (Deadwood) within the decision area were qualitatively assessed by BLM fisheries and hydrology staff after the grazing season in the fall of 2023 and noted for presence/absence of cattle signs (trails, droppings, browse, post holing, bank trampling). Areas where disturbances were observed to banks or stream beds were documented spatially in GIS. The BLM has observed that cattle use has not been evenly distributed throughout riparian areas in the Deadwood allotment. Evidence of cattle presence and impacts to aquatic and riparian habitat were most numerous in the western portion of the allotment, likely due to a greater availability of perennial water sources, though impacts were also observed in proximity to intermittent stream channels as well. Disturbances were primarily associated with meadow/wetland habitats. Cattle signs were also observed in forested riparian areas, but impacts were limited to observed cattle trails and droppings, and did not include stream bed and bank disturbances. Nutrient inputs and small sediment inputs where trails cross or closely parallel streams are occurring within some of these forested areas but are minor and small in spatial extent compared to impacts observed in the meadow habitats, where larger areas of disturbance were observed.

Within the portion of the Deadwood allotment in the decision area, there are 66 acres of wetland and meadow habitat. Of these acres, grazing impacts were noted within 46 acres (70 percent of all meadow/wetland habitats within the Deadwood allotment). This does not mean that every acre was degraded, but that within the 46 identified acres there were areas where disturbances were noted. Observed impacts included post-holing of soft ground, hoof shear of banks into stream channels, incised channels, cow manure in channels, and browsed riparian grasses. Disturbances were primarily linear in nature, occurring within and in close proximity (100 feet or less) to channels. Surveys were conducted after leaf fall, making assessment of grazing impacts to willow/shrubs difficult. There is no complete boundary fence around the Deadwood allotment,

and one cattle trail was observed leaving the allotment and leading to a spring and meadow complex near the top of Grizzly Creek, where trampled banks were noted.

Several areas within the Deadwood allotment in the CSNM totaling approximately 4 acres are currently excluded from grazing by fences, and these exclosures were observed to be intact and functioning. Other sensitive areas in the decision area have also been protected through exclosure fences, such as the Tunnel Creek ACEC which includes approximately 40 acres of wetland habitat. Known and mapped exclosures which protect wetland/riparian meadow habitats total 47 acres within active allotments in the decision area.

Assuming grazing use patterns in other decision area allotments are similar to those observed for the Deadwood allotment, and considering areas known to be currently excluded by fences, under Alternative A (No Action), the BLM estimates that 137 acres (5 percent) of wetland/meadow habitats would continue to be impacted to varying degrees by cattle grazing. These areas would continue to be vulnerable to episodic and chronic disturbances, such as stream bed and bank trampling, browse of riparian vegetation, and inputs of cattle manure and sediment. Degraded and incised channels would continue to be disturbed, impacting floodplain function and perpetuating reduced water capture and storage capacity. With continued use and without applying measures to reduce impacts, these areas would not recover. Impacts are and would continue to be focused in the Jenny Creek Watershed (Table 3-3). Sensitive meadow areas adjacent to fish bearing habitats total approximately 20 acres and include a meadow complex adjacent to 2.8 miles of Jenny Creek. The stream is the allotment boundary but is not fenced. This area includes the Fredenburg Springs and areas south towards Hwy 66. The stream bed through much of this area is armored by rock and is resistant to disturbance but there are numerous areas of softer bank and ground where disturbances are occurring, especially where seeps and springs enter Jenny Creek. These disturbances (sediment and fecal inputs) directly impact habitat for aquatic organisms including Jenny Creek sucker, redband trout, and northwestern pond turtles.

Alternatives B, C, and E (Proposed RMP)

Alternatives B, C, and the Proposed RMP would retain grazing at the same level as Alternative A (No Action). Similar to Alternative A, the BLM would conduct studies for all lands available for livestock grazing to determine the impacts of livestock grazing on CSNM objects of biological interest and make determinations on compatibility with protection of those objects through subsequent NEPA analysis (refer to Appendix Q). The BLM has only conducted studies on the lands in the original boundary of the CSNM. Selection of any of these alternatives would result in the same effects on aquatic and riparian habitat as those described under Alternative A, until such time as subsequent NEPA analysis is completed. By following these future decision-making steps and processes, the BLM would identify sensitive areas and apply appropriate implementation measures to ensure CSNM objects are protected, such as installing exclosure fencing, changing the season of use, or adjusting stocking levels (refer to Appendix E and Appendix Q for more detailed information). Management direction requires that the BLM conduct livestock grazing at levels that protect CSNM objects and values, and future implementation decisions, such as excluding sensitive areas, would occur on a site-specific basis. For example, a new exclsoure fence is planned in the fall of 2024 adjacent to Hoxie Creek to protect a stream-associated meadow that is habitat for a sensitive butterfly. Other sites are not

currently identified. Therefore, the BLM would have the ability to protect wetland/meadow habitats in grazing allotments under these alternatives.

Specific to the Proposed RMP, the BLM includes additional management direction Appendix E, section 4. G for allotments with unprotected sensitive aquatic and riparian habitats, prior to beginning the next livestock season of use, implement grazing management practices to provide interim protections of these areas until a long-term/permanent solution is implemented. These interim protections would reduce both the spatial extent and/or degree of impacts to sensitive aquatic habitats. Areas excluded from grazing by fences would be protected from all grazing related impacts. Areas where changes to livestock management are implemented would be subjected to less disturbance, through reduction of stocking levels or changes to season/duration of use. Because both water and suitable browse are at a minimum during the late season (i.e. late summer – early fall), excessive cattle use in sensitive aquatic habitats, where both water and suitable browse are still available, is most likely to occur during this period; reducing/eliminating late season grazing would provide site level protections to these sensitive aquatic habitats, as cattle would be less likely to congregate in these areas.

Table 3-3. Grazing acres available in the decision area and amount of sensitive riparian habitats excluded and assumed to be impacted by grazing

Watershed	Alternatives A, B, C, E (Proposed RMP)			
	Available Acres	Sensitive Riparian Acres	Excluded Acres	Assumed Vulnerable Acres
Bear Creek	3,492	12	0	8
Irongate	507	3	3	0
Jenny Creek	16,685	132	4	90
Little Butte Creek	4,561	30	0	21
Spencer Creek	2,575	66	40	18
TOTAL	**27,820**	**243**	**47**	**137**

Note: This table does not include acres of open water associated with the large reservoirs.

Alternative D

Alternative D would phase out livestock grazing through non-renewal of leases. No acres of EMA-RH or wetlands or meadows would continue to be available for authorized grazing. Disturbed areas would have the opportunity to begin to recover as the impact-causing element (cattle) would be removed. Cattle impacts adjacent to and in Jenny Creek would no longer occur, eliminating direct impacts to aquatic organisms in this area. Recovery rates would vary. Disturbed vegetation would begin to recover immediately, but full recovery of vegetation may take several decades (Nussle, Mathews, & Carlson, 2017). As vegetation recovers, bank stability would also improve, resulting in increased resistance to the erosive force of water, and reductions in sediment input and deposition to aquatic channels. Incised areas may need active restoration or colonization by beaver to encourage channel aggradation to increase floodplain connectivity and water capture and storage to allow for full recovery.

Conclusion and Cumulative Effects – Grazing

Grazing is estimated to currently impact areas within 137 acres of sensitive aquatic and riparian habitats in the decision area. These areas would continue to be impacted under Alternatives B and C until such time that measures are taken to protect them. Authorized grazing would only change under Alternative D, which, through elimination of grazing, would have beneficial effects to aquatic and riparian habitats as described above. Some areas may need further measures to restore degraded channels through active restoration techniques to allow channels to aggrade and re-connect with their adjacent floodplains under Alternative D. These same measures could be undertaken under other alternatives but would require that exclosure fences be erected and maintained adjacent to in-channel restoration or that changes to grazing practices occur following allotment assessments and implementation-level NEPA analysis for grazing lease renewal applications.

For Alternative E (Proposed RMP), the BLM would also apply management direction to ensure interim protection of sensitive riparian areas until a long-term/permanent solution is implemented (refer to Appendix E, Section 4.G). The BLM would modify, as needed, grazing practices prior to next livestock season of use to meet established standards for utilization, stubble height, and browse of riparian woody vegetation. This would provide additional protection to sensitive aquatic habitats in the near term by requiring exclosure fencing and changes to stocking levels and season of use if sensitive riparian areas continue to be impacted by grazing.

Throughout the planning area, grazing is known to be occurring on private lands within the planning area and expected to continue in the foreseeable future under all alternatives. Data are not available to quantify the scope of impacts, but it is reasonable to assume that sensitive riparian areas are and would continue to be degraded by livestock grazing. Grazing related impacts would be focused in portions of the Jenny Creek, Spencer Creek, and Little Butte Creek Watersheds, as they have large portions of their watersheds both within and outside of the planning area that are within active grazing allotments. Wild and feral horse use adjacent to streams within the planning area continue to contribute site level impacts to riparian and aquatic habitats in the Klamath-Irongate Watershed.

Travel and Transportation Management Decisions

Roads, road maintenance, and road use are known to influence aquatic and riparian habitats (Luce & Black, 1999). Roads can disrupt natural hydrologic pathways through capture and routing of precipitation and shallow ground water and can be sources of sediment and turbidity inputs directly to aquatic habitat. Road maintenance activities can result in increased disturbances and erosion rates, increasing the potential for sediment delivery to streams. Maintenance can also reduce potential sediment delivery through activities that reduce erosion rates (e.g. adding rock to the road surface to provide additional armoring), or that disconnect roads from aquatic habitats (e.g. outsloping road surfaces, addition of cross drains or water dips). Road use increases erosion rates through the breakdown of road surfaces or creation of ruts which can collect and channel water and route it and sediment to aquatic habitat. Roads that cross streams have direct hydrological connectivity with aquatic habitat, and the portion of the road between the stream crossing and nearest drainage control device is the portion of the road where sediment delivery is likely to occur from. Erosion and transport of sediment from roads to aquatic habitat typically occurs during the wet season, due to increased precipitation. Closing

roads to use and restricting use during the wet season results in less erosion of road surfaces and less transport of sediment into aquatic habitat. These types of actions would yield reductions in sediment input to stream channels from hydrologically connected roads. Specific routes are not proposed for decommissioning in this plan, but future RMP implementation decisions that result in decommissioning of roads in riparian areas would allow for vegetative recovery. Where road decommissioning occurs adjacent to stream channels, stream shade would slowly improve as vegetation establishes and develops and would also yield reductions of sediment input to aquatic habitat.

Common to all Alternatives

All alternatives include management direction to maintain roads, through addition of rock, erosion control features, brushing of encroaching vegetation, and cleaning of ditches and relief culverts, with specific management direction and best management practices (refer to Appendix I, Table I-1) to reduce road impacts to streams and water quality. These activities would result in small amounts of sediment input, detectable only at site levels (e.g. where roads are directly hydrologically connected with streams), to aquatic habitat in the short term (immediately following ground-disturbing activities, such as blading of ditch lines); but the activities are intended to reduce long-term impacts by reducing erosion rates as well as the length of the road network that is hydrologically connected to aquatic habitats. All alternatives allow for decommissioning of roads, which would result in restored hydrological processes, reduced sediment production, and increased vegetative cover. Decommissioning of hydrologically connected roads, either through site-level RMP implementation or comprehensive travel management planning, would result in the elimination of chronic sediment inputs, and vegetative recovery adjacent to channels would result in recovery of shade and sources of future large wood input to channels to the benefit of aquatic habitat. All alternatives include management direction to maintain or improve aquatic organism passage at road/stream crossings. Under all alternatives the Soda Mountain Wilderness would remain closed to all motorized vehicle use. All alternatives limit motorized use to existing roads until comprehensive travel management planning occurs, at which time specific routes would be identified allowing site-specific analysis of effects on aquatic and riparian habitat.

Alternative A (No Action)

Existing management direction varies by RMP and is described in the RMPs for each area they cover. Relevant to this discussion, the RMPs all prohibit vehicle use in areas designated as closed, limit public use to existing roads, and include provisions for maintaining and providing access to non-federal landowners across BLM-administered lands, including allowing for new road construction, if necessary to provide reasonable access. The 2016 SWO RMP directs the BLM to maintain the road network needed to meet the full range of public use and resource management, while the 2008 CSNM RMP directs the agency to maintain the minimal road network necessary to facilitate protection of resources and includes direction to close and decommission roads to protect resource values. The 2016 SWO RMP includes similar road decommissioning direction to meet hydrology objectives. All existing RMPs allow for new road construction, but the 2008 CSNM RMP places specific restrictions on new road construction tied to objectives for travel management and protection of resources and requires that there be no net-increase in road densities in ACS-designated Key Watersheds (the portion of Jenny Creek within the 2008 CSNM RMP decision area). Lands within the 1993 Redding RMP decision area in

California have very few existing roads, most of which are gated and not open for public vehicular use. Within the planning area there are approximately 582 miles of existing roads (Table 3-4, Map 3-4, Existing Travel and Transportation Network). No areas are currently designated as limited to seasonal use to wheeled vehicles, though there are gates that are seasonally closed on several road systems. Under Alternative A (No Action), the BLM would continue to manage the existing road system. Natural surfaced roads would remain designated as open for public use during the wet season, including 25.4 miles of roads within riparian areas in the decision area (Table 3-4). These roads include 166 stream crossings, and their use in the wet season would result in increased inputs of sediment and turbidity where the roads cross streams. Use of natural surfaced roads located at high elevations would be limited during portions of the winter due to snow. Shoulder season use of these roads (before/after snow, but when roads are still wet) may still occur, resulting in site-level impacts to natural surfaced roads, such as rutting and increased sediment transport to aquatic habitats.

Table 3-4. Existing road mileage, natural surface road mileage, and natural surface road/stream crossings by planning and decision areas

Watershed	Road Miles			Natural Surface Road/Stream Crossings	
	Total All Roads	Total Natural Surface	Natural Surface in EMA-RH	Planning Area	Decision Area
Bear	102.5	37.4	5.6	97	40
Bogus	0.6	0.2	0	0	0
Cottonwood	8	2.9	0.3	6	4
Irongate	6.9	2.8	0.2	1	1
Jenny	397.8	137.4	17.6	141	112
L Butte	46.9	11.7	1.4	11	7
Spencer	19.5	2.5	0.3	2	2
TOTAL	**582.2**	**194.9**	**25.4**	**258**	**166**

Common to all Action Alternatives

Under all action alternatives (Alternatives B, C, D, and E (Proposed RMP)), the BLM would incorporate objectives and management direction that directs future travel management planning to consider reducing road densities in riparian areas to disconnect roads from aquatic habitat where possible, reducing road densities in habitat for sensitive species, and limiting public motorized use to existing roads (refer to Section 3.14, Travel and Transportation Management). These activities would be analyzed during the travel management planning process, at which time specific routes would be identified.

Within the Hyatt Lake Campground and Table Mountain SRMAs, the BLM would seasonally close roads December 1 through March 31 under each of the action alternatives. The only roads located in these areas are paved, are outside riparian areas, or are associated with the

campground, which is seasonally closed with access restricted by a locked gate. The proposed Watchable Wildlife Area would designate 9 acres of Hyatt Lake Shorefront as closed under all alternatives, but there are no roads within it. Therefore, these decisions would not affect aquatic or riparian habitats.

Alternative B

Relevant travel and transportation management decisions to aquatic and riparian habitat proposed in Alternative B include designating ACECs and certain recreation management areas, including the Buck Rock ERMA, as closed areas for public motorized access (refer to Section 3.14). This area is currently behind a closed and locked gate and not accessible to public vehicle use. Within areas allocated as closed to off-highway vehicles, there are 17.5 miles of existing roads (Table 3-5), including 4.9 miles in riparian areas. Closure areas proposed under Alternative B would include 24 stream crossings, including one that drains through a sensitive fen/meadow complex in the proposed Cottonwood Glades ACEC. Selection of this alternative would preclude vehicle use on this road and reduce potential impacts to the meadow. The Lost Lake RNA would be designated as closed; however, there are no existing roads within this area. The Old Baldy RNA would also be designated as closed; however, this area does not include any aquatic or riparian habitats.

Alternative B proposes to seasonally restrict wheeled vehicle use in the Buck Prairie ERMA from December 1 through March 31. This would seasonally limit use to 14.8 miles of road, which includes 95 stream crossings, within EMA-RH. This is not anticipated to result in measurable benefits to aquatic habitat, because most of the roads in the Buck Prairie ERMA are snowbound naturally for most years between December and late March and effectively closed by deep snow drifts. The seasonal restriction does not include much of the shoulder seasons (before snowfall, after snowmelt), when the roads may be wet and still accessible to vehicles and susceptible to erosion from traffic. The shoulder seasons, when roads are wet and sub-grades are saturated but not frozen or covered by snow, are when roads have greatest hydrological connectivity with aquatic habitat and are most susceptible to damage and erosion by vehicle traffic (Furniss et al., 2000). Alternative B also proposes to seasonally limit OHV use on existing roads to hunting season. However, these roads would still be open to street-legal vehicles, and therefore the potential for erosion of road surfaces by traffic would not be reduced.

Alternative B would have minimal beneficial effects to aquatic and riparian habitats but would have no adverse effects. The one tangible benefit it would provide would be protection of a sensitive and unique aquatic habitat found in the Cottonwood Glades ACEC by closing the area to vehicle traffic. Road use on a native surfaced road that fords the stream below the fen and bisects the meadow was observed to be occurring during a site visit in fall of 2023. The road was deeply rutted in spots and is a source of sediment input to the stream at the crossing site. Closing this area to vehicle traffic would reduce future potential site level inputs of sediment to the sensitive meadow by ensuring that rutting of the road is not exacerbated. As vegetation establishes itself on the native surfaced road, the potential for both erosion and transport of sediment would be reduced.

Alternative C

Alternative C proposes to close the proposed Cottonwood Glades ACEC and Buck Rock Tunnel ERMA, as described above for Alternative B, to public motorized access. Additional closure areas would occur in lands managed for their wilderness characteristics. The proposed closed areas include 68.8 miles of road, including 17.4 miles within EMA-RH (Table 3-5). Closure areas proposed under Alternative C would include 119 stream crossings. Closure areas include roads that cross fish-bearing habitat (resident trout) in Emigrant Creek (Bear Creek Watershed) and Lincoln Creek (Jenny Creek Watershed). Many of the additional riparian roads proposed for closure within lands managed for their wilderness characteristics have been abandoned and undriveable for many years.

The Buck Prairie ERMA would be reduced from 9,927 acres to 5,500 acres under Alternative C compared to Alternative B and would seasonally restrict vehicle access to 8.1 miles of roads within EMA-RH, which would include 75 stream crossings. Similar to Alternative B this would result in minimal effects to aquatic and riparian habitats, as the date range of the seasonal restriction does not include the shoulder seasons before/after snowfall/snowmelt.

Alternative C proposes to seasonally restrict vehicle use on natural surfaced roads from December to May across the decision area, which would preclude vehicle use on 25.4 miles of roads within EMA-RH during most of the wet season. Many of these roads are at low to mid elevations and are not seasonally snowbound. This would reduce the potential for sediment transport to 166 stream crossings in the decision area, yielding site-level reductions to aquatic habitats, including directly to fish-bearing habitats in the Bear Creek and Jenny Creek Watersheds. Reid and Dunne (1984) suggest that sediment production on aggregate surfaced roads that receive no traffic (i.e. are closed) is reduced by a factor of 10 as compared with road segments that receive light (e.g. pickup truck) traffic. Because the roads proposed for closure in the wet season are native surfaced and lack armoring, it is reasonable to assume that the difference between light traffic sediment production and no traffic sediment production would be further reduced than the factor of 10 reported by Reid and Dunne (1984).

Alternative D

Alternative D would close the proposed Grizzly Peak Trail ERMA and all lands managed for their wilderness characteristics to public motorized access. These closed areas include 52.7 miles of road including 13.7 miles within EMA-RH (Table 3-5). Alternative D would result in fewer stream crossings closed to traffic than under Alternative C, but would close the same crossings over fish habitat as Alternative C. No areas would be seasonally restricted. All areas roads would be closed to OHV use, but still open to street legal vehicles, precluding any benefits to aquatic and riparian habitats.

Alternative E (Proposed RMP)

For the Proposed RMP, the BLM would apply the same closures and seasonal restrictions of routes and would have the same effects as described for Alternative C, with one notable exception: roads in the Buck Prairie ERMA would be seasonally restricted from November 1 through April 30, which includes much of the shoulder season. Precluding traffic during this period, when road surfaces and subgrades are most likely to be wet and saturated, can reasonably be expected to correlate with reduced road surface erosion. Reid and Dunne (1984) suggest that sediment production on aggregate surfaced roads that receive no traffic (i.e. are closed) is

reduced by a factor of 10 as compared with road segments that receive light (e.g. pickup truck) traffic.

Although this alternative does not propose to designate the Cottonwood Glades as an ACEC, the area would be designated as closed to public motorized access, as it is under Alternative C.

Table 3-5. Miles of roads and number of stream crossings within proposed closure areas by alternative in the decision area

Watershed	Road Miles within Proposed Closure Areas by Alternative						Stream crossings within Proposed Closure Areas		
	Decision Area			within EMA-RH					
	Alt. B	Alt. C & E	Alt. D	Alt. B	Alt. C & E	Alt. D	Alt. B	Al.t C & E	Alt. D
Jenny Creek	1.8	19.5	18.5	3.1	5.4	4.7	22	31	30
Little Butte Creek	0.3	0.3	0.2	0.2	0.2	0.2	1	1	1
Bear Creek	15	48.5	34	3.1	11.8	8.8	1	87	65
Cottonwood Creek	0.5	0.5	0	0	0	0	0	0	0
TOTAL	17.6	68.8	52.7	6.4	17.4	13.7	24	119	96

Conclusion and Cumulative Effects – Travel and Transportation

Alternative E (Proposed RMP) would result in the greatest potential travel and transportation related benefits to aquatic and riparian habitats, because areas closed to public motorized use would include more miles of roads within EMA-RH than the other alternatives; because it would restrict use of natural surface roads during the wet season, until such time as comprehensive travel management planning occurs; and because it proposes to seasonally restrict vehicle traffic for a period that includes much of the shoulder seasons when roads are likely to be wet but still accessible to traffic. Alternative B would result in fewer beneficial effects to aquatic and riparian habitats because it would not seasonally restrict vehicle use on native surfaced roads. However, Alternative B would still provide additional protection to the Cottonwood Glades ACEC and to streams in the Buck Rock and Buck Prairie ERMAs compared to Alternative A (No Action). Alternative D would protect slightly fewer stream crossings than Alternative C and the Proposed RMP and would not reduce potential impacts to aquatic habitat that may occur through wet-season use of natural surface roads.

Roads within proposed closure areas are not currently proposed for decommissioning, and therefore would still exist and continue to have the potential to influence aquatic and riparian habitats. Closing use on the roads to public traffic would reduce erosion of road surfaces, and this can reasonably be predicted to result in reduction of sediment transport compared to the roads remaining open and available to regular traffic. The same conclusion can be made for seasonally restricting use during the wet season. However, drawing quantitative conclusions regarding road use and impacts on aquatic habitat is difficult, given that there are many variables that influence any given road segments likelihood to contribute sediment to aquatic habitat, and

given that effects are highly dependent on site-specific conditions, including road gradient, degree to which a road is hydrologically connected, amount of use, and season of use. Comprehensive travel management planning would allow for route-by-route analysis to determine the degree to which these roads may or may not be affecting aquatic habitat. The same process would also allow for the identification of problematic routes to be closed or decommissioned, resulting in reduced sediment delivery to streams. Currently two routes are identified for decommissioning in the foreseeable future; these include approximately one-half acre within riparian areas, along with four stream crossings. This work would eliminate chronic site-level sources of sediment and turbidity inputs.

Other non-BLM-managed natural surfaced roads within the planning area would remain open to public use during the wet season in the foreseeable future. Use of those roads which are connected to aquatic habitats would continue to result in site-level inputs of sediment and turbidity during the wet season.

Minerals Management Decisions

Quarry development and use result in ground and vegetative disturbances. Quarries located near aquatic habitat may result in losses of shade and sediment inputs into aquatic habitat.

Alternative A (No Action)

There are currently 16 quarries which total 54 acres within the decision area. Within riparian areas there are 12 acres of quarries. Four quarries are in close proximity (50 feet or less) to streams, which is close enough to potentially effect shade afforded to adjacent stream channels and to input sediment into streams. These areas are open to administrative use currently and would remain so under the Alternative A (No Action). No quarries are adjacent to fish-bearing channels.

Alternative B

The effects from Alternative B would be similar to Alternative A, except quarry expansion would be limited to 2 acres per decade and would be evaluated to ensure that any expansion would be compatible with CSNM objects and values. No changes to quarries within riparian areas would occur and these areas would continue to exist in a disturbed state.

Alternatives C and E (Proposed RMP)

Under both Alternatives C and E (Proposed RMP), the BLM proposes to reduce the number of quarries available for use to 8, totaling 26 acres, of which 4 acres would be within riparian areas. Quarry expansion would be limited to one acre per decade. Two quarries would remain in close proximity to streams. The remaining quarries would be reclaimed. This would allow for the eventual recovery of eight acres of vegetation within EMA-RH.

Alternative D

Under Alternative D, the BLM would prohibit quarry use and development and would reclaim all existing quarries. This would allow for the eventual recovery of 12 acres of vegetation withing the EMA-RH. No quarries would remain near streams.

Conclusion

Alternatives C and D, and E (Proposed RMP) would reduce quarries within EMA-RH and in close proximity to stream channels resulting in beneficial effects to aquatic habitat through establishment and improvement of shade and reduction of sediment delivery potential to adjacent aquatic habitats. Alternative D would result in the greatest net benefit as all riparian areas disturbed by quarries would be allowed to recover. Full vegetative recovery may require 100 or more years in forested areas. Sediment delivery potential would be reduced at the site level following reclamation activities.

Lands and Realty Management Decisions

Common to all Alternatives

Alternatives A and B would allocate lands in the decision area as a ROW avoidance area (except the Soda Mountain Wilderness, which would be a ROW exclusion area). Alternatives C and E (Proposed RMP) would allocate all lands in the decision area as a ROW avoidance area (except the Soda Mountain Wilderness and lands managed for wilderness characteristics, which would be ROW exclusion areas). All new ROW applications must be determined to be compatible with CSNM objects and values, which include aquatic and riparian habitats. Under Alternative D, the entire decision area would be managed as a ROW exclusion area, except when mandated by law, and for providing reasonable access to non-federal ands. Therefore, under any alternative new ROWs may be granted in the future. The BLM receives, on average, approximately two new ROW requests annually within the decision area. The BLM assumes future requests to continue at a similar rate. Given this trend; given that riparian and aquatic habitats make up a very small percentage of all lands within the decision area; and given that requests must be compatible with CSNM objects and values, the probability that new future ROW requests would impact aquatic habitat is expected to be low. However, in the event no alternative means of access are possible, new ROWs that include ground disturbance within a riparian area would likely require removal of riparian vegetation, leading to small site-level reductions in native vegetation. Areas adjacent to aquatic habitat would have the potential to result in site-level reductions of shade and inputs of sediment into aquatic habitat.

Recreation Management Decisions

Management decisions for recreation that could influence aquatic and riparian habitats include seasonal road closures (discussed above in analysis of travel and transportation management decisions) and designation of recreation management areas. RMA designations vary by alternative and have the potential to include new developments in riparian areas. All action alternatives (Alternatives B, C, D, and E (Proposed RMP)) would reduce the amount of riparian habitat in an RMA (Table 3-6) compared to Alternative A (No Action). At this level of planning, potential future developments are not identified. Potential impacts from recreation management include trail construction, maintenance, and use. Where these trails cross aquatic habitats there would be the potential for site-level inputs of sediment to aquatic habitat. New trailhead development in riparian areas may result in site-level disturbance to riparian vegetation but are not likely to reduce shade to aquatic habitat, because management direction for new recreation use includes the protection of CSNM objects and values, which includes water quality and quantity and aquatic and riparian habitats. Therefore, any future proposals for expansion of recreation opportunities would be evaluated to ensure that they do not contribute to aquatic and riparian habitat degradation prior to development.

Table 3-6. Acres of recreation areas in riparian areas by alternative

Watershed	Recreation Area Riparian Acres				
	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Bear Creek	1,113	830	255	7	255
Jenny Creek	2,057	1,718	653	152	572
Little Butte Creek	958	416	290	1	290
Spencer Creek	288	288	0	0	0
TOTAL	**4,416**	**3,252**	**1198**	**160**	**1087**

Conclusions and Cumulative Effects

All action alternatives (Alternatives B, C, D, and E (Proposed RMP)) would not result in additional detrimental effects to aquatic or riparian habitats as compared with Alternative A (No Action). These alternatives would result in site-level reductions to sediment from travel and transportation management decisions, and increased protections afforded to some intermittent streams within the decision area. Alternatives C and E (Proposed RMP) would result in the greatest reduction of site-level sediment input from roads, by establishing areas of public access closure and seasonal use limitations on natural surfaced roads. Alternative D would result in the greatest benefit to aquatic and riparian habitats through phasing out of livestock grazing allotments. Phasing out livestock grazing allotments would eliminate direct disturbances to riparian and aquatic habitats, including to portions of 137 acres of identified sensitive meadow and wetland habitats; allow for channel, streambank, and riparian vegetative recovery; and result in improvements to water quality and potentially to water storage, in the event degraded channels recover or are restored and reconnected with their adjacent floodplains. Alternative D would reclaim all quarries, allowing for 12 acres of riparian recovery. All action alternatives would result in reductions in riparian acreage within proposed recreation management areas compared to Alternative A. Restoration activities would continue in the foreseeable future, yielding site-level benefits to aquatic habitats and species. Removal of the Klamath River dams may allow for expansion of the distribution of anadromous fish into the decision area, though this would be limited because of natural barriers that would preclude migration to most of the decision area, as described in the AMS (USDI BLM, 2023a, Section 6.5.3).

3.3. Areas of Critical Environmental Concern and Research Natural Areas

Key Points

- None of the alternatives are expected to have adverse effects on the relevant and important values of ACECs and the scientific research and education purposes of RNAs primarily due to the management direction for these lands, including for overlapping designations (e.g., Wilderness Areas). Managing natural ignitions (lightning-caused wildfires) when conditions are compatible to meet resource objectives would have a beneficial effect under Alternatives B, C, and E (Proposed RMP).
- Relevant and important values in ACECs and scientific research and education values in RNAs would be protected regardless of whether a given ACEC or RNA is designated or not primarily due to the requirements of Proclamation Nos. 7318 and 9564 and BLM policy for management of National Conservation Lands. The relevant and important values of ACECs and scientific research values are also CSNM objects and values identified in the Proclamations, and as such would be protected consistent with the purpose and need for this plan.

Analysis Issue

1. How would the alternatives affect the relevant and important resource values of existing and proposed ACECs, the scientific research and education purposes of RNAs, and the Mariposa Lily Botanical Area?

ACECs and RNAs Issue 1

How would the alternatives affect the relevant and important resource values of existing and proposed ACECs, the scientific research and education purposes of RNAs, and the Mariposa Lily Botanical Area?

Summary of Analytical Methods

The geographical scale of this analysis is the individual ACECs and RNAs. The temporal scale is 20 years, the expected life of the plan. Analysis assumptions include the following:

- The current grazing animal unit months (AUMs) would remain the same or decline; see Table 6-7 of the AMS (USDI BLM, 2023a, p. 122) for details.
- All current snowmobile routes are located on roads. Cross-country snowmobile routes would be allowed in the Surveyor Mountain ERMA (Alternative B only), but the routes would avoid Tunnel Creek ACEC and Old Baldy RNA ACEC.
- There are no designated or user-created trails within any ACEC, RNA, or the Mariposa Lily Botanical Area.
- The presence of roads within an ACEC, RNA, or Mariposa Lily Botanical Area indicates the probability of dispersed camping.
- The BLM would continue to provide reasonable access as needed to non-federal lands within the monument boundary. Site-specific NEPA would be conducted and BMPs (Appendix I) or project design features would be applied, as needed, to minimize

negative impacts to CSNM objects and values consistent with BLM Manual 6220 (Section 1.6.E).

For this analysis, the BLM used information from the Analysis of the Management Situation (AMS) (USDI BLM, 2023a), the ACEC and RNA report (Appendix G), maps showing overlapping management areas, and management direction by alternative for each relevant management area and resource program. This analysis compares the special management attention identified for each ACEC, RNA, and Mariposa Lily Botanical Area to the management direction for the relevant management areas and resource programs to determine if the relevant and important values for ACECs and scientific values for RNAs would be protected and special management attention needs would be met, whether the ACEC or RNA were designated or not. Some administratively designated areas, such as ADMA-Lands Managed for their Wilderness Characteristics, require more protective restrictions than ACECs and RNAs.

Affected Environment

Per Section 103(a) of FLPMA and BLM policy, the BLM designates ACECs when special management attention is required to protect and prevent irreparable damage to important historic, cultural, and scenic values; to protect fish or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards (BLM Manual 1613, Areas of Critical Environmental Concern). Research Natural Areas (RNAs) serve as living laboratories for studying ecosystems and understanding the impacts of human activities on the environment. They help preserve and protect unique plant and animal associations, threatened or endangered species, and geologic, soil, or water features that are crucial for scientific research, conservation efforts, and maintaining biodiversity. Areas established as RNAs should be of sufficient number and size to adequately provide for scientific study, research, and demonstration purposes (43 CFR 8223.0–6).

The BLM uses National Conservation Lands, including the CSNM, as a laboratory for testing innovative land management practices, including adaptive management, consistent with the conservation, protection, and restoration of the resources, objects, and values for which these lands were designated. Findings from such research are to be made available to the scientific and educational communities and distributed for use throughout the BLM to inform future management decisions (BLM Manual 6100, National Landscape Conservation System Management, Section F. Science; refer also to the management direction for Science and Research in Appendix E).

Where multiple NLCS designations overlap, the BLM must comply with all applicable statutes. To do so, the more restrictive management requirements would apply; however, this is evaluated on a case-by-case basis. For example, where designated Wilderness overlaps with a National Monument, no motorized vehicles or equipment may be used in the overlap unless they are the minimum necessary to administer the area for the purpose of the Wilderness Act (BLM Manual 6220, National Monuments, National Conservation Areas, and Similar Designations). Congressionally designated areas typically have more restrictive management requirements than other designations and resource programs. Within the CSNM, the order from most restrictive to least, for most issues, for Congressionally designated Areas is 1) Wilderness, 2) designated Wild and Scenic Rivers, 3) eligible Wild and Scenic Rivers, and 4) National Scenic and Historic Trails.

The CSNM currently includes five ACECs and two RNAs and the Mariposa Lily Botanical Area. During scoping, the BLM received four ACECs nominations by external commentors; one area (Cottonwood Glades) was found to meet the relevance and importance criteria. The BLM nominated the Mariposa Lily Botanical Area to be designated as an ACEC.

Indigenous uses of the landscape were a significant factor in shaping the biodiversity of the CSNM and traditional practices enhanced the resilience of many plant communities to factors such as fire, insects, disease, and drought (Crawford, Mensing, Lake, & Zimmerman, 2015; Frost & Sweeney, 2000; Lake, 2007; LaLande & Pullen, 1999). The BLM understands that the nature, extent, and locations of resources that are important to Tribal entities have not all been disclosed. Nor does the BLM know all the specifics related to certain uses or traditional cultural practices. A comprehensive cultural context (ethnographic study) is in progress to aid in identifying Tribal uses and values within the CSNM. Additionally, this study would inform future management of the CSNM, while maintaining confidentiality and discretion regarding sensitive Tribal information. Until this study is completed, the BLM's analysis is limited to available information.

Table 3-7 lists the relevant and important values and special management attention needed for each existing or proposed ACEC and RNA. Refer also to Table 6-2 in the AMS for more details (USDI BLM, 2023a, p. 72).

Table 3-7. List of ACECs and RNAs, their relevant and important values (ACECs) and scientific research and education purposes (RNAs), and special management attention needed

ACEC/RNA Name	Relevant and Important Values/Scientific Values	Special Management Attention Needed
Lost Lake RNA ACEC (2016 SWO RMP)	• Geologic processes • Native fish species • Western pond turtle • Plant communities • Long-term vegetation monitoring site	• Minimize human disturbance • Allow natural processes to dominate • Any management action taken should emulate natural processes or events
Old Baldy RNA ACEC (2016 SWO RMP)	• Native plant communities	• Minimize human disturbance • Allow natural processes to dominate • Any management action taken should emulate natural processes or events
Moon Prairie ACEC (2016 SWO RMP)	• Native plant communities	• Use prescribed fire as needed to maintain pines
Tunnel Creek ACEC (2016 SWO RMP)	• Native plant communities • Bureau sensitive plant species • ESA Federally Threatened Oregon Spotted Frog Site/Critical Habitat Unit	• Exclude livestock • Apply riparian treatments as needed to maintain hydrological processes • Enhance beaver habitat • Restore native meadows
Jenny Creek RNA ACEC (1993 Redding RMP)	• Native fish • Upland and riparian plant communities • Geologic processes	• Minimize human disturbance • Allow natural processes to dominate • Any management action taken should emulate natural processes or events

ACEC/RNA Name	Relevant and Important Values/Scientific Values	Special Management Attention Needed
Oregon Gulch RNA (2008 CSNM RMP)	• Native plant communities • Bureau sensitive plant species	• Minimize human disturbance • Allow natural processes to dominate • Any management action taken should emulate natural processes or events
Scotch Creek RNA (2008 CSNM RMP)	• Native plant communities	• Minimize human disturbance • Allow natural processes to dominate • Any management action taken should emulate natural processes or events
Mariposa Lily Botanical Area/ACEC (2008 CSNM Proposed RMP)	• Native plant communities • Bureau sensitive plant species	• Restore native plants • Reduce/control yellow starthistle • Use prescribed fire as needed to maintain oaks, native forbs and grasses, and Greene's mariposa lily • Restrict cross-country travel by vehicles and heavy equipment
Cottonwood Glades ACEC (Proposed)	• Native trout • Unique wetland	• Restrict livestock • Restrict motorized and non-motorized vehicle use

Note: Refer to the AMS (USDI BLM, 2023a) and ACEC and RNA Report (Appendix G) for more information.

The four existing ACECs designated in the 2016 SWO RMP lie within grazing allotments. Tunnel Creek ACEC is fenced to exclude cattle. Ongoing science and educational projects would continue in the Mariposa Lily Botanical Area/ACEC.

There are 504 private parcels within the monument boundary; 47 of those have current ROWs for road use (refer to Section 3.6, Lands and Realty). Most private parcels are accessed under casual use as existing roads are generally open to the public. Since 2000 (initial designation), within the entire CSNM boundary including the expansion area, the BLM has received an average of two new ROW requests per year (excluding renewals and amendments, as well as those related to encumbered lands).

The demand for public lands for outdoor recreation is expected to continue to increase in intensity and diversity. However, recreation developments would be limited to designated ERMAs and SRMAs (refer to Section 3.12, Recreation & Visitor Services).

Environmental Consequences

Common to All Alternatives

The proposed objectives and management direction for the following resource programs would not have any adverse effect on the relevant and important values in ACECs and the scientific values in RNAs: Air Quality, Collections/Special Forest Products, Geology and Paleontology, Lands and Realty, Minerals, Soils, Visual Resources, and Travel and Transportation Management. Management direction for Terrestrial Wildlife; Cultural Resources; Special Status Plants, Lichens, and Fungi; invasive plants; and the EMA – Riparian Habitat are expected to protect or benefit the relevant and important values. The proposed management corridor for the

Applegate Trail, part of the California National Historic Trail, does not cross any ACECs or RNAs, and no lands with wilderness characteristics overlap any existing or proposed ACEC or RNA. Therefore, these plan components are not discussed in further detail in this analysis.

One purpose of the monument designation is to provide opportunities for research to further understanding of the purposes of the CSNM and support administration of the CSNM (BLM Manual 6220, National Monuments, National Conservation Areas, and Similar Designations, Section 1.6.B.1; Presidential Proclamations 7318, 9564). All national monument plans must include a science plan in support of monument management. Management direction for the Science and Research program (in Appendix E) furthers this requirement and is compatible with the general purpose of ACECs and an integral part of RNAs.

The following management direction has the potential to affect relevant and important values of an ACEC and the scientific research and education purposes of RNAs: CDMA - Wilderness, CDMA - eligible Wild and Scenic Rivers, CDMA – NSHT, specifically for the Pacific Crest National Scenic Trail, the Ecosystem Management Areas (Old-Growth Emphasis, Diversity Emphasis, and Riparian Habitat), Livestock Grazing, Recreation and Visitor Services, Travel and Transportation Management, and Wildland Fire Management (refer to Appendix E, Objectives and Management Direction).

Table 3-8 lists which ACECs and RNAs would fall within the above designations or potentially be affected by management direction for the above resource programs. The acres shown for the Ecosystem Management Area are what would apply if no Congressional or Administrative designated area was present.

Table 3-8. Portions (acres) of ACECs and RNAs within other designations and allocations

Designation or Program	Cottonwood Glades ACEC	Jenny Creek RNA	Lost Lake RNA	Mariposa Lily ACEC	Moon Prairie ACEC	Old Baldy RNA	Oregon Gulch RNA	Scotch Creek RNA	Tunnel Creek ACEC
Wilderness	--	--	--	--	--	--	1,050	1,798	--
Eligible Wild and Scenic River	94	253	313	--	26	--	--	--	76
National Scenic and Historic Trails	--	--	--	--	--	143	--	--	--
Ecosystem Management Area	115	268	385	253	26	470	--	--	80
Grazing Allotment	--	--	385	--	26	470	--	--	80
Wildland Urban Interface	68	--	--	168-145*	--	--	--	--	--

* Varies by alternative

The Oregon Gulch and Scotch Creek RNAs lie within the Soda Mountain Wilderness, which was designated by Congress in 2009, after the 2008 CSNM RMP was completed. Wilderness management direction follows the requirements of the 1964 Wilderness Act and BLM policy in Manual 6340, Management of Designated Wilderness Areas, and the 2012 Soda Mountain Wilderness Stewardship Plan (USDI BLM, 2012). This direction is to allow natural processes to dominate, and exclude motorized and mechanized vehicle and tool use, except where a minimum tool analysis determines that use of such equipment is the minimum necessary for administration of the wilderness. Wilderness management direction provides the same or higher level of protection for the scientific values of the two RNAs. See Appendix K of the 2008 CSNM RMP for a more comprehensive description of Scotch Creek RNA and Appendix L for a more comprehensive description of Oregon Gulch RNA. Little or no active management has occurred in either RNA.

Wilderness management direction is compatible with protecting the scientific values for which Scotch Creek and Oregon Gulch RNAs were established. The only advantage of continuing with RNA designation within the Soda Mountain Wilderness is to identify these two areas as examples of specific plant communities to the scientific community. The presence of an RNA has no effect on wilderness, and wilderness designation provides protection to the scientific values of the RNAs. Since a purpose of both RNA designation and the CSNM designation is to provide opportunities for scientific research, designation of an RNA is not necessary to meet that purpose. Instead, documenting what plant communities occur within the Soda Mountain Wilderness would also serve that purpose as well as providing a partial inventory of the Monument objects and values. No direct or indirect effects are expected for either RNA under all alternatives. Because wilderness has the most protective requirements, Oregon Gulch and Scotch Creek RNAs are not discussed further.

The only recreation and visitor use that may have an adverse impact on the relevant and important values of ACECs is dispersed camping just off the road, while road maintenance activities may have an effect should the area beyond the current road prism be entered. The CSNM does not have designated dispersed camping sites and currently visitors tend to pull off the road with either tents or trailers and camp for the night or up to 14 days. Only Mariposa Lily Botanical Area and Moon Prairie ACECs have roads within them where dispersed camping may occur and road maintenance is expected to occur. The road through Mariposa Lily accesses private land on both ends and may be little used except for that purpose. The road through Moon Prairie dead-ends at the CSNM boundary and would be more attractive to dispersed campers due to the lack of traffic. Either the special management attention needed under ACEC designation or the recreation management direction and best management practices for roads (Appendix I) would likely limit or prevent damage from dispersed camping or road maintenance in both areas. The risk may be slightly higher for the road through Mariposa Lily if much of the maintenance is provided by the local landowners or county instead of BLM, because coordination may not occur or maintenance actions may reach beyond the current road prism.

Alternative A

Alternative A includes the two existing RNAs, five ACECs, and the Mariposa Lily Botanical Area. The 1993 Redding RMP designated the Jenny Creek RNA ACEC (USDI BLM, 1993), while the 2016 SWO RMP designated the Lost Lake and Old Baldy RNA ACECs and Tunnel Creek and Moon Prairie ACECs (USDI BLM, 2016a, Appendix F). In 2017, Proclamation No.

9564 closed these areas to leasable and locatable mineral entry and sustained-yield timber management. The Oregon Gulch and Scotch Creek RNAs and Mariposa Lily Botanical Area predate the 2008 CSNM RMP and were carried forward in that plan. Table 3-9 covers the remaining management direction from the 2016 SWO RMP and the 1993 Redding RMP.

Table 3-9. Existing management direction for ACECs and RNAs under the 2016 SWO RMP and the 1993 Redding RMP

ACEC or RNA	Public Motorized Access	Salable Mineral Entry	Livestock Grazing	Vegetation Management
Jenny Creek RNA	Limited to designated routes	Closed	Closed	No timber harvest
Lost Lake RNA	Closed	Closed	Closed	No timber harvest
Moon Prairie ACEC	Limited to designated routes	Closed	Open	Use uneven-aged management to improve forest structure and fire resiliency while maintaining legacy trees
Old Baldy RNA	Closed	Closed	Closed	No timber harvest
Tunnel Creek ACEC	Limited to designated routes	Closed	Open with stipulations	No timber harvest

Uneven-aged forest management is allowed in Moon Prairie to improve forest structure and fire resiliency while retaining legacy trees.

Jenny Creek RNA ACEC overlaps an eligible Wild and Scenic River segment in California. The Redding Field Office found this segment was eligible with a preliminary designation of Scenic (USDI BLM, 2018, pp. 3–26). This planning effort confirmed the eligibility of the Jenny Creek segment in California with outstandingly remarkable values of scenery (refer to Appendix P, Wild and Scenic River Eligibility Report).

Moon Prairie and Tunnel Creek lie within grazing allotments with Tunnel Creek fenced to exclude grazing. Part of Old Baldy ACEC lies within the Pacific Crest Trail 1 and 2 Special Recreation Management Area (SRMA). In addition to the management designations, Lost Lake, Old Baldy, and Tunnel Creek lie within a northern spotted owl critical habitat unit and Tunnel Creek lies within an Oregon spotted frog critical habitat unit. No ACECs or RNAs lie within identified wildland urban interface but Lost Lake, Moon Prairie, Old Baldy, and Tunnel Creek lie within the area classified as suitable for the use of natural ignitions.

The management direction and special management attention of the seven ACECs and RNAs and Mariposa Lily Botanical Area would protect the relevant and important values or scientific values. Cattle grazing in Moon Prairie would be managed to protect the late successional forests that this ACEC was established; limiting the degree to which cattle are using Moon Prairie for browsing and shade and limiting significant trampling or compaction that would affect reproduction of the tree species for which it was designated. The BLM would continue to monitor to determine if cattle activity in Moon Prairie is impacting tree regeneration and what

grazing modifications would be needed to alleviate impacts. Current use is limited because abundant downed wood inhibits cattle use of the ACEC.

The management direction and special management attention needed to protect the scientific values for Old Baldy have priority over the management direction for the Pacific Crest Trail SRMA (refer to Section 3.10). The designation of eligible Wild and Scenic River and inclusion within critical habitat units provides additional protections for the wildlife values of Jenny Creek, Lost Lake, Old Baldy, and Tunnel Creek.

Wildland fire management consists of fuels management and responses to unplanned ignitions (e.g., wildfires). Both fuels management and responding to unplanned ignitions are subject to a variety of constraints to protect resource values from the adverse effects. Temporary effects can occur, but post-activity restoration and rehabilitation measures are intended to correct any impacts, particularly with respect to responding to unplanned fires. Fuels management and vegetation management are closely connected with many of the same effects and constraining management direction (refer to Appendix E), and they are also expressed as best management practices (refer to Appendix I).

The two aspects of wildland fire management with the greater probability of longer-term effects on the relevant and important values and scientific values of ACECs and RNA ACECs are the option to use lightning-caused fires for resource benefits and actions taken to reduce the risk of unwanted fires or fire effects crossing the public-private boundary in either direction. In both cases, goals are to limit the occurrence of large areas of high-severity fire. However, the amount and spatial arrangement of private lands within the expansion area greatly limit options for using natural ignitions to help maintain the relevant and important values within the ACECs. Outside of the Soda Mountain Wilderness in the original CSNM boundary and in the California expansion area, all unplanned fires are to receive a suppression response. However, that response can vary in its intensity and in the Jenny Creek RNA ACEC the 1993 Redding RMP specifically calls for modified suppression tactics. Some benefits as well as harm to the values of all ACECs and RNAs may occur due to unplanned wildfires, but any effects are highly dependent on fuel and weather conditions and resource availability at the time of the fire.

Alternative B

Under Alternative B, Mariposa Lily would be redesignated as an ACEC and Cottonwood Glades would be designated as an ACEC. The same ACECs and RNAs under Alternative A would be included under Alternative B for a total of seven ACECs and two RNAs. As already discussed Oregon Gulch and Scotch Creek RNAs are also included within the Soda Mountain Wilderness so are not discussed further.

In addition to Jenny Creek, Cottonwood Glades, Lost Lake, Moon Prairie, and Tunnel Creek would also lie wholly or partly within eligible Wild and Scenic River corridors (Table 3-10). Old Baldy would lie partly within the Pacific Crest corridor and within the Dragon Spine/Vulture Rock ERMA. Cottonwood Glades would be included in the Buck Prairie ERMA. As under Alternative A, Moon Prairie and Tunnel Creek lie within grazing allotments; Lost Lake, Old Baldy, and Tunnel Creek within northern spotted owl critical habitat units; and part of Tunnel Creek within an Oregon spotted frog critical habitat unit. Lastly, a wildland urban interface/fuels emphasis area overlaps 48 acres of Cottonwood Glades and 168 acres of Mariposa Lily.

As with Alternative A, the management direction and special management attention identified would protect and maintain the relevant and important values of all ACECs and RNAs under this alternative. Additional protection would be provided by inclusion in eligible Wild and Scenic River, the Pacific Crest Trail corridor, and critical habitat units.

Table 3-10. Outstandingly Remarkable Values for eligible Wild and Scenic River segments that include an ACEC or RNA and the relevant and important values of the ACEC or RNA

ACEC/RNA	Eligible Wild and Scenic River Segment	Outstandingly Remarkable Values	Relevant and Important Values
Cottonwood Glades ACEC	Keene Creek	Fish, Wildlife, Cultural	Fish, Hydrology, Vegetation Communities
Jenny Creek RNA	Jenny Creek	Scenery	Fish, Vegetation Communities
Lost Lake RNA	Lost Creek	Scenery, Fish, Geologic	Fish, Northwestern Pond Turtle, Geology, Vegetation Communities
Moon Prairie ACEC	Hoxie Creek	Wildlife	Late Successional Forest
Tunnel Creek ACEC	Tunnel Creek	Wildlife, Botany	Oregon Spotted Frog, Hydrology, Riparian Plant Communities

Management direction for eligible Wild and Scenic River segments has priority over management direction and special management attention for ACECs and RNAs where any conflicts in direction exist. However, the management direction for eligible Wild and Scenic River segments is not dissimilar to the special management attention needed for the ACECs and RNAs. Site-specific analysis would be needed to determine if prescribed burning could occur to maintain fire-dependent pines and oaks in the Moon Prairie ACEC.

The management direction for the Pacific Crest National Scenic Trail supersedes that for the Old Baldy RNA ACEC should any conflicts develop. However, the management direction for National Scenic and Historic Trails generally and the Pacific Crest National Scenic Trail specifically is compatible with the special management attention needed for Old Baldy. The scientific values contained in Old Baldy are part of the recreational setting characteristics. Alternative B restricts vegetation and fuels management treatments within 500 feet of the trail, supporting the special management attention needed to protect the RNA ACEC's scientific values. The only potential impacts may be if dispersed camping were to begin within the RNA. However, the special management attention of minimizing human disturbance provides the needed direction to discourage or prohibit dispersed camping, should that develop. The same goes for the Pacific Crest National Scenic Trail's management direction to maintain the recreational setting characteristics and restrictions on vegetation and fuels treatment.

While no impacts have been documented within the Moon Prairie ACEC from cattle grazing, the potential for impact is the same as under Alternative A. Inclusion of Old Baldy in the Dragon Spine/Vulture Rock ERMA is not expected to result in any significant effects on the relevant and important values. Some additional protections are provided in that the ERMA would be closed to

camping, shooting, and biking and OHV travel would be limited to existing routes until travel management planning is completed. Travel management may need to close any existing trails used by motorized or mechanized vehicles that pass through Old Baldy, if any of the values are threatened by use or already damaged. Other aspects of ERMA management may need to be adjusted within Old Baldy such as harvesting of special forest products. Cottonwood Glades would be at greater risk of potential damage since the Buck Prairie ERMA off road travel by four-wheel drive vehicles, snowmobiles, and mountain bikes into the fen may occur despite the lack of a designated route.

Treatments within the WUI are typically more intensive with a goal of restricting the likelihood of large areas of high-severity fire and limiting the probability of high- and moderate-intensity fire crossing the public-private boundary where structures are present. Such treatments would reduce surface fuels, ladder fuels, and canopy fuels as needed to produce an expected flame length of four feet or less. A four-foot flame length represents the limit of direct attack tactics and creates a high probability of successful defense of both homes and CSNM objects and values. Wildland fire use would be limited to times and conditions when large areas of high intensity fire are not expected and when the fires are more likely to meet resource objectives for the designations affected. As such, the BLM expects to continue to suppress all unplanned fires during periods of high to extreme fire danger. While lightning-caused fires are rare during periods of low to moderate fire danger, they do occur. The specific limits on when lightning-caused fires might be used to meet CSNM management objectives are specified in the appropriate Fire Management Plan.

Under Alternative B, the entire CSNM, including all ACECs and RNAs would be suitable for wildfire use. Some of the values in the ACECs and RNAs would also benefit from wildfire use, particularly in RNAs where allowing natural processes to dominate is one of the special management actions. Although not explicitly called for as special management action, allowing natural processes to dominate is a common intent of BLM policy for ACECs and RNAs.

Any treatments to address the risks of high-intensity and high-severity fires would also need to protect the values in the Cottonwood Glades and Mariposa Lily ACECs. Depending on the specific site conditions, actions taken to address risks within WUI could also serve to protect those values.

Alternative C

Under Alternative C only Mariposa Lily and Cottonwood Glades would be designated as ACECs. The remaining ACECs and RNAs would revert to underlying designations (Table 3-11). Approximately 145 acres of WUI would overlap Mariposa Lily and 94 acres of Cottonwood Glades would underlie the Keene Creek eligible Wild and Scenic River segment. Table 3-10 displays the crosswalk between the tentative outstandingly remarkable values of Keene Creek and the relevant and important values of Cottonwood Glades. As with Alternative B, Cottonwood Glades would be included in the Buck Prairie ERMA. Oregon Gulch and Scotch Creek lie wholly within the Soda Mountain Wilderness, which protects their values. Scientific research, although rarely conducted, is also a purpose of the 1964 Wilderness Act.

Table 3-11. Designations that would replace the ACEC or RNA designations not carried forward in Alternative C

ACEC/RNA	Eligible Wild & Scenic River	PCT Corridor	NSO Critical Habitat Unit	Oregon Spotted Frog Critical Habitat Unit	EMA – Diversity Emphasis	EMA -Old Growth Emphasis	EMA - Riparian Habitat
Jenny Creek	253 ac	0 ac	0 ac	0 ac	204 ac	0 ac	64 ac
Lost Lake	313 ac	0 ac	376 ac	0 ac	41 ac	234 ac	111 ac
Moon Prairie	26 ac	0 ac	0 ac	0 ac	0 ac	20 ac	6 ac
Old Baldy	0 ac	143 ac	470 ac	0 ac	0 ac	466 ac	4 ac
Tunnel Creek	76 ac	0 ac	48 ac	38 ac	0 ac	5 ac	75 ac

Until suitability determinations are made, river segments that the BLM has determined eligible for inclusion in the National Wild and Scenic Rivers System are managed to protect their free flow, water quality, and outstandingly remarkable values. If the suitability analysis determines that a segment is not suitable, the default is to return to the underlying management designation and direction. Generally, these designations would be EMA-Riparian Habitat and some combination of EMA-Old-Growth Emphasis or EMA-Diversity Emphasis if no other designation higher in the hierarchy was present. The presence of critical habitat units in the place of Lost Lake, Old Baldy, and Tunnel Creek would aid in protecting the values of those portions included regardless of whether the ACEC or RNA ACEC was designated or not. Given that one purpose of all NLCS lands, including National Monuments and Wilderness, is to provide opportunities for scientific research, the identification of the values in these five ACECs and RNA ACECs along with those identified in Oregon Gulch and Scotch Creek RNAs provides location information for scientists to use.

The general management direction for National Scenic and Historic Trails allows for vegetation and fuel treatments if recreational opportunities remain unchanged and recreational setting characteristics are maintained. The preference is to allow wildfires to burn across the trail corridor instead of constructing mechanical firelines, and wildfire responses should protect the trail corridor values. The scientific values of 143 acres of Old Baldy RNA ACEC would be protected by the Pacific Crest National Scenic Trail direction to protect the recreational setting characteristics, and also by limiting vegetation and fuels treatment within 250 feet of the trail.

Should later assessments determine that any of the eligible Wild and Scenic River segments listed above are not eligible, then the land designation would revert to an Ecosystem Management Area designation. Approximately 10 percent of the Ecosystem Management Area would be treated per decade, including an estimated 1,538 acres of EMA-DE, 3,736 acres of EMA-OGE, and 881 acres of EMA-RH. The focus of treatments would be oak-pine, oak, meadow, shrubs, young stands, and mixed conifer, including within the wildland-urban interface. Since much of the purpose of treatments is to restore ecosystem functioning and biodiversity,

these treatments are expected to be compatible with protecting the vegetation and riparian/aquatic values in the discontinued ACECs.

While some of the special management attention needed was to allow for natural processes to dominate and minimize human disturbance, some level of disturbance is needed to restore or accelerate ecosystem processes interrupted or adversely affected by invasive plants and fire exclusion (refer Section 3.15, Vegetation for more details). The Vegetation analyses indicate that natural processes would dominate as management activities would occur at too small a scale both spatially and temporally to affect vegetation trajectories otherwise.

Grazing management is not expected to adversely affect the relevant and important values of Moon Prairie and Tunnel Creek ACECs, whether the ACECs are designated or not, due to the presence of the eligible Wild and Scenic River segments. Should any segments be determined to be ineligible, the use of outcome-based grazing management is expected to better protect the values associated with the former Moon Prairie ACEC, and the former Tunnel Creek would still be fenced to exclude cattle to protect Oregon spotted from habitat and the hydrological functions of this unique area. The BLM would continue to monitor to determine what impacts, if any, cattle resting in the former Moon Prairie is having on tree regeneration and what grazing modifications would be needed to alleviate impacts. Current use is minimal as abundant downed wood inhibits cattle use of the area.

Any impacts from recreation use and travel and transportation management for Mariposa Lily and the former Moon Prairie are expected to be the same as under Alternative B. The former Cottonwood Glades would remain at risk from inappropriate use of motorized and mechanized vehicles due to its inclusion in the Buck Prairie ERMA.

Wildland urban interface/fuels emphasis would overlay about 145 acres of Mariposa Lily ACEC. All of the CSNM outside of WUI would be suitable for use of unplanned natural ignitions. Many values within Mariposa Lily and Cottonwood Glades as well as the former ACEC and RNAs would benefit from use of lightning-caused fires. Such use would move toward restoring natural processes that are parts of a larger ecosystem process necessary for maintaining the biodiversity included in remaining and former ACECs and RNAs. The nature of Cottonwood Glades means fire would likely affect only the edges. As with Alternative B, actions taken within the WUI would need to protect any values potentially affected and WUI treatments can also benefit those values.

Alternative D

Under Alternative D no ACECs or RNAs would be carried forward. Instead, the management direction would become the next level of designation (Table 3-12). Vegetation management would focus on treating around legacy trees, in stands less than 60 years old, and along evacuation routes and for strategic control. Grazing management would be outcome based as in Alternatives B and C, but would be phased out over time. The entire CSNM outside of WUI would be suitable for use of unplanned natural ignitions. In Alterative D, WUI would be 120 feet from private-public boundaries where structures were present on private land, with a slight overlap where Mariposa Lily ACEC and Cottonwood Glades would have been.

Table 3-12. Designations that would replace the ACEC or RNA designations not carried forward in Alternatives D and E

ACEC/RNA	Eligible Wild & Scenic River	PCT Corridor	NSO Critical Habitat Unit	Oregon Spotted Frog Critical Habitat Unit	EMA – Diversity Emphasis	EMA – Old Growth Emphasis	EMA – Riparian Habitat
Jenny Creek	253 ac	0 ac	0 ac	0 ac	204 ac	0 ac	64 ac
Lost Lake	313 ac	0 ac	376 ac	0 ac	41 ac	234 ac	111 ac
Moon Prairie	26 ac	0 ac	0 ac	0 ac	0 ac	20 ac	6 ac
Old Baldy	0 ac	143 ac	470 ac	0 ac	0 ac	466 ac	4 ac
Tunnel Creek	76 ac	0 ac	48 ac	38 ac	0 ac	5 ac	75 ac
Mariposa Lily	0 ac	0 ac	0 ac	0 ac	188 ac	12 ac	52 ac
Cottonwood Glades	94 ac	0 ac	0 ac	0 ac	16 ac	18 ac	81 ac

As under Alternative C, the management direction for eligible Wild and Scenic Rivers, the Pacific Crest Trail, and critical habitat units is expected to protect the values in the former ACECs where that designation occurs. Natural processes would largely affect the trajectory values of the former ACECs and RNAs as treatment rates would be too low to have much impact (refer to Vegetation issues in Section 3.15 for details). With the possible exception of WUI in the former Mariposa Lily, no restoration treatments are anticipated within any of the former ACECs and RNAs. Given the investment and time in community-based restoration efforts in Mariposa Lily, the BLM expects this emphasis to continue with treatments continuing to reduce invasive plants and prescribed burning to favor the native vegetation, including Greene's mariposa lily, consistent with the special management attention identified for this area. No vegetation or fuels treatments, except as needed to protect public health and safety, would be allowed within the Pacific Crest Trail corridor.

The small size of the WUI under this alternative is unlikely to result in any adverse effects to relevant and important values or scientific values. Suppressing all unplanned fires regardless of burning conditions may result in a failure to obtain potential resource benefits to those values. Conversely, actual fire behavior could also result in allowing a fire under a suppression strategy to burn across an area with relevant and important values and scientific values, resulting in benefits to those values where the ACECs and RNAs would have been located under other alternatives.

Grazing management is not expected to adversely affect the relevant and important values of Moon Prairie and Tunnel Creek ACECs, whether the ACECs are designated or not, due to the presence of the eligible Wild and Scenic River segments. In addition, Tunnel Creek is fenced to exclude livestock and protect Oregon spotted frog habitat and the hydrologic functions of this unique area. The BLM would continue to monitor to determine what impacts, if any, cattle resting in Moon Prairie is having on tree regeneration and what grazing modifications would be needed to alleviate impacts. Current use is minimal as abundant downed wood inhibits cattle use of the ACEC.

Alternative E (Proposed RMP)

Like Alternative D, no ACECs or RNAs would be designated and the BLM would rely on management direction for the underlying management areas and associated designations (Table 3-12). The former Cottonwood Glades would be excluded from the Buck Prairie ERMA. Vegetation management would have the same emphasis and treatment rate as Alternative C. Grazing management would be outcome based as in Alternatives B and C. The entire CSNM outside of WUI would be suitable for use of unplanned natural ignitions. The WUI overlay would be the same as Alternative D, plus one-quarter mile from identified communities at risk with no WUI within the Soda Mountain Wilderness. That designation would result in the same amount of overlap in the former Mariposa Lily and Cottonwood Glades as in Alternative D. No vegetation or fuels treatments would be allowed within 250 feet of the Pacific Crest Trail except to as needed to protect public health and safety and to control invasive plants. Overall effects are expected to be very similar to Alternative D for most resource direction and Alternative C with respect to use of unplanned ignitions and vegetation management. Removal of the Cottonwood Glades area from the Buck Prairie ERMA and allocating the area as closed to public motorized access would increase the protection of this area from OHV use.

Cumulative Effects

As discussed in Vegetation Issue 4, invasive plants are expected to remain a constant presence throughout the EMA-DE area and become a permanent part of those plant communities, including within ACECs and RNAs. Climate change increases the uncertainty over success rates of restoration and fuels treatment activities and makes predictions difficult of how well the management direction under any alternative would protect the values identified in the ACECs and RNAs. A common prediction under climate change is that new plant communities would develop as the climate warms and dries, disturbances such as drought and fire become more common and more severe, summer low flows decline and spring runoff shifts to earlier in the year, and individual species migrate or adapt at their own rate, if at all. Some plant and animal species may be lost, and new species may migrate in. Management activities under all alternatives is too little to affect vegetation trajectories, habitat availability and quality, and resulting impacts on relevant and important values. The BLM cannot predict the timing, intensity, severity, or size of future natural events, increasing the uncertainty that the relevant and important values in ACECs and RNAs can be conserved regardless of whether the ACECs and RNAs were designated or not. In the case of RNAs, whether designated or not, these sites offer opportunities to track vegetation and habitat change through natural events and with climate change, thus fulfilling part of their purpose as well as a purpose of monument designation.

Conclusion

There is some risk of adverse effects to ACECs and RNAs when using lightning-caused fires for resource benefits, but the same also applies to wildfires that are suppressed. Treating WUI is not expected to result in direct or indirect impacts to relevant and important values or scientific values. In addition, both WUI treatment and wildfire use could result in benefits to the values in ACECs and RNAs under Alternatives B and C, and to a lesser degree under Alternative A.

Overall, the values identified within ACECs and RNAs would be protected under all alternatives. The relevant and important values of ACECs and scientific research values are also CSNM objects and values identified in the Proclamations. Most of the area encompassed by existing or proposed ACECs and RNAs would be protected by Congressional designations and other management area direction. If some segments overlaying an ACEC or RNA were later found to be ineligible, management direction for EMA–RH is expected to provide a similar or the same degree of protection. Management direction for all EMAs is expected to protect the values identified for all ACECs and RNAs given conformance with the proclamations and the overall purpose of the CSNM. Reducing fire risks in WUI is expected to benefit ACEC/RNA values by reducing the probability of unacceptable fire effects.

A low risk of potential adverse impacts from dispersed camping and road maintenance would be present in the Mariposa Lily and Moon Prairie ACECs. Uncertainty remains about the potential for adverse impacts to tree regeneration, if any, from livestock use of Moon Prairie for shade and resting. Wildfires, whether used for resource benefits or suppressed, can benefit or damage ACEC/RNA values, depending on burning conditions at the time of the fire.

3.4. CLIMATE CHANGE

Key Points

- Annual greenhouse gas emissions associated with management of BLM-administered lands would remain less than one percent of the 2021 statewide and national greenhouse gas emissions.
- Annual greenhouse gas emissions and the social costs associated with them on BLM-administered lands would increase under all alternatives, with the largest increase under Alternative B and the least increase under Alternative D.
- Science-based ecological restoration and hazardous fuels reduction would provide mitigation and adaptation benefits that could be applied to the CSNM that would potentially reduce social and ecological disruptions arising from warming and drying conditions.

Climate Change Analysis Issue

What would be the expected contribution to greenhouse gas emissions and associated social costs from BLM proposed management direction (e.g., ecological restoration, livestock grazing, prescribed burning)?

Summary of Analytical Methods

For this analysis, the BLM estimated the gross greenhouse gas emissions from prescribed burning, timber harvest, and livestock grazing. The BLM included wildfire emission estimates for the purpose of context with the emissions from management activities (timber harvest, livestock grazing, and prescribed). The term "timber harvest" is used in this section to describe the action of harvesting trees that result in GHG emissions when applying certain ecological restoration treatments.

This analysis is based on a quantitative assessment of GHG emissions, including those that lack carbon (nitrous oxide), and all relevant sources of emissions. These estimates are the direct emissions of the following GHG's: carbon dioxide, methane, and nitrous oxide. Because methane and nitrous oxide have higher global warming potential than carbon dioxide, the BLM followed global and national standards by reporting GHG emissions as carbon dioxide equivalents (CO2e) and multiplied the estimates by a global warming mathematical factor recommended by the IPCC (Lee & Romero, 2023). The Planning Criteria provides more detailed information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is incorporated here by reference (USDI BLM, 2023a). Appendix H details the estimation methods and associated uncertainties and the AMS for effects of climate change regarding GHG's state and nationwide (USDI BLM, 2023a, pp. 74–77).

Affected Environment

The planning area lies within the western Cascade Range and the Siskiyou subrange of the Klamath Mountains. This rugged topography of southwest Oregon and parts of Northern California, combined with diverse geology, make up a variety of hydrologic processes and sensitivities to climate change. Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be a result of natural variation, human impacts, or variations

in the solar cycle or other natural phenomena. Since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil, and gas (Lee & Romero, 2023). Current ongoing global climate change is linked to the atmospheric buildup of greenhouse gases (GHGs), which can persist for decades or even centuries. Each GHG has a global warming potential that accounts for the intensity of each GHG's heat-trapping effect and its longevity in the atmosphere (Dello & Mote, 2010; EPA, 2023).

Carbon dioxide emissions from combustion of fossil fuel for energy production in the United States were equal to 73 percent of total U.S. human-caused GHG emissions, while the other major GHGs like methane and nitrous oxide emissions caused by human activity make up another 18 percent of total human-caused U.S. GHG emissions in 2020 (U.S. Energy Information Administration, 2022). Nationally, these GHGs emissions make up a total of 91 percent. The remaining cause of GHG emissions from wildfires and prescribed burning make up considerably less relative to the U.S. total.

Figure 3-1 and Table 3-13 below shows the relative amount of GHG emissions from timber harvest, grazing, prescribed fire, and wildfire within the planning area from 2008–2022. Livestock grazing, timber harvest, and prescribed fire emitted much less GHG's than wildfire during this time-period. For context, average emissions from wildfires made up about 94 percent of all GHG emissions within the planning areas compared to excluding wildfire (Figure 3-2 and Table 3-14). During this span, 70,352 acres burned from wildfire and 18,090 acres were burned from prescribed fire on BLM–administered lands within the planning area. Only 17 acres burned between 2000-2008 resulting from wildfire.

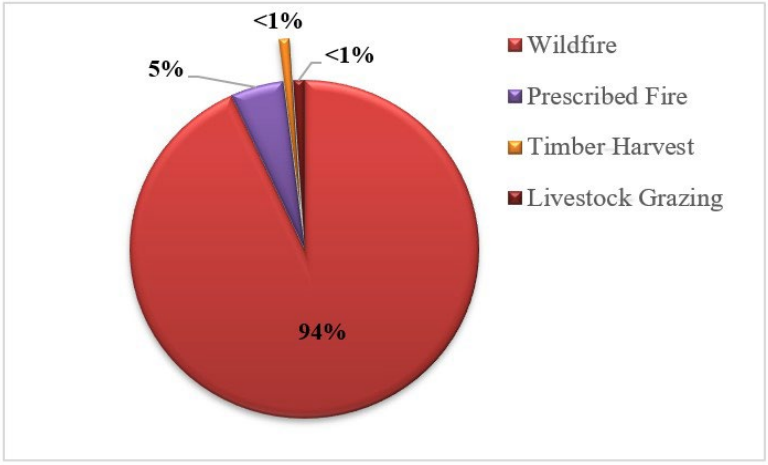


Figure 3-1. Proportion of estimated GHG emissions from livestock grazing (enteric fermentation), timber harvest operations, prescribed fires, and wildfires on BLM-administered lands within the planning area

Table 3-13. Annual GHGs (metric tons per year) by source in the planning area, including wildfire, 2008–2022

Source (includes wildfire)	Carbon Dioxide	Methane	Nitrous Oxide	AR6 100- Year CO2e*	AR6 20-Year CO2e**
Livestock Grazing	--	15.8	0.9	717	1,550
Prescribed Fire	8,900	0.68	0.34	9,013	9,049
Wildfire	169,215	13	6.5	171,377	172,063
Timber Harvest	169	--	--	169	169
TOTAL	**178,284**	**29.5**	**7.7**	**181,276**	**182,831**

* 100-year time horizon global warming potentials applied are carbon dioxide = 1; methane = 29.8; nitrogen dioxide = 273, from the IPCC Sixth Assessment Report (Lee & Romero, 2023).

** 20-year time horizon global warming potentials applied are carbon dioxide = 1; methane = 82.5; nitrogen dioxide = 273, from the IPCC Sixth Assessment Report (Lee & Romero, 2023).

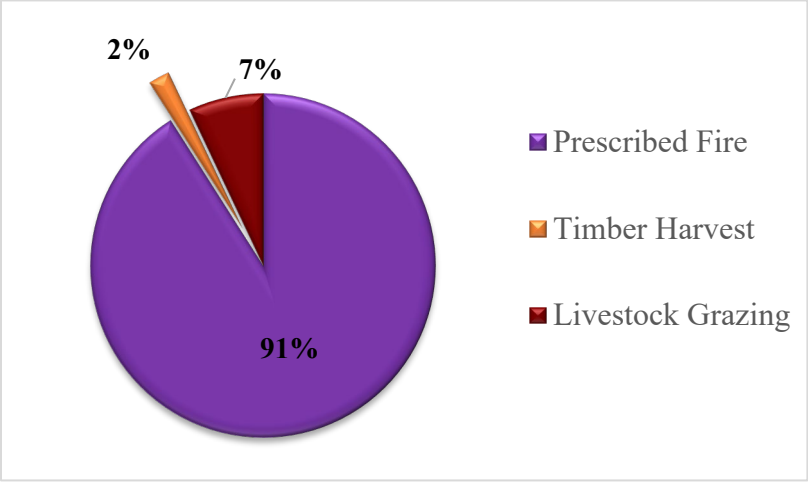


Figure 3-2. Proportion of estimated GHG emissions from livestock grazing (enteric fermentation), timber harvest operations, and prescribed fire on BLM-administered lands within the planning area, excluding wildfire

Table 3-14. Annual GHGs (metric tons per year) by source in the Planning Area, excluding wildfire, 2008–2022

Source (excludes wildfire)	Carbon Dioxide	Methane	Nitrous Oxide	AR6 100- Year CO2e*	AR6 20-Year CO2e**
Livestock Grazing	--	15.8	0.9	717	1,550
Prescribed Fire	8,900	0.68	0.34	9,013	9,049
Timber Harvest	169	--	--	169	169
TOTAL	**9,069**	**16.48**	**1.24**	**9,899**	**10,768**

* 100-year time horizon global warming potentials applied are carbon dioxide = 1; methane = 29.8; nitrogen dioxide = 273, from the IPCC Sixth Assessment Report (Lee & Romero, 2023)

**20-year time horizon global warming potentials applied are carbon dioxide = 1; methane = 82.5; nitrogen dioxide = 273, from the IPCC Sixth Assessment Report (Lee & Romero, 2023).

Environmental Consequences

Alternative A (No Action)

Under the No Action Alternative, the BLM would continue to contribute to the cumulative and current GHG emissions total from vegetation and livestock grazing management activities in the CSNM from 2008–2022 (9,899 Mg CO2e/yr.). Livestock grazing would result in GHG emissions that make up 7 percent of quantifiable GHG emissions in the CSNM. Prescribed fire would emit about 91 percent of the BLM management-related GHG's from the 15-year average (USDI BLM, 2023a). The level of timber harvest from ecological restoration treatments would stay the same and make up 2 percent of quantifiable GHG emissions in the CSNM. When applying the 100-year global warming potentials from the IPCC AR6, the average annual estimated CO2e from quantifiable emission-generating activities when modeled in the CSNM comprise approximately 0.02 percent of Oregon's total GHG emissions of CO2e in 2021 (ODEQ, 2023), and 0.002 percent of total U.S. total GHG emissions of CO2e in 2021 (EPA, 2023). Refer to Tables 3-14 and 3-15, and Figures 3-1, 3-2, and 3-3.

Alternative B

Alternative B would result in GHG total emissions (Mg CO2e/yr.) equal to 10,903 tons of 100-year time horizon CO2e and 11,776 tons of 20-year time horizon CO2e. Total emissions from vegetation and livestock grazing management activities under Alternative B would result in the most GHG emissions of all the Alternatives analyzed. Under Alternative B, ecological restoration treatments would increase climate resiliency, improving vegetation communities' health in the long term, compared with Alternative A. As described in Section 3.17, Fire and Fuels Management, this would result in more frequent, less severe fires. Management actions under this alternative would include the addition of restoration projects intended to restore ecological function to vegetation communities. These actions would improve the carbon storage potential in the CSNM. When applying the 100-year global warming potentials from the IPCC AR6, the average annual estimated CO2e from quantifiable emission-generating activities when modeled in the CSNM comprise approximately 0.02 percent of Oregon's total GHG emissions of CO2e in 2021 (ODEQ, 2023), and 0.002 percent of total U.S. total GHG emissions of CO2e in 2021 (EPA, 2023). Refer to Tables 3-14 and 3-15, and Figures 3-1, 3-2, and 3-3.

Alternative C

Alternative C would result in GHG total emissions (Mg CO2e/yr.) equal to 5,360 tons of 100-year time horizon CO2e and 6,211 tons of 20-year time horizon CO2e. Total emissions from vegetation and livestock grazing management activities under Alternative B would result in the most GHG emissions throughout all the Alternatives. Under Alternative C, ecological restoration treatments would increase climate resiliency, improving vegetation communities' health in the long term, compared with Alternative A. However, there would be less acres treated under this Alternative versus Alternative B. As described in Section 3.17, Fire and Fuels Management, this would result in more frequent, less severe fires. Management actions under this alternative would include the addition of landscape-scale restoration projects intended to restore functional vegetation communities. These actions would improve the carbon storage potential in the CSNM. When applying the 100-year global warming potentials from the IPCC AR6, the average annual estimated CO2e from quantifiable emission-generating activities when modeled in the CSNM comprise approximately 0.01 percent of Oregon's total GHG emissions of CO2e in 2021 (ODEQ, 2023), and 0.0001 percent of total U.S. total GHG emissions of CO2e in 2021 (EPA, 2023). Refer to Tables 3-14 and 3-15, and Figures 3-1, 3-2, and 3-3.

Alternative D

Alternative D would result in GHG total emissions (Mg CO2e/yr.) equal to 2,331 tons of 100-year time horizon CO2e and 2,340 tons of 20-year time horizon CO2e. Without livestock grazing under this Alternative, total emissions from vegetation management activities would result in the least GHG emissions throughout all Alternatives. Under Alternative D, ecological restoration treatments would increase climate resiliency, improving vegetation communities' health in the long term, compared with Alternative A (No Action). However, there would be fewer acres treated under this Alternative versus Alternatives B, C, and the Proposed RMP (Alternative E). These actions would improve the carbon storage potential in the CSNM, but not as much as these other Alternatives. When applying the 100-year global warming potentials from the IPCC AR6, the average annual estimated CO2e from quantifiable emission-generating activities when modeled in the CSNM comprise approximately 0.004 percent of Oregon's total GHG emissions of CO2e in 2021 (ODEQ, 2023), and 0.0004 percent of total U.S. total GHG emissions of CO2e in 2021 (EPA, 2023). Refer to Tables 3-14 and 3-15, and Figures 3-1, 3-2, and 3-3.

Alternative E (Proposed RMP)

The anticipated GHG emissions for vegetation management (i.e., ecological restoration) under Alternative E (the Proposed RMP) would be comparable to those of Alternative C. The only distinction between Alternatives C and the Proposed RMP is that the latter would have a smaller area of WUI than Alternative C, resulting in less than one percent difference in WUI acres. For additional details on the acreage of proposed treatments under the Proposed RMP, please refer to Appendix N.

The Proposed RMP would result in GHG total emissions (Mg CO2e/yr.) equal to 5,312 tons of 100-year time horizon CO2e and 6,155 tons of 20-year time horizon CO2e. Under this alternative, ecological restoration treatments would increase climate resiliency, improving vegetation communities' health in the long term, compared with Alternative A (No Action). However, the BLM would treat fewer acres under this Alternative versus Alternatives B. As described in Section 3.17, Fire and Fuels Management, this would result in more frequent, less

severe fires. Management actions under this alternative would include the addition of landscape-scale restoration projects intended to restore functional vegetation communities. These actions would improve the carbon storage potential in the CSNM. When applying the 100-year global warming potentials from the IPCC AR6, the average annual estimated CO2e from quantifiable emission-generating activities when modeled in the CSNM comprise approximately 0.01 percent of Oregon's total GHG emissions of CO2e in 2021 (ODEQ, 2023), and 0.0001 percent of total U.S. total GHG emissions of CO2e in 2021 (EPA, 2023). Refer to Tables 3-14 and 3-15, and Figures 3-1, 3-2, and 3-3.

Table 3-15. Annual GHGs (metric tons per year) by alternative in the planning area

Alternative	Carbon Dioxide	Methane	Nitrous Oxide	AR6 100- Year CO2e*	AR6 20-Year CO2e**
Alternative A (No Action)	9,069	16.48	1.24	9,899	10,768
Alternative B	10,059	16.57	1.28	10,903	11,776
Alternative C	4,586	16.15	1.07	5,360	6,211
Alternative D	2,301	0.18	0.9	2,331	2,340
Alternative E (Proposed RMP)	4,545	16.01	1.06	5,312	6,155

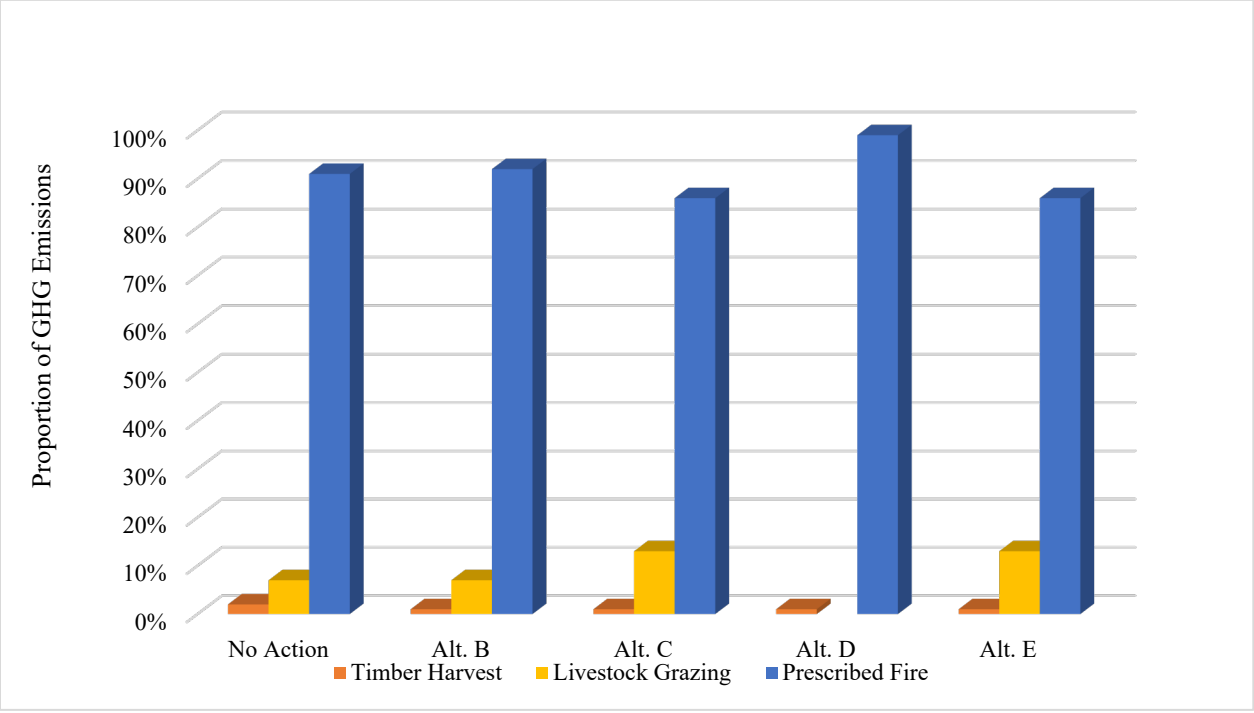


Figure 3-3. Annual GHGs (metric tons per year) by alternative in the planning area

Under all alternatives, ecological restoration and prescribed fire treatments would assist in maintaining ecological resilience across the planning area in a warmer climate. "Landscapes that retain functionality in a warmer climate would have greater capacity to survive natural disturbances and extreme events (Halofsky, Peterson, & Gravenmier, 2022). Climate change increases the uncertainty on the effectiveness and efficacy of different management approaches and is expected to contribute toward future wildfire risk include increasing temperatures, increasing drought frequency and severity, reduced snowpack, and fewer but more extreme precipitation events (Halofsky, Peterson, & Gravenmier, 2022). Assuming that climatic trends and the effects (i.e., drought) associated with such patterns continue, these forested lands would be less resilient to disturbance and, as has been shown in several cases in and around the CSNM, more susceptible to large-scale mortality events. As a result, existing forest types and habitat for late-successional dependent species would be compromised by increased fuel loading, thereby increasing fire hazard. These potential impacts from climate change to vegetation are described in more detail in Section 3.15, Vegetation, and Section 3.17, Fire and Fuels Management. Refer to the 2016 Western Oregon Proposed RMP/Final EIS (USDI BLM, 2016a, Vol.1, pp. 199–202) for additional information.

Cumulative Effects

As the analysis above shows, fire in the CSNM, whether prescribed or natural, is the dominant source of GHGs currently, comprising 99 percent of quantifiable total GHG emissions in the CSNM. Other BLM-authorized activities within the CSNM that have the potential to impact GHG concentrations include livestock grazing operations, and timber harvest from thinning. Currently, livestock-grazing emissions of methane comprise 2 percent of quantifiable GHG emissions in CSNM. Other potential impacts of livestock grazing that can impact climate change include the spread of noxious weeds and plants, as well as the reduction in soil nutrient contents, which exasperate climate change impacts. Conversely, sustainable livestock grazing can have beneficial effects by reducing fuel loads and improving soil conditions and biological diversity.

Harvest operations from thinning would result in emissions of GHGs from logging equipment, which comprise 7 percent of quantifiable GHG emissions in the CSNM currently. Impacts can also be the result of GHG emissions from prescribed fire or mechanical treatments that may be used where harvest does not occur. Indirect effects would occur if removed products are combusted for wood-burning purposes. Beneficial impacts would include a reduction of GHG emissions from wildfires, which, as explained in Section 3.17, Fire and Fuels Management, would result from management that would maintain or improve forest and woodland health and reduce the potential for catastrophic wildfire.

Ecological restoration addresses composition, structure, pattern, and ecological processes in terrestrial and aquatic environments, typically with a focus on long-term sustainability relative to desired social, economic, and ecological conditions (Halofsky, Peterson, & Gravenmier, 2022). Ecological restoration provides mitigation and adaptation benefits that could be applied to the CSNM. Conservation, improved management, and restoration of forests and other ecosystem services offer the largest share of economic mitigation potential. Ecosystem restoration, reforestation, and afforestation can lead to trade-offs due to competing demands on land (Lee & Romero, 2023).

Social Cost of Greenhouse Gases

The "social cost of carbon," "social cost of nitrous oxide," and "social cost of methane" – together, 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.

On January 20, 2021, President Biden issued E.O. 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. Section 1 of E.O. 13990 establishes an Administration policy to, among other things, listen to the science; improve public health and protect our environment; ensure access to clean air and water; reduce greenhouse gas emissions; and bolster resilience to the impacts of climate change. Section 2 of the E.O. calls for federal agencies to review existing regulations and policies issued between January 20, 2017, and January 20, 2021, for consistency with the policy articulated in the E.O. and to take appropriate action.

Consistent with E.O. 13990, the Council on Environmental Quality (CEQ) rescinded its 2019 "Draft National Environmental Policy Act Guidance on Considering Greenhouse Gas Emissions" and issued interim NEPA Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. This guidance, effective upon publication, builds upon and updates the CEQ's 2016 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. While CEQ works on updated guidance, it has instructed agencies to consider and use all tools and resources available to them in assessing GHG emissions and climate change effects, including recommending that agencies provide additional context for GHG emissions through the use of social cost of GHG estimates.

Regarding the use of Social Cost of Carbon or other monetized costs and benefits of GHGs, the 2016 GHG Guidance noted that NEPA does not require monetizing 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 how important it is for federal agencies to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account" and established an Interagency Working Group on the Social Cost of Greenhouse Gases (the "IWG"). In February 2021, the IWG published its *Technical support document: Social cost of carbon, methane, and nitrous oxide: Interim estimates under Executive Order 13990* (IWG, 2021). This is an interim report that updated previous guidance from 2016.

In accordance with this direction, this subsection provides estimates of the monetary value of changes in GHG emissions that could result from selecting 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 numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other 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-CO2), methane (SC-CH4), and nitrous oxide (SC-N2O) developed by the Interagency Working Group (IWG) on the SC-GHG. Select estimates are published in the IWG's *Technical support document* (IWG, 2021) and the complete set of annual estimates is available on the Office of Management and Budget's website. The IWG's SC-GHG 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 percent, 3 percent, and 5 percent (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 percent annual discount rate for future economic effects. This is a low-probability but high-damage scenario, representing an upper bound of damages within the 3 percent discount rate model. The estimates below follow the IWG recommendations.

Table 3-16 displays the SC-GHGs associated with estimated emissions from alternatives for the CSNM, using the emissions from Table 3-15. These estimates represent the present value of future market and nonmarket costs associated with CO2, CH4, and N2O emissions. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM's estimates of emissions in each year. They are rounded to the nearest $1,000. The social costs associated with carbon dioxide emissions are the greatest of the three gases. Alternative D has the lowest social costs among the alternatives. As described above in Climate Change analysis and in Section 3.17, Wildland Fire Management, the alternatives contain actions to address the risk of wildfires and improve the carbon storage potential in the CSNM. Alternatives that treat more acres could result in lower emissions from future wildfires, although these amounts are not quantified, and could therefore result in lower social costs associated with those wildfires.

Table 3-16. Present value (in 2024) of Estimated Social Cost of CO2, CH4, and N20 emissions, 2020$

Emissions	Alternative A	Alternative B	Alternative C	Alternative D
Carbon Dioxide				
Average, 5%	$2,331,140	$2,585,615	$1,178,808	$591,460
Average, 3%	$8,736,271	$9,689,950	$4,417,746	$2,216,580
Average, 2.5%	$13,176,880	$14,615,309	$6,633,267	$3,343,257
95th Percentile, 3%	$25,538,541	$29,435,680	$13,420,025	$6,733,443
Methane				
Average, 5%	$208,372	$209,510	$204,200	$2,276
Average, 3%	$516,177	$518,996	$505,841	$5,638
Average, 2.5%	$690,946	$694,719	$677,110	$7,547
95th Percentile, 3%	$1,375,332	$1,382,843	$1,347,792	$15,022
Nitrous Oxide				
Average, 5%	$128,978	$133,183	$111,295	$93,613
Average, 3%	$444,548	$458,888	$383,602	$322,656
Average, 2.5%	$665,258	$686,718	$574,053	$482,849
95th Percentile, 3%	$1,180,207	$1,218,278	$1,018,404	$856,602

3.5. HYDROLOGY

Key Points

- Management direction in the EMA-RH and the incorporation of Best Management Practices (BMPs) (Appendix I) would maintain and protect water quality to meet the Clean Water Act.
- Water availability is an increasing concern for CSNM objects and values. Drought, climate change, and legal exports of water from the CSNM are continued stressors on water resources, underscoring the need for vegetation management. Alternative B provides the most potential to improve or maintain summer low flows using vegetation treatments, due to the largest decadal target for ecological restoration treatments, which would include thinning and creation of forest openings in the current snow zone.
- Selection of Alternative C or E (Proposed RMP) would provide a benefit to water quality via a reduction in road sediment by restricting vehicular use of naturally surfaced roads during the wet season.
- Alternative D eliminates livestock grazing on 3,555 acres of EMA-RH and would result in a reduction of adverse effects to water quality on 137 acres of sensitive riparian meadows and wetlands, benefit riparian conditions, and improve summer streamflows.
- Alternative E (Proposed RMP) includes both interim and long-term/permanent management direction that would provide protections to sensitive aquatic and riparian habitats by requiring modifications to grazing practices where impacts continue to occur, including in unprotected sensitive areas prior to next livestock season of use.

Analysis Issue

1. How would management direction affect water quality and availability?

Hydrology Issue 1

How would management direction affect water quality and availability?

Summary of Analytical Methods

The geographic scale would be the planning area and the temporal scale would be the life of the plan (20 years).

Vegetation, livestock grazing, travel and transportation, lands and realty, recreation, and minerals management decisions have the potential to impact water quality and availability. For this analysis, the primary concerns for potential impacts to water quality are the reduction of stream shading (and increases to stream temperatures) from riparian vegetation removal and livestock grazing, and sedimentation from vegetation removal activities, grazing, and roads. Reservoir operations and legal water diversions out of the decision area greatly dictate water availability in the CSNM. Vegetation management decisions in the EMAs and livestock grazing management decisions have the potential to enhance the capture and storage of water across the landscape and improve water availability.

For the purposes of this analysis, BLM has made the following assumptions:

- Hydrologic features were analyzed as if all are within the EMA-RH (Ecosystem Management-Riparian Habitat), regardless of other overlapping designations. For analytical purposes, the BLM assumed the management direction for the EMA-RH would apply to the degree the management direction for the overlapping designations allow.
- Impacts to hydrologic resources are either qualitatively or quantitatively analyzed, based on the availability of data and the ability to forecast reasonable assumptions.
- No changes to current water management would occur. Inter-basin transfers would continue (primarily the export of surface water from Jenny Creek Watershed). The State of Oregon and California would issue surface water and groundwater rights on private lands in accordance with State laws.
- Private lands within the planning area would continue to be managed as they are currently (logging on private forest land, agricultural clearing, and grazing) based on historical use patterns.
- One site potential tree height width Riparian Reserves would be of adequate width to protect hydrologic resources (wetlands, springs, streams, constructed reservoirs, ponds, and lakes) by precluding sediment transport from upland areas (Rashin et al., 2006) and providing stream-channel shade (Groom, Dent, Madsen, & Fleuret, 2011; Reeves, Burnett, & McGarry, 2003; USDA FS & USDI BLM, 2004).
- Areas designated as seasonally limited and closed to public use would produce less road surface erosion and sedimentation impacts to streams, where roads are hydrologically connected. Hydrologic connectivity between roads and streams increases during the wet season (Furniss et al., 2000) and road surface erosion is much greater on unsurfaced roads than roads with aggregate surfacing (Swift, 1985).
- Climate trends would continue and amplify (refer to USDI BLM, 2023a, Section 6.3).
- With climate change, snowpack would be reduced, potentially causing lower base flows (Halofsky, Peterson, & Gravenmier, 2022).
- The use of BMPs is required by the Clean Water Act to reduce nonpoint source pollution to the maximum extent practicable. Nonpoint source pollution is defined as pollutants detected in waterbodies, such as streams or lakes, which come from the landscape in a dispersed manner. The BLM is responsible for implementing BMPs on the lands the BLM administers. The BMPs provide compliance with the Clean Water Act of 1972. All applicable BMPs would be carried forward in this plan (refer to Appendix I).

Affected Environment

The BLM manages on-the-ground activities to help minimize impacts on water resources for resource values (e.g., watershed function, wildlife, fisheries, and riparian systems) within a framework of applicable federal water laws and agency policies. The BLM complies with applicable State water laws in the management of on-the-ground activities, as stated in the BLM Manual 7250, Water Rights Manual, Section 1.2. States have primary authority and responsibility for the allocation and management of water resources within their borders except as otherwise specified by Congress. The BLM cooperates with State governments and complies with applicable state laws to the extent consistent with federal law to acquire, perfect, protect, and manage water rights to protect water uses identified for public land management purposes. The BLM ensures that land use authorizations granted to third parties contain appropriate terms

and conditions to protect BLM-administered water rights and uses. Third-party uses of appropriated water on BLM-administered lands that operate under BLM permitting authority shall comply with applicable state laws, federal laws, and executive orders.

The planning area is located in the Klamath and Rogue River basins and seven watersheds: Spencer Creek, Jenny Creek, Klamath-Iron Gate, Cottonwood Creek, Bogus Creek, Little Butte Creek, and Bear Creek. The planning area encompasses a variety of rivers with regulated flow, unregulated free-flowing watercourses, wetlands, lakes, reservoirs, constructed ponds, seeps and springs. Impacts on water quality and water supply are ongoing due to water management methods, changes in vegetation regimes, and climate change. Further detailed information on hydrologic features in the CSNM can be found in the AMS (USDI BLM, 2023a, Section 6.7) and is incorporated here by reference.

Water Quality

The Clean Water Act requires states to identify designated uses of water bodies as a component of the water quality standards. The Oregon Department of Environmental Quality (ODEQ) has designated the following uses for the Bear Creek and Little Butte Creek watersheds: domestic water supply (municipal and private), industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing, salmonid fish spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and hydropower (ODEQ, 2007a; ODEQ, 2008a). The upper portion of the Klamath River Basin crosses from Oregon into California. The 1957 Klamath River Basin Compact between Oregon and California recognizes the following designated uses for the Jenny Creek, Klamath-Iron Gate, and Cottonwood Creek Watersheds: domestic water supply; livestock watering; irrigation; protection and enhancement of fish, wildlife, and recreation resources; industrial; hydroelectric power production; navigation; and flood prevention (OWRD, 1997). Water quality standards are typically designed to protect the most sensitive designated uses within a waterbody. The most sensitive designated uses for the CSNM are the protection and enhancement of fish resources, salmonid fish rearing and spawning, aquatic life, and domestic water supply. Temperature, dissolved oxygen, bacteria/pathogens, turbidity, and sedimentation are the key water quality indicators most critical to these sensitive beneficial uses.

The Oregon DEQ's 2022 303(d) list of water quality limited streams includes streams within the planning area; these streams are listed in Table 6-5 of the AMS (USDI BLM, 2023a). In the Upper Bear Creek Watershed, Carter Creek, Emigrant Creek, and Tyler Creek are listed for temperature. In the South Fork Little Butte Creek Watershed, Lost Creek is listed for temperature and sedimentation. In the Jenny Creek Watershed, Keene Creek, Jenny Creek, and Johnson Creek are listed for temperature. No streams in the Klamath-Iron Gate Watershed or Cottonwood Creek Watershed portions of the planning area are on the 303(d) list for Oregon or California.

Section 303 of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for waters included on the 303(d) list. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. The Bear Creek Watershed TMDL (ODEQ, 2007a), Rogue Basin TMDL (ODEQ, 2008a), and Upper Klamath and Lost River Subbasins TMDL (ODEQ, 2017) are the applicable TMDLs to 303(d) listed streams within the decision area. Water Quality Management Plans (WQMPs) were developed by ODEQ to describe a strategy for reducing water pollution to the level of the load allocations prescribed in the three TMDLs (ODEQ, 2007b; ODEQ, 2008b; and ODEQ, 2017).

BLM developed three Water Quality Restoration Plans (WQRPs), which cover watersheds within the decision area, to address restoration on water quality limited streams and to provide a management framework for protecting and enhancing water quality on CSNM lands. The Upper Bear Creek Analysis Area WQRP (USDI BLM, 2008a), North and South Forks Little Butte Creek Key Watershed WQRP (USDI BLM, 2006), and Jenny Creek Watershed WQRP (USDI BLM, 2011a) constitute the BLM's commitment to the implementation of the TMDLs and WQMPs—given its status as a designated management agency responsible for compliance with the Clean Water Act on BLM-administered lands within the CSNM.

Water Quantity

There are no continuous streamflow-monitoring stations on non-regulated (natural flowing) streams within the planning area. Unregulated streamflows in the planning area fluctuate with seasonal variation of precipitation. Moderate to high flows generally occur from mid-November through May. Streamflows during the months of March, April, May, and part of June are augmented by melting snowpack in high elevations. Low flows normally coincide with the period of low precipitation from July through October.

The lowest streamflows in the planning area occur during the summer due to both natural and human-caused factors. Natural factors affecting summer flows include low summer rainfall and sustained high evapotranspiration. Summer streamflows in Jenny Creek Watershed are highly influenced by human-caused factors such as water withdrawals, reservoir storage, and interbasin transfers. Low summer flows in the other areas of the human-caused factors affecting low summer flows include riparian vegetation removal resulting from timber harvest, improper livestock grazing, or residential/agricultural clearing. Loss of riparian vegetation can lead to channel widening, channel degradation, or lowering of the water table (Platts, 1991). Channels that become wider and shallower have an increased stream surface area that can be heated up and lost to evaporation and more efficiently drain the adjacent floodplains. Lower water tables signify that less water is moving into the stream channel and thus there would be subsequent reduction in low flows.

Historically, beaver dams maintained high water tables and wide riparian areas by adding structure to the floodplains, dissipating stream energy, and capturing sediment. As beaver were trapped and removed from the monument, these beneficial hydrologic functions have been diminished.

Environmental Consequences

Management of the Congressionally Designated Management Area and Administratively Designated Management Area lands would not affect water quality or availability under any alternative because the management direction for these areas includes restrictions that would protect these lands from adverse effects, including effects to water quality and availability. This analysis focuses on how management direction for the Ecosystem Management Area would affect water quality and availability.

Vegetation Management Decisions

Alternative A (No Action Alternative)

Under the No Action Alternative, the Aquatic Conservation Strategy and the Riparian Reserves are designed to protect these features and ecosystems from potential effects of management activities in the adjacent management areas.

Common to Alternatives B, C, D, and E (Proposed RMP)

The Ecosystem Management Area consists of three sub-management areas: EMA-Old-Growth Emphasis, EMA-Diversity Emphasis, and EMA-Riparian Habitat (Table 2-3). Allowable methods for conducting ecological restoration activities in the EMA varies by alternative and includes prescribed fire, manual and mechanical thinning, seeding and planting, biological and chemical treatments, and Indigenous Knowledge methods. Impacts to water quality and availability are expected from vegetation removal and increased erosion and sedimentation from soil disturbance due to yarding and burning. Under these alternatives, the EMA-RH is designed to protect hydrologic features and riparian ecosystems from potential effects of management activities in the adjacent EMA-OGE and EMA-DE areas, and to provide management direction for implementation of restoration projects to improve water quality and availability.

Alternative A (No Action)

Under the No Action alternative, within the original Monument boundary, riparian areas (hydrologic features) are managed under the Aquatic Conservation Strategy (ACS), a strategy carried forward from the Northwest Forest Plan. The ACS strategy includes designation of Riparian Reserves (RR), which vary by watershed and are based on site potential tree heights (155 to 170 feet). Northwest Forest Plan guidance includes RR widths of two site potential trees for fish-bearing streams and one site potential tree width for all other streams. The lands in the expanded Monument in Oregon are managed under the SWO RMP (USDI BLM, 2016c), which does not follow the Northwest Forest Plan, but rather established a Riparian Reserve land use allocation. The SWO RMP applies RR widths ranging from a single site potential tree width for fish bearing and perennial streams to only a 50-foot width for intermittent streams within designated class III subwatersheds, which include Jenny Creek and Spencer Creek watersheds within the expansion area. In the SWO RMP, inner, middle, and outer zones are identified and include specific management direction for each zone. Areas within the expanded Monument in California are currently managed under the Northwest Forest Plan and incorporate the ACS as part of management direction (USDI BLM, 2023a, Section 6.5). Riparian Reserve widths range from 50 feet to 340 feet across the CSNM. For a more detailed discussion of the riparian management direction under the existing RMPs, refer to the Alternative A analysis in Section 3.2, Aquatic and Riparian Habitat.

Within the original Monument boundary negative short-term impacts to water resources in the monument could result from proposed activities (such as thinning and prescribed fire) that decrease vegetative cover, increase soil compaction, or increase soil erosion. Potential effects on water resources could include turbidity, sedimentation, and temperature (USDI BLM, 2005, p. 139). No increase in stream temperature is anticipated from thinning or prescribed burning in the Old Growth Emphasis Areas since shading would be maintained on perennial streams (USDI BLM, 2005, pp. 139–140). Treatment in RRs along perennial streams would be done in accordance with the Sufficiency Analysis for Stream Temperature (USDA FS & USDI BLM,

2004), would be proposed where vegetation density is high and would benefit from thinning, and would not occur in the primary shade zone. Management objectives in the Diversity Emphasis Area include protecting and enhancing hydrologic function and water quality (USDI BLM, 2005, p. 141). Restoration and protection of riparian areas and wetlands would be beneficial to water sources, improving hydrologic function and water quality. One of the primary management objectives for riparian areas in the existing CSNM RMP is the protection and enhancement of hydrologic function, aquatic connectivity, and water quality (USDI BLM, 2008, p. 58), which includes reducing water withdrawals where possible.

Under the No Action alternative, negative short-term impacts to water resources in the monument expansion area (i.e., lands within the decision area of the SWO RMP) could result from proposed activities (such as thinning and prescribed fire) that decrease vegetative cover, increase soil compaction, or increase soil erosion. Potential effects on water resources could include turbidity, sedimentation, and temperature. Management direction varies between the 2008 CSNM RMP and SWO RMP, but both allow for vegetative treatments within the RR for ecological or fuel reduction purposes. The SWO RMP includes specific direction on diameter limits for trees that may be cut, proximity of treatments to streams, and retention for canopy cover and trees per acre. For both RMPs, the RR was developed to protect riparian features and water quality from potential effects of forest management in adjacent upland areas. The RRs are of sufficient width to protect hydrologic resources and water quality (wetlands, springs, streams, constructed reservoirs, ponds, and lakes) by precluding sediment transport from upland areas (Rashin et al., 2006) and providing stream-channel shade (Groom et al., 2011; Reeves et al., 2003; USDA FS & USDI BLM, 2004).

Under both RMPs, the implementation of best management practices (BMPs) is essential to minimize adverse effects on water resources, especially the water quality limited (303(d)) streams in the monument. Management direction in both RMPs incorporates recovery goals identified for BLM-managed lands in the Water Quality Restoration Plans through active and passive restoration measures identified in the WQRPs. Riparian Reserve management direction across the CSNM includes restoration of instream and riparian features.

Alternatives B, C, D and E (Proposed RMP)

The proposed management of the EMA-RH is common to all action alternatives. Detailed information on the management direction for the EMA-RH can be found in Appendix E.

Management direction for EMA-RH includes application of a singular width to all streams based on the largest site potential tree height (170 feet) in the decision area, as opposed to varying widths across watersheds as under Alternative A. The area is divided into Inner and Outer Zones. In the outer zones, canopy cover of 50 percent or greater would protect secondary shade and micro-climate conditions. Compared to Alternative A, the action alternatives (Alternatives B, C, D, and E (Proposed RMP)) would reduce the width of the riparian management zone from two site tree widths to one site tree width in portions of the original CSNM and the expansion area in California. The action alternatives would also increase the riparian zone width for intermittent streams in portions of the expanded Monument currently following the SWO RMP direction. The EMA-RH width (170 feet) would be of adequate width to protect hydrologic resources (wetlands, springs, streams, constructed reservoirs, ponds, and lakes) and water quality by precluding sediment transport from upland areas (Rashin et al., 2006) and providing stream-channel shade (Groom et al., 2011; Reeves et al., 2003; USDA FS & USDI BLM, 2004).

Management direction for EMA-RH incorporates recovery goals identified for BLM-managed lands in the Water Quality Restoration Plans. Elements addressed by the recovery goals for the temperature TMDLs include stream shade, channel form, and streamflow. Proposed restoration would involve both passive and active strategies. Applicable passive restoration identified in the WQRPs includes allowing riparian vegetation to reach target shade values, allowing historic streambank failures to re-vegetate, and allowing natural channel evolution to continue. Active restoration in EMA-RH that is relevant to the WQRPs includes thinning and prescribed fire that would increase the growth rate and survival of riparian vegetation, vegetation planting that would result in increased tree height and density, and conducting ecological restoration activities such as the addition of large wood, Low Tech Process-Based Restoration, large boulders, and changes to cattle grazing practices and exclosure fencing to restore degraded channels.

All alternatives include management direction to secure water rights for the enhancement of water quality and availability. Both the Rogue Basin and the Klamath basin in Oregon are over-appropriated, meaning there are more surface water rights than there is available water. The Klamath Basin is closed to applications for new surface water rights. The Rogue Basin is not technically closed to new surface water right applications, but new junior water rights, if approved, are only likely to be valid, or viable, in water years with exceptional surplus surface water. Therefore, securing water rights to protect CSNM objects and support resilience is only likely through acquisition of parcels of land within the CSNM from willing sellers.

The EMA-RH management direction includes improving, reconstructing, or decommissioning water structures to improve channel complexity and water quality. This could include decommissioning diversion structures no longer needed for resource management and re-allocating water rights for the enhancement of aquatic life and water quality. Other EMA-RH management direction relevant to water quality and water availability includes conducting ecological restoration to restore degraded channels with large wood, Low Tech Process-Based Restoration, large boulders, and changes to cattle grazing and practices. Additionally, removal of encroaching conifer from riparian meadow systems would restore the hydrologic function and water storage.

An objective for the Ecosystem Management Area is to enhance the capture and storage of water across the landscape. Allowable treatments in the EMA-Old Growth Emphasis Area and EMA-Diversity Emphasis Area include forest thinning and prescribed fire. Physical interactions involving the capture, storage, and release of water are complex and vary by stream condition, slope, aspect, and other site conditions. Potential to change soil moisture through ecosystem restoration treatments in the EMA is discussed in Section 3.13, Soils. Appropriately sized forest gaps have the potential to alter the timing and magnitude of snowmelt. Snow ablation (melting and evaporation) is controlled primarily by solar radiation in smaller gaps, which is critically dependent on canopy cover and structure. In a study on the eastern slope of the Cascades in Washington, Sun et al. (2018) determined through hydrologic modelling that when 24 percent of the watershed drainage was converted to gaps 60 meters in diameter (0.06 acres), mean monthly stream flows were increased 13.5 percent to 40 percent during the low flow period from late summer through fall. This represents far more intensive treatment than is proposed in the management direction in EMA-OGE, but serves as a reference for capture, storage and release of snowmelt in the snow zone elevations in the CSNM. Sun et al. (2018) also concluded that a greater number of distributed small gaps can have greater potential for longer snow retention than a smaller number of larger gaps, given the same total gap acreage. Table 3-17 has a

summary of forested acres in the snow zone for potential gap placement (excluding Soda Mountain Wilderness acres). Selection of gap placement would include considerations such as slope, aspect, elevation, soil type and other site conditions. All vegetation treatments would be consistent with management direction in Congressionally Designated, Administratively Designated, and Ecosystem Management Areas.

Table 3-17. Summary of forested acres in all action alternatives in the snow zone

Watershed (HUC 5th field)	Forested acres in snow zone
Bear Creek	1,467
Little Butte Creek	2,475
Spencer Creek	2,127
Jenny Creek	27,656
Klamath-Iron Gate Watershed	64
Cottonwood Creek	79

Note: Soda Mountain Wilderness are not included in totals.

Forest thinning and gap creation, particularly within a drainage area, has the potential to result in small increases in summer base flows, which would benefit water quality and potentially provide lower stream temperatures. Low and moderate intensity fire that resulted in these similar forest conditions could have similar potential benefit to hydrologic conditions, but predicting the intensity and location of wildfire is not possible for this analysis. Alternatives B and C include decadal targets for restoration activities such as small diameter thinning and prescribed fire in the EMAs. Alternative B has the highest decadal target (20 percent) and allows for gaps sizes up to 4 acres. Alternative C has a smaller decadal target (10 percent) and allows for gaps sizes up to 2 acres. Alternate D does not include a decadal target for restoration, but BLM assumes 5 percent of the lands would be treated per the management direction. Alternative D focuses treatments in young stands <60 years old and around legacy trees (refer to Appendix E, EMA).

Management direction in the EMA-RH includes exploring opportunities to close areas to beaver trapping to improve riparian habitat conditions (refer to Appendix E, EMA-RH). Stored water in stream channels and on adjacent floodplains from increased beaver presence and dams would be available for release during summer low flow periods, providing a benefit to water availability (Hood & Bayley, 2008).

Alternative E (Proposed RMP)

Alternative E (Proposed RMP) has the same decadal target (10 percent) for thinning and prescribed fire and gap size allowance (up to 2 acres) as Alternative C. Alternative E (Proposed RMP) provides additional management direction for retaining riparian hardwood and brush species when implementing vegetative treatments within the EMA-RH. Retaining these species supports riparian plant community diversity and function.

Conclusion and Cumulative Effects

Water quality would be protected under Alternative A (No Action), since RR in the existing RMPs includes management direction that maintains shade and vegetation that filters sediment. Both RMPs also provide management direction for active restoration activities that benefit water quality and BMPs that protect water quality and ensure Clean Water Act compliance.

All the action alternatives would provide comprehensive management direction to protect water quality and availability in the EMA-RH for all riparian areas in the decision area. Specific management direction regarding ecological restoration, including increased beaver presence (USDI BLM, 2023a, Section 6.5, Planning Area Profile, Fish and Aquatic Habitat, incorporated here by reference), would increase water floodplain connectivity and water storage opportunities in riparian areas, potentially improving summer low flows. No increase in water temperature is anticipated from thinning or prescribed burning in the EMA-RH since shading would be maintained on perennial streams. Use of BMPs and specific management direction in the EMA-RH regarding yarding and road maintenance during ecological restoration activities would protect water quality and ensure Clean Water Act compliance.

With climate change, snowpack would be reduced, potentially causing lower base flows (Halofsky et al., 2022). Models that incorporate changes in snowmelt and the underlying geology suggest a 10 to 30 percent reduction in low flows across the planning area, with the more significant reductions in the watersheds in the Klamath Basin portions of the monument (Halofsky et al., 2022). These models do not take into account changes in vegetation associated with climate change. The BLM acknowledges that wildfire would likely continue to be a major change agent, interacting with other disturbance agents (e.g. drought and insect outbreaks) and affecting ecosystems and vegetation structure (USDI BLM, 2023a, p. 206). Increasing drought and resultant increases in fire and mortality may initially increase base flows. However, if such disturbances keep forests in earlier seral stages, increased water demand from vegetation may make low flows even lower (Perry & Jones, 2017). Appropriately sized gaps in the snow zone that retain snow for longer periods of time would have the potential to support low flows in the headwater regions of the CSNM. Low- and moderate-intensity fire that resulted in these similar forest conditions could have similarly potential benefit to low flows. Alternatives A, B, C, D, and E (Proposed RMP) include management direction for varying amounts of thinning. Alternative E (Proposed RMP) provides additional management direction to ensure riparian hardwood species are not cut when conducting vegetation treatments in the EMA-RH. Unlike Alternates A and D, Alternatives B, C and E (Proposed RMP) provide management direction for creating variably sized and spaced openings (gaps). Using thinning and appropriately sized and placed gaps, Alternative B has the most potential to yield small increases in low flows using vegetation treatments, strictly because of having the largest decadal acreage targets. Alternative D would have the least benefit to summer stream flows using vegetation treatments because it has the most limited thinning and decadal targets and does not include management direction for creating variably sized and spaced openings. However, under Alternative D, summer stream flows would benefit from grazing removal in active allotments as sensitive riparian areas crucial for water storage and release recover and improve.

Disturbances from some past BLM actions would continue to slowly recover in areas where riparian timber harvest occurred and in areas where grazing is no longer authorized. Past restoration activities in the decision area have included instream large wood placement, beaver dam analogs, and road decommissioning in the Soda Mountain Wilderness. Foreseeable future restoration activities include installing beaver dam analogs and riparian road decommissioning. Alternative B assumes the highest decadal acreage targets for ecological restoration across the EMA. Alternative B would result in the most potential to yield small increases in lowflows from vegetation treatments.

Grazing Management Decisions

Livestock grazing has the potential to change processes that affect water quality and quantity. Riparian vegetation removal reduces stream shade, increases erosion, increases stream channel width-depth ratio, and lowers the water table. Direct streambank disturbance causes increased erosion and increased channel width-depth ratios. Water quality contamination due to livestock in streams has the potential to increase bacteria and pathogens. Additionally, livestock grazing has the potential to decrease summer streamflow due to water withdrawals.

The level of impacts would depend on the intensity of grazing, range site potential, local climate and weather conditions, and the seasonal timing of use. Allotment management plans or Rangeland Health Evaluations based on Rangeland Health Standards and Guidelines, would monitor grazing practices, evaluate resource conditions based on soil conditions and land health, and would also take into consideration water resource impacts. Adequate ground cover would reduce soil erosion, increase infiltration to maintain water resources, and maintain watershed health and desired vegetation communities. The most acute areas for impacts would exist where livestock tend to concentrate such as salt licks, water sources, and fence lines.

Alternatives A (No Action), B, C, and E (Proposed RMP)

Under Alternatives A, B, C, and E (Proposed RMP), a total of 27,820 acres of lands would be available for grazing in the Jenny Creek, Bear Creek, Little Butte Creek, Spencer Creek, and Klamath-Iron Gate reservoir watersheds. Where available, the timing and intensity of grazing would continue at the current levels. Most of the lands available for grazing are in the Jenny Creek watershed. A total of 3,555 acres of EMA-RH are and would continue to be available to grazing. All riparian areas within one allotment (Deadwood) within the decision area were qualitatively assessed by BLM aquatics staff after the grazing season in the fall of 2023 and noted for presence/absence of cattle signs such as cattle trails, droppings, browse, post holing, bank trampling (refer to Section 3.2).

Unless inaccessible to livestock due to topographic constraints or fenced exclosures, the EMA-RH acreage, particularly along perennial stream reaches and long-duration intermittent streams, has the potential for grazing impacts on water quality and quantity. Water withdrawals and developments for livestock use reduces summer streamflows. Across the monument, in the 11 active grazing allotments there are more than 20 legal water developments (primarily reservoirs less than 0.25-acre feet in volume) for use by livestock. In forested riparian areas, cattle impacts to stream shade are limited because streams are primarily shaded by trees rather than riparian vegetation (shrubs, grasses, etc.). Cattle impacts to stream substrate are also less in areas with hardened stream substrate. Impacts to streams from cattle can occur in forested and meadow

riparian systems via routing of sediment from cattle trails, particularly where cattle access water and browse.

Riparian meadow systems are the most sensitive areas to livestock impacts. Table 3-2 in the riparian and aquatic habitat analysis (Section 3.2 above) includes a summary of acres of sensitive riparian meadows by watershed. These vulnerable 137 acres include wetlands and riparian meadows currently not excluded from cattle. The majority of these acres are within the Jenny Creek watershed. While they represent a small percentage of the EMA-RH acreage total, these areas serve as important water storage and release during low flow periods. Degraded and incised channels in these meadow and wetland systems reduce floodplain connectivity, limiting inundation and saturation of these areas during flood flows. Reduced water storage in these areas results in less available water to support summer lowflows.

Management for grazing direction under Alternatives A, B, C, and E (Proposed RMP) requires conducting grazing at levels that allow for the protection of CSNM objects and values, developing structural improvements (e.g. exclosures) to protect CSNM objects and values, and resting from livestock grazing those areas disturbed by natural and human-induced events. For Alternative E (the Proposed RMP), the BLM would also apply additional management direction to ensure protection of sensitive riparian areas (refer to Appendix E, section 4.G). The BLM would modify, as needed, grazing practices prior to the next livestock season of use to meet established standards for utilization, stubble height, and browse of riparian woody vegetation. Per the grazing management direction outlined in Appendix E, grazing levels would be determined by current land health assessments and valid scientific studies of livestock impacts on CSNM objects of biological interest. Appendix Q outlines the framework for making future decisions regarding livestock grazing. Based on assessments, the BLM would take actions to protect CSNM objects and values, such as adjusting seasonal timing of grazing, applying rotational grazing, or installing range improvements. Exclosure fencing of sensitive areas identified in Rangeland Health Assessments and grazing compatibility studies (following the framework in Appendix Q) would occur on a site-specific basis to protect these areas.

Alternative D

Under Alternative D, all lands would be unavailable for livestock grazing. Existing leases would be phased out as they expire and would not be renewed. Impacts from grazing such as riparian vegetation removal, reduction of stream shade, increased erosion from bank trampling and hoof shear, and channel widening would not continue. Water withdrawals for livestock consumption would not continue nor would water quality contamination due to livestock in streams. Degraded areas of riparian vegetation would gradually recover and in the long term, channel morphology would improve as banks revegetate and stabilize. With the removal of livestock, compacted areas of soil within the riparian areas would recover from grazing impacts at varying time scales. This alternative eliminates the potential for impacts from grazing in the long-term and the management direction for EMA-RH provides the tools to restore any degraded areas, if applicable. For example, the BLM would be able to use large wood additions, boulders, and Low Tech Process-Based Restoration to restore hydrologic floodplain connectivity, hydrologic function, and riparian plant communities.

Conclusion and Cumulative Effects

Under Alternatives A, B, C, and E (Proposed RMP), sensitive areas would continue to be impacted in the short term until adjustments or modifications to practices are made. Alternative E (Proposed RMP) would provide interim protections to sensitive aquatic and riparian habitats by requiring modifications to grazing practices where impacts continue to occur, including in unprotected sensitive areas prior to next livestock season of use. These interim protections of sensitive riparian areas would improve water storage and contribute to the maintenance or improvement of water quality. Other EMA-RH acres within the available lands for grazing accessible by cattle would have direct impacts to water quality in areas of concentrated use (e.g. cattle trails). Additionally, water withdrawals for livestock use would decrease summer streamflows. Per the grazing management direction outlined in Appendix E, grazing levels would be determined by current land health assessments and valid scientific studies of livestock impacts on CSNM objects and values. Appendix Q outlines the framework for making future decisions regarding livestock grazing. The management direction for the EMA-RH and livestock grazing provides tools to restore degraded areas including, but not limited to, exclosure fencing; instream restoration, such as installation of beaver dam analogs; riparian planting of site-appropriate vegetation; and changes to livestock grazing management. Alternative D would eliminate grazing, which would have beneficial effects to water quality, riparian vegetation, and summer streamflows. As sensitive wetlands and riparian meadows recover, water storage would improve. Degraded areas with channel incision or high width-to-depth ratios may need active restoration in order to establish floodplain connectivity and restore hydrologic processes.

Across the planning area grazing is occurring, and would likely continue to occur, on private lands. Grazing impacts on these lands would continue to varying degrees, based on riparian habitat types (e.g. forested riparian, wetlands, or springs). The Jenny Creek watershed would be a particular focus of additional grazing related impacts, due to the high percentage of private industrial timber land with active grazing, particularly in the Johnson Creek subwatershed. The BLM would continue to address the impacts of trespass feral horses in accordance with BLM trespass regulations (43 CFR 4150) and removing or returning wild horses straying from outside the herd management area consistent with the Pokegama Herd Management Plan.

Travel and Transportation Management Decisions

Roads, road maintenance, and road use affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, water quality, and riparian conditions within a watershed. Road maintenance can cause a short-term increase to sediment delivery during activities such as blading and ditch cleaning. However, road maintenance can also reduce potential sediment delivery through the addition of surfacing and disconnecting roads from streams via outsloping and drainage improvements, such as adding cross drains, rolling dips, and water bars. A dense road network can intercept groundwater and exacerbate summer low flow conditions (Moore & Wondzell, 2005).

Public motorized vehicle use on low-volume roads and native surfaced roads can affect the water quality of streams and waterbodies connected to streams by increased sediment delivery and contamination from vehicle fluids. The specific effects of individual roads and public motorized use on water quality and availability would be addressed in the preparation of implementation-level transportation management plans.

Management direction for future transportation planning relevant to water quality and water availability includes reduction of road density in riparian areas, disconnection of roads from hydrologic features, and limiting public motorized use to existing roads. While not a decision in this RMP, future transportation planning efforts which include specific route analysis would identify opportunities to decommission roads to protect CSNM objects and values.

Decommissioning roads and reducing road density would provide overall improvement to the hydrologic function and water quality in the drainages affected. Decommissioning roads also restores compacted ground, improves infiltration, and restores hydrologic pathways for shallow groundwater. More specifically, decommissioning roads with hydrologic connectivity would reduce road-caused sediment delivery and the risk of culvert-related road failure while allowing for recovery of riparian vegetation. Full road-decommissioning activities include removing culverts and fill at stream crossings and ditch relief locations, laying back stream banks to at least a 2:1 slope, restoring stream channel gradients, recontouring the road prism, breaking up compaction, scattering available vegetation, and spreading native seed to prevent erosion.

Under all alternatives, the original CSNM boundary would limit motorized use to existing roads and the Soda Mountain Wilderness would remain closed to all motorized vehicle use.

Alternative A (No Action)

Under Alternative A, all acres outside the wilderness would remain designated as limited to existing roads and trails, meaning only existing roads and trails can be used for public motorized access. All the current RMPs include provisions for maintaining access to private lands, including new road construction under terms of ROW authorizations. There are no prohibitions on the use of OHVs on BLM-administered roads in the CSNM (except in the Soda Mountain Wilderness). There are approximately 583 miles of roads within the planning area boundary. Natural surface roads would remain designated open for legal use during the wet season. Motorized use of these types of roads in the wet season can increase sediment delivery from portions of the roads that are hydrologically connected to streams. Hydrologic connectivity between roads and streams increases during the wet season (Furniss et al., 2000) and road surface erosion is much greater on unsurfaced roads than roads with aggregate surfacing (Swift, 1985).

The Jenny Creek watershed has the largest percentage of the roads, followed by the Bear Creek watershed. See Table 3-4 in riparian and aquatic habitat section (Section 3.2 above) for an accounting of roads by watershed within the planning area.

Alternative B

The management direction for future transportation planning relevant to water quality and water availability includes reduction of road density in riparian areas and disconnection of roads from hydrologic features and limiting public motorized use to existing roads.

Alternative B designates ACECs, and the certain recreation management areas as closed for motorized access. Administrative use continues to be allowed in these areas.

This alternate proposes several transportation decisions not relevant to protecting water quality. Under this alternative, the Hyatt Lake campground and Table Mtn. SRMA would seasonally close roads from December 1 through March 31. This decision does not affect water quality since the roads within these areas are paved and not within the EMA-RH. This alternative

proposes to restrict wheeled vehicle use in the Buck Prairie ERMA during this same date range which is of little benefit to water quality because travel is typically precluded by snowpack. This date-range restriction does not include the wet season, before snowfall and after snow melt, when wheeled travel restriction would be more beneficial to protecting water quality. The Lost Lake RNA and Old Baldy RNA would both be designated as closed. However, the Lost Lake RNA has no existing roads, and the Old Baldy RNA has no hydrologic features.

The closed designation would improve water quality in the Cottonwood Glades ACEC and Buck Rock Tunnel ERMA. In these areas, designated as closed, there are 4.9 miles of road in riparian areas and 24 stream crossings. Closing vehicle traffic in the Cottonwood Glades ACEC would help protect a sensitive fen and meadow system and damage from a native surfaced road with a stream crossing. Alternative B would provide minimal benefit to water quality but would provide a measure of protection for Cottonwood Glades ACEC and Buck Rock ERMA.

Alternative C

The management direction for future transportation planning relevant to water quality and water availability includes reduction of road density in riparian areas and disconnection of roads from hydrologic features and limiting public motorized use to existing roads.

Alternative C proposes to close the proposed Cottonwood Glades ACEC and Buck Rock Tunnel ERMA to motorized access, except for administrative access. Lands managed for their wilderness characteristics would also be closed in this alternative, except for administrative access.

Under this alternative, the Hyatt Lake campground and Table Mountain SRMA would seasonally close roads from December 1 through March 31. This decision does not affect water quality since the roads within these areas are paved and not within the EMA-RH. Buck Prairie ERMA would be a smaller area under this alternative than Alternative B. As in Alternative B, restriction of wheeled vehicle use during the snow season is of little benefit to water quality.

As in Alternative B, the closed designation in Alternative C would benefit water quality in the Cottonwood Glades ACEC and Buck Rock Tunnel ERMA. Due to the addition of the closure of LWCs, Alternative C would include closing 17.4 miles of roads within the EMA-RH and 119 stream crossings (refer to Table 3-5). Alternative C also proposes to seasonally restrict vehicle use on naturally surfaced roads from December to May across the decision area. This would preclude vehicle use of 25.4 miles of roads and 166 stream crossings within the EMA-RH during the wet season.

Alternative D

The management direction for future transportation planning relevant to water quality and water availability includes reduction of road density in riparian areas, disconnection of roads from hydrologic features, and limiting public motorized use to existing roads.

Under this alternative, the Hyatt Lake campground and Table Mountain SRMA would seasonally close roads from December 1 through March 31. This decision does not affect water quality since the roads within these areas are paved and not within the EMA-RH.

Alternative D closes the proposed Grizzly Peak recreation area and the Lands with Wilderness Characteristics to motorized access, except for administrative access. In total the closed areas

include 52.7 miles of road, of which 13.7 miles are within EMA-RH (Table 3-5). The total number of stream crossings are less than under Alternative C. No areas would be seasonally restricted. All other roads would be open to street legal vehicle use, despite being closed to OHV use, which ultimately provides no benefit to water quality. Alternative D prohibits the construction of new roads or trails but does allow for the re-routing of existing trails and roads, where doing so is necessary to protect CSNM objects and values.

Alternative E (Proposed RMP)

The management direction for future transportation planning relevant to water quality and water availability includes reduction of road density in riparian areas and disconnection of roads from hydrologic features and limiting public motorized use to existing roads.

The Proposed RMP includes the same closures and seasonal restrictions, and therefore would have the same effects as Alternative C. One additional benefit to water quality would be the seasonal restriction of roads in the Buck Prairie ERMA from November 1 to April 30, which includes the shoulders of the wet season. Alternative E (Proposed RMP) does not include the designation of the Cottonwood Glades ACEC, but that area would be designated as closed to public motorized access as it is in Alternative C. Unlike the other alternatives, management direction in Alternative E (Proposed RMP) includes defining levels of road decommissioning, consistent with valid existing rights, for roads with no future resource management need as well as roads not currently needed for resource management but with a future need for use.

Conclusion and Cumulative Impacts

Selection of Alternative C and E (Proposed RMP) provides the greatest potential benefit to water quality because it would close more areas to vehicular travel than the other action alternatives as well as the No Action Alternative. Additionally, until comprehensive transportation planning occurs, Alternative C and E (Proposed RMP) restrict the use of naturally surfaced roads during the wet season. This would be of increasing benefit to water quality as climate change results in reducing the snowpack that currently precludes travel on naturally surfaced on roads. Alternative D would include closure of areas with fewer road miles and stream crossings than Alternative C and E (Proposed RMP). Alternative D also contains no provision to restrict the use of naturally surfaced roads in the wet season. Alternative B provides the least potential benefit to water quality but would close motorized access in Cottonwood Glades ACEC and the Buck Rock Tunnel ERMA.

Roads within the proposed closure areas would continue to exist and be used for administrative purposes. Until future transportation planning decisions, these roads still exist and have the potential to deliver sediment to streams and intercept and route shallow groundwater. The closure of roads to public use would reduce sediment delivery to streams when compared to roads that are open to public use. Closure of naturally surfaced roads during the wet season provides a similar benefit to water quality. Future comprehensive travel management would identify opportunities to improve water quality and quantity through decommissioning and closures. Funding is secured for two routes in the Jenny Creek watershed identified for decommissioning that include four stream crossings. Decommissioning these roads would restore natural flowpaths in wetland areas bi-sected by the current roads and reduce sediment inputs to hydrologically connected streams and hydrologic features.

Private lands within the CSNM boundary would continue to be managed as they are currently, with naturally surfaced roads being used without restriction during the wet season.

Lands and Realty Decisions

Except for exclusion zones, management direction from lands and realty allows a variable amount of ROW authorizations throughout the planning area. Areas that are managed as ROW exclusion areas would eliminate impacts on water resources from ROW-related ground disturbing activities. A ROW authorization gives a valid existing rights holder the ability to provide reasonable access to their property, which is typically a surfaced road. BMPs for ROW road construction would be implemented to meet water quality objectives.

Alternatives A (No Action) and B

All lands within the decision area are ROW avoidance areas, except for the Soda Mountain Wilderness which is a ROW exclusion zone. Under Alternatives A and B there would be 88,799 acres of ROW avoidance areas and 24,700 acres of ROW exclusion areas. ROW avoidance areas allow new ROW only if the BLM determines that the ROW proposals are compatible with the protection of CSNM objects and values and when no feasible alternative route is available as applicable with BLM laws and policy. Management direction allows for renewal, assignment, and amendment of existing ROW for linear features (e.g. roads) where compatible with the protection of CSNM objects and values. Acres considered ROW avoidance areas would have the greatest potential for impacts to water quality from roadside vegetation management, road construction and road maintenance such as grading and ditch cleaning. In ROWs approved in EMA-RH, these activities can cause sediment delivery to streams, channel disturbance if stream crossings are installed, and reduction of streamside shade. These actions would not occur over all 88,799 acres of the ROW avoidance area. Most private parcels are accessed under casual use as existing roads are generally open to the public. The historic average for ROW approvals in the planning area has been two per year. All road construction and road maintenance would comply with the protection of CSNM objects and values by conducting site-specific NEPA analysis and through the proper application of best management practices.

Alternative C and E (Proposed RMP)

All lands within the decision area are ROW avoidance areas, except for the Soda Mountain Wilderness and lands managed for wilderness characteristics which are ROW exclusion zones. Under Alternative C and E (Proposed RMP), there would be 80,258 acres of ROW avoidance areas and 33,248 acres of ROW exclusion areas. Acres considered ROW avoidance areas would have the greatest potential for impacts to water quality from roadside vegetation management, road construction and road maintenance such as grading, and ditch cleaning. In ROWs approved in EMA-RH, these activities can cause sediment delivery to streams, channel disturbance if stream crossings are installed, and reduction of streamside shade. These actions would not occur over all 80,258 acres of the ROW avoidance area. Most private parcels are accessed under casual use as existing roads are generally open to the public. The historic average for ROW approvals in the planning area have been two per year. All road construction and road maintenance would comply with the protection of CSNM objects and values by conducting site-specific NEPA analysis and through the proper application of best management practices.

Alternative D

Under Alternative D, the ROW exclusion areas would be approximately 113,500 acres, the entire decision area. For ROW exclusion areas, management direction dictates no granting of new ROW, except when mandated by law, or as necessary for the administration of valid existing rights and providing reasonable access. Additionally, existing ROW for linear features (e.g., roads and utilities) would not be eligible for renewal or amendment, except when mandated by law, or as necessary for the administration of valid existing rights and providing reasonable access. While the exclusion zone severely limits the chance of impacts on water resources, the BLM would still provide reasonable access to valid existing rights holders. The same impacts on water resources that happen in ROW avoidance zones may happen in ROW exclusion zones, albeit less likely. All road construction and road maintenance would comply with the protection of CSNM objects and values by conducting site-specific NEPA analysis and through the proper application of best management practices (refer to Appendix I).

Conclusion

The historic level of ROW authorizations in the planning area does not present a significant impact to water quality or availability. Assuming historic levels of ROW authorizations are carried forward, there would be two ROW authorizations per year over the life of the plan. Any ground-disturbing activity associated with ROW authorizations would have site-specific NEPA associated with them, which offers analysis and the opportunity to apply best management practices to minimize impacts on water quality and availability.

Recreation Management Decisions

The management decisions for recreation that could influence water quality include seasonal road closures (discussed in the Travel and Transportation Management Decisions section) and designation of recreation management areas. The designations vary by alternative (Table 3-6) and could potentially include new developments in riparian areas. Potential future developments are unknown but could include trail development and site-level disturbance to riparian vegetation. If a road is present, there could be dispersed camping. Dispersed camping has the potential to negatively affect water quality due to improper waste disposal and ground disturbance resulting in sediment delivery if the camping occurs adjacent to a hydrologic feature. The location and extent of dispersed camping is difficult to predict.

The demand for public lands for outdoor recreation would continue to increase in intensity. Estimated visitor use in the CSNM has increased 22 percent from 2012 to 2022. Management direction for recreation development and use includes protection of CSNM objects and values, which include water quality and quantity and aquatic and riparian habitats. Any future proposals for expansion of recreation opportunities would be evaluated to ensure that they protect and maintain water quality and quantity via site-specific NEPA analysis and through the proper application of best management practices.

Minerals Management Decisions

Analysis of quarry development and use is analyzed in the Aquatic and Riparian Section of this Final EIS. Quarries located within a 50-foot lineal distance of streams or waterbodies have the potential to affect water quality via the reduction of stream shade or sediment delivery due to expansion or use. Effects on water quality are the same as those identified to aquatic and riparian habitat. No quarries are near the streams listed as water quality limited on the ODEQ's 2022 303(d) list (refer to USDI BLM, 2023a, Section 6.5).

3.6. LANDS AND REALTY

Key Points

- Land Tenure Zone 1 lands (WSRs, NHT corridors, wilderness, LWC, etc.) would not be available for exchange. Land Tenure Zone 2 lands within the decision area would be available for exchange only if exchange furthers the purposes of the CSNM. Lands under BLM administration within existing and future designated and eligible Wild and Scenic River corridors; wilderness areas; National Scenic and Historic Trail management corridors; lands managed for their wilderness characteristics; and lands acquired with Land and Water Conservation Funds (LWCF) would not be available for exchange under any action alternative.
- Under all alternatives, BLM-administered lands would generally be available for ROWs for administration of valid existing rights (VERs), to provide reasonable access to non-federally owned lands when no feasible alternate route is available, or subject to applicable laws. Alternative D would most constrain the BLM's ability to grant ROWs. Alternative D would phase out all discretionary land use authorizations that do not meet those criteria.

Analysis Issues

1. How would land tenure allocations affect lands available for exchange and acquisition?
2. How would the allocation of ROW avoidance and exclusion areas affect the availability of BLM-administered lands for ROWs, leases, and other land use authorizations?

Lands and Realty Issue 1

How would land tenure allocations affect lands available for exchange and acquisition?

Affected Environment

There are 504 privately owned land parcels (approximately 51,780 acres) within the CSNM boundary. The intermixed land ownership presents challenges to managing for the benefit of resources such as wildlife connectivity, visual resources, and travel management. The BLM has acquired approximately 12,400 acres within the decision area since 2010.

Under the proclamations, BLM-administered lands within the CSNM boundary were withdrawn for disposal or sale but remain available for exchange.

Summary of Analytical Methods

The BLM identified the number of acres in each alternative and the Proposed RMP that would be included in each Land Tenure Zone. Through RMP-level decisions, the BLM places all of BLM-administered lands into one of the following two Zones:

- Lands in Zone 1 are retained under BLM administration.
- Lands in Zone 2 are available for exchange as long as the exchange furthers the purposes of the CSNM.

For all action alternatives, the BLM used the following criteria to determine Land Tenure Zones:

- Zone 1 lands:
    - Designated and eligible Wild and Scenic River corridors
    - Wilderness areas
    - National Scenic and Historic Trail management corridors
    - Lands managed for their wilderness characteristics
    - ACECs and RNAs
    - Lands acquired with Land and Water Conservation Funds (LWCF)
- Zone 2 lands:
    - All remaining lands within the decision area

This analysis of Land Tenure Zones does not present acreage by specific criteria (e.g., ACECs and National Historic and Scenic Trail management corridors). These specific criteria have substantial geographic overlap, creating confusion and errors related to the acreage associated with each specific criterion. Instead, the BLM identifies the criteria and presents the total acreage for Zones by alternative.

Environmental Consequences

The difference between Alternatives A (No Action), B, C, and E (the Proposed RMP) is the acreage distribution of Zones 1 and 2 (Table 3-18). While the criteria remain the same across all alternatives, the acres of those criteria vary by alternative. Designated wilderness and lands acquired with LWCF acreages do not vary by alternative. Under Alternative D, no acres would be available for exchange.

Table 3-18. Land tenure zone allocations by alternative in approximate acres

Zones	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Zone 1 – Lands Identified for Retention	~36,523 ac.	~54,529 ac	~57,737 ac.	~113,506 ac.	~57,738 ac.
Zone 2 – Lands Available for Exchange	~76,993 ac.	~58,987 ac	~55,778 ac.	0 ac.	~55,778 ac.

Land Tenure Zones

Common to All Alternatives

Any land acquisition (whether through purchase, exchange, or donation) must result in a net gain of objects and values in the CSNM, such as wildlife habitat and connectivity corridors, threatened and endangered or sensitive species habitat, riparian or wetland areas, cultural or historic sites, or areas key to the maintenance of productive ecosystems. As acquisitions would only occur from willing participants, the BLM cannot predict precise parcels or timelines for acquisition.

Alternative A (No Action)

Under the No Action Alternative, all acres not in designated wilderness or acquired with LWCF are Zone 2 and the remaining acres are Zone 1.

Alternatives B, C, and E (Proposed RMP)

Lands in designated wilderness areas, acquired with LWCF, designated and eligible wild and scenic rivers, National Scenic and Historic Trails, lands managed for wilderness characteristics, and ACECs and RNAs would be Zone 1 and all remaining lands would be Zone 2. All acquisitions would be considered on a site-specific basis as they become available. The portions of the CSNM already determined to have additional special values through the allocation processes listed for LTZ 1 (national trails, eligible WSR, wilderness, etc.) would be clearly delineated as not available for consideration of exchange. Lands acquired with LWCF funds are not eligible for exchange as the determination would be made at time of acquisition that it was to the benefit of the present resources and the public to have them under federal ownership. This would allow flexibility to enhance CSNM objects and values through exchanges in the rest of the CSNM when purchasing is not possible.

Alternative D

As acquisitions would only occur from willing participants, eliminating the possibility of exchange may prevent the BLM from acquiring more desirable lands if the owner is willing to exchange but not sell, or if sufficient funding is not available for purchase but the owner would be willing to exchange.

Cumulative Effects

Residential development, or conversion of existing residences from seasonal vacation occupancy to year-round occupancy, on private lands within and adjacent to the CSNM is likely to continue or increase. Real estate values have generally trended upwards. Increased development and upward price trends may make it more challenging for BLM to acquire lands within the CSNM.

Conclusion

All alternatives would allow for the protection of the most sensitive and unique areas of the CSNM while allowing for the acquisition of additional parcels for the benefit of CSNM objects and values. Alternatives A, B, C, and the Proposed RMP would allow more flexibility in the method of acquisition than Alternative D. Under these alternatives, exchanges may not result in a net increase of acres despite the net increase to CSNM objects and values for every acquisition. Alternative D would result in an increase in acreage with every acquisition, though there may be fewer of them. None of the alternatives would result in a net loss of CSNM objects and values.

Lands and Realty Issue 2

How would the allocation of rights-of-way avoidance and exclusion areas affect the availability of BLM-administered lands for rights-of-way, leases, and other land use authorizations?

Affected Environment

There are 504 non-federally owned land parcels within the CSNM boundary. The checkerboard land ownership pattern of the O&C lands generates most of the need to cross public lands to provide access and utilities to intermingled non-federal lands. The BLM generally does not know

the location and nature of such proposals until the Bureau receives an application. As of January 2024, there were 133 land use authorizations within the decision area (Table 3-19). On average, the BLM receives applications for two new authorizations each year within the decision area. The majority of non-federal lands in the decision area are currently accessed as casual use via roads and routes open to the public.

The Oregon Public Lands Transfer and Protection Act (Pub. L. 105-321), enacted in 1998 and amended by Pub. L. 106-176 in 2000, prohibited the reduction in acres of O&C lands through disposal, exchange, or sale. Prior to establishment of the "no net loss" requirement, BLM had leased with intent to transfer two parcels of land within the decision area. Pinehurst School Complex under the Recreation and Public Purposes Act (R&PP) and Pinehurst State Airport (24S) under the Airport and Airway Improvement Act of 1992. Both are still in active use.

Construction of 17 private homes/cabins at Hyatt Lake was authorized in under the Small Tract Act of 1938, as amended, and have continued to be renewed through 2024 under FLPMA.

Table 3-19. Existing land use authorizations within the decision area as of January 2024

Existing Authorizations	Quantity	Approx. Acres of BLM-administered Land
ROW Roads	47	117
ROW Water Facility	10	9
ROW Communication Sites	11	90
ROW Power Facilities	16	745
ROW Telephone	16	131
RS 2477 Roads	3	115
RS 2339 Water Facility	3	9
O&C Logging Road ROW Permit (Unilateral)	6	92
R&PP	1	11
Airport Lease	1	93
Permits	1	80
Oil and Gas Pipelines	1	5*
Occupancy Leases	17	12
Total:	133	1,492
O&C Logging Road ROW Permit (encumbered lands – Schedule 1)	–	58,641

*Approximately 5 acres of the total authorization for the pipeline is within the CSNM.

Land ownership within the CSNM boundary primarily consist of federal lands and private timber industry lands, co-mingled with non-industrial private parcels. The O&C Act provides for mutual and beneficial access between federal and private industrial landowners for the purpose of forest management. The intermixed federal lands and private industrial lands are largely managed under O&C reciprocal agreements and referred to as encumbered lands. An O&C reciprocal agreement is composed of two parts: the United States rights over private lands is governed by a right-of-way (ROW) and road use agreement while private industrial rights over United States lands are governed by an O&C logging road ROW permit. O&C reciprocal agreements are authorized in perpetuity and remain valid.

Summary of Analytical Methods

The BLM identified the number of acres in each alternative that would be designated as ROW avoidance and exclusion areas. The BLM then considered how these designations would affect the availability of rights-of-way on BLM-administered lands in the decision area.

Through RMP-level decisions, the BLM may identify certain BLM-administered lands as ROW avoidance or exclusion areas (BLM Manual 6220, National Monuments, National Conservation Areas, and Similar Designations, Section 1.6.E.8).

- ROW avoidance areas – Areas with sensitive resource values where the BLM would grant future land use authorizations on a case by case basis if the BLM determines that the proposals are compatible with the protection of the values for which the land was designated, or when no feasible alternative route is available as applicable with BLM laws and policy. As a matter of policy, BLM allows for reasonable access to non-federal lands.
- ROW exclusion areas – The BLM would not grant future rights-of-way except as mandated by law, if necessary for the administration of valid existing rights, or to allow for reasonable access to non-federal lands.

Under the No Action Alternative and Alternative B, only the Soda Mountain Wilderness would be a ROW exclusion area, and all other lands would be ROW avoidance areas. Under Alternatives C and the Proposed RMP, the Soda Mountain Wilderness and lands with wilderness characteristics would be ROW exclusion areas, and all other lands would be ROW avoidance areas. Under Alternative D, the entire decision area would be an exclusion area.

Environmental Consequences

Table 3-20. Rights-of-Way avoidance and exclusion areas by alternative in acres

Rights-of-Way Areas	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Rights-of-Way Avoidance Area	88,799	88,799	80,258	0	80,258
Rights-of-Way Exclusion Area	24,700	24,700	33,248	113,506	33,248

Land Use Authorizations

Common to All Alternatives

Under all alternatives, the BLM would continue to issue land use authorizations including rights-of-ways, leases, and permits as necessary for the administration of valid existing rights and to provide for reasonable access to non-federal lands.

Alternatives A (No Action) and B

Alternatives A and B would allocate designated wilderness (24,707 acres) as a rights-of-way exclusion area and the remaining lands (88,799 acres) within the decision area as a rights-of-way avoidance area (Table 3-20).

Alternatives C and E (Proposed RMP)

Alternatives C and the Proposed RMP would allocate designated wilderness and lands with wilderness characteristics (33,248 acres) as a rights-of-way exclusion area and the remaining lands (80,258 acres) within the decision area as a rights-of-way avoidance area (Table 3-20).

Alternative D

Under Alternative D, the entire decision area would be a right-of-way exclusion area (Table 3-20). Subject to applicable law, VERs, and needs for reasonable access to non-federal lands, existing authorizations would be phased out through non-renewal and construction of new facilities would be prohibited. Existing facilities that do not meet one of the previous criteria and do not have administrative, recreational, cultural, or historic value would be removed or allowed to naturally disintegrate. Existing authorizations that would be phased out under this alternative include the occupancy leases at Hyatt Lake, communication site facilities not needed for public health and safety, Pinehurst School Complex, and Pinehurst State Airport.

Refer to Section 3.12, Socioeconomics, for analysis of the social and economic impacts of phasing out existing authorizations.

Cumulative Effects

It is anticipated that climate change-driven vegetation changes along with increasing wildfire risks may result in greater numbers of hazard trees along ROWs and increased maintenance needs. The amount of vegetation removal would depend upon the severity of vegetation needs. Residential development, or conversion of existing residences from seasonal vacation occupancy to year-round occupancy, on private lands within and adjacent to the CSNM, is likely to continue or increase. BLM anticipates increased demand for access authorizations, commercial filming permits, communications needs, and utility development. All requests would be evaluated for their potential impacts to CSNM objects and values prior to approval. Refer to Section 3.12, Socioeconomics.

Private, industrial timberland owners within and adjacent to the CSNM are expected to continue to exercise their rights to use encumbered lands to facilitate harvest and extraction of timber from their lands. The frequency and intensity of the need depends on unpredictable factors, including timber prices, salvage operations following insect or disease outbreaks and wildfires, and forest management practices.

Conclusion

Alternative D would provide substantially less flexibility to the BLM to administer uses within the decision area.

3.7. LIVESTOCK GRAZING

Key Points

- Overall, availability of authorized livestock grazing under Alternatives B, C, and E (Proposed RMP) would be the same as current management under the No Action Alternative (Alternative A), with potentially minimal impacts to availability from the application of management direction to use outcome-based and adaptive management techniques.
- Alternative D would have the greatest impact to availability of authorized grazing, as all lands would be allocated as unavailable for livestock grazing and existing leases would be phased out through non-renewal as they expire.
- The BLM's management approach under Alternative A (No Action) would not affect forage availability for livestock grazing. Under Alternatives B, C, and E (Proposed RMP), the BLM would integrate adaptive, flexible, and outcome-based grazing management. This would alter annual livestock forage availability but would not exceed current authorized AUMs.
- Under Alternative A (No Action), rangeland health would remain stable. Under Alternatives B, C, and E (Proposed RMP), the BLM's incorporation of adaptive, flexible, outcome-based grazing, along with maintaining protective features and non-structural range improvements, would improve overall rangeland conditions. Alternative D would rely on passive management of rangelands.
- The BLM, under all alternatives, proposes to carry forward, from the 2008 CSNM RMP (Alternative A), the process described in Appendix Q for determining whether livestock grazing is compatible with "protecting the objects of biological interest" and evaluating the allotments for lease renewal to ensure that livestock grazing is consistent with current laws and regulations.

Analysis Issues

1. How would allocation decisions and management direction affect the amount of lands available for livestock grazing?
2. How would management direction affect livestock forage availability and rangeland health on lands available for grazing?

Livestock Grazing Analysis Issue 1

How would the alternatives affect the amount of lands available for livestock grazing?

Summary of Analytical Methods

The analysis area is the decision area, and the temporal scale is the life of the CSNM RMP or approximately 20 years. For this analysis, the BLM compared the acres available for grazing under each alternative.

Affected Environment

Authorized livestock grazing in the planning area has changed significantly since grazing began here in the 1850s (USDI BLM, 2002a, pp. 108–109). At that time unregulated grazing by large numbers of cattle and sheep within the area caused resource damage that lasted for decades. Grazing on public lands was eventually regulated, and by the 1960s it had been reduced to half of the original livestock numbers in the 1800s. An additional 50 percent reduction in livestock grazing occurred after the 1960s, in the 1970s, and again in the 1980s.

The decision area contains 11 active grazing allotments managed by the Ashland, Klamath Falls, and Redding field offices. Approximately 27,820 acres (25 percent) of BLM-administered lands are actively being grazed by livestock in the CSNM, representing approximately 55 percent of the total BLM allotment acreage of the 11 grazing allotments.

Within the 11 allotments, there are 10 lessees who have 15 grazing leases for authorization to graze 1,119 cattle and to utilize up to 3,287 animal unit months (AUMs). The 1,119 cattle authorized to graze 3,287 AUMs is calculated using the entire allotment acreage, which includes use outside of the planning area. The authorized cattle numbers, authorized AUMs, and the season of use listed in Table 3-21 are calculated for the whole grazing allotment. An AUM is the amount of forage required to sustain a cow/calf pair for one month. The overall seasons of use range from March 1 to November 30 annually but vary with the allotment.

Table 3-21. Active grazing allotments (ALLOT) in the planning area (PA)

Allotment Name (No. of leases)	Total ALLOT acres	Total BLM ALLOT Acres	Percent BLM land in ALLOT	BLM ALLOT Acres in PA	Percent BLM ALLOT in PA	Current BLM AUMs (AUTH)	Current AUTH (cattle)	Season of Use
Buck Lake (2 leases)	16,489	11,971	73%	10,284	86%	280	87	6/15-10/15
Buck Mountain (1 lease)	50,015	8,142	16%	2,322	29%	204	30	5/15-9/1
Conde Creek (2 leases)	11,083	5,491	50%	903	16%	592	168	6/16-9/30
Cove Creek (1 lease)	2,986	1,290	43%	1,290	100%	87	54	5/16-6-30
Cove Ranch (1 lease)	80	80	100%	80	100%	20	4	7/1-11/30
Deadwood (2 leases)	11,860	7,967	67%	6,13	77%	788	393	*6/16-8/15 8/16-10/15
Dixie (1 lease)	28,334	5,547	20%	1,248	23%	320	91	5/1-8/15
Fall Creek (1 lease)	301	301	100%	294	100%	48	16	3/1-5/30

Allotment Name (No. of leases)	Total ALLOT acres	Total BLM ALLOT Acres	Percent BLM land in ALLOT	BLM ALLOT Acres in PA	Percent BLM ALLOT in PA	Current BLM AUMs (AUTH)	Current AUTH (cattle)	Season of Use
Grizzly (2 leases)	9,434	5,153	55%	4,310	84%	378	84	6/1-10/15
Lake Creek Summer (1 lease)	8,872	4,442	50%	632	14%	550	182	7/16-10/15
North Cove Creek (1 lease)	285	285	100%	284	100%	20	10	7/16-9/15
TOTAL	**139,739**	**50,669**	**36%**	**27,820**	**55%**	**3,287**	**1,119**	**3/1-11/30**

*6/16-8/15 season of use in even years; 8/16-10/15 season of use in odd years

Environmental Consequences

Management direction for Congressionally and Administratively Designated Management Areas, Ecosystem Management Areas, Recreation and Visitor Services, Travel and Transportation Management, Lands and Realty, and Minerals management would have no effect on livestock grazing and are not included in this analysis. These uses would affect very small pieces of land in acreage except in connection with wildland fire management.

Grazing Management

Common to Alternatives A (No Action), B, C, and E (Proposed RMP)

Under Alternatives A (No Action), B, C, and E (Proposed RMP), all active grazing allotments (27,820 acres) would continue to be available for livestock grazing, while the remaining approximately 85,680 acres of the decision area would be unavailable (Table 3-22 and Map 2-15). This equates to approximately 25 percent of the CSNM available for livestock grazing, and 75 percent unavailable to livestock grazing.

The BLM would conduct a compatibility study following the framework identified in Appendix Q and while the allotments would be retained, the voluntary relinquishment process would apply to those lands (refer to Appendix Q).

Table 3-22. Livestock grazing availability by alternative

Livestock Grazing Availability	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Acres available for livestock grazing	27,820	27,820	27,820	0	27,820
Acres unavailable for livestock grazing	85,680	85,680	85,680	113,500	85,680

Alternative D

Under Alternative D, all active grazing allotments (27,820 acres) would be unavailable for livestock grazing, and the balance of approximately 85,680 acres of the planning area would remain unavailable as well (Table 3-22 and Map 2-16).

Conclusion

Acreage available (27,820 acres) and unavailable (85,680) for livestock use would be the same in Alternatives A, B, C, and E (Proposed RMP). Alternative D would have the greatest effect on available lands for grazing since there would be no grazing within the CSNM. Grazing leases would be phased out after they expire and would not be renewed in Alternative D.

Livestock Grazing Analysis Issue 2

How would the alternatives affect livestock forage availability and rangeland health on lands available for grazing?

Background

The proclamations direct the BLM to ensure that discretionary uses are compatible with the protection of CSNM objects of scientific and historic interest identified in the proclamations. Additionally, the proclamations require that the BLM "study the impacts of livestock grazing on the objects of biological interest in the monument with specific attention to sustaining the natural ecosystem dynamics."

In 2005, the BLM published *A Plan for Studying the Impacts of Livestock Grazing on the Objects of Biological Interest* (USDI BLM, 2005a). The study plan describes the objectives, methodologies, and protocols to use to evaluate current grazing practices on monument resources. The proclamations also state that "Should grazing be found incompatible with protecting the objects of biological interest, the Secretary shall retire the grazing allotments pursuant to the processes of applicable law" (Proclamation No. 7318). The BLM would use the results of livestock studies conducted during the life of this plan to help determine whether or not livestock grazing is compatible with "protecting the objects of biological interest."

After many livestock grazing reductions over the last 100 years with the enactment of the Taylor Grazing Act in 1934, the BLM has strived to follow fundamentals of rangeland health to meet objectives that promote healthy and sustainable rangeland ecosystems, and to accelerate restoration and improvement of public rangelands to properly functioning conditions. Current livestock grazing regulations (43 CFR 4180) direct the BLM to manage livestock grazing in accordance with Standards for Rangeland Health.

Standards for Rangeland Health

The BLM developed the 1997 Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (USDI BLM, 1997) in consultation with Resource Advisory Councils, Provincial Advisory Committees, Tribes, and others. These standards are the basis for assessing and monitoring rangeland conditions and trends and include:

1. Watershed Function – Uplands
2. Watershed Function – Riparian/Wetland Areas

3. Ecological Processes
4. Water Quality
5. Native, threatened and endangered, and locally important species

Evaluation of these five standards requires analyzing indicators of rangeland health and gathering baseline data related to current conditions. Indicators of rangeland health include studying conditions of soil, foliage cover, bare ground, native vegetation, invasive plants, reproductive capability of plant species, and ecosystem function (USDI BLM, 1997).

Summary of Analytical Methods

For analysis of forage availability, the BLM compared the potential changes in authorized use (AUMs) for grazing on BLM-administered lands within active grazing allotments over the life of the plan by alternative (approximately 20 years). The BLM then compared this authorized use in relation to different management techniques proposed in the alternatives and how this can influence rangeland health.

Rangeland health assessments for the affected lands in this analysis area have not been completed since those conducted between 2001 to 2008 (USDI BLM, 2023a, p. 123). In the absence of more recent assessments, for this analysis, the BLM relied on baseline ecological data gathered from BLM resource specialists, combined with Assessment, Inventory, and Monitoring (AIM) data collected in 2023 to identify existing conditions of rangelands, utilization records, and actual use records.

For this analysis, the BLM applied the following assumptions:

- If soil, vegetation, or other resources within a grazing allotment require immediate protection because of certain conditions resulting from disturbance events (e.g., drought or fire), or if continued grazing use poses an imminent likelihood of significant resource damage, the BLM would temporarily close allotments or portions of allotments to grazing or modify authorized grazing. Modifications could include reducing the number of livestock allowed to graze during the season of use or removing livestock from the allotment(s) prior to end of the authorized season (43 CFR 4110.3-2 and 4110.3-3(b)).
- If prescribed fire or wildfire removes substantial amounts of vegetation, it often takes two years or longer to successfully establish a new seeding, especially when establishing native plants (H-1742-1, Burned Area Emergency Stabilization and Rehabilitation Handbook, p. 36).

Affected Environment

Table 3-23 displays the utilization levels for each allotment from 2005 to 2023. This information is based on data collected by the BLM during lease/permit compliance checks. The BLM does not officially record all utilization checks annually. Lessees report their actual use annually after the grazing season so that livestock stocking levels can be monitored and authorized AUMs are not exceeded.

Approximately 80 to 90 percent of the Medford District's allotments are visually inspected annually. It is a goal of all grazing leases not to exceed moderate use (40–60 percent forage consumption) to provide adequate forage for livestock and wildlife species.

Table 3-23. Grazing allotment utilization within the CSNM planning area, 2005–2023

Allotment	BLM AUMs (AUTH)	Years Inspected	No Use (0-5%)	Slight Use (6-20%)	Light Use (21-40%)	Moderate Use (41-60%)
Buck Lake	280	2005		X		
Buck Mountain	204	2005		X		
Conde Creek	592	2015; 2023			X, X	
Cove Creek	74	2015				X
Cove Ranch	20	2008			X	
Deadwood	788	2018; 2022		X	X	
Dixie	320	2012; 2013; 2017; 2023		X, X, X	X, 2012	
Fall Creek	48	2023		X		
Grizzly	378	2016; 2023		X	X, 2016	
Lake Creek Summer	550	2023			X	
North Cove Creek	20	2008		X		

Note: No allotments have documented utilization of Heavy Use (61-80 percent) or Severe Use (80-100 percent).

Table 3-24 below provides the level of authorized AUMs averaged into 5-year increments and provide the 25-year average. When available, actual use records show that AUMs have not exceeded authorization and range from 50 to 80 percent of the authorized use between 1998 and 2022 (Table 3-24).

The low stocking rates reported as actual use of cattle with regulated season of use correlates to low utilization levels (21–40 percent forage utilized) across the grazing allotments. On average, the current 21–40 percent of forage utilization by livestock equates to the removal of approximately one-quarter to one-third of the total forage available for livestock grazing compared to 100 years ago.

Table 3-24. Grazing allotments leased AUMs and BLM actual use averages in the CSNM planning area, 1998–2022

Allotment	BLM AUMs	Total AUMS incl. priv. lands	AUMs 1998-2002	AUMs 2003-2007	AUMs 2008-2012	AUMs 2013-2017	AUMs 2018-2022	25-yr. avg. (1998-2022)
Buck Lake	280	280	No Records	No Records	No Records	No Records	No Records	No Records
Buck Mountain	204	204	No Records	No Records	No Records	116	No Records	116 (5-yr. avg.)
Conde Creek	592	592	337	400	259	256	271	305
Cove Creek	74	87	31	71	32	50	52	47
Cove Ranch	20	20	19	20	20	20	8	17
Deadwood	788	788	575	586	433	630	630	571
Dixie	320	460	380	342	No Records	305	No Records	342 (15-yr. avg.)
Fall Creek	48	48	No Records	No Records	No Records	No Records	No Records	No Records
Grizzly	378	378	361	218	82	177	238	215
Lake Creek Summer	550	550	473	407	421	367	479	429
North Cove Creek	20	20	17	19	12	0	13	12

The condition of rangeland health continues to be a high priority within the planning area for current and future livestock grazing management. Grazing use on average is low and dispersal of livestock is high. Annual maintenance of structural protective features (e.g., exclosures) is required to help maintain or improve rangeland health and ecological functions.

Watershed Function – Uplands

Upland watershed function is the first standard of rangeland health. Indicators of this standard as it relates to soils are rills, bare ground, litter movement, soil surface resistance to erosion, soil surface loss or degradation, and compaction layer. Soil conditions across the planning area remain intact, productive, and have not drastically deviated from the natural conditions expected in absence of human activities (refer to Section 3.13, Soils).

There have been 23 scientific AIM plots read within the CSNM in recent years (20 plots in 2023) that had low (average 1.0 percent) bare ground and high vegetation cover protection. These soils were also tested for soil stability, which averaged at high levels. The low bare ground combined with high stability level equates to low erosion potential.

The AIM data collected in recent years directly correlates to the types of soils that can be found within the planning area. Refer to Section 3.13, Soils, for a complete description of soil types within the allotments. Table 3-27 below displays the two largest soil types in each of the active grazing allotments.

The limiting factors of these soils that can affect livestock grazing are erosion, compaction, seasonal drought, and seasonal wetness. The AIM data show that there is very low erosion potential where livestock use occurs due to the types of soils identified. Compaction can occur when grazing is allowed on soils that are too wet or do not have the appropriate soil moisture. Seasonal use grazing allows for soil moisture to reach desired conditions before livestock are allowed to graze, which in turn minimizes soil compaction.

Range readiness checks are conducted by BLM annually and adjustments are made to the season of use in drought and wet years if necessary to allow for appropriate plant/vegetation development and for soil moisture to level out. In this instance, authorized season of use can be adjusted. Table 3-25 lists the existing range improvements within allotments established to protect resources such as streams, springs, amphibians, fish, and wildlife habitats.

Table 3-25. Existing range improvement object protective features within CSNM Grazing Allotments

Improvement Name	Allotment	Location (Legal Description)
Northwestern Pond Turtle Exclosure	Cove Creek	T39S-R2E- Section 11 SESW
Guard Station Riparian Exclosure	Deadwood	T38S-R4E-Section 20
Moon Aspen #1 Exclosure	Deadwood	T38S-R4E-Section 17
Moon Aspen #2 Exclosure	Deadwood	T38S-R4E-Section 17
Moon Prairie Mardon Skipper Exclosure	Deadwood	T38S-R4E-Section 17
Moon Prairie Mardon Skipper Exclosure	Deadwood	T38S-R4E-Section 17
Griffin Pass Spring Exclosure	Deadwood	T38S-R4E-Section 25
Hoxie East Riparian Exclosure	Deadwood	T38S-R4E-Section 29
Hoxie West Riparian Exclosure	Deadwood	T38S-R4E-Section 29
Aspen Exclosure	Grizzly	T38S-R2E-Section18
Mollusk Exclosure	Grizzly	T38S-R2E-Section18
Tunnel Creek ACEC Exclosure* (1,200 acres fenced for riparian & sensitive plants)	Buck Lake	T38S-R5E-Sections 23 and part of 22
Surveyor Campground Riparian Exclosure	Buck Lake	T38S-R5E-Section 21

Note: This does not include allotment boundary fences, pasture fences, stock tanks, or cattleguards that all aid in livestock management. Those with an * are not located within the boundary of the CSNM.

Water Quality and Watershed Function – Riparian/Wetland Areas

Water quality and riparian and wetland watershed function are two standards of rangeland health. Hydrological indicators of rangeland health include water flow patterns, pedestaling, and gullies/rutting. As described in Section 6.7 of the AMS (USDI BLM, 2023a, p. 103), stream survey data was collected for Jenny Creek, Little Butte Creek, and Bear Creek watersheds between 1999 and 2008. Additional data collection efforts are underway using the USGS FlowPer model.

Section 6.7 of the AMS includes information regarding water quality in CSNM, and Section 3.5 Hydrology provides analysis of the effects of the alternatives on water quality and availability. At present, future riparian restoration activities in the planning area are expected to be minimal (<1 to 5 acres). These projects would take place in sensitive or unstable sites.

Ecological Processes

Another of the five standards of rangeland health focuses on Ecological Processes, addressing energy flow and nutrient cycling as influenced by existing plant and animal communities. The BLM evaluated the AIM data for existing CSNM plant communities. Total foliar cover ranges from 53 percent to 98 percent across the 23 plot locations. Plants measured include annual and perennial grasses, perennial forbs, shrubs, and conifers and/or hardwoods. Bare soil ranged from 0–4 percent, meaning absent of vegetation, litter, rock, or woody debris.

Native, Threatened, Endangered & Locally Important Species

Lastly, native, threatened, and endangered, and locally important species is one of the five standards of rangeland health. Special status wildlife species associated with active grazing allotments in the CSNM are listed in Table 3-26. There are no ESA-listed as threatened and endangered fish species within the CSNM (refer to Section 3.2).

No gray wolf (federally listed as endangered under the ESA) breeding or rendezvous sites have been documented in any of the allotments shown in Table 3-26.

Northern Spotted Owls

All allotments except Fall Creek have recorded northern spotted owls (NSO) sites, so all allotments except Fall Creek are assumed to have NSO presence.

Mardon Skipper

Mardon skippers (a Bureau Sensitive species) have been documented in three allotments (Table 3-26). Habitat suitable for Mardon skipper has not been documented in the remaining allotments. There are currently several structural protective features in place within the allotments.

Oregon Spotted Frog

Oregon spotted frogs (OSF) have been found in the Buck Lake Allotment. The OSF habitat in this allotment is protected by a fence, making it excluded from livestock grazing.

Franklin’s Bumble Bee

The presence of Franklin’s bumble bee is possible anywhere within its historic range, which wholly overlaps the CSNM. There are at least two historic records of Franklin’s bumble bee within the CSNM. Franklin’s bumble bee High Priority Zones (HPZs) have been identified by

the US Fish & Wildlife Service and contain known historical observation locations of Franklin's bumble bee and a 1.86-mile (3 km) buffer around each historical Franklin's bumble bee observation. There are Franklin's bumble bee HPZs that cover portions of the CSNM and portions of the active grazing allotments (Table 3-26). The analysis of effects of livestock grazing on Franklin's bumble bee is in the Terrestrial Wildlife section below (Section 3.18).

Fisher

The presence of fishers has been documented in many of the allotments through baited camera stations and radio telemetry tracking. Cove Ranch, North Cove Creek, Dixie, and Fall Creek have not had documentation of fishers, but these allotments do have habitat suitable for use by fishers and are assumed to have fisher presence.

Bald Eagles

Bald eagles have been documented in many of the allotments. Five of the allotments have documented bald eagle use. Five of the allotments lack significant habitat for bald eagles—large potential nest trees, foraging areas (e.g. lakes, rivers, or other waterbodies).

Great Gray Owl

Surveys for great gray owls have not taken place within the original CSNM since about 2000, or in the expansion area since 2016. Great gray owls have been documented in seven of the allotments and are likely to occur in two other active allotments that have suitable habitat for great gray owls (Table 3-26). The remaining two active allotments do not contain habitat suitable for great gray owls. The analysis of effects of livestock grazing on great gray owl is in Appendix F, and analysis of effects of livestock grazing on meadow/grassland habitat for Bureau Sensitive Species is in Section 3.18, Wildlife Analysis Issue 1.

Table 3-26. Special status wildlife species within CSNM active grazing allotments considered for baseline rangeland health

Allotment	NSO	Franklin's bumble bee	Fisher	Bald Eagle	Great Gray Owl	Mardon Skipper	Oregon Spotted Frog
Buck Lake	Yes	No	Yes	Yes	Yes	No	Yes
Buck Mountain	Yes	No	Yes	Yes	Yes	No	No
Conde Creek	Yes	HPZ	Yes	No	Yes	Yes	No
Cove Creek	Yes	HPZ	Yes	No	Yes	Yes	No
Cove Ranch	Yes	HPZ	Likely	No	Likely	No	No
Deadwood	Yes	HPZ	Yes	Yes	Yes	Yes	No
Dixie	Yes	No	No	Likely	No	No	No
Fall Creek	No	No	No	Yes	No	No	No
Grizzly		HPZ	Yes	No	Yes	No	No

Allotment	NSO	Franklin's bumble bee	Fisher	Bald Eagle	Great Gray Owl	Mardon Skipper	Oregon Spotted Frog
Lake Creek Summer	Yes	No	Yes	Yes	Yes	No	No
North Cove Creek	Yes	No	Likely	No	Likely	No	No

Botanical Species

Botanical species are also included in the fifth standard of rangeland health. Documented special status botanical species in the CSNM consist of 24 Bureau Sensitive (BS) vascular species, four BS non-vascular species, and one federally Endangered plant (*Fritillaria gentneri,* Gentner's fritillary). Special status species consist of plants, lichens, and fungi and are listed in Appendix J, Special Status Species.

According to a biological assessment (USDI BLM & USDI FWS, 2020, p. 54), "under current utilization rates, direct impacts by cattle on Gentner's fritillary appear to be very minor from either trampling or grazing." However, as noted by LaPointe, Bussieres, Crete, and Ouelette (2010), repeated defoliation of Liliaceae family plants is demonstrated to affect subsequent leaf area, biomass, carbohydrate reserves, and nutrient reserves; thus, concentrations of cattle over consecutive years within fritillary sites could cause long-term local population decline. There are no known Gentner's fritillary sites within the 11 active grazing allotments listed above. Two allotments, the Dixie and Fall Creek allotments are within the potential range of Gentner's fritillary, but no sites have been discovered.

Table 3-27. Acres and percentages of the two main soil types in each grazing allotment

Allotment	Soil Type or Map Unit	Acres	Percent
Cove Creek	Bybee-Tatouche complex, 12 to 35% north slopes	358	28
	Heppsie-McMullin complex, 35 to 70% south slopes	199	15
Conde Creek	Farva very cobbly loam, 12 to 35% north slopes	600	11
	Pinehurst loam, 3 to 12% slopes	1,084	20
Deadwood	Farva very cobbly loam, 3 to 12% slopes	2,093	26
	Pinehurst loam, 3 to 12% slopes	1,612	20
Grizzly	Bybee-Tatouche complex, 12 to 35% north slopes	772	15
	Woodseye-Rock outcrop complex, 35 to 80% slopes	584	11
Cove Ranch	McNull-McMullin gravelly loams, 35 to 60 percent south slopes	22	27
	Medco-McMullin complex, 12 to 50 percent slopes	39	49
North Cove Creek	Bybee-Tatouche complex, 12 to 35 percent north slopes	168	59
	Bybee-Tatouche complex, 12 to 35 percent south slopes	51	18

Allotment	Soil Type or Map Unit	Acres	Percent
Lake Creek Summer	McNull-Medco complex, high precipitation, 12 to 50% slopes	1167	26
	Medco clay loam, high precipitation, 12 to 50% north slopes	804	18
Buck Mountain	Oatman-Otwin complex, 0 to 12 percent slopes	741	28
	Pokegema-Woodcock complex, 1 to 12% slopes, mlra 21	614	23
Buck Lake	Oatman-Otwin complex, 0 to 12 percent slopes	3,907	37
	Woodcock-Pokegema complex, 12 to 35 percent south slopes, mlra 21	2,209	21
Dixie	Campfour-Paragon complex, 1 to 12 percent slopes	548	27
	Randcore-Shoat complex, 0 to 5 percent slopes	296	14
Fall Creek	Campfour-Paragon complex, 1 to 12 percent slopes	115	39
	Pinehurst variant very stony loam, 0 to 15 percent slope	145	49

For Noxious Plant Species Cover, the 23 plots show that 57 percent (13 plots) have no invasives present, 13 percent (3 plots) have 0–1 percent invasives present, 13 percent (3 plots) have 1–10 percent invasives present, and 17 percent (4 plots) have 26–43 percent invasives present. Refer to Table 3-28 below.

Table 3-28. AIM plot noxious plant species percent cover by allotment

Grazing Allotment	Noxious Species Cover 0%	Noxious Species Cover >0-1%	Noxious Species Cover >1%	Noxious Species Cover Percentage
Buck Lake				No plots taken
Buck Mountain				No plots taken
Conde Creek	3 plots		1 plot	0-1.3%
Cove Creek	2 plots		1 plot	0-26%
Cove Ranch	1 plot			0%
Deadwood	3 plots	1 plot		0-0.67%
Dixie			3 plots	30-43.3%
Fall Creek				No plots taken
Grizzly	1 plot	2 plots		0-0.67%
Lake Creek Summer	1 plot		2 plots	0-10%
North Cove Creek	2 plots			0%

Environmental Consequences

Alternative A (No Action)

Livestock management and authorized use would continue at current levels. Forage availability and rangeland health would not be expected to change unless there is a severe event such as a catastrophic fire. Refer to Table 3-29 below. The BLM would continue to maintain existing protective exclosures to protect the CSNM objects and values.

Table 3-29. Livestock grazing authorized use by alternative

Livestock Grazing	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Authorized AUMs	3,287	3,287	3,287	0	3,287

Alternatives B, C, and E (Proposed RMP)

Similar to Alternative A, for Alternatives B, C, and E (Proposed RMP), the BLM would authorize a maximum of 3,287 AUMs for currently active grazing allotments. In contrast to Alternative A, under Alternatives B, C, and E (Proposed RMP), the BLM would modify livestock management practices to integrate adaptive, flexible, and outcome-based grazing management. For example, the BLM would incorporate resting/rotational grazing and changes to season-of-use, duration, and intensity/stocking levels as needed. These modifications would alter annual livestock use but would not exceed current authorized AUMs (Table 3-29).

The BLM's incorporation of management direction provided in Appendix E, Section 4.G, would maintain, restore, and enhance the overall condition of rangeland ecosystems. Refer to Sections 3.2, Aquatic and Riparian Habitat, and Section 3.18, Terrestrial Wildlife, for analysis of the effects of continued livestock grazing on aquatic and terrestrial wildlife species. Continued grazing use of 21–40 percent of forage utilization by livestock or less equates to the removal of approximately one-quarter to one-third of the total forage available for livestock grazing, leaving approximately two-thirds to three-quarters of available forage either for wildlife or else unused by any species.

The BLM would incorporate adaptive, flexible, and outcome-based management techniques for livestock grazing into lease terms and conditions upon renewal.[23] This could include changes to season of use, duration of use, forage allocations, and the promotion of rangeland health (USDI BLM, 1997). The specific management techniques would be identified and analyzed for during subsequent NEPA analysis prior to lease renewal, as outlined in Appendix Q. Over the short term (1 to 2 grazing seasons), changes to lease terms and conditions could limit the forage available for livestock grazing operations. However, improving the overall rangeland condition through actions such as maintenance or restoration of nonstructural (native seeding, prescribed fire, invasive species treatment) and structural range improvements would lead to improved/stabilized rangeland health and could lead to increased available AUMs over the long

[23] The BLM's framework for making future decisions on whether and how to renew existing grazing leases is outlined in Appendix Q, Livestock Grazing Compatibility and Voluntary Permit Relinquishment.

term (5 to 10 years). Maintenance of existing protective exclosures would continue to protect the CSNM objects and values.

Alternative D

Under Alternative D, there would be no forage or authorized AUMs available for livestock use in the CSNM planning area (Table 3-29).

Under this alternative, the BLM would utilize passive management of rangelands.

Conclusion and Cumulative Effects

The BLM's management approach under Alternative A (No Action) would not affect forage availability for livestock grazing. Rangeland management and authorized use for livestock grazing would continue at current levels. Under Alternatives B, C, and E (Proposed RMP), the BLM would integrate adaptive, flexible, and outcome-based grazing management. For example, the BLM would incorporate resting/rotational grazing, and changes to season-of-use, duration, and intensity/stocking levels, as needed. This would alter annual livestock forage availability but would not exceed current authorized AUMs. Alternative D would have the greatest impact on forage availability as no lands would be available for grazing in the long term once the leases expire. The ranching community relies heavily on the availability of BLM grazing allotments for their operations, because federal and private land grazing leases or permits are seldom available in Southwestern Oregon.

Under Alternative A (No Action), rangeland health would remain stable. Under Alternatives B, C, and E (Proposed RMP), the BLM's incorporation of adaptive, flexible, outcome-based grazing, along with maintaining protective features and nonstructural range improvements, would improve overall rangeland conditions. Refer to Sections 3.2, Aquatic and Riparian Habitat, and Section 3.18, Terrestrial Wildlife, for analysis of the effects of continued livestock grazing on aquatic and terrestrial wildlife species. Alternative D would rely on passive management of rangelands. The rate of improvement to rangeland health under Alternatives B, C, D, and E (Proposed RMP) is unknown and would require additional data. The BLM's Monitoring Plan for the Proposed RMP includes monitoring questions to aid in this, as well as livestock-impacts studies (refer to Appendix R, Monitoring Plan, and Appendix Q, Livestock Grazing Compatibility and Voluntary Permit Relinquishment).

3.8. LANDS WITH WILDERNESS CHARACTERISTICS

Key Points

- Although there would be no areas managed for their wilderness characteristics under Alternative A (No Action), wilderness characteristics would still receive some protection from other existing management decisions. VRM Class II allocation and limiting public motorized access (OHV use allocations) to existing and designated routes would limit actions that would negatively impact the naturalness, opportunities for solitude, and primitive and unconfined recreation in areas that have been identified as having wilderness characteristics.
- Alternative B does not designate any lands with wilderness characteristics and allows other compatible uses to occur. Like Alternative A, actions that would negatively impact wilderness characteristics would be limited through the VRM Class II allocation and OHV use allocation as limited to existing and designated routes for street legal vehicles only (excepting hunting season).
- Alternatives C, D, and the Proposed RMP (Alternative E) would provide more protection of wilderness characteristics than Alternatives A and B. Both Alternatives C, D, and the Proposed RMP would allocate lands with wilderness characteristics as closed to OHV use, which would prohibit OHV use entirely and would increase opportunities for solitude and reduce impacts to naturalness through OHV use.
- Alternative D would have the least impact to wilderness characteristics as a result of WUI treatments compared to the other alternatives, since those treatments would be available to occur over the smallest area (73 acres, or 0.9 percent of lands with wilderness characteristics). However, all action alternatives would have minimal impacts to lands with wilderness characteristics from treatments in the WUI; Alternative C would impact 221 acres (2.6 percent); Alternative E (Proposed RMP) would impact 294 acres (3.4 percent); and Alternative B would impact 1,319 acres (15 percent). In addition, the BLM assumes not all lands would require treatments to reduce fire risk on every acre. Lastly, WUI treatments would have short-term negative impacts on apparent naturalness and solitude and primitive and unconfined recreation; over time, however, they would enhance naturalness by creating forest stands that more closely mimic the appearance and function of forests in which natural fire has not been suppressed.

Analysis Issue

1. How would management direction affect the size, apparent naturalness, outstanding opportunities for solitude or primitive and unconfined recreation, and supplemental values of lands with wilderness characteristics?

Land with Wilderness Characteristics Analysis Issue 1

How would management direction affect the size, apparent naturalness, outstanding opportunities for solitude or primitive and unconfined recreation, and supplemental values of lands with wilderness characteristics?

The BLM is required under Section 201 of FLPMA and current BLM policy to inventory wilderness characteristics and to consider such information during land use planning. BLM Manual 6310, Conducting Wilderness Characteristics Inventory on BLM Lands (p. 31), provides guidance on conducting wilderness characteristics inventories. Wilderness characteristics are derived from Section 2(c) of the Wilderness Act. To have wilderness characteristics, an area must possess:

1. Sufficient size –
    a. Roadless areas with more than 5,000 acres of contiguous BLM lands.
    b. Roadless areas with less than 5,000 acres of contiguous BLM lands where any one of the following apply:
        i. They are contiguous with lands that have been formally determined to have wilderness or potential wilderness values, or any federal lands managed for the protection of wilderness characteristics.
        ii. It is demonstrated that the area is of sufficient size as to make practicable its preservation and use in an unimpaired condition.
        iii. Any roadless island of public lands.
2. Naturalness –
    a. the area must appear to have been affected primarily by the forces of nature, and any work of human beings must be substantially unnoticeable.
3. Outstanding opportunities for solitude or a primitive and unconfined type of recreation.

In 2009, Congress designated the now 24,707-acre Soda Mountain Wilderness (SMW) in the original CSNM boundary. Since that time, no updated lands with wilderness characteristics inventory had been completed on BLM-administered lands in the original CSNM boundary.

The BLM conducted inventories on the expansion area lands in the Medford and Lakeview districts in preparation for developing the 2006 Western Oregon Plan Revision and the 2016 Western Oregon RMPs. The BLM did not identify lands with wilderness characteristics in the expansion area through either of these inventory efforts.

The monument expansion lands in the BLM Northern California District are managed under the 1993 Redding RMP and were incorporated into the Northern California Integrated Plan (NCIP) planning effort that began in 2016. The BLM completed a wilderness characteristics inventory for these lands in 2016 and did not identify any lands with wilderness characteristics. The CA expansion lands would continue to be managed under the Redding RMP until the CSNM planning effort is completed. Per BLM Manual 6310, the public is authorized to submit areas for the BLM to consider for further review. Information submitted by the public must meet the minimum standard as outlined in BLM Manual 6310.

During the 2016 Western Oregon RMP planning effort, the BLM received a detailed proposal from the public identifying the 3,077-acre Green Springs Mountain area as having wilderness

characteristics. The BLM reviewed this information and conducted a wilderness characteristics inventory for this area. Through this inventory, the BLM determined that the area did not meet any of the minimum size criteria outlined in BLM Manual 6310. This inventory can be found here: https://www.blm.gov/programs/planning-and-nepa/plans-in-development/oregon-washington/western-oregon-wci

During the NCIP planning effort, the BLM also received a detailed proposal from the public identifying the 4,080-acre Horseshoe Ranch area as having wilderness characteristics. The BLM inventoried these lands and found that, while most of the area did not meet the minimum size criteria outlined in BLM Manual 6310, two parcels that are adjacent to the Soda Mountain Wilderness did.

Summary of Analytical Methods

The BLM evaluated each area identified as having wilderness characteristics to determine whether wilderness characteristics (size, naturalness, opportunities for solitude or primitive and unconfined recreation, and supplemental values) would be maintained or not, based on the management direction in each alternative.

This analysis focuses on the impacts to the individual lands with wilderness characteristics units over the next 20 years, the expected life of the plan. Analysis assumptions include the following:

- ROWs may be granted to cross public land to provide access and utilities to intermingled private lands in the CSNM.
- The demand for public lands for outdoor recreation would continue to increase in intensity and diversity.

To determine impacts to wilderness characteristics, the BLM evaluated management direction for the following resource programs: Lands and Realty, Wildland Fire Management, including treatments in the WUI, and Travel and Transportation management, including Public Motorized Access (OHV area allocations).

For this planning effort, the BLM developed management areas using a hierarchy to address overlapping designations and ensure the BLM manages areas for the highest protection required. For example, Congressionally Designated Management Areas (CDMAs) are highest in the hierarchy, which includes Wilderness Areas, designated and eligible Wild and Scenic Rivers, and National Scenic and Historic Trails.

Administratively Designated Management Areas (ADMAs) are second in the hierarchy and include areas of critical environmental concern, research natural areas, herd management areas, special recreation management areas, and lands managed for their wilderness characteristics. The Ecosystem Management Areas comprise the remaining lands in the decision area. This hierarchy and the associated management area direction informed this analysis.

Approximately 2,106 acres of the 8,548 acres of identified lands with wilderness characteristics are overlapped by CDMA; specifically, eligible Wild and Scenic Rivers (WSRs) and a National Scenic and Historic Trail (NSHT) management corridor. These designated areas do not vary across the alternatives. The management direction for these two designations would identify where future actions may or may not be allowed on those 2,106 acres of lands with wilderness characteristics and the restrictions or requirements that may be placed on those future actions.

These designations provide protections that would limit the potential impacts on wilderness characteristics.

Affected Environment

Eight units met the size criteria as outlined in BLM Manual 6310 because they are contiguous with the Soda Mountain Wilderness (refer to Appendix K, Lands with Wilderness Characteristics Inventory Report) (Table 3-30).

Table 3-30. Units with wilderness characteristics

Unit Name	Unique Identifier	Acres
Slide Creek	OR-M04-062	211
Lone Pine Ridge	OR-M04-063	177
Porcupine Mountain	OR-M04-064	1,948
Baldy Creek	OR-M04-065	611
Hartwell Draw	OR-M04-066	40
Randcore Pass	OR-M04-068	1,597
Lincoln Creek	OR-M04-069	1,941
Green Mountain	OR-M04-071	2,023
Total		**8,548**

Environmental Consequences

Management direction for the following resource programs would not affect lands with wilderness characteristics and are not discussed further in this analysis: Air Quality, Collections/Special Forest Products, Cultural Resources, Geology and Paleontology, Livestock Grazing, Minerals, Science and Research, Soils, Terrestrial Wildlife, Travel and Transportation, and Visual Resources. In general, management actions that protect resources, such as improvements in water quality and quantity, restrictions on surface disturbance, management for desired plant communities and habitats, travel restrictions, visual resources, and recreation restrictions, would help maintain and enhance wilderness characteristics. Livestock grazing would not impact any area identified with wilderness characteristics, since no lands identified with characteristics are available for livestock grazing. Existing quarries would not impact areas identified with wilderness characteristics because they were considered an existing use and were not included in the boundary of lands with wilderness characteristics.

Impacts Common to All Alternatives

Land Use Authorizations

Under all alternatives, land use authorizations (ROW, permits, leases, and easements) have the potential to adversely impact lands with wilderness characteristics. Under Alternative A (No Action), management direction regarding land use authorizations recognizes and protects valid

existing rights, and non-federal landowners would retain access to their property. Under Alternatives B, all BLM-administered lands outside of the Soda Mountain Wilderness would be allocated as ROW avoidance areas. In a ROW avoidance area, the BLM would only permit new ROWs if the proposal were compatible with the protection of CSNM objects and values, and when no feasible alternative route is available, as applicable with BLM laws and policy. Under Alternative C and the Proposed RMP (Alternative E), lands identified with wilderness characteristics and the Soda Mountain Wilderness would be allocated as ROW exclusion areas. Under Alternative, D all BLM-administered lands would be allocated as ROW exclusion areas. In a ROW exclusion area, the BLM would not grant future rights-of-way except as mandated by law, when necessary for the administration of valid existing rights, or to allow for reasonable access to non-federal lands. Though the requirements for permitting ROWs are different when it comes to an avoidance versus an exclusion allocations, under all the alternatives identified lands with wilderness characteristics may be subject to land use authorizations.

Land use authorizations, such as for transmission lines and roads, impact the surface of the land to create these features (vegetation removal, ground disturbance, introduction of invasive species, and changes in scenery), which contribute to a loss of apparent naturalness of lands with wilderness characteristics. Road utilization can affect solitude by impacting a visitor's opportunity to avoid the sights, sounds, and evidence of other people in the area. However, implementing best management practices (Appendix I) would reduce these impacts on wilderness characteristics.

Wildland Fire Management

Where wildfire threatens safety of property, wildfire response could degrade wilderness characteristics. Under all alternatives, throughout the CSNM, Minimum Impact Suppression Tactics (MIST) would be used. These tactics aim to suppress a wildfire while minimizing the long-term effects of the suppression action. Disturbances caused by wildfire suppression activities, such as creating bulldozer lines and tree falling to stop the spread of wildfires, can affect the apparent naturalness of an area and the opportunity for solitude. Following a wildfire, rehabilitation and restoration actions would be conducted to protect and sustain ecosystem services, public health and safety, and infrastructure adversely affected by fire management operations or direct fire effects, which would reduce the impacts to wilderness characteristics. There is no accurate way to predict the exact location and timing of wildfires or the specific wildfire response. Therefore, there is no reasonable basis on which to identify, across the alternatives, a difference in the effect of wildfire response on wilderness characteristics.

Alternative A (No Action)

Under Alternative A (No Action), the BLM would manage the identified lands with wilderness characteristics following management direction as written in the three current RMPs and consistent with applicable presidential proclamations, court rulings, laws, and executive orders.

All but two of the units identified as lands with wilderness characteristics—namely, Slide Creek and Lone Pine Ridge—occur in the original CSNM boundary and would be managed under the 2008 CSNM RMP. The Slide Creek and Lone Pine Ridge lands with wilderness characteristics would be managed under the 1993 Redding RMP; however, they have been incorporated into the CSNM under Presidential Proclamation No. 9564. Though no lands with wilderness

characteristics were identified in the CSNM in either RMP, the potential for negative impacts to wilderness characteristics are reduced through existing management direction.

The 2008 CSNM RMP designated all areas of the original CSNM outside of the Soda Mountain Wilderness Study Area[24] (WSA) area as VRM Class II area with an objective to retain the existing character of the landscape. The VRM Class II designation would limit management actions that would negatively impact the apparent naturalness of the 8,548 acres of lands identified to have wilderness characteristics.

Per Presidential Proclamation Nos. 7318 and 9564, all motorized and mechanized vehicle use off road is prohibited, except for emergency or authorized administrative purposes. Limiting OHV use to designated open roads reduces impacts to solitude or primitive and unconfined recreation and would decrease new disturbances to naturalness that OHV use may cause.

Alternative B

Under Alternative B, the BLM would not designate lands to be managed for their wilderness characteristics on any lands in the decision area.

Under this alternative, 2,106 acres of the identified lands with wilderness characteristics are overlapped by WSRs and NSHT Congressional designations. The management objective for eligible WSRs is to protect and enhance the free-flowing condition, water quality, and outstandingly remarkable values. NSHT objectives include enhancing, promoting, and protecting High Potential Historic Sites and the Scenic, Natural, and Cultural resource values associated with current and future designated trails. Both Congressionally Designated Management Areas (CDMA) provide protections that would limit the potential impacts on wilderness characteristics, regardless of them not being designated to be managed for their wilderness characteristics.

Lands with wilderness characteristics, eligible WSRs, and NSHT areas are all assigned a VRM Class II, which aims to retain the existing character of the landscape. Management activities, such as vegetation treatments and road maintenance, must be designed so that they have low levels of change to the characteristic landscape. Retaining the existing character of the landscape under VRM Class II would limit management actions that would negatively impact the apparent naturalness of lands with wilderness characteristics.

The 8,548 acres of lands with wilderness characteristics would be designated as limited to existing and designated routes for OHV use. Motorized use would be limited to street legal vehicles only (excepting hunting season) on existing roads until such time as a travel management plan is completed. Limiting visitors to existing and designated routes would allow for more opportunities for solitude or primitive and unconfined recreation and decrease new disturbances to naturalness that OHV use may cause.

Alternative B promotes the most active management to protect CSNM objects and values from fires originating on adjacent private lands, and to reduce the risk of wildfires spreading to residential properties in the WUI. Alternative B establishes the WUI as one-quarter mile from private property boundaries where structures are present, and a one-quarter mile around identified communities at risk. WUI treatments, including vegetation and fuels management

[24] The Soda Mountain Wilderness was not designated until 2009 and much of the area was designated as a Wilderness Study Area in the 2008 CSNM RMP (USDI BLM, 2008, pp. 14, 16).

treatments, would affect the appearance of naturalness and solitude in lands with wilderness characteristics. Mechanical vegetation removal impacts solitude with increased presence and noise and temporarily impacts apparent naturalness by creating abnormal concentrations of dead vegetation and fuel loading. Vegetation management and restoration over time would improve vegetation structure, function, and condition, thereby enhancing naturalness by creating forest stands that more closely mimic the appearance and function of forests in which natural fire has not been suppressed.

Under Alternative B, WUI treatments would be allowed in the Lincoln Creek, Baldy Creek, Green Mountain, Porcupine Mountain, Randcore Pass and Hartwell Draw lands with wilderness characteristics units (totaling 1,319 acres, or 15 percent of lands with wilderness characteristics).

Alternative C

Under Alternative C, the BLM would manage 6,442 acres of lands with wilderness characteristics to minimize impacts on wilderness characteristics via management restrictions (e.g., terms and conditions of use or stipulations) while balancing other management and resource priorities and objectives. The remaining 2,106 acres of lands with wilderness characteristics would be managed under eligible WSR and NHST management direction.

Under Alternative C, all 8,548 acres of lands with wilderness characteristics would be designated as VRM Class II and any management activities would need to retain the existing character of the landscape. This would limit the number of actions that would negatively impact apparent naturalness of the lands with wilderness characteristics.

In addition, all lands with wilderness characteristics would be closed to OHV use, thereby preventing potential damage from this use. Compared with Alternative B, lands with wilderness characteristics would be more protected from OHV use under this alternative because more acres would be closed to OHV use. This would increase the opportunities for solitude by restricting the sight and sound of OHV use and other people. Reduced OHV use also improves apparent naturalness by preventing user-created route proliferation and route widening or braiding.

Alternative C establishes the WUI as one-quarter mile around identified communities at risk. Impacts to lands with wilderness characteristics from WUI treatments would be similar to Alternative B; however, a smaller area (221 acres or 2.6 percent) would be treated, reducing the overall impact to wilderness characteristics. These WUI treatments would be allowed in the Lincoln Creek, Baldy Creek, and Porcupine Mountain lands with wilderness characteristics units.

Alternative D

Under Alternative D, the BLM would manage 6,442 acres of lands with wilderness characteristics for the protection of those characteristics, while providing for compatible uses. Only discretionary actions that protect the roadless size, apparent naturalness, and opportunities for solitude or primitive and unconfined recreation would be allowed. Like Alternatives B and C, the remaining 2,106 acres of lands with wilderness characteristics would be managed under eligible WSR and NHST management direction.

Like Alternative C, all 8,548 acres of lands with wilderness characteristics would be designated as VRM Class II, which would limit management actions that would negatively impact apparent naturalness of these lands with wilderness characteristics. Any management activities would retain the existing characteristic of the landscape.

Additionally, like Alternative C, all 8,548 acres of lands with wilderness characteristics would be closed to OHV use. This increases opportunities for solitude or primitive and unconfined recreation and reduces impacts to naturalness by OHV use.

Alternative D establishes the WUI as 120 feet from private property boundaries where structures are present. Impacts to lands with wilderness characteristics from WUI treatments are similar to Alternatives A and B; however, this alternative would allow treatments on the smallest area (73 acres or 0.9 percent) and would have the least impact to wilderness characteristics. WUI treatments would occur in the Lincoln Creek, Baldy Creek, Porcupine Mountain, and Randcore Pass lands with wilderness characteristics units.

Alternative E (Proposed RMP)

Similar to Alternative C, under Alternative E, the Proposed RMP, the BLM would manage 6,442 acres of lands with wilderness characteristics (ADMA-LWC) to minimize impacts on wilderness characteristics via management restrictions (e.g., terms and conditions of use or stipulations) while balancing other management and resource priorities and objectives. The remaining 2,106 acres of lands with wilderness characteristics would be managed as CDMA-eligible WSR and CDMA-NHST and objectives and management direction for those designations would apply.

Under the Proposed RMP, all 8,548 acres of ADMA-LWC would be designated as VRM Class II. Management activities may be seen but would not attract the attention of the casual observer and would need to retain the existing character of the landscape.

In addition, all ADMA-LWC would be closed to OHV use, thereby preventing potential damage from this use. This would increase the opportunities for solitude by restricting the sight and sound of OHV use and other people. Reduced OHV use also improves apparent naturalness by preventing user-created route proliferation and route widening or braiding.

The BLM would manage the WUI one-quarter mile around an identified community at risk and 120 feet from private property boundaries with structures present. WUI treatments would be allowed on 294 acres (3.4 percent) of lands in ADMA-lands to be managed for their wilderness characteristics. This alternative would allow WUI treatments on slightly more acreage than Alternatives C and D (0.8 and 2.5 percent more, respectively), but less acreage than in Alternative B (11.6 percent less).

Cumulative Impacts

Past and present land management activities and natural disturbance processes on lands with wilderness characteristics have included vegetation and fuels management, invasive species introduction and spread, road use and maintenance, wildfires, and restoration projects. These types of actions are anticipated to continue in the relatively foreseeable future and could impact the lands with wilderness characteristics.

Resource uses also include recreational use. Recreational use is expected to increase in the CSNM and would alter the landscape over time through increased human presence, OHV use where allowed, dispersed camping, and hiking in certain areas. Such activities can lead to increased disturbances, such as crowding, noise, route widening, and campsite expansion. These alterations could increase surface disturbance that degrade the apparent naturalness of the area and affect visitors' opportunity for solitude.

Conclusion

Although there would be no areas managed for their wilderness characteristics under Alternative A (No Action), wilderness characteristics would still receive some protection from other existing management decisions. VRM Class II designation and limiting OHV use to existing and designated routes would limit management actions that would negatively impact the naturalness, opportunities for solitude, and primitive and unconfined recreation in areas that have been identified with wilderness characteristics.

Alternative B does not designate any lands as ADMA-LWC and allows other compatible uses to occur. Like Alternative A, the type of actions that would negatively impact wilderness characteristics would be limited through the VRM Class II designation and OHV use designated as limited to existing and designated routes for street legal vehicles only (excepting hunting season).

WUI treatments under Alternative B would be allowed on the most amount (1,319 acres, or 15 percent) of lands with wilderness characteristics compared to the other action alternatives. Alternative D would allow the least amount of WUI treatments on lands with wilderness characteristics (73 acres or 0.9 percent) and would have the least impacts to wilderness characteristics as a result of WUI treatments. Alternative C and the Proposed RMP, would be similar in impacts to wilderness characteristics from WUI treatments, as treatments would be allowed on between 221 acres (2.6 percent) to 294 acres (3.4 percent), respectively. In addition, the BLM assumes not all lands would require treatments to reduce fire risk on every acre. Lastly, WUI treatments would have short-term negative impacts on apparent naturalness and solitude and primitive and unconfined recreation; over time they would enhance naturalness by creating forest stands that more closely mimic the appearance and function of forests in which natural fire has not been suppressed.

Overall, Alternatives C, D, and the Proposed RMP would provide more protection of wilderness characteristics than Alternatives A and B. Alternatives C, D, and the Proposed RMP would designate lands with wilderness characteristics as closed to OHV use, which would prohibit OHV use entirely and would increase opportunities for solitude and reduce impacts to naturalness through OHV use.

3.9. MINERALS – EXISTING ROCK QUARRIES

Key Points

- Under Alternatives A and B, all existing quarries would be available for BLM administrative use, resulting in the greatest availably of quarry rock. Alternative D proposes to reclaim all the existing quarries, resulting in no availability of quarry rock from these sites. In Alternative C and the Proposed RMP (Alternative E), half of the quarries are available for administrative use and half are reclaimed, resulting in a decrease in rock availability.
- No land use allocations and or other management directions prohibit the availability of quarry rock for administrative use.

Analysis Issue

1. How would land use allocations and minerals management direction affect quarry rock available for BLM administrative use?

Minerals Analysis Issue 1

How would land use allocations and minerals management direction affect quarry rock available for BLM administrative use?

Summary of Analytical Methods

Sixteen existing quarries were considered for potential use and surveyed to determine if the site should be retained for BLM administrative use or reclaimed. Considerations included quarry location, quantity, and quality of rock at each site. Management Direction and Land Use Allocations were overlayed with each quarry to assess if resource conflicts are present. Impacts were characterized as increasing or decreasing the amount of constraint on quarry rock availability.

Analytical Assumptions include the following:

- Impacts would be limited to the previous disturbed existing quarry and/or adjacent to the previously disturbed area.
- Based on BLM engineering estimates, approximately two acres per decade for expansion (new disturbance outside of the existing quarry area) for all quarries in total could be necessary to provide rock for administrative use.
- Increased levels of constraints on quarries within the CSNM would generally result in reduced opportunities to acquire quarry rock.
- If the quarries within the CSNM are closed to administrative use, hauling distance on public roads, fuel consumption, and costs would increase, and therefore rock availability could decrease (Clinkenbeard & Gius, 2018, pp. 17–18).
- Stockpiles of crushed or broken rock are typically located within the existing disturbance of a quarry or adjacent to the quarry. No ground disturbance occurs to access stockpiles and they are available for use under all alternatives.

- Reclamation of a quarry can include contouring and covering the rocky area with a growth medium (overburden, topsoil) and planting native vegetation. It also includes having the sites available for dispersed camp sites, wildland firefighter operation/safety zones or parking areas, or a combination thereof.

Affected Environment

There are approximately 30 existing rock quarries in the decision area that were developed under BLM timber sales for road building, road maintenance, and BLM administrative use. In addition, quarry rock has been used for blocking access, fish weirs, boat ramps, slope stabilization, and projects to reduce sedimentation. Of these existing rock quarries, the BLM evaluated 16 quarries for continued use by the BLM for administrative purposes.

Table ES-1, in Appendix E displays the size of the 16 quarries considered for continued use by alternative, and Maps 2-27 to 2-29 display their location. Seven sites are less than two acres, eight sites are three to six acres, and one site is ten acres. This acreage includes: the flat equipment/crusher pad area, the rock benches/slopes/disturbed area, quarry access, and the stockpile area. The Analysis of the Management Situation (USDI BLM, 2023a, pp. 127–129) provides additional background information and is incorporated here by reference.

Environmental Consequences

Alternative A (No Action)

Sixteen existing quarries could be available for use/development for BLM administrative projects that occur inside and outside the CSNM with no acre limit for expansion if it is determined to be compatible with CSNM objects and values through site-specific NEPA analysis. No changes would occur in availability of quarry rock for BLM administrative use.

Alternative B

Sixteen existing quarries could be available for use/development for BLM administrative projects that occur inside and outside the CSNM (with a limit of two acres per decade for expansion of all quarries in total) if it is determined to be compatible with CSNM objects and values through site-specific NEPA analysis. Quarry rock availability would remain the same as compared to Alternative A, No Action.

Alternatives C and E (Proposed RMP)

Eight existing quarries would be available for use, and potential expansion for BLM administrative projects that occur inside and outside the CSNM (with a limit of one acre per decade for expansion of all quarries in total) if it is determined to be compatible with CSNM objects and values. The BLM would evaluate compatibility of quarry expansion through site-specific NEPA analysis at the implementation level. Eight quarries would be reclaimed, including Rosebud quarry which is in the Lincoln LWC.

Quarry rock availability would be less available (sites reduced by 50 percent) compared to Alternatives A and B.

Alternative D

Quarry rock availability would be decreased compared to other alternatives. None of the existing quarries would be available for BLM administrative projects. All existing quarries would be reclaimed.

Conclusion

Reclamation and expansion limits across the alternatives vary the quarry rock available for BLM administrative use. In Alternative A and B, all existing quarries would be available resulting in the greatest availability of quarry rock. Alternative D proposes to reclaim all the existing quarries, resulting in no availability of quarry rock from these sites. Half of the quarries are available for administrative use and half are reclaimed in Alternative C and the Proposed RMP, which would decrease the availability of quarry rock.

Cumulative effects

There are no reasonable future foreseeable actions that would affect the availability of quarry rock from these quarries for administrative use. Given there is no incremental effect to rock quarry availability based on past, present, and reasonably future foreseeable actions, there is no cumulative effect.

3.10. National Scenic and Historic Trails

Key Points

- The scenic values and recreational experiences for the Pacific Crest National Scenic Trail (PCT) would be protected under all action alternatives, including the Proposed RMP.
- Allowing for invasive plant management activities along the PCT under the Proposed RMP would provide opportunities to continue improving rangelands conditions and reduce the incursion of noxious and invasive species to ensure the preservation of intact natural landscapes and restoration of human-altered landscapes along the trail.

Analysis Issue

1. How would the alternatives affect scenic values and recreation opportunities for the Pacific Crest National Scenic Trail?

National Scenic and Historic Trails Analysis Issue 1

How would the alternatives affect scenic values and recreation opportunities for the Pacific Crest National Scenic Trail?

Summary of Analytical Methods

Incorporated by reference is the Cascade-Siskiyou National Monument Inventory, Assessment, and Monitoring Report for the Pacific Crest and Applegate Trails, which was prepared by Logan Simpson for the BLM in September 2023 (refer to Appendix L). This report, in addition to documenting the completion of an inventory and assessment of the PCT, also defines the baseline conditions to inform the BLM of management corridor alternatives during the planning process. Based on this inventory and assessment completed for the PCT, the BLM determined that existing management corridor widths under the current plans were adequate for meeting objectives to protect the resources, qualities, values, and associated settings of the PCT per BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or

Recommended as Suitable for Congressional Designation. Therefore, the BLM did not explore varying widths in the range of alternatives, but rather varied potential management restrictions in the corridor.

The BLM considered how changes in where vegetation and fuels management would be excluded within the proposed National Trail Management Corridor ("management corridor") PCT would affect the values and uses associated with the trail. Map 2-2 displays the PCT management corridor, which includes lands within one-quarter mile from the centerline of the trail (one-half mile total width) (refer also to Table 2-2 in Section 2.3).

For the purposes of this analysis, the BLM assumed that the management decisions for PCT management corridor would adequately protect the values and uses associated with the National Scenic Trail. The BLM bases this assumption on the following management direction that would apply to all action alternatives and the Proposed RMP:

- Designate a one-quarter mile from centerline of trail management corridor to protect trail values associated with the PCT.

- Conduct vegetation and fuels management activities only if they do not interfere with protecting scenic values and recreation opportunities and maintain recreation setting characteristics.
- Minimize impacts from wildfire response tactics by allowing fire to burn across the trail in lieu of constructing mechanical fire lines.
- Wildfire response strategies and tactics must protect CSNM objects and values, as well as trail corridor values to the maximum extent possible.
- Within the management corridor, any fuels management must look natural, with stumps and shrubs cut low enough not be obvious to the casual observer.
- When conducting travel management planning, reduce, where feasible, natural surfaced roads management corridors for the centerline of the Applegate and Pacific Crest National Scenic Trails.
- Limit the use of stock animals on the trail to a maximum of 12 stock animals per group.
- Manage for Visual Resource Management Class II.
- Designate as *OHV - Limited* to public motorized access.

Background

The National Trails System Act of 1968 (NTSA), as amended, established a network of recreation, scenic, and historic trails to provide for outdoor recreation needs of the public and to promote the preservation of public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources. The NTSA (Pub. L. Nos. 90-543 and 111-11; 16 United States Code [U.S.C.] 1241-1251) provides federal recognition and protection of long-distance, high-quality trails with substantial recreation and scenic potential, including National Scenic Trails (NST) and National Historic Trails (NHT). They are designed to exemplify extraordinary and unique scenic qualities for trail users. This analysis focuses on the effects of the alternatives on the scenic values and recreation opportunities of the Pacific Crest National Scenic Trail. Refer to Appendix F for discussion of the anticipated effects to the Applegate National Historic Trail.

Affected Environment

Pacific Crest National Scenic Trail

The Pacific Crest National Scenic Trail (Pacific Crest Trail or PCT) is a long-distance hiking and equestrian trail closely aligned with the highest portion of the Sierra Nevada and Cascade Mountain ranges. The Pacific Crest Trail was designated a National Scenic Trail in 1968. The trail's southern terminus is on the U.S. border with Mexico and its northern terminus is on the U.S. border with Canada, traveling through California, Oregon, and Washington. The Pacific Crest Trail is 2,663 miles long and ranges in elevation from just above sea level at the Oregon-Washington border to 13,153 feet in the Sierra Nevada Mountain range. The PCT covers approximately 32 miles within the planning area (Map 2-2). The PCT is renowned for its outstanding scenery that passes over 100 mountain passes and through 9 distinct ecoregions. The trail is used by thousands of hikers and equestrians in different ways. Some may travel a mile while others may complete the entire 2,650 mile thru-hike (USDA FS, 2022).

In 1978, an Amendment to the National Trails System Act of 1968 directed the Secretary of Agriculture to prepare and submit to Congress a comprehensive plan for the development, management, and use of the trail. The Secretary assigned planning responsibility to the Forest Service, the trail's lead managing agency. As specified in the Act, this plan was developed in consultation with the Pacific Crest Trail Advisory Council, the Governors of affected States, the BLM, and the National Park Service. The CMP provides overall guidance, direction, and strategy for management of the trail. The CMP also identified scenic, natural, historical, and cultural resources as well as trail-related issues.

National Trail Right of Way (ROW) is the corridor selected by the administering agency in the trail-wide Comprehensive Management Plan that includes the area of land wide enough to encompass national trail resources, qualities, values, and associated settings (BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation). A National Trail ROW has not been selected by the Forest Service in the trail-wide Comprehensive Management Plan. Both the Comprehensive Management Plan and Foundation Document have objectives to acquire the minimum trail rights-of-way over privately owned land necessary to maintain continuous passage. This is different, however, from a National Trail Management Corridor, the allocation established through the land use planning process for an area wide enough in which to encompass national trail resources, qualities, values, and associated settings and the primary use or uses that are present or to be restored (BLM Manual 6280). A National Trail Management Corridor in the form of a Special Recreation Management Area (SRMA) was established for the CSNM expansion area through the 2016 Southwestern Oregon (SWO) RMP, with 6,161 acres in the Medford District (Pacific Crest Trail 1 and 2 SRMA) and 659 acres in the Klamath Falls Field Office (Pacific Crest Trail Corridor SRMA). A PCT management corridor has not been established within the original CSNM boundary.

Scenic Landscape Element

The PCT traverses between exposed ridges and densely forested saddles and valleys. This portion of the PCT consists not only of rugged and prominent mountains and ridges with scattered exposed volcanic rock slopes and geologic features, but also of smaller, rounded landforms and undulating valley bottoms adjacent to narrow and long glassy blue reservoirs. In the most enclosed areas along the northern portions of the PCT, where views beyond approximately 0.25 miles are intermittent to rare due to the dense tree line, the forest is made up of grandiose and monumentally large trees with a brilliant array of green tones occurring between the trees, lichens, brush, and grasses.

While views are frequently enclosed in forested areas, due to the terrain and slopes that the PCT winds along, exposed portions of the PCT along crests and ridges reveal and conceal exterior views. These sections of the trail often have expansive views of distant mountains and valleys due to the elevation that the trail generally sits at. These significant scenic views include features such as Mount Shasta, Mount McLoughlin, Mount Ashland, Soda Springs Peak, Hobart Bluff, Pilot Rock, and the Rogue Valley. Other scenic features, such as Howard Prairie Reservoir, Hyatt Reservoir, Little Hyatt Reservoir, and Keene Creek are visible at various points along the PCT, predominantly when the trail passes directly next to these features. Distant views from the PCT are only restricted by the mountain ranges themselves and when there are no trees blocking views from the trail, visibility can easily be upwards of 30 miles or more. Mount Shasta, 55

miles south in California, could be readily seen from Wildcat Hill. While these types of views exist, they are rare and intermittent at best. The most exposed vistas, such as Pilot Rock, Hobart Bluff, and Wildcat Hill, have nearly unrestricted 360-degree views that offer a glimpse of the high visual quality of the entire Monument and surrounding areas (Appendix L, National Scenic and Historic Trails Inventory, Assessment, and Monitoring Report).

Recreation Landscape Elements

The PCT provides numerous recreational opportunities within the CSNM. Chief among them are hiking or horseback riding the over 40 miles of the PCT within the Monument itself. Recreationalists are able to do this via day hiking, backpacking, or thru-hiking through the CSNM. Thru-hikers represent only a small percentage of the use on the trail, while day use and overnight out-and-back or loop trips represent most of the use. Day-hiking opportunities abound as plentiful trailheads allow visitors access to many different sections of the PCT. Longer routes, ideal for backpacking exist as well, because it is possible to section-hike parts of the PCT or even use other trails in the CSNM to create long loops. A notable example of this is the 17-mile Lone Pilot Loop trail through the Soda Mountain Wilderness, which relies on the PCT as part of its route. Dispersed camping is allowed throughout the Monument for those backpacking or thru-hiking on the PCT. Other recreational infrastructure to support PCT trail-users includes nine trailheads with relatively immediate access to the PCT, two trailhead restroom facilities, and the Hyatt Lake Campground.

Other recreational opportunities associated with the PCT in the CSNM include rock climbing. Technical rock climbing is only allowed on Pilot Rock in the CSNM and is only accessed by a PCT side trail. There are seven climbing routes on the rock's south face, including four with fixed, bolted anchors. Additionally, the entirety of the CSNM is open to hunting. Hunting is regulated by the Oregon Department of Fish and Wildlife, and the area is known for its black-tailed deer. During hunting season, hunters may use the PCT and occupy dispersed camping areas along it. Cross-country skiing occurs along the trail in the winter. In 2016 the BLM estimated day use along the BLM-administered segment of the Pacific Crest Trail at approximately 25,000 visitors annually (USDI BLM, n.d.).

Vegetation communities associated with the PCT are predominantly similar to the rest of the CSNM itself, and the vegetative diversity is a key element of the PCT experience. Conifer forests are commonplace, but other vegetation communities such as mixed forests and open grasslands with a variety of wildflowers can be found along the trail as well (USDI BLM, 2023a, Map 6-8).

Environmental Consequences

This section describes the potential direct, indirect, and cumulative impacts on the PCT from resource uses such as vegetation and fuels management.

Direct and Indirect Effects

Alternative A (No Action)

Alternative A (No Action) does not have a National Trail Management Corridor for the PCT. It does exclude thinning within 250 feet from the trail under the 2008 CSNM RMP. In the 2016 Southwestern Oregon (SWO) RMP, a 659-acre area around the trail occurs around the PCT as part of the SRMA in the Klamath Falls Field Office and 6,161-acre area along SRMA PCT Trail

1 and 2. In the SWO RMP, silvicultural treatments would be conducted within this area as needed to protect or maintain recreation setting characteristics or to achieve recreation objectives.

Under the 2008 CSNM RMP, the BLM would not conduct thinning projects within the 250 feet area on either side of the PCT and impacts from fire suppression tactics would be minimized to the immediate area that is visible from the trail (USDI BLM, 2008, p. 110). Fires would be allowed fire to burn across the PCT and in surrounding area rather than constructing dozer lines to suppress fires (USDI BLM, 2008, Appendix N, p. N-1)

Alternative B

Under this alternative, the BLM would prohibit vegetation and fuels management within 500 feet of the trail, except for actions necessary for public health and safety. The 500-foot exclusion would protect scenic values and recreation experiences within the management corridor. The changes to the landscape from these actions would not be visible from all sections of the trail, as many portions traverse though densely forested stands, which prevent opportunities for long-distance views.

Alternative C and Alternative E (the Proposed RMP)

Under these alternatives, the BLM would prohibit vegetation and fuels management within 250 feet of the trail, except for actions necessary for public health and safety, and under the Proposed RMP the BLM has also clarified that invasive plant management would be allowed. Allowing for invasive plant management along the trail would provide opportunities to continue improving rangelands conditions and reduce the incursion of noxious and invasive species to ensure the preservation of intact natural landscapes and restoration of human-altered landscapes along the trail (Refer to Section 4.2.4, Natural Opportunities in Appendix L, National Scenic and Historic Trails Inventory, Assessment, and Monitoring Report).

While these alternatives pose a slightly greater risk of impacting the scenic value and recreational experience, the inclusion of management direction that requires where vegetation treatments and fuels management would be allowed, they must not interfere with protecting scenic values and recreation opportunities and maintain recreation setting characteristics. Therefore, these actions would not adversely affect the scenic value or recreational experience of trail users. Additionally, the changes to the landscape from these actions would not be visible from all sections of the trail, as many portions traverse though densely forested stands, which prevent opportunities for long-distance views.

Alternative D

Under this alternative, the BLM would not allow any vegetation or fuels management activities within the entire management corridor, except for actions necessary for public health and safety. Therefore, Alternative D would have no potential to impact scenic values and recreation experiences within the management corridor.

Cumulative Effects

The Pacific Crest Trail Foundation Document (USDA FS, 2022), a vision document, identified three trends associated with the trail:

- Increasing levels of visitor use, especially long-distance travel;
- Increasing frequency of severe weather events and wildfires impacting the trail treadway and associated structures; and
- Agencies not able to fully maintain, reconstruct, and if necessary, relocate the Pacific Crest Trail to a sustainable equestrian standard if needed.
- Over the years, publications, movies, documentaries, the internet, and social media have steadily increased trail promotion, and this has fueled increased use of the trail. From the 1970s through the 1990s, the number of thru-hikes remained below 100 (Figure 3-4).

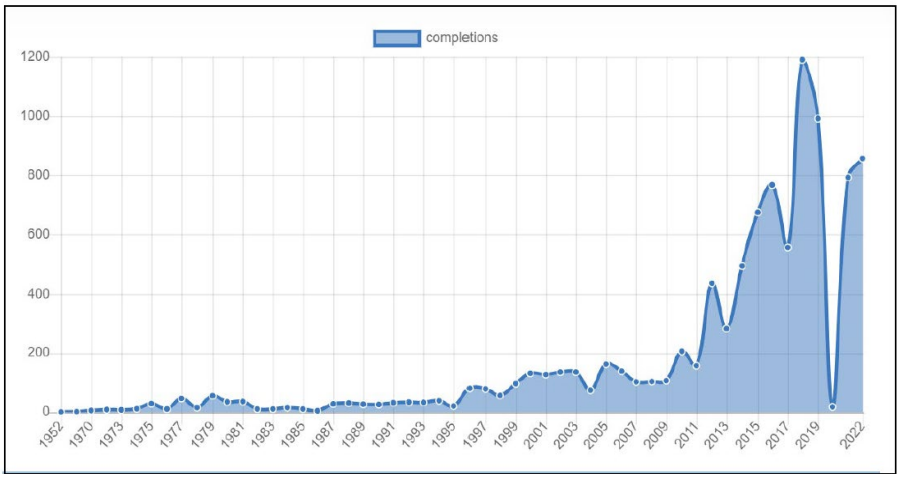


Figure 3-4. Number of completed thru-hikes on the Pacific Crest Trail, 1952–2020

Adapted from the Pacific Crest Trail Association (PCTA, n.d.)

In the year 2000, 132 thru-hikers completed the PCT and in 2010, 206 thru-hikes were completed. The popularization of the trail greatly influenced Cheryl Strayed's bestselling memoir Wild (Strayed, 2012), about her PCT hike in 1995, and the subsequent movie in 2014. The memoir and movie furthered interest in the PCT, resulting in a rapid rise in the number of thru-hikers and other visitors. In 2012, 437 thru-hikes were finished. Other significant peaks occurred in 2016 with 767, in 2018 with 1,191, and in 2022 with 856 thru-hikes. Only 18 thru-hikes were completed during the height of the Covid-19 outbreak in 2020 (PCTA, n.d.).

3.11. SOCIOECONOMICS

Key Points

- Alternative D has the greatest potential for negative social and economic impacts due to phasing out of existing facilities through changes in rights-of-way management, a likely decrease in recreational opportunities, elimination of livestock grazing opportunities, an increase in risk to private lands and properties from wildfires, and the lack of active management to protect and restore CSNM objects and values (although these would continue to be protected as required by the Proclamations). The other alternatives vary in their effects, but the social and economic impacts would not be significant.
- These impacts of Alternative D would fall on many sectors of society but are more likely to be felt by low-income populations in the adjacent counties. Therefore, Alternative D would have negative, disproportionate impacts on this environmental justice population. The other alternatives would not have environmental justice impacts.
- The BLM recognizes that inclusion of O&C Act lands in the CSNM impact revenue, and thereby counties and communities, due to restrictions on sustained yield commercial timber harvest. However, because the prohibition on sustained yield commercial timber harvest was inherent in the proclamations, any associated social and economic (and other) conditions are not affected by any of the alternatives and are therefore not included in this analysis.
- During the planning process, the BLM has received many comments about the importance of the Soda Mountain site for the Emergency Communications of Southern Oregon (ECSO) tower. The use of Soda Mountain for the ECSO tower is considered a current management (implementation-level) decision and is not being evaluated in this EIS, so the associated social and economic (and other) effects are not analyzed. None of the alternatives being considered would preclude continuation of the use of the Soda Mountain site for emergency communications.

Analysis Issues

1. What social and economic values are tied to specific resource management considerations (e.g., recreation and tourism, grazing management, communication site and transmission line leases, wildfire risk management, and resource protection) and how would these values and uses be affected by changes in management?
2. How would any identified environmental justice populations be affected by changes in management?

Socioeconomics Analysis Issues 1 and 2

What social and economic values are tied to specific resource management considerations (e.g., recreation and tourism, grazing management, communication site and transmission line leases, wildfire risk management, and resource protection) and how would these values and uses be affected by changes in management?

How would any identified environmental justice populations be affected by changes in management?

Affected Environment

The socioeconomic planning area for the CSNM plan is Jackson and Klamath counties in Oregon and Siskiyou County in California. While some of the impacts of CSNM management would extend beyond these counties, they are where most of the social and economic impacts of concern would take place, and where there is the greatest potential for effects on environmental justice (low income, minority, and Tribal) populations.[25] This section describes the counties' social and economic conditions, values and concerns, and identifies any environmental justice populations. Information related to social and economic values is contained in many of the other resource sections of this Final EIS.

Jackson County

Just over half of the County is federal land, split nearly evenly between the BLM and the Forest Service.[26] The county population in 2021 was 223,734, an increase of about 23 percent from 2000. The county seat and largest city is Medford, which has a population of 84,894. Other sizeable cities include Ashland (21,348), the closest city to the Monument, and Central Point (18,948). In 2021, the median age of county residents was 42, slightly higher than the median for Oregon residents (40). Of the population 25 years and older, 30 percent had a bachelor's degree or higher level of education, compared to 35 percent statewide.

About 88 percent of county residents reported their race as white, compared to about 81 percent of Oregon residents. About one percent or less reported their race as Black or African American, American Indian, Asian, or Native Hawaiian or other Pacific Islander, and seven percent said they were two or more races. All of these percentages were lower than those for Oregon residents as a whole. Fourteen percent reported being Hispanic or Latino (of any race), about the same percent as reported by Oregon residents. Considering both race and ethnicity, 79 percent of county residents reported being white and not Hispanic, so the total minority population is 21 percent, compared to 26 percent statewide.

Out of the 127,000 jobs in Jackson County in 2021, 18 percent were in non-services industries, with the majority in construction and manufacturing. About 74 percent were in services-related industries, which include a wide range of categories including health care and social assistance,

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[25] The U.S. Census Bureau measures race separately from ethnicity. Race is defined most basically as American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, Black or African American, White, some other race (other than White), or a combination of two or more races. Ethnicity is defined as either being Hispanic/Latino or not, regardless of race. On the census, people self-identify both their race and ethnicity.

26 Unless otherwise noted, county data comes from the BLM Socioeconomic Profile Tool (https://headwaterseconomics.org/tools/blm-profiles/).

retail trade, accommodation and food services, real estate, professional and technical services, administrative and waste services, transportation and warehousing, and finance and insurance (listed in order of the number of jobs provided). An additional 9 percent of jobs are in government, with most (72 percent) provided by local government, followed by federal and then state government.

The average wages for these jobs vary widely by specific type of job but average $55,000 for the non-services sector, $50,000 for the services sector, and $61,000 for government. Jackson County (2023) reports that the top six employers in the area are Amy's Kitchen, Asante Health System, Harry & David, Lithia Motors Inc., Pacific Retirement Services, and Providence Health System. Ashland is the home of Southern Oregon University, with more than 5,000 students and 37 areas of study. SOU and Rogue Community College also have campuses in Medford.

The average per capita income of residents employed in 2021 was $56,842, lower than the statewide average of $61,596. A higher proportion of county individuals (13.5 percent) than residents statewide (12.1 percent) live below the poverty level. Under BLM policy, 33 percent of residents are considered low-income, compared to 29 percent statewide.

Of residents' total personal income, half is from labor sources and half from non-labor, proportions comparable to those statewide but with a slightly higher proportion of non-labor income. Non-labor income consists of sources such as income from investments, Medicare and social security payments, and hardship-related transfer payments such as SNAP (Supplemental Nutrition Assistance Program, formerly known as food stamps) and Medicaid.

A higher percentage of Jackson County residents reported hardship and age-related payments than individuals statewide, consistent with an older population and higher proportion of low-income residents.

Klamath County

More than half of the County is federal land (57 percent), with almost 80 percent of the federal land managed by the Forest Service and about 10 percent managed by the BLM. The county population in 2021 was 70,164, an increase of about 10 percent from 2000. The county seat and largest city is Klamath Falls, which had a population of 21,710 in 2021. In 2021, the median age of county residents was 41, slightly higher than the median for Oregon residents (40). Of the population 25 years and older, 21 percent had a bachelor's degree or higher level of education, compared to 35 percent statewide.

About 83 percent of county residents reported their race as white, compared to about 81 percent of Oregon residents. About one percent or less reported their race as Black or African American, Asian, or Native Hawaiian or other Pacific Islander, and eight percent said they were two or more races. All of these percentages were lower than those for Oregon residents as a whole. Almost four percent reported being American Indian, primarily members of the Karuk Tribe, compared to just over one percent statewide. Fourteen percent reported being Hispanic or Latino (of any race), about the same percent as reported by Oregon residents. Considering both race and ethnicity, 76 percent of county residents reported being white and not Hispanic, so the total minority population is 24 percent, compared to 26 percent statewide.

Out of the 31,538 jobs in Klamath County in 2021, 18 percent were in non-services industries, with the majority in construction, manufacturing and farming. About 66 percent were in

services-related industries, which include a wide range of categories including health care and social assistance, retail trade, accommodation and food services, other services, real estate, professional and technical services, and transportation and warehousing. and finance and insurance (listed in order of the number of jobs provided). An additional 15.5 percent of jobs were in government, with most (72 percent) provided by local government, followed by federal and then state government. Two large higher educational institutions are located in Klamath County: the Oregon Institute of Technology (759 degrees awarded in 2020); and Klamath Community College (309 degrees).

The average wages for these jobs vary widely by specific type of job but average $50,832 for the non-services sector, $41,090 for the services sector, and $56,777 for government. Klamath County reports that the top three employers in the area are Sky Lakes Medical Center, the Klamath County School District and Jeld-Wen, which manufactures doors and windows. (https://businessviewmagazine.com/klamath-county-oregon-rural-ready/)

The average per capita income of residents employed in 2021 was $48,050, lower than the statewide average of $61,596. A higher proportion of county individuals (19 percent) than residents statewide (12.1 percent) live below the poverty level. Under BLM policy, 42 percent of residents are considered low-income, compared to 29 percent statewide.

Of residents' total personal income, 53.5 percent is from non-labor sources and 46.5 from non-labor, a slightly higher proportion of non-labor income compared to statewide percentages. Non-labor income consists of sources such as income from investments, Medicare and social security payments, and hardship-related transfer payments such as SNAP and Medicaid.

Siskiyou County

Almost two-thirds of Siskiyou County is federal land (63 percent) with most (92 percent) of the federal land managed by the Forest Service, and just three percent managed by the BLM. The county population in 2021 was 44,118, about the same as in 2000. The county seat and largest city is Yreka, which had a population of 7,807 in 2021. In 2021, the median age of county residents was 47, 10 years above the median for California residents (37). Of the population 25 years and older, about 21 percent had a bachelor's degree or higher level of education, compared to 35 percent statewide.

About 82 percent of county residents reported their race as white, compared to about 52 percent of California residents. About 2 percent reported their race as Black or African American (compared to 6 percent statewide), 1.5 percent as Asian (compared to 15 percent statewide), and nine percent said they were two or more races (versus 11 percent statewide). Just over 3 percent (3.4) percent reported being American Indian, compared to one percent statewide. Thirteen percent reported being Hispanic or Latino (of any race), compared to 40 percent statewide.

Considering both race and ethnicity, 75 percent of county residents reported being white and not Hispanic, so the total minority population in Siskiyou County is 25 percent, far lower than the 64 percent in California.

Out of the 20,789 jobs in Siskiyou County in 2021, 17 percent were in non-services industries, nearly all in farming, construction, and manufacturing. As described in the 2015 County of Siskiyou Grazing Policy, ranching is viewed as important to the economy, culture, and environment of Siskiyou County. The Policy notes that federal lands have historically been an

important source of livestock forage, and that the decline of AUMs on federal lands has negatively affected the economy and culture of Siskiyou County, reflected by the loss of ranches and related businesses (County of Siskiyou, 2015).

About 60 percent of the jobs in the County were in services-related industries, which include a wide range of categories including health care and social assistance, retail trade, accommodation and food services, other services, real estate, administrative and waste services, professional and technical services, finance and insurance, arts, entertainment and recreation, and transportation and warehousing (listed in order of the number of jobs provided). An additional 20 percent of jobs were in government, with most (74 percent) provided by local government, followed by federal and then state government.

The average wages for these jobs vary widely by specific type of job but average $54,617 for the non-services sector, $41,441 for the services sector, and $56,475 for government. The county is home to College of the Siskiyous, a public community college with campuses in Weed (main campus) and Yreka. This is the only institution for higher education in the County. The College awarded about 400 degrees in 2020 (https://datausa.io/profile/university/college-of-the-siskiyous).

The average per capita income of residents employed in 2021 was $52,368—much lower than the statewide average of $76,614. A higher proportion of county individuals (17 percent) than residents statewide (12 percent) live below the poverty level. Under BLM policy, 38.4 percent of residents are considered low-income, compared to 28.5 percent statewide.

Of residents' total personal income, 58 percent is from non-labor sources, much higher than the California percentage of 37 percent. Non-labor income consists of sources such as income from investments, Medicare and social security payments, and hardship-related transfer payments such as SNAP and Medicaid. A higher percentage of Siskiyou County residents reported hardship and age-related payments (34 percent) than individuals statewide (15 percent), consistent with an older population and higher proportion of low-income residents.

Attitudes and Values Regarding the Monument

This section describes public attitudes and values relevant to CSNM management based on the CSNM Situation Assessment Report prepared for the BLM and published in April 2023, supplemented by comments received during the public scoping period and summarized in the CSNM Scoping Report, published in November 2023 (USDI BLM, 2023a; refer to individual documents for an explanation of how they were developed).

People were aware of and supportive of protecting the objects and values for which the CSNM was created, including the diverse ecosystems that provide habitat for rare and endemic and special status wildlife and plant species, intact habitats and undisturbed corridors that allow for animal migration and movement, and reducing fire risk both within the wildland urban interface and with respect to CSNM objects and values.

Wildfire was the most frequently discussed topic of concern among those interviewed. Areas of concern included protecting communities and the risks associated with wildfire on plantations, mature forests, and oak forests. Fire and fuel management is believed necessary in the CSNM because of the substantial number of homes and growing number of full-time residents in the CSNM. Many said there is not a wildland fire urban interface strategy in the CSNM and

expressed concern about the CSNM becoming a "fireball." Property owners indicated that a top concern is providing defensible space to protect people and structures in areas within and adjacent to the CSNM. They would like to see more fuels reduction treatments around population centers, plantations, and in areas with a high rate of tree mortality.

The presence of invasive and noxious weeds was described as a growing problem on the CSNM by interviewees. Yellow starthistle, medusahead, Dyer's woad, foxtails, and Armenian blackberries were all mentioned as noxious weeds found along roads and trails, in disturbance areas, and in restoration areas. Many of those interviewed were concerned that there was not enough being done to control and mitigate the spread of noxious weeds. Neighboring entities are frustrated because they are required to do weed abatement or are doing their part, often at great expense, while the federal lands do not appear to be held to the same standard and weeds are getting worse.

While there was a desire to protect sensitive areas from the impacts of cattle grazing, it is thought that monitoring should be conducted to verify if impacts are coming from cattle or feral horses. Operators also expressed interest in finding collaborative solutions to look at how grazing practices may benefit the land. Since the 2017 CSNM expansion, remaining grazing allotments were cited by many as disrupting restoration efforts.

Many comments addressed the "checkerboard" land ownership, including O&C Lands, within the CSNM. One solution suggested to resolve conflicts was land swap/land exchange to create contiguous federal land ownership or management. Some interviewees thought that previous land exchanges between federal agencies and Tribal Nations provide an example of a path forward to consolidating management and meeting the purpose of the CSNM by providing ecological connectivity.

Acquiring property was described as a priority to provide a continuous landscape to help preserve biodiversity. Some advised the BLM to develop a strategic land acquisition plan to be ready to act when land is available. Many believed that roads are needed to access private properties or provide egress. However, at a meeting with the BLM in May 2024, Jackson County commissioners expressed a lack of support for future acquisitions of private lands, registering concerns about lost tax revenue when lands transfer from private ownership to federal ownership.

People requested more research on the fire history of the CSNM, including indigenous practices, to guide treatment and restoration activities. Forest health was a consistent theme among interviewees. There is a general sentiment about the lack of management of forested areas in the CSNM, and reference to projects that were approved but never implemented.

A lack of understanding of BLM forest management processes and priorities and a desire for the BLM to "do something" was prevalent among many interviewed. Active management (also referred to as Vegetation Management) was discussed as important to maintaining forest health, flora and fauna biodiversity and health, water quality and hydrology, and soil health. Active management was described as mechanical treatments such as thinning or reducing density of the tree canopy, prescribed fire (e.g., under burns or low intensity burns), removing dead and dying trees, and selective cutting of larger diameter trees.

Interviewees reported that the CSNM provides a wide range of year-round and seasonal habitat and migration pathways for a diversity of wildlife. The convergence of three major biological regions occurs at the site which supports an overlap of many species. The CSNM was described by many interviewed as playing an important role in providing land connectivity and safe crossings for wildlife. The convergence of four floristic/biological regions that converge in the CSNM—namely, the Cascade, Siskiyou's, Great Basin, and California floristic province—was believed to contribute to diversity of soils and flora in the area.

Environmental Justice

Environmental Justice (EJ) 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.
- Meaningful involvement means that EJ populations have a voice when we make 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." This includes Tribes.

The BLM is required to identify environmental justice populations and to consider whether BLM management decisions may result in disproportionately high and adverse human health or environmental effects to these populations. Current BLM policy regarding analysis of environmental justice impacts is provided in IM 2022-059, Addressing Environmental Justice in NEPA Documents (https://www.blm.gov/sites/default/files/docs/2022-09/IM2022-059_att1.pdf).

A low-income population is either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals who experience common conditions of environmental exposure or effect. A location, in this case a County, has a low-income population if 50 percent or more of its residents are low-income (defined as living at or below 200 percent of the poverty threshold); or if the percentage of low-income residents is the same or higher than that of a reference area (in this case the State); or other data indicate a low-income population is present.[27]

Minority populations are identified as environmental justice populations if more than 50 percent of the individuals in a defined area are members of one or more minorities, or if the percentage of minority individuals in a given area is greater than that of a relevant reference area. As was the case with low-income populations, environmental justice populations can also consist of a geographically dispersed/transient set of minority individuals who experience common conditions of environmental exposure or effect. As described in IM 2022-059, individuals are

[27] The BLM follows the EPA (https://www.epa.gov/ejscreen/overview-socioeconomic-indicators-ejscreen) in defining low-income individuals as those who live at or below 200 percent of the poverty threshold. For more information, refer to the BLM Environmental Justice Implementation IM 2022-059 (https://www.blm.gov/policy/im2022-059) and attachment.

defined as a minority if they are of a race other than white, or are Hispanic/Latino, or are American Indians (or a combination of one or more of these categories).

Based on the County data presented in the previous sections, all three counties are considered to be environmental justice populations based on their low-income status. In addition, American Indians in Klamath and Siskiyou Counties are considered to be environmental justice populations.

Summary of Analytical Methods

The purpose of this RMP is to provide a framework that guides the management of BLM-administered lands in the decision area to conserve, protect, and restore the resources, objects, and values for which the area was designated.

All action alternatives would be required to protect and restore the CSNM objects and values so the non-market and ecosystem values of the CSNM would be maintained or enhanced.

The social and economic effects of the alternatives depend on management and allocation of other resources, and how these would affect social and economic conditions and values, including livestock grazing, recreation and travel management, rights-of-way, and wildfire.

Effects on quality of life can be positive or negative and stem from actions such as changes in grazing availability, access to recreational opportunities, improvements in recreation access or facilities, and others.

Effects on local and regional economies can come from increased or decreased access to CSNM resources and lands and changes in existing economic uses or provision of new or improved economic opportunities.

The analyses are qualitative in most cases because the data from other resource analyses are not sufficient to permit quantitative analysis. For example, the analysis does not incorporate an economic input-output model that predicts the employment, income, and total economic output resulting from each alternative (i.e., an IMPLAN method).

The result is a qualitative summary, by alternative, of the meaningful differences in quality of life, economic opportunity, and effects on visitors and the public concerned about CSNM resources and opportunities.

The environmental justice analysis evaluates whether any negative effects would fall disproportionately on environmental justice populations. This evaluation is made based on the sum of effects from each alternative.

Like other socioeconomic analyses, the environmental justice analysis relies heavily on the impact analyses from other resource areas. Because the impacts on Cultural Resources and Tribal Uses and Values are not issues that are analyzed in detail, an environmental justice analysis was not conducted for Tribal populations. Impacts to cultural resources were not analyzed in detail because the potential effects on cultural resources would be the same across all alternatives and the objectives and management direction call for the protection of CSNM objects and values, which includes cultural resources. Impacts to Tribal uses and values were not analyzed in detail because the management direction does not preclude Tribal Nations access to sacred sites, landscapes, native plants, and other natural resources, so long as compatible with the protection

of CSNM objects and values, and permits are not required for Tribal Nation collections. In addition, the management direction calls for collaboration with Tribal Nations and other partners, to identify and provide co-stewardship opportunities and interpretive, educational, and outreach programs that lead to a better understanding, protection, and conservation of their interests and practices, as appropriate and desired by Tribal Nations. The environmental justice analysis would therefore focus on low-income populations.

The environmental justice analysis is also qualitative and could be adapted based on comments on the Draft EIS received from the relevant environmental justice populations.

Environmental Consequences

Each of the following sections describe the socioeconomic and environmental justice impacts of the alternatives, considering the changes in livestock grazing, recreation management, travel management, rights-of-way management, and wildfire risk management (each of which is briefly summarized, in that order).

Alternative A (No Action)

The No Action alternative would continue implementation of the management direction as written in the existing plans, including approved amendments.

The livestock grazing section, Section 3.7, shows that under Alternative A, all active grazing allotments (27,820 acres) would be available for livestock grazing and there would be no decrease in the 3,287 authorized AUMs.

The BLM would continue to manage 9,859 acres as six SRMAs and 21,031 acres as two ERMAs. The remaining BLM lands in the CSNM outside of special designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would be managed as undesignated lands. The No Action Alternative would allocate the largest number of acres (30,890) as RMAs as when compared to Alternatives B, C, and D. The No Action Alternative places an emphasis on the management and protection of recreation opportunities on approximately 27 percent of the decision area. SRMAs include specific measurable recreation outcomes and, therefore, their management is generally more prescriptive on allowable recreation activities, experiences, and associated management and allocation decisions. The more prescriptive management direction for SRMAs has the potential to both adversely and beneficially affect recreation opportunities and experiences.

Under the No Action Alternative, all acres outside of wilderness would also remain limited to existing roads and trails and road mileage would remain the same. This would leave the public with 636 miles of road to use. User conflict would remain between snowmobile use and wheeled vehicles on the same routes in winter, and sensitive areas with roads would remain accessible by motor vehicle. 27,819 acres of CSNM would be closed to motorized use (including the Soda Mountain Wilderness), and 85,688 acres would be limited to existing roads and trails.

When considering land tenure zone, Alternative A would include about 77,000 acres considered suitable for exchange, an amount greater than that under the other alternatives. This is because it includes fewer eligible Wild and Scenic Rivers, and fewer acres in National Scenic and Historic Trails, lands managed for wilderness characteristics, and ACECs and RNAs. Alternative A and Alternative B would allocate designated wilderness (24,700 acres) as a right-of-way exclusion

area and the remaining lands (88,799 acres) within the decision area as a right-of-way avoidance area. Alternative C would allocate 80,258 acres as avoidance areas and 33,248 acres as exclusion areas. In avoidance areas, the BLM would grant future land use authorizations on a case-by-case basis if the BLM determines that the proposals are compatible with the protection of the CSNM objects and values or when no feasible alternative route is available, in a manner consistent with BLM laws and policy.

Under Alternative A, it would also be possible to directly reduce or maintain low-moderate wildfire risk on 20 percent of the area within the People and Property "Local Area," and reduce wildfire risk to CSNM objects on an additional strategically placed 13 percent of the "Landscape Area." The estimated 26,884 restoration acres under Alternative A would directly reduce or maintain low-moderate wildfire risk within 36 percent of the People and Property "Local Area" extent or 36 percent of the "Landscape Area" over the life of the plan, if all restoration acres were focused within either extent.

Because Alternative A continues management under the existing land use plans, there would be no expected significant changes in social or economic conditions, nor any new environmental justice impacts.

Alternative B

Alternative B would use the most active management approach of the alternatives, promoting intensive management for the purposes of protection, maintenance, and restoration of CSNM resources using a variety of management tools.

The livestock grazing section (Section 3.7) shows that under Alternative B, all active grazing allotments (27,820 acres) would be available for livestock grazing and there would be no decrease in the 3,287 authorized AUMs. Under Alternative B, however, the 3,287 AUMs are the maximum available because flexible outcome-based grazing could alter annual livestock use.

Under Alternative B, the BLM would manage 431 acres as three SRMAs and 21,309 acres as ten ERMAs. The remaining BLM lands in the CSNM outside of special designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would be managed as undesignated lands. Alternative B includes designation of three SRMAs at currently developed recreation facilities that are recognized as being unique and important as compared to other recreation opportunities in the CSNM. The primary land focus would be management and protection of recreation opportunities. Of all alternatives, Alternative B includes the greatest portion of the decision planning area as ERMAs (19 percent). Because they can be less prescriptive, ERMAs can provide greater management flexibility to adapt to changes in recreation use and facility/infrastructure needs.

Under Alternative B, public motorized road use would be limited to street legal vehicles only throughout the CSNM, excluding closed areas, representing 636 miles of BLM roads. All sensitive areas outside of wilderness would remain accessible by motor vehicle. Hunting season would not include the use of OHVs within the CSNM, and natural surfaced roads would remain in use during the wet season. Also under Alternative B, cross country snowmobile use would be considered as prescribed in the proclamation on Surveyor Mountain. This use would occur only with sufficient depth (12 inches), and Surveyor Mountain would remain a limited area designation. Under this alternative, 27,819 acres of CSNM would be closed to motorized use,

10,300 acres would be limited seasonally (Surveyor Mountain), and 75,300 acres would be limited to existing roads and trails.

When considering land tenure zone, Alternative B would include about 59,000 acres considered suitable for exchange, an amount slightly greater than the acreages included under Alternatives C and D.

Alternative B (and Alternative A) would allocate designated wilderness (24,707 acres) as a rights-of-way exclusion area and the remaining lands (88,799 acres) within the decision area as a rights-of-way avoidance area. In avoidance areas, the BLM would grant future land use authorizations on a case-by-case basis if the BLM determines that the proposals are compatible with the protection of the CSNM objects and values or when no feasible alternative route is available, in a manner consistent with BLM laws and policy.

As stated in Chapter 1, one of the purposes of this RMP is "Reducing fire risk both within the wildland urban interface and to CSNM objects and values." Alternative B establishes the WUI as one-quarter mile from private property boundaries where structures are present and one-quarter mile around identified communities at risk. WUI treatments include vegetation and fuels management treatments. Under Alternative B it would be possible to reduce or maintain low-moderate wildfire risk on 20 percent of the area within the People and Property "Local Area," and reduce wildfire risk to CSNM objects on an additional strategically placed 13 percent of the "Landscape Area." The estimated 26,884 restoration acres under Alternative A would directly reduce or maintain low-moderate wildfire risk within 37 percent of the People and Property "Local Area" extent or 29 percent of the "Landscape Area" over the life of the plan, if all restoration acres were focused within either extent.

Alternative B includes management direction that differs from Alternative A (No Action) because it takes a more active and intensive approach. Managing grazing as a more flexible and outcome-based could ensure that CSNM objects and values are not compromised—but there is no automatic decrease in authorized AUMs. Permittees would be able to continue their livestock grazing, although it's possible that they could incur some increased costs based on monitoring. Recreation would be more intensively managed using both SRMAs and ERMAs, but there is no estimate or changed use patterns or levels, so access to valued recreational opportunities would remain, as would associated economic benefits. Less acreage would be available for OHV use, in part due to seasonal closures to snowmobiles, but this could decrease some user conflicts, and there would not be an increase in the acres closed to OHV use. The same amount of acreage as under Alternative A would be rights-of-way avoidance areas, which maintains the potential for valued future land use authorizations. A WUI would be established around both developed private property and communities at risk, which directly addresses strong public concerns about the risk of wildfires damaging private property in a checkerboard land pattern. The active management approach also addresses peoples' concern that lack of active management puts biodiversity values, adjacent timberlands, grazing operations, private properties, and recreation at risk from high-intensity wildfire. In sum, Alternative B protects CSNM objects and values while not restricting other public uses and values, including economic benefits. Therefore, low-income populations should not be negatively or disproportionately affected.

Alternative C

Alternative C would employ a moderate level of active management for protection, maintenance, and restoration of CSNM resources, and set some limitations on management actions and tools available.

The livestock grazing section (Section 3.7) shows that under Alternative C, all active grazing allotments (27,820 acres) would be available for livestock grazing and there would be no decrease in the 3,287 authorized AUMs. Under Alternatives C, however, the 3,287 AUMs are the maximum available because flexible outcome-based grazing could alter annual livestock use.

Under Alternative C, the BLM would manage 431 acres as three SRMAs and 6,409 acres as nine ERMAs. The remaining BLM lands in the CSNM outside of special designations (e.g., wilderness, areas of critical environmental concern, Wild and Scenic Rivers) would be managed as undesignated lands.

Under Alternative C, all ACECs, RNAs, lands with wilderness characteristics, and Buck Prairie RMA would be closed to motorized use. The public would have to reach these areas by foot, or possibly bicycle. In addition, motorized use would be limited to street legal vehicles only (excepting hunting season) while natural surfaced roads would be closed for use from December to May annually. This alternative would result in 12,989 acres of land closed to motorized use outside of wilderness due to ACECs, RNAs, or lands with wilderness characteristics. Even after closing ACECs and RNAs, the mileage of roads available are only reduced by 15.2 miles. In addition, existing snowmobile routes would remain in place during the snow season north of Highway 66, while wheeled vehicles would be prohibited on managed snowmobile routes during snowmobile season at Hyatt Lake and Buck Prairie. Under Alternative C, 27,819 acres would be closed to motorized use, and 85,688 acres would be limited seasonally, with natural surfaced roads closed between December and May annually.

When considering land tenure zone, Alternative C would include just under 56,000 acres considered suitable for exchange, an amount similar to that under Alternatives B and D. Alternative C would allocate 80,258 acres as avoidance areas and 33,248 acres as exclusion areas. In avoidance areas, the BLM would grant future land use authorizations on a case-by-case basis if the BLM determines that the proposals are compatible with the protection of the values for which the land was designated or when no feasible alternative route is available, in a manner consistent with BLM laws and policy.

As stated in Chapter 1, one of the purposes of this RMP is “Reducing fire risk both within the wildland urban interface and to CSNM objects and values.” Alternative C establishes the WUI as one-quarter mile around identified communities at risk. Impacts to lands with wilderness characteristics from WUI are similar to Alternative B; however, a smaller area would be treated, which reduces the overall impact to wilderness characteristics but also increases risk to private property.

Under the estimated minimum restoration acres for Alternative C, it would not be possible to reduce or maintain low-moderate wildfire risk on 20 percent of the area within the People and Property “Local Area” or reduce wildfire risk to CSNM objects on 20 percent of the “Landscape Area.” The estimated 12,310 restoration acres under Alternative C would directly reduce or maintain low-moderate wildfire risk within 17 percent of the People and Property “Local Area”

extent or 13 percent of the "Landscape Area" over the life of the plan, if all restoration acres were focused within either extent.

Although Alternative C takes a less active approach to management than under Alternative B, many of the resource conditions and allocations are similar. There would be fewer recreation designations, but this does not mean that recreation opportunity or quality would decrease, or that use levels or patterns would be altered. Additional areas would be closed to OHV use, which would affect people who have become attached to these areas. but closures should decrease some user conflicts and still leave most mileage of existing roads accessible to use. Alternative C would pose an increased risk of wildfire to private property compared to Alternative B because fewer acres would be treated and there would not be a WUI buffer within one-quarter mile of developed private lands. Treatments would directly reduce or maintain low-moderate wildfire risk within 17 percent of the People and Property "Local Area" extent or 13 percent of the "Landscape Area" over the life of the plan, if all restoration acres were focused within either extent, compared to 37 percent and 29 percent under Alternative B. This would be viewed by many as a significant difference and could pose a negative, possibly disproportionate impact to low-income populations depending on where the risk of wildfire would increase.

Alternative D

Alternative D would employ the least active management; the BLM would rely primarily on natural ecosystem processes that would allow plant community dynamics to unfold without active intervention.

Under Alternative D, no livestock grazing would be allowed. Currently, ten lessees have 15 grazing leases for authorization to graze 1,119 cattle within the 11 active grazing allotments, which constitute 55 percent of the total BLM allotment acreage of the 11 grazing allotments. Thus, a majority of the acreage within the allotments would no longer be available. This would be a significant loss for the lessees. As described in the AMS (USDI BLM, 2023a), demands for federal land grazing allotments are high and are likely to increase because these lands are critical to family-run cattle operations and are not readily available. Requests for grazing leases on the Medford District BLM have been high, but these leases are not available because grazing allotments are either already in use by other operators or BLM-administered lands have been made unavailable for grazing use by the 2016 Southwestern Oregon RMP/ROD (USDI BLM, 2016c).

Under Alternative D, the BLM would manage 431 acres as three SRMAs and 580 acres as five ERMAs. The remaining BLM-administered lands in the CSNM outside of Congressional and administrative designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would be managed as undesignated lands. The designation of SRMAs would remain the same as Alternatives B and C; however, only five ERMAs associated with existing recreation developments, such as trails, and trailheads, would be designated. Alternative D would designate the least amount of acres and the least number of RMAs across all alternatives. Recreation and visitor services would be minimally accommodated while still meeting legal requirements for visitor health and safety and mitigating resource user conflicts. No new recreation opportunities or experiences would be considered under Alternative D. Therefore, Alternative D would be least likely to meet anticipated recreation demand.

Under Alternative D, public motorized use would be limited to street legal vehicles only, throughout the year, with no exception for hunting season, and no seasonal limitation on natural surfaced roads. Under Alternative D, only street legal vehicles could be used within CSNM. Under this alternative, 27,819 acres would be closed to motorized use, while 85,588 acres would be limited to existing roads and trails.

When considering land tenure zone, Alternative D would include about 56,000 acres considered suitable for exchange, an amount similar to that under Alternatives B and C, but acquisitions would only occur from willing participants; eliminating the possibility of exchange may prevent the BLM from acquiring more desirable lands if the owner is willing to exchange but not sell, or if sufficient funding is not available for purchase but the owner would be willing to exchange.

Under Alternative D, the entire decision area would be a right-of-way exclusion area. The BLM would not grant future rights-of-way except as mandated by law, when necessary for the administration of valid existing rights (VER), or to allow for reasonable access to non-federal lands. Subject to applicable law, VERs, needs for reasonable access to non-federal lands, and public safety, existing authorizations would be phased out through non-renewal and construction of new facilities would be prohibited. Existing facilities that do not meet one of the previous criteria and that do not have administrative, recreational, cultural, or historic value would be removed or allowed to naturally disintegrate. Existing authorizations that would be phased out under this alternative include the occupancy leases at Hyatt Lake, communication site facilities not needed for public health and safety, Pinehurst School Complex, and Pinehurst State Airport.

As stated in Chapter 1, one of the purposes of this RMP is "Reducing fire risk both within the wildland urban interface and to CSNM objects and values." Alternative D establishes the WUI as 120 feet from private property boundaries where structures are present. Given the estimated minimum restoration acres for Alternative D, it would not be possible to reduce or maintain low-moderate wildfire risk on 20 percent or even 10 percent within the People and Property "Local Area" or reduce wildfire risk to CSNM objects and values on 20 percent of the "Landscape Area." The estimated 6,182 restoration acres under Alternative D would directly reduce or maintain low-moderate wildfire risk within only 8 percent of the People and Property "Local Area" extent or 7 percent of the "Landscape Area" over the life of the plan, if all restoration acres were focused within either extent.

In the Situation Assessment, people expressed the concern that lack of active management puts biodiversity values, adjacent timberlands, grazing operations, private properties, and recreation at risk from high-intensity wildfire. Their concerns are reflected in this alternative, which would pose the greatest risk of wildfire to private properties and communities. Alternative D would risk not meeting recreation demand and missing out on associated economic benefits. It would also remove existing facilities and preclude future ones by making the entire decision area an exclusion area. While emergency facilities and some others would remain, removal of the phased-out facilities would both deprive people of their use and incur substantial costs for removal. As described in the AMS (USDI BLM, 2023a), the demand for broadband capacity is rapidly increasing due to a variety of factors including greater numbers of wireless devices, increased needs for data delivery at a high speed, and capacity for home entertainment and home offices as well as business use. Resolving conflicts and increasing protection of CSNM objects and values would be more difficult due to the changes in land tenure processes. Prohibiting grazing without an analysis of its effects on CSNM objects and values, while favored by some

stakeholders, would pose significant difficulties for permittees who would likely have few other options. The impacts would extend beyond the permittees and could affect the local economy as well as public perceptions of the CSNM. The sum of these changes would be expected to fall disproportionately on low-income populations, so Alternative D would have environmental justice impacts.

Alternative E – Proposed RMP

As described in Chapter 2, Alternative E (the Proposed RMP) is a variation on Alternative C, which the BLM identified in the Draft RMP/EIS as the preferred alternative, with some components taken from Alternatives B and D. Like Alternative C, Alternative E would employ a moderate level of active management for protection, maintenance, and restoration of CSNM resources, and set some limitations on management actions and tools available.

The livestock grazing section (Section 3.7) shows that under Alternatives E, all active grazing allotments (27,820 acres) would be available for livestock grazing and there would be no decrease in the 3,287 authorized AUMs. As is the case with Alternatives B and C, the 3,287 AUMs are the maximum available because flexible outcome-based grazing could alter annual livestock use.

Under Alternative E, the BLM would manage the same area of SRMAs as under the other action alternatives, and slightly fewer acres of ERMAs compared to Alternative C. The remaining BLM lands in the CSNM outside of special designations (e.g., wilderness, Wild and Scenic Rivers) would be managed as undesignated lands.

Under Alternative E, there would be no designated ACECs or RNAs and therefore no accompanying restrictions on OHV use that are present in these areas under other alternatives. Motorized use would be limited to street legal vehicles only (excepting hunting season) while natural surfaced roads would be closed for use from December to May annually. Under Alternative E, 35,256 acres would be closed to motorized use, slightly fewer acres than would be closed under Alternative C; 72,365 acres would be limited to existing routes, slightly more than under Alternative C; and 5,887 acres would be limited to existing routes with seasonal restrictions, slightly more than under Alternative C.

When considering land tenure zone, Alternative E would include just under 56,783 acres considered suitable for exchange, an amount slightly less than under Alternative B and slightly more than under Alternative C. Alternative E would allocate 80,258 acres as avoidance areas and 33,248 acres as exclusion areas, nearly identical to the amounts under Alternative C. In avoidance areas, the BLM would grant future land use authorizations on a case-by-case basis if the BLM determines that the proposals are compatible with the protection of the values for which the land was designated or when no feasible alternative route is available, in a manner consistent with BLM laws and policy.

As stated in Chapter 1, one of the purposes of this RMP is “Reducing fire risk both within the wildland urban interface and to CSNM objects and values.” The Proposed RMP includes a management approach for reducing fire risk to CSNM objects and values and to people and property in wildland urban interface areas by providing objectives and management direction for lands within one-quarter mile of a community at risk and within 120 feet of private property boundaries where structures are present, excluding lands in CDMA-Wilderness.

Alternative E establishes the WUI as one-quarter mile around identified communities at risk and a 120-foot buffer around private property boundaries where structures are present, excluding lands in CDMA-Wilderness. As described in the Wildland Fire analysis, in Section 3.17, the estimated 12,310 restoration acres under Alternative E (Proposed RMP) would directly reduce or maintain low wildfire risk within 18 percent of the People and Property "Local Area" extent or 13 percent of the "Landscape Area" over the life of the plan, if all restoration acres were focused within either extent. Placement of these acres within the "Local Area" nearly achieves the 20 percent threshold and strategic placement in the "Landscape Area" would exceed the 10 percent strategic threshold. Proposed actions could also contribute toward improving safe and effective areas for wildfire containment along all strategic linear features available for restoration activities.

Although Alternatives C and E take a less active approach to management than Alternative B, many of the resource conditions and allocations are similar. There would be fewer recreation designations, but this does not mean that recreation opportunity or quality would decrease, or that use levels or patterns would be altered. Additional areas would be closed to OHV use, which would affect people who have become attached to these areas. but closures should decrease some user conflicts and still leave most mileage of existing roads accessible to use.

Conclusion

Because Alternative A continues management under the existing land use plans, there would be no expected significant changes in social or economic conditions, nor any new environmental justice impacts. Alternative B protects CSNM objects and values while not restricting other public uses and values, including economic benefits. Therefore, low-income populations should not be negatively or disproportionately affected.

Although Alternative C takes a less active approach to management than under Alternative B, many of the resource conditions and allocations, and socioeconomic effects, would be similar. An exception is Alternative C's increased risk of wildfire to private property and communities; this would likely be viewed by many as a significant difference and could pose a negative, possibly disproportionate impact to low-income populations depending on where the risk of wildfire would increase.

Alternatives A and B would contribute the greatest amount toward wildfire risk reduction to the WUI and CSNM objects and values, followed by Alternative E (Proposed RMP), then Alternative C, and lastly Alternative D. Alternative D would not satisfy the 10 percent minimum thresholds for wildfire risk reduction.

The overall socioeconomic effects of the Proposed RMP would be close to those described for Alternative C, but with reduced risk of wildfire to private properties. Although the Proposed RMP would not include designation of any ACECs or RNAs, the analysis in Section 3.3 concludes that the associated values would still be protected due to the requirements in the proclamations and BLM policy on management of National Conservation Lands. Alternative D would have a variety of negative effects on socioeconomic conditions in the planning area, the sum of which would be expected to fall disproportionately on low-income populations, so Alternative D would have environmental justice impacts.

3.12. Recreation and Visitor Services

Key Points

- Alternative A (No Action) would provide the largest number of acres allocated as Recreation Management Areas. Alternative D reduces managed recreation opportunities as compared to Alternative A (No Action). Alternative E, the Proposed RMP, would provide more acres allocated as Recreation Management Areas than Alternative D, and less acres than Alternatives A (No Action), B, and C.
- Proposed vegetation treatments in the WUI would cause short-term impacts to naturalness, evidence of use, and access recreation setting characteristics (RSCs) through noise and limited access during WUI treatments. However, over time these treatments would create more natural stands. Therefore, there would no change to the desired RSCs in SRMAs or targeted RSCs in ERMAs from WUI treatments under all the alternatives.
- Livestock grazing would have the most effect on the naturalness RSC in RMAs under Alternative A (No Action). Alternatives B, C, D, and E (Proposed RMP) do not designate any RMAs with a Primitive or Back Country naturalness RSC; therefore, there would be no effects or change to the desired and targeted RSCs under these alternatives.
- Under all the alternatives there are no management activities that would affect the desired and targeted RSCs in RMAs to warrant a change in the physical component RSCs of remoteness and visitor facilities, the social component RSCs of contacts, group size, and evidence of use, and the operational component RSCs of visitor services and management controls.
- The Proposed RMP (Alternative E) is the same as Alternatives B, C, and D with regard to containing no specific restrictions on where SRPs can be issued, but groups larger than 25 and larger than 12 in the Soda Mountain Wilderness would require prior authorization.

Analysis Issue

1. How would management direction affect the BLM's ability to provide recreation opportunities and recreation setting characteristics within RMAs?

Recreation and Visitor Services Analysis Issue 1

How would the alternatives affect the BLM's ability to provide recreation opportunities and affect recreation setting characteristics within RMAs?

Affected Environment

BLM-administered lands in the CSNM offer diverse opportunities for a variety of outdoor recreation activities and related benefits. The primary recreational activities in the area include hiking on the Pacific Crest National Scenic Trail and other trails in the area (e.g., Grizzly Peak, Hobart Bluff, Pilot Rock, and the Lone Pilot Trails); bicycling and mountain biking; camping at Hyatt Lake Campground and Surveyor Recreation Site; rock climbing at Pilot Rock; horseback riding; driving for pleasure; mushroom hunting; dispersed camping; hunting throughout the decision area; and Nordic skiing and snowmobiling on miles of groomed trails in the winter.

Many of these uses, and the facilities that support them, were present prior to the area being designated as a national monument, particularly in the expansion area. For example, the Buck Prairie cross country ski trail system, which includes two trailheads and a restroom; the Table Mountain Winter Play Area, which includes a sledding hill, warming hut, and restroom; and a disc golf course near Grizzly Peak were all present prior to the Monument expansion.

Management of recreation in the decision area is guided by BLM regulations and policies, federal and state laws, current and emerging trends in public demand for recreation opportunities and activities, and areas' physical, cultural, and natural surroundings. The BLM manages recreation by establishing recreation management areas (RMAs) and issuing special recreation permits (SRPs) and recreation use permits. RMAs identify where the BLM generally prioritizes the expenditure of funding. BLM Handbook H-8320-1, Planning for Recreation and Visitor Services, provides policy guidance on recreation and visitor services on public lands and waters.

Under this policy, during the RMP process the BLM designates public lands and waters as Special Recreation Management Areas (SRMAs) where it recognizes recreation management as the predominant land use plan focus and where the BLM intends to manage and provide specific recreation opportunities and recreation setting characteristics on a long-term basis. In addition, the BLM designates Extensive Recreation Management Areas (ERMAs) as administrative units that require specific management consideration to address recreation use or demand where recreation management is commensurate and considered in context with the management of other resources and resource uses.

BLM-administered lands that are not designated as RMAs (undesignated lands) are managed to meet basic recreation and visitor services (R&VS) and resource stewardship needs (resource protection, human health and safety, and use or user conflicts). Recreation is not emphasized on these lands; however, recreation activities may occur, except on those lands closed to public use. R&VS are managed to allow recreation uses that are not in conflict with the primary management of these lands. The BLM does not specifically manage for recreation setting characteristics, although lands not designated as RMAs do still provide intrinsic recreational values and opportunities. Since management of undesignated lands would be the same across all alternatives, it is not discussed further in this analysis.

There are no existing designated RMAs in the original boundary of the CSNM or on the CA lands in the decision area. Within the expansion area in Oregon, the BLM designated eight RMAs in the 2016 SWO RMP. Each RMA has an accompanying framework that guides management of the RMA and describes "the recreation values, types of visitors targeted, the outcome objectives, the Recreation Setting Characteristics, and the applicable management actions and allowable use restrictions" (USDI BLM, 2016a). The BLM currently manages six SRMAs and two ERMAs that total 30,203 acres, accounting for approximately 27 percent of the decision area. These areas are shown in Map 2-3, Administratively Designated Management Areas – Alternative A.

Recreation Use Permits

The Hyatt Lake Recreation Area is the only developed recreation site in the CSNM that is authorized under the Federal Lands Recreation Enhancement Act to issue recreation use permits to collect day use and overnight camping fees. Fees collected at the Hyatt Lake Recreation Area go to support maintenance, security, visitor information and facility improvements.

Special Recreation Permits

Special Recreation Permits (SRPs) are authorized under the Federal Lands and Recreation Enhancement Act and issued to manage visitor use, protect natural and cultural resources, and accommodate commercial recreation uses. There are five types of uses for which an SRP is required: commercial, competitive, vending, individual or group use in special areas, and organized group activity and event use. Often SRP activities offer a specialized opportunity for the recreating public to experience activities that they themselves do not have the skills, equipment, or resource knowledge to perform independently.

For BLM-administered lands currently managed under the 2008 CSNM RMP, the BLM issues SRPs on a case-by-case basis and issues or renews permits only if the proposed activity is found to be consistent with RMP objectives. SRPs involving commercial stock use are prohibited due to the high potential for resource damage (USDI BLM, 2008). Within the Soda Mountain Wilderness, the BLM issues SRPs in a similar manner, on a case-by-case basis with commercial stock use, competitive use events, and vending activities not permitted in the SMW (USDI BLM, 2012). Annually the BLM receives 2-3 inquiries on SRPs but after pre-application consultation the individual usually does not apply. For BLM-administered lands currently managed under the 2016 SWO RMP, the BLM may issue SRPs for a variety of uses, so long as doing so is consistent with other resource programs and objectives. In 2023, two SRPs were issued in the CSNM: a one-day field course to observe butterflies and moths, and an endurance horse ride event.

Reasonably Foreseeable Trends and Planned Actions

In 2023, the decision area had an estimated 230,182 visits. Recreation use in the decision area has been monitored for many years; however recorded visitation numbers represent only a portion of the actual level of recreation use. This can be attributed to the fact that there are numerous access points and recreation locations throughout the decision area, which makes it very difficult to accurately count visitation. In the decision area, recreation visitation is estimated at 28 recreation sites (USDI BLM, n.d.). This includes trailheads; Surveyor Campground; the Hyatt Lake Recreation area, which includes two campgrounds and a day use area; and dispersed recreation locations throughout the decision area. Figure 3-5 shows the combined total recreation visits for the 28 recreation sites in the decision area that are reported in RMIS from 2012 through 2023.



Figure 3-5. Estimated recreation visits in the decision area

Based on RMIS data from 2012–2023

A recreation visit is the estimated number of visitors who take part in a recreational activity. Estimated visitor use in the decision area has increased from 177,485 in 2012 to 230,182 in 2023, an increase of approximately 30 percent (USDI BLM, n.d.).

Forecasts

The CSNM forms the backdrop to many parts of the Rogue Valley in southern Oregon and the Shasta Valley in northern California. With the ease of access and diversity of recreational opportunities from skiing and snowmobiling in the winter to hiking, biking, and camping in the summer, the BLM expects the demand for recreation use of BLM-administered lands in the CSNM to continue to increase based on historic trends shown in Figure 3-5.

Summary of Analytical Methods

The BLM evaluated the effects of the alternatives on recreation opportunities and outcomes by comparing how they would (1) designate RMAs by type; (2) potentially change recreation setting characteristics; (3) affect the availability of recreation opportunities and the extent to which they meet anticipated recreation demand in the CSNM; and (4) restrict available recreation-specific activities. This analysis includes recreation management strategies and effects from management for other program areas on recreation resources under each of the alternatives.

Recreation Management Areas

Designating SRMAs and, to a lesser extent, ERMAs, would have long-term beneficial effects on the management and protection of specific recreation opportunities and experiences. SRMAs set distinct recreation management strategies for identified values and characteristics at discrete locations, resulting in beneficial effects on recreation use. Recreation planning across BLM-managed surface lands has shifted to an outcomes-focused management framework. Each SRMA has specific measurable outcomes, focused objectives, and associated management actions that provide a beneficial effect by guiding the amounts and types of uses allowed. ERMA management is commensurate and considered in context with the management of other resources and resource uses. Recreation was not specifically identified as an object and value for which the

CSNM was designated, and recreation is considered a discretionary use. In ERMAs, recreation would be managed commensurately with the protection of CSNM objects and values, which include rare, endemic, and special status wildlife and plants species and their habitat, along with other resources.

The RMA Frameworks have been developed for each SRMA and ERMA (Appendix M, Recreation Management Area Frameworks). These frameworks provide the management objectives for each RMA which identify the key elements, including targeted recreation activities, experiences, benefits, outcomes, allowable use activities, and management actions associated with each area.

Undesignated Lands

BLM lands not designated in an RMA would emphasize the protection of CSNM objects and values. These lands not designated as an RMA would be managed to meet basic R&VS and resource stewardship needs. In these areas no R&VS program investments have been made that require specific management considerations. Although recreation is not emphasized, a variety of dispersed recreation activities would continue to occur, including seasonal activities such driving for pleasure, mushroom hunting, dispersed camping, hiking, cycling, and hunting. The BLM and its managing partners would monitor recreation use and resources. Implementation actions would be adaptively performed, as necessary, to address (1) visitor health and safety; (2) use and user conflicts; (3) the type(s), activities, and locations where special recreation permits would or would not be issued; and (4) mitigation of recreation impacts on cultural and natural resources.

Undesignated lands, as opposed to ERMAs and SRMAs, are not managed for specific recreation setting characteristics and no recreation management objectives have been developed for these areas. Under all the alternatives recreation management in undesignated lands is the same and is therefore not analyzed further.

Recreation Opportunities and Restrictions

The BLM manages, allows, and restricts specific recreation activities within RMAs to create and sustain high-quality recreation opportunities; achieve desired recreation conditions; including recreation setting characteristics; protect public health and safety; and protect desired outcomes from potential conflicts between recreationists.

Recreation Setting Characteristics

Visitors seek a diverse range of setting-dependent outdoor recreation opportunities. They choose different areas in which to recreate based upon the qualities and conditions of the area as well as a desired set of recreation experiences and benefits. The BLM establishes RMA objectives that identify desired recreation setting characteristics for RMAs to complement the desired recreation opportunities and activities within those RMAs.

The BLM categorizes the type of recreation setting characteristic desired in a particular area through its Recreation Setting Classification System. The BLM bases this system on a combination of physical, social, and operational components. Physical components include characteristics of remoteness, naturalness, and visitor facilities. Social components include characteristics of contacts, group size, and evidence of use. Operational components include characteristics of access, visitor services, and management controls. Tables 3-31 through 3-40 provide the criteria for the physical, social, and operational components of the RSCs that were

used to develop the desired RSCs for SRMAs and the targeted RSCs for ERMAs that can be found in the RMA Frameworks (Appendix M). These RSCs, along with management actions and allowable use decision, facilitate the attainment of RMA objectives.

For SRMAs, the BLM has focused the discussion on how the alternatives would affect the physical, social, and operational components that might change the existing recreation setting characteristics. Since recreation is managed commensurately with the protection of CSNM objects and values in ERMAs, the analysis focuses on how the alternatives would affect the targeted RSC attributes for each ERMA.

Physical Components

"Remoteness" is defined by an area's proximity to human modifications associated with roads or trails. The BLM identified the recreation setting class for remoteness by using route classification and identifying distance criteria (Table 3-31).

Table 3-31. Distance criteria for establishing recreation setting class for remoteness (approximate distance from routes)

Remoteness Setting Class	Distance Criteria
Primitive	More than ½-mile from either mechanized or motorized trails/routes.
Backcountry	Within ½-mile of four-wheel drive vehicle, ATV, and motorcycle routes (BLM-identified "primitive roads" and "motorized trails").
Middle Country	Within ½-mile of low clearance or passenger vehicle routes (BLM-identified "roads," which includes unpaved county roads and private land routes).
Front Country	Within 1-mile of paved/primary roads and highways.
Rural	Within ½-mile of paved/primary roads and highways.
Urban	Within ½-mile of streets and roads within municipalities and along highways.

"Naturalness" is defined by the level of an area's influence by human modifications other than roads and trails (Table 3-32). Human modifications can include areas of development, utilities, rights-of-way, livestock structures, fences, habitat treatments, or landscape alterations. Naturalness considers the presence of human modifications and how these modifications may, or may not, affect the visitor's experience. Management considerations in this planning process would influence landscape alterations through Wildland Urban Interface (WUI) treatments and livestock grazing. As such, the BLM's analysis of naturalness uses the amount of proposed WUI treatments and livestock grazing in RMAs to measure potential changes in recreation setting classes for naturalness.

Table 3-32. Level of human modification criteria for establishing recreation setting class for naturalness (landscape texture, form, line, and color)

Naturalness Setting Class	Level of Human Modification
Primitive	Undisturbed natural landscape.
Backcountry	Natural landscape with modifications in harmony with surroundings and not visually obvious (e.g., stock ponds, habitat treatments, historic structures).
Middle Country	Character of the natural landscape retained. A few modifications contrast with character of the landscape (e.g., fences, ditches).
Front Country	Character of the natural landscape partially modified but none overpower the natural landscape (e.g., structures, utilities).
Rural	Character of the natural landscape considerably modified (e.g., agriculture, residential, airstrips, or industrial alterations).
Urban	Urbanized developments dominate the landscape.

Visitor facilities refers to the level of recreation development to accommodate visitors in RMAs and includes trailhead facilities such as restrooms and parking, type of trails, and campground facilities (Table 3-33).

Table 3-33. Level of visitor facilities criteria for establishing recreation setting class for visitor facilities

Visitor Facilities Setting Class	Level of Visitor Facilities
Primitive	No structures. Foot/horse and water trails only.
Backcountry	Developed trails made mostly of native materials such as log bridges. Structures are rare and isolated.
Middle Country	Rustic facilities such as campsites, restrooms, trailheads, interpretive displays and maintained and marked trails.
Front Country	Modern facilities such as campgrounds, group shelters, boat launches, and occasional exhibits.
Rural	Moderately developed resorts.
Urban	Elaborate full-service facilities such as laundry, restaurants, and groceries.

Social Components

Contacts refers to the average number of other groups that may be contacted and can provide an indication of visitor density and crowding, which strongly affect the visitor's experience (Table 3-34).

Table 3-34. Number of contacts criteria for establishing recreation setting class for contacts

Contacts Setting Class	Number of Contacts
Primitive	Fewer than 3 encounters/day at campsites and fewer than 6 encounters/day on travel routes.
Backcountry	7-15 encounters/day on travel routes.
Middle Country	15-29 encounters/day on travel routes.
Front Country	30 or more encounters/day on travel routes.
Rural	People seem to be generally everywhere.
Urban	Busy place with other people constantly in view.

Group size is the average number of individuals in a group that may be contacted when recreating (Table 3-35).

Table 3-35. Criteria for establishing recreation setting class for average group size

Group Size Setting Class	Average Group Size
Primitive	Fewer than or equal to 3 people/group.
Backcountry	4-6 people per group.
Middle Country	7-12 people/group.
Front Country	13-25 people/group.
Rural	26-50 people/group.
Urban	Greater than 50 people/group.

Evidence of use refers to the sights and sounds of other individuals and includes impacts to soils and vegetation, tracks, noise, and litter (Table 3-36).

Table 3-36. Criteria for establishing recreation setting class for evidence of use

Evidence of Use Setting Class	Evidence of Use
Primitive	No alteration of the natural terrain. Footprints only observed. Sounds of people rare.
Backcountry	Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.
Middle Country	Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
Front Country	Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people regularly heard.
Rural	A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.
Urban	Large areas of alteration prevalent. Some erosion. Constantly hear people.

Operational Components

Public access refers to the types of public travel allowed and includes non-motorized, mechanized, and motorized travel (Table 3-37).

Table 3-37. Criteria for establishing recreation setting class for public access

Public Access Setting Class	Public Access
Primitive	Foot, horse, and nonmotorized float boat travel.
Backcountry	Mountain bikes and other mechanized use, but all is nonmotorized.
Middle Country	Four-wheel-drive vehicles, ATVs, dirt bikes, or snowmobiles, in addition to nonmotorized, mechanized use.
Front Country	Two-wheel-drive vehicles predominant, but also four-wheel drives and nonmotorized, mechanized use.
Rural	Ordinary highway auto and truck traffic is characteristic.
Urban	Wide variety of street vehicles and highway traffic is ever present.

Visitor services refers to how information is provided to visitors when they visit an RMA (Table 3-38).

Table 3-38. Criteria for establishing recreation setting class for visitor services

Visitor Facilities Setting Class	Level of Visitor Services
Primitive	No maps or brochures available onsite. Staff rarely present to provide onsite assistance.
Backcountry	Basic maps, staff infrequently present (e.g., seasonally, high-use periods) to provide onsite assistance.
Middle Country	Area brochures and maps, staff occasionally (e.g., weekends) present to provide onsite assistance.
Front Country	Information materials describe recreation areas and activities, staff periodically present (e.g., weekdays and weekends).
Rural	Information materials, plus experience and benefit descriptions. Staff regularly present (e.g., almost daily).
Urban	Information materials, plus regularly scheduled onsite outdoor demonstrations and clinics.

Management control is the level of regulations, use restrictions, and enforcement (Table 3-39).

Table 3-39. Criteria for establishing recreation setting class for management control

Management Control Setting Class	Level of Management Controls
Primitive	No onsite posts/signs of visitor regulations, interpretive info, or ethics. Few use restrictions.
Backcountry	Basic user regulations at key access points. Minimum use restrictions.
Middle Country	Some regulatory and ethics signs. Moderate use restrictions (e.g., camping, human waste).
Front Country	Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.
Rural	Regulations strict and ethics prominent. Use may be limited by permit, reservation, etc.
Urban	Enforcement in addition to rules to reduce conflicts, hazards, and resource damage.

This analysis focuses on the lands in RMAs and the potential effects over the expected life of the plan (20 years). The following analytical assumptions were applied:

- Since visitor use patterns are difficult to estimate and dependent on many factors beyond the scope of management (e.g., recreation trends and economy), only qualitative language (e.g., increase or decrease) is used to describe anticipated effects on visitation.
- Congressional and administrative designations would attract more visitors and result in higher use levels. Studies have shown that a special identification or designation (e.g., SRMA, WSR) may lead to increased visitation. Designated areas that are currently receiving a custodial level of management would consequently need more intensive recreation oversight and monitoring (e.g., increased facilities, signage, increased staff presence and enforcement, and increased user controls).
- Visual Resource Management (VRM) classes support the desired physical recreation settings and aid in the attainment and long-term protection of these settings. VRM classes establish objectives, which prescribe the amount of change that BLM management actions are allowed to cause in the characteristics of the landscape.

Proposed management decisions that have the potential to affect recreation opportunities and recreation setting characteristics include lands and realty (ROW), livestock grazing, OHV designations, and vegetation and wildfire management.

Table 3-40. Recreation Management Areas (RMAs) by alternative

Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Continue to manage six existing SRMAs (9,730 acres)	**Designate three SRMAs (431 acres)**	**Designate three SRMAs (431 acres)**	**Designate three SRMAs (431 acres)**	**Designate three SRMAs (431 acres)**
• Hyatt Lake Campground (52 acres) • Grizzly Peak Trail (2,912 acres) • Pacific Crest Trail 1 and 2 (6,070 acres) • Pacific Crest Trail Corridor (659 acres) • Surveyor Mtn. Campground (28 acres) • Table Mountain Snow Play Area (9 acres)	• Hyatt Lake Recreation Area (394 acres) • Surveyor Mtn. Campground (28 acres) • Table Mountain Snow Play Area (9 acres)	• Hyatt Lake Recreation Area (394 acres) • Surveyor Mtn. Campground (28 acres) • Table Mountain Snow Play Area (9 acres)	• Hyatt Lake Recreation Area (394 acres) • Surveyor Mtn. Campground (28 acres) • Table Mountain Snow Play Area (9 acres)	• Hyatt Lake Recreation Area (394 acres) • Surveyor Mtn. Campground (28 acres) • Table Mountain Snow Play Area (9 acres)
Continue to manage two existing ERMAs (20,473 acres)	**Designate ten ERMAs (21,994 acres)**	**Designate nine ERMAs (6,416 acres)**	**Designate five ERMAs (149 acres)**	**Designate nine ERMAs (6,292 acres)**
• Buck Prairie/ Hyatt (9,369 acres) • Surveyor Mtn. (11,104 acres in CSNM)	• Buck Prairie (10,054 acres) • Buck Rock (266 acres) • Dragon Spine/ Vulture Rock (316 acres) • Green Springs Mtn Trail (23 acres) • Grizzly Peak Trail (90 acres) • Hobart Bluff Trail (8 acres) • Pilot Rock Trail (26 acres) • Shale City (76 acres) • Surveyor Mtn. (11,133 acres) • Watchable Wildlife Site (2 acres)	• Buck Prairie (5,525 acres) • Buck Rock (266 acres) • Dragon Spine/ Vulture Rock (400 acres) • Green Springs Mtn Trail (23 acres) • Grizzly Peak Trail (90 acres) • Hobart Bluff Trail (8 acres) • Pilot Rock Trail (26 acres) • Shale City (76 acres) • Watchable Wildlife Site (2 acres)	• Green Springs Mtn Trail (23 acres) • Grizzly Peak Trail (90 acres) • Hobart Bluff Trail (8 acres) • Pilot Rock Trail (26 acres) • Watchable Wildlife Site (2 acres)	• Buck Prairie (5,401 acres) • Buck Rock (266 acres) • Dragon Spine/ Vulture Rock (400 acres) • Green Springs Mtn Trail (23 acres) • Grizzly Peak Trail (90 acres) • Hobart Bluff Trail (8 acres) • Pilot Rock Trail (26 acres) • Shale City (76 acres) • Watchable Wildlife Site (2 acres)

Environmental Consequences

Impacts Common to All Alternatives

Land Use Authorizations

Under all alternatives, land use authorizations (ROW, permits, leases, and easements) could affect recreation opportunities and experiences in RMAs. In a ROW avoidance area, the BLM would only permit new ROWs if the proposal is compatible with the protection of CSNM objects and values and when no feasible alternative route is available, in a manner consistent with BLM laws and policy. In a ROW exclusion area, the BLM would not grant future rights-of-way except as mandated by law, when necessary for the administration of valid existing rights, or to allow for reasonable access to non-federal lands. Though the requirements for permitting ROWs are different in an avoidance versus an exclusion allocation, under all the alternatives RMAs may be subject to land use authorizations.

Development and management of land use authorizations, such as transmission lines and roads, may create health and safety concerns for the recreation user, such as noise, dust, and vehicle conflicts; adverse effects on recreation experiences through damage to recreation settings and perceptions of naturalness; and reduced or restricted access to recreation areas.

Wildland Fire Management – Wildfire Response

Where wildfire threatens safety of property, wildfire response could affect recreation opportunities and experiences in RMAs. Under all alternatives, throughout the CSNM Minimum Impact Suppression Tactics (MIST) would be used. These tactics aim to suppress a wildfire while minimizing the long-term effects of the suppression action. Disturbances caused by wildfire suppression activities, such as creating bulldozer lines and tree falling to stop the spread of wildfires, can affect the apparent naturalness of an area. Such disturbances can also affect recreation opportunities by restricting access. Following a wildfire, rehabilitation and restoration actions would be conducted to protect and sustain ecosystem services, public health and safety, and infrastructure adversely affected by fire management operations or direct fire effects, reducing impacts on recreation opportunities and experiences. There is no accurate way to predict the exact location and timing of wildfires or the specific wildfire response. Therefore, there is no reasonable basis on which to identify differences between the alternatives when it comes to the effect of wildfire response on recreation RSCs or opportunities in RMAs.

Vegetation Management in the Wildland Urban Interface/Fuels Emphasis Area

Treatments in the WUI/Fuels emphasis area, including vegetation and fuels management treatments, would affect the RSC of naturalness as well as recreation experiences. Mechanical vegetation removal affects solitude due to increased presence and noise, and it temporarily affects apparent naturalness by creating abnormal concentrations of dead vegetation and fuel loading. Changes to the landscape that can be seen from popular recreation sites, trails, or scenic roads (for example, Hwy 66) could affect the recreational setting characteristic of naturalness and have an impact on recreation experiences. These treatments would have short-term negative effects on apparent naturalness and the recreation experience due to noise; over time, however, they would enhance naturalness by creating forest stands that more closely mimic the appearance and function of forests in which natural fire has not been suppressed.

Alternative A (No Action)

Under Alternative A (No Action), Recreation and Visitor Services would be managed under management direction as written in the three RMPs and consistent with applicable Presidential proclamations, court rulings, laws, and executive orders.

Recreation Management Areas

The BLM would continue to manage 9,730 acres as six SRMAs and 20,473 acres as two ERMAs. The remaining BLM lands in the CSNM outside of Congressional and administrative designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would not be designated as RMAs (undesignated lands). Congressional and administrative designations' objectives may be inconsistent with RMA designations; therefore, no RMA designations overlap Congressional and administrative designations. Recreation mitigation would be addressed through plans and prescriptions for those designations.

The eight RMAs would be managed in accordance with the RMA frameworks for the Medford District (USDI BLM, 2016f) and the RMA frameworks for the Klamath Falls FO of the Lakeview District (USDI BLM, 2016g) that were developed in the 2016 SWO RMP. These frameworks provide the management objectives and identify the key elements of the RMAs, including targeted recreation activities, experiences, benefits, outcomes, allowable use activities, and management actions associated with each area.

Compared to Alternatives B, C, and D, the No Action alternative would allocate the largest total number of acres (30,203) and the largest portion (approximately 27 percent) of the decision area as RMAs.

Alternative A (No Action) also includes the largest total number of acres (9,730) and the largest portion of the decision area as SRMAs (approximately 9 percent) with the management and protection of recreation opportunities as the primary land use focus. SRMAs include specific measurable recreation outcomes; therefore, their management is more prescriptive on allowable recreation activities, experiences, and associated management and allocation decisions.

Recreational Target Shooting

Under Alternative A (No Action), recreational target shooting would continue to be prohibited in campgrounds, developed recreation facilities, Grizzly Peak, and the Pacific Crest Trail 1 and 2 SRMA, with the affected acreage comprising approximately 9,071 acres. Opportunities for recreational target shooting would continue to be open throughout the rest of CSNM (104,435 acres). Restrictions on target shooting can be beneficial to recreationists that are seeking opportunities for hiking, camping, sightseeing, and other activities and want to avoid noise and public safety risks associated with recreational target shooting. However, restrictions can also negatively affect the shooting sports community by limiting their opportunities. Alternative A (No Action) is the most restrictive of all alternatives because it would prohibit recreational target shooting in the most acreage, although the activity would still be allowed in more than 90 percent of the CSNM.

Special Recreation Permits

SRPs under Alternative A (No Action) would be managed under management direction in the three existing RMPs. SRPs in most of the CSNM would be issued on a case-by-case basis if they are consistent with RMP objectives. In the 2016 SWO RMP, competitive events were prohibited in the Pacific Crest Trail 1 and 2 SRMA (6,070 acres) and all SRPs were prohibited in the Pacific Crest Corridor SRMA (659 acres). Issuing SRPs can help to manage visitor use, protect natural and cultural resources, and achieve the goals and objectives of the recreation program. Restricting SRPs may also limit an individual's opportunity to participate in a recreational activity that they may not normally be able to pursue, such as outfitting and guided hunting. Alternative A (No Action) is the most restrictive of the all the alternatives, since it prohibits SRPs in the most acreage. SRPs under Alternative A (No Action) could be issued in more than 90 percent of the CSNM.

Livestock Grazing

Livestock Grazing under Alternative A (No Action) would be managed under management direction in the three existing RMPs and would occur in the greatest amount of acreage of RMAs of all the alternatives. Livestock grazing can have adverse effects on recreation experiences through damage to recreation settings and perceptions of naturalness, and it can lead to reduced or restricted access to recreation opportunities with fencing and enclosures.

All the Grizzly Peak SRMA, all the Surveyor Mountain ERMA, and portions of the Pacific Crest Trail Corridor and Pacific Crest Trail 1 and 2 SRMA would be available for livestock grazing. Under the 2016 SWO RMP, the Grizzly Peak SMRA and Surveyor Mountain ERMA have proposed RSCs of Middle Country, the PCT 1 and 2 SRMA has a proposed RSC of Back Country, and the PCT Corridor SRMA has a proposed RSC of Primitive. Under Alternative A (No Action), grazing would have the most effect on the PCT Corridor SRMA primitive RSC and the PCT 1 and 2 SRMA Back Country RSC but would not affect the Middle Country RSCs of the remaining two RMAs. In a Primitive RSC for naturalness, the character of the natural landscape is undisturbed; and in a Back Country RSC, the natural landscape has modifications that are in harmony with surroundings and not visually obvious. Facilities associated with livestock grazing (fencing, water troughs) and natural disturbances from cattle (trails and manure) would change the character of the natural landscape. Therefore, there would be effects to Primitive and Back Country naturalness RSC.

OHV Designations

The Presidential proclamations establishing the CSNM closed BLM-managed land within the CSNM to the use of OHVs, except on designated open roads and for emergency use (e.g. search and rescue, medical evacuation). Under Alternative A (No Action), approximately 32,043 acres are closed to OHV use, 72,094 acres are limited to existing routes, and 9,368 acres are limited to existing routes with a winter seasonal closure. The Buck Prairie ERMA and Hyatt Lake SRMA are closed to OHV use from November 1 to April 30 to protect winter recreation opportunities. Since there are no prohibitions on the use of OHVs on designated CSNM roads (except in the Soda Mountain Wilderness) under Alternative A (No Action), there are no effects on the desired RSC in SRMAs and no effect on the targeted RSCs for ERMAs.

Alternative B

Recreation Management Areas

Under Alternative B, the BLM would manage 431 acres as three SRMAs and 21,994 acres as ten ERMAs. The remaining BLM lands in the CSNM, excluding Congressional and administrative designations, would not be designated as RMAs (undesignated lands). These designations' objectives may be inconsistent with RMA designations; therefore, no RMA designations overlap Congressional and administrative designations. Recreation mitigation would be addressed through plans and prescriptions for those designations.

Alternative B carries forward the designation of three SRMAs (Hyatt Lake Recreation Area, Surveyor Mountain Campground, and Table Mountain Snow Play Area), which were designated as SRMAs in the 2016 SWO RMP. The existing recreation opportunities at these developed recreation facilities are recognized as being unique and important as compared to other recreation opportunities in the CSNM. The primary land focus in these three SRMAs would be the management and protection of recreation activities, experiences, benefits, and desired RSCs identified in the RMA frameworks for each SRMA.

The Pacific Crest Trail 1 and 2 SRMA (6,070 acres) and the Pacific Crest Trail Corridor (659 acres) under alternatives B, C, and D would no longer be designated as RMAs but would be designated as a National Trails Management Corridor (see Section 3.10, National Scenic and Historic Trails).

Of all the alternatives, Alternative B includes the greatest portion of the decision area as ERMAs (19 percent). Alternative B would include designation of ERMAs on lands within the decision area where there are existing recreation facilities and existing recreation use is occurring, as well as two new recreation opportunities. Unlike SRMAs, ERMA objectives do not explicitly prescribe specific measurable recreation experiences and benefits but have associated qualities and conditions. Since recreation in ERMAs is managed commensurately with the protection of CSNM objects and values, the allowable recreation activities, experiences, and associated management and allocation decisions are less prescriptive. Because they can be less prescriptive, ERMAs can provide greater management flexibility to adapt to changes in recreational use, facility/infrastructure needs, and resource concerns. Objectives for these ERMAs and the targeted RSCs, management actions, and allowable use decisions can be found in the RMA frameworks presented in Appendix M.

Under alternatives B, C, D, and E (the Proposed RMP), the Grizzly Peak SRMA designated as such in the No Action alternative would be designated an ERMA, and the acreage would be reduced from 2,912 acres to 90 acres. The Grizzly Peak area is recognized for its habitat connectivity and plant populations; therefore, to limit any future recreation-caused resource effects or impacts, the ERMA would only include the area that incorporates the 4-mile-long Grizzly Peak trail.

Four new ERMAs (Green Springs Mountain Trail, Hobart Bluff Trail, Pilot Rock Trail, and Watchable Wildlife Site) would be designated at existing developed recreation sites. These four locations were in the original CSNM boundary and were never designated as RMAs; however, they have significant R&VS investments and provide quality recreation experiences.

The Dragon Spine/Vulture Rock ERMA would offer new recreation opportunities in an area of unique geology where there is currently little to no existing recreation use. The Buck Rock and Shale City ERMAs would offer recreation opportunities in areas where existing recreational use is occurring.

Lastly, the remaining two ERMAs (Buck Prairie and Surveyor Mountain) under the No Action alternative would be carried forward under Alternative B. The Surveyor Mountain ERMA (11,133 acres), while already a popular area for snowmobiling on groomed routes, would consider cross country snowmobile use. Cross country snowmobile use would be prohibited in the Old Baldy RNA and in the Tunnel Creek ACEC.

Recreational Target Shooting

Recreational target shooting would be prohibited in campgrounds and developed recreation facilities under 43 CFR 8365.2-5 (a) and the Final Supplementary Rules on Public Lands in Oregon and Washington (70 FR 48584), which is approximately 1,238 acres. Opportunities for recreational target shooting would continue throughout the rest of CSNM (112,268 acres).

Special Recreation Permits

Under Alternative, B the BLM would issue SRPs as a discretionary action for activities that are consistent with CSNM objects and values, are within budgetary and workload constraints, and would not cause public health and safety issues or create user conflicts. Alternative B is less restrictive than Alternative A (No Action) since SRPs are not prohibited in any areas.

Livestock Grazing

Livestock grazing would be managed in the same manner as under Alternative A; however, less acreage would be designated as RMAs. Under Alternative B, the PCT 1 and 2 and PCT Corridor SRMAs are not designated as RMAs, and the Surveyor Campground has a desired RSC of Middle Country for naturalness. In a Middle Country RSC for naturalness the character of the natural landscape is retained with a few modifications that contrast with character of the landscape (e.g., fences, ditches). Livestock grazing would not change the character of the natural landscape; therefore, there would be no effects to naturalness RSC in the Surveyor Campground SRMA. In ERMAs, recreation is managed commensurately with other resources and resource uses, and recreation opportunities may even be constrained by decisions to benefit other resources such as livestock grazing. Livestock grazing under Alternative B would occur in the Surveyor Mountain, Grizzly Peak, Dragon Spine/Vulture Rock, and Shale City ERMAs. All of these ERMAs have targeted RSCs of Middle Country. Therefore, livestock grazing would not affect the naturalness RSC in these areas either.

OHV Designations

Under Alternative B, approximately 27,819 acres are closed to OHV use, 75,346 acres are limited to existing routes, and 10,342 acres are limited to existing routes with a seasonal closure. Public motorized road use would be limited to street legal motorized vehicles only throughout the CSNM, excluding closed areas. Since OHV use would be prohibited on existing routes, this would affect public access in the Surveyor Mountain and Buck Prairie ERMAs primarily during the hunting season when OHV use increases.

Alternative C

Recreation Management Areas

Under Alternative C, the BLM would manage 431 acres as three SRMAs and 6,416 acres as nine ERMAs. The remaining BLM lands in the CSNM outside of Congressional and administrative designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would not be designated as RMAs (undesignated lands).

Alternative C designates the same three SRMAs as Alternative B (Hyatt Lake Recreation Area, Surveyor Mountain Campground, and Table Mountain Snow Play Area) and would be managed to protect and enhance the same targeted set of activities, experiences and benefits, and desired recreation setting characteristics.

Alternative C also designates nine of the ten ERMAs in Alternative B but does not designate the Surveyor Mountain ERMA and reduces the Buck Prairie ERMA by approximately 3,844 acres.

The Surveyor Mountain ERMA area would not be designated as an RMA and would be considered undesignated lands. Recreation would still occur in this area and managed to meet basic R&VS and resource stewardship needs.

Recreation use in the Buck Prairie area is associated with the existing road and trail system primarily for cross-country skiing, snowmobile, cycling, and dispersed camping. To limit any future recreation-caused resource effects or impacts, the Buck Prairie ERMA would only include the area that incorporates the existing road and trail system, which includes approximately 30 miles of routes. Per Proclamation No. 9564, non-motorized mechanized (bicycle) use on designated trails would be considered in the Buck Prairie ERMA.

Recreational Target Shooting

Recreational target shooting is managed the same as under Alternative B, with campgrounds and developed recreation sites (approximately 1,322 acres) closed to recreational target shooting. Opportunities for recreational target shooting would continue throughout the rest of the CSNM (112,184 acres).

Special Recreation Permits

Under Alternative C, SRPs are managed the same as under Alternative B, where SRPs are not prohibited in any areas.

Livestock Grazing

Livestock grazing would be managed in the same manner as under Alternative B; however, less acreage would be designated as RMAs. Livestock grazing would not change the character of the natural landscape; therefore, there would be no effects to the naturalness RSC in RMAs.

OHV Designations

Under Alternative C, approximately 35,516 acres are closed to OHV use, 72,190 acres are limited to existing routes, and 5,801 acres are limited to existing routes with a seasonal closure. Public motorized road use would be limited to street legal motorized vehicles only (except during hunting season) throughout the CSNM, excluding closed areas.

Alternative D

Recreation Management Areas

Under Alternative D, the BLM would manage 431 acres as three SRMAs and 580 acres as five ERMAs. The remaining BLM lands in the CSNM outside of Congressional and administrative designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would not be designated as RMAs (undesignated lands).

Under Alternative D, the designation and management of three SRMAs (Hyatt Lake Recreation Area, Surveyor Mountain Campground, and Table Mountain Snow Play Area) would remain the same as under Alternatives B and C.

Only five ERMAs associated with existing recreation developments, such as trails and trailheads, would be designated (Pilot Rock Trail, Hobart Bluff Trail, Green Springs Mountain Trail, Grizzly Peak Trail, and Wildlife Viewing Site). Objectives for the five ERMAs and their targeted RSCs, management actions, and allowable use decisions can be found in the RMA frameworks presented in Appendix M. Of all alternatives, Alternative D includes the smallest portion of the decision area as RMAs, approximately 0.05 percent.

Special Recreation Permits

Under Alternative D SRPs are managed the same as under Alternatives B and C, where SRPs are not prohibited in any areas.

Recreational Target Shooting

Recreational target shooting management would be the same as Alternative B and C, prohibited in campgrounds and developed recreation facilities under 43 CFR 8365.2-5 (a) and the Supplementary Rules (70 FR 48584). However, since there would be fewer areas designated as ERMAs with shooting restrictions, the acreage that restricts shooting would be reduced to approximately 580 acres. This is beneficial to the shooting sports community but can also negatively affect recreationists that are seeking opportunities for hiking, camping, sightseeing, and other activities and want to avoid noise and public safety risks associated with recreational target shooting.

Livestock Grazing

Under Alternative D all lands in the decision area would be unavailable for livestock grazing and all existing grazing leases would be phased out (not renewed). Therefore, under Alternative D, there would be no effects on recreational objectives and RSCs from livestock grazing.

OHV Designations

Under Alternative D, approximately 33,792 acres are closed to OHV use, 79,715 acres are limited to existing routes, and 0 acres limited to existing routes with a seasonal closure. Public motorized road use would be limited to street legal motorized vehicles only, throughout the year, throughout the CSNM, excluding closed areas. Since the Buck Prairie and Surveyor Mountain ERMAs would not be designated as RMAs, there would be no effects on the desired RSCs in SRMAs and no effects on the targeted RSCs for ERMAs.

Alternative E (Proposed RMP)

Recreation Management Areas

Under Alternative E, the Proposed RMP, the BLM would manage 431 acres as three SRMAs and 6,292 acres as nine ERMAs. The remaining BLM lands in the CSNM outside of Congressional and administrative designations (e.g., wilderness, areas of critical environmental concern, wild and scenic rivers) would not be designated as RMAs (undesignated lands).

Alternative E (Proposed RMP) designates the same three SRMAs as Alternative C (Hyatt Lake Recreation Area, Surveyor Mountain Campground, and Table Mountain Snow Play Area), and these SRMAs would be managed to protect and enhance the same targeted set of activities, experiences and benefits, and desired recreation setting characteristics.

Alternative E (Proposed RMP) also designates the same nine ERMAs as Alternative C but reduces the Buck Prairie ERMA by approximately 124 acres to eliminate overlap with the Table Mountain Snow Play Area SRMA (9 acres) and Cottonwood Glades, a fen and meadow area (115 acres). Recreation would not be emphasized in the Cottonwood Glades area, and any impacts to the natural resources found in the area attributed to recreational use would be addressed.

The Surveyor Mountain ERMA area would not be designated as an RMA and would be considered undesignated lands. Although recreation would not be emphasized in this area, existing recreation would still occur in this area including snowmobiling, cross-country skiing, hunting, and dispersed camping. The BLM and its managing partners would monitor recreation use and resources. Implementation actions would be adaptively performed, as necessary, to address (1) visitor health and safety; (2) use and user conflicts; (3) the type(s), activities, and locations where special recreation permits would or would not be issued; and (4) mitigation of recreation impacts on cultural and natural resources.

Similar to Alternative C, and per Proclamation No. 9564, under Alternative E (Proposed RMP) non-motorized mechanized (bicycle) use on designated trails would be considered in the Buck Prairie ERMA.

Objectives, RSCs, management actions, and allowable use decisions for the three SRMAs and nine ERMAs can be found in the RMA frameworks presented in Appendix M.

Recreational Target Shooting

Recreational target shooting is managed the same as under Alternative C, with campgrounds and developed recreation sites (approximately 1,322 acres) closed to recreational target shooting. Opportunities for recreational target shooting would continue throughout the rest of CSNM (112,184 acres).

Special Recreation Permits

Under Alternative E (Proposed RMP), SRPs are managed the same as under Alternative B and C, where SRPs are not prohibited in any areas. However, to reduce impacts to monument objects and values, groups larger than 25 people and groups larger than 12 people within the Soda Mountain Wilderness would require prior authorization.

Livestock Grazing

Livestock grazing would be managed in the same manner as under Alternative B and C; however, under Alternative E (Proposed RMP), less acreage would be designated as RMAs. Livestock grazing would not change the character of the natural landscape; therefore, there would be no effects on the naturalness RSC in RMAs.

OHV Designations

Under Alternative E (Proposed RMP), approximately 35,526 acres are closed to OHV use, 72,365 acres are limited to existing routes, and 5,887 acres are limited to existing routes with a seasonal closure. Public motorized road use would be limited to street legal motorized vehicles only (except during hunting season) throughout the CSNM, excluding closed areas.

Cumulative Impacts

Past and present land management activities and natural disturbance processes that have affected recreation and visitor services include vegetation and fuels management, invasive species introduction and spread, road use and maintenance, wildfires, and restoration projects. These types of actions are anticipated to continue in the relatively foreseeable future and could impact recreational objectives and RSCs.

Recreation use can also impact other resource uses. Recreation use is expected to increase in the CSNM, and it would alter the landscape over time through increased human presence, OHV use where allowed, dispersed camping, and hiking in certain areas. This can lead to impacts to social RSCs (contacts, group size, and evidence of use) through increased disturbances, such as crowding, noise, route widening, and campsite expansion.

Increasing use and diversification of recreation opportunities also has many positive benefits including improving access to nature for marginalized groups, economic contributions to local communities, improved physical and mental well-being, as well as a greater respect and support for public lands.

Conclusion

Management actions associated with WUI treatments and livestock grazing would have effects on desired RSCs in RMAs.

Alternative A (No Action) has the most acreage of all the alternatives that would be affected by vegetation treatments in the WUI. Alternatives B, C, D and E (Proposed RMP), since they designate less acres as RMAs, would have fewer effects from WUI treatments, with Alternative D being the least affected. WUI treatments can affect the naturalness, evidence of use, and access RSCs. However, the effects of WUI treatments are short term, since the noise and limited access during WUI treatments subside once the work is completed, and over time WUI treatments create more natural stands. Therefore, there would no change to the desired RSCs in SRMAs or targeted RSCs in ERMAs from WUI treatments under all the alternatives.

Livestock grazing would have the most effect on the naturalness RSC in RMAs under Alternative A (No Action). Alternatives B, C, D, and E (Proposed RMP) do not designate any RMAs with a Primitive or Back Country naturalness RSC; therefore, there would be no effects on or change to the desired and targeted RSCs under these alternatives.

Under all the alternatives there are no management activities that would affect the desired and targeted RSCs in RMAs to warrant a change in the physical component RSCs of remoteness and visitor facilities, the social component RSCs of contacts, group size, and evidence of use, and the operational component RSCs of visitor services and management controls. Management activities in the CSNM focus on protecting and restoring objects and values identified in the proclamations, which include habitat for rare and endemic wildlife and plant species, protecting habitat corridors, and restoring resilient landscapes.

Varying the number, type, size, and management of RMAs affects the availability of recreation opportunities and the extent to which the RMAs meet anticipated recreation demand.

Alternative A (No Action) would designate the most overall acreage as RMAs (30,203 acres), the most SRMAs (ten) with most acreage (9,730 acres), and the least number of ERMAs (two). Under Alternative A (No Action), all the RMAs are in the expanded area of the CSNM and there would be no RMAs designated in the original monument boundary. Recreation would still occur outside of RMAs and visitor health and safety, resource protection, and use and user conflicts would be addressed. However, the expenditure of funding for R&VS would not be prioritized. As a result, the overall availability of recreation opportunities would be less than under Alternatives B, C, and E (Proposed RMP), and would not meet the anticipated recreation demand.

Alternatives B, C, and E (Proposed RMP) would designate the same three SRMAs with the same amount of acreage (431 acres). Alternatives B, C, and E (Proposed RMP) designate similar ERMAs, except Alternative C and E do not designate the Surveyor Mountain ERMA and reduce the acreage of the Buck Prairie ERMA. Recreation opportunities and experiences in these two alternatives are similar except Alternative B would consider cross country snowmobile use in the Surveyor Mountain ERMA, and Alternative C and E (Proposed RMP) would consider mountain bike use in the Buck Prairie ERMA. Alternatives B, C, and E (Proposed RMP) would also diversify and increase recreation opportunities through designating two ERMAs in areas of existing recreational use and one new ERMA. Buck Rock ERMA would offer year-round recreation and interpretation opportunities near the Buck Rock Tunnel. The Shale City ERMA contains a long-standing popular disc golf course, and the Dragon Spine/Vulture Rock ERMA would offer new recreation and interpretation opportunities near one of the most unique geologic features in the CSNM. By diversifying and increasing recreation opportunities and experiences, Alternatives B, C, and E (Proposed RMP) are expected to better meet anticipated recreation demand than the No Action alternative and Alternative D.

Alternative D would designate the least number of acres as RMAs (580 acres), and recreation and visitor services would be minimally accommodated while still meeting legal requirements for visitor health and safety. Designating the same three SRMAs as alternatives B, C, and E (Proposed RMP), Alternative D would designate five ERMAs associated with existing recreation developments, such as trails and trailheads. No new recreation opportunities or experiences would be considered under Alternative D. Therefore, Alternative D would be least likely to meet anticipated recreation demand and enable BLM to provide needed recreation opportunities.

Management actions and allowable use decisions would affect recreation and visitor services. Allowing, restricting, or prohibiting recreation opportunities, including both the opportunity for access (e.g., public closure) and opportunity to engage in specific activities (e.g., camping, recreational target shooting, and riding OHVs) can create and sustain high-quality recreation

opportunities, achieve recreation objectives and RSCs, protect public health and safety, reduce potential conflicts between recreationists, and protect resources.

Recreational target shooting restrictions are established under 43 CFR 8365.2-5 (a) and the Supplementary Rules (70 FR 48584). The Alternative A (No Action) restricts recreational target shooting in the greatest number of acres (approximately 9,071 acres). Alternative D is the least restrictive and restricts recreational target shooting in approximately 580 acres. However, across all alternatives there would still be adequate recreational shooting opportunities, since more than 90 percent of CSNM would remain open to recreational shooting under all the alternatives.

Issuing SRPs is a discretionary action, and Alternative A (No Action) is in this respect the most restrictive all the alternatives, since it prohibits SRPs in the most acreage (approximately 6,729 acres). Alternatives B, C, and D do not place any specific restrictions on where SRPs could be issued; however, SRP activities must be consistent with CSNM objects and values, within budgetary and workload constraints, and not cause public health and safety issues or create user conflicts. The Proposed RMP (Alternative E) is the same as Alternatives B, C, and D with regard to containing no specific restrictions on where SRPs can be issued; but under Alternative E, groups larger than 25 and larger than 12 in the Soda Mountain Wilderness would require prior authorization. Across all the alternatives there would be adequate opportunities for the issuance of SRPs, since more than 90 percent of the CSNM would be open to the issuance of SRPs.

OHV use designations can affect the publics ability to access BLM lands in RMAs. Alternatives B, C, D, and the Proposed RMP (Alternative E) limit motorized use to street legal vehicles only, except OHVs can be used during hunting season under Alternative C and D. Since OHV use would be restricted under these alternatives, public access for visitors wanting to use OHVs would be affected particularly in the Surveyor Mountain and Buck Prairie ERMAs where there are more dispersed camping opportunities. Since there are no prohibitions on the use of OHVs on designated CSNM roads (except in the Soda Mountain Wilderness) under Alternative A (No Action), there are no effects on the public’s ability to access BLM lands in RMAs.

3.13. SOILS

Key Points

- Alternative B would result in the greatest short-term detrimental soil disturbance, but with the greatest long-term benefit. Alternative D would result in the least short-term detrimental soil disturbance but would forgo long-term gains of soil functionality and have higher risk of high-intensity wildfire-related soil disturbance.
- AIM data from rangelands within the planning area show that current levels of livestock grazing are having minimal impact on soil resources. Alternatives A, B, C, and E (Proposed RMP) would continue to have the same level of impact, while Alternative D would remove the effect of livestock grazing on soil resources.

Analysis Issue

1. How would management direction affect soil productivity and function across the landscape?

Soil Resources Analysis Issue 1

How would management direction affect soil productivity and function across the landscape?

Affected Environment

The Natural Resources Conservation Service (NRCS) performed a complete inventory of soils within the planning area in 1993. The inventory is public-facing and can be found either at https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx or at https://casoilresource.lawr.ucdavis.edu/gmap/ (USDA, 2019). The survey covers dozens of soil properties, including erosion potential, taxonomy classifications, and surface texture. Soils within the planning area are highly variable, representing the area's biological and geological diversity (Table 3-41). Shallow rocky soils are prevalent and support a variety of ecosystems depending on the prevailing climate and hydrogeographic features ranging from wetland habitat to dry arid scrubland. Deep clay soils support oak savannah ecosystems with high organic matter content and water holding capacity. Overall, six of the twelve soil orders are within the planning area, representing multiple soil series, and there are minor components of histosols mapped within wet meadow ecosystems.

Table 3-41. Acres of soil orders represented by major components within the CSNM planning area

Soil Order	Acres
Alfisols	269
Andisols	18,198
Inceptisols	50,562
Mollisols	85,419
Vertisols	9,169

Source: NRCS Soil Survey for 1993 (USDA, 2019)

Trends in soil functionality vary within the planning area based on past use. Most of the planning area's soil resources remain intact and productive, and they have not drastically deviated from the natural conditions expected in absence of human activities. Soils that were used for agroforestry, including but not limited to plantations and roads, would not reach a more natural and functional state without intervention depending on the severity of the initial impact. For example, soils that have experienced compaction at 20-30 cm did not recover for the duration of a 30-year monitoring study of forested soils (Page-Dumroese, Morris, Curzon, & Hatten, 2021).

While intuitively the trend in soil functionality in such areas should be flat, the chance of a high-severity, stand-replacing wildfire is higher in forest stands seeing effects from past use. Trees planted with the intention of being harvested later were planted close enough together such that a wildfire under current conditions would be stand replacing. The amount of litter and fuel loading would increase risk of lasting soil damage.

Soil physical properties (i.e., bulk density) recover from grazing impacts when livestock are excluded from areas for as little as two to three decades, with variation in recovery correlated to soil texture (Dumroese, 2020). This places some rangeland areas within the decision area (i.e., retired grazing allotments) on an upward trend of recovery in terms of direct grazing impacts. While there are positive impacts from the retirement of grazing in certain areas, all rangelands are impacted from climate change, droughts, etc. in the form of an increase in exposed bare soil in dry meadows and decreased resilience to other forms of disturbance (Whitridge, Elvington, & Southworth, 2015).

Within the CSNM planning area itself, soil impacts remain after 40 years in the form of tilled and rowed forest soils visible from LiDAR (Figure 3-6).

Soil functions are pivotal for the health and resiliency of a landscape. Properly functioning soil serves as a medium for plant growth, a system for water filtration and storage, a cycler of nutrients and atmospheric gases, and even as a habitat for certain animals. Properly functioning soil requires land management practices that limit detrimental disturbance. Detrimental disturbance can be caused by improper implementation of vegetation management, livestock grazing, construction, or recreation activities. Soils that are detrimentally disturbed show signs of erosion, compaction, high-intensity burning, or a loss of organic matter.



Figure 3-6. Tilled and rowed forest soils are still visible 40 years after harvest, using LiDAR

Summary of Analytical Methods

Protocols used for defining detrimental disturbance vary depending on the cause of the disturbance. For example, quantifying detrimental soil disturbance from forest management actions use the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese, Abbott, & Rice, 2009), whereas livestock grazing impacts are measured using Rangeland Health Assessments (RHAs) or Assessment, Inventory, and Monitoring (AIM) plots. The impacts from some actions, such as quarry expansion, remove soil altogether, and the impact is measured by counting the acres that no longer function as vegetative habitat relative to what remains on the landscape. Impacts to soil resources were either qualitatively or quantitatively analyzed based on the availability of data and the ability to forecast reasonable assumptions.

Ecosystem Management

Impacts to soil within management from ecosystem management actions were quantified using the Forest Soil Disturbance Monitoring Protocol (FSDMP) (Page-Dumroese et al., 2009). This includes both vegetation management, such as mechanical thinning, and prescribed fire impacts from underburning and pile burning. Measuring detrimental soil disturbance is a field exercise where random points are examined to measure the impact and severity of forest ecosystem treatments. Within the decision area, various ecosystems beyond conifer forests would be treated, such as underburning of oak-woodland ecosystems, and those impacts would be quantified using the same metrics. The FSDMP relies on visual indicators to rapidly assess whether a site is detrimentally impacted or not relative to an undisturbed control. Those visual indictors are forest

floor depth, forest floor impact, topsoil displacement, erosion, rutting, burning, compaction, and structure.

Forest floor depth/impact: Impacts to a forest litter layer can have wide-ranging implications for the long-term productivity of the soil. An intact forest floor of appropriate depth gives mineral soil protection against rain splash impact and runoff due to overland flow. The forest floor also is the primary pool of organic matter that keeps the mineral topsoil productive. Changes in the distribution and depth of the forest floor would change the soil-disturbance severity rating.

Topsoil displacement: Mineral topsoil displacement and gouging can result in degradation of site quality by altering slope hydrology and causing excessive erosion, which in turn causes a loss of nutrients. Changes in the soil-disturbance categories are based on mixing of topsoil with subsoil, topsoil removal, and evidence of gouging and piling.

Erosion: While erosion is always happening to soil, human activities accelerate this process to detrimental rates. Accelerated soil erosion causes a shallower, less productive soil onsite, while causing sediment pollution offsite. Visual indicators of accelerated erosion rates are sheet erosion, rills, and pedestals.

Rutting: Wheel tracks or ruts are the impressions left in soil after heavy equipment has made one or more passes. Different types of equipment making a different number of passes affect the size and depth of the ruts. These ruts channel water offsite, making it unavailable for plant growth. Water moving offsite in ruts also carries topsoil offsite. Ruts are also strongly associated with several other indicators of detrimental disturbance. Rutting severity is measured based on their depth on the soil surface and their extension into the mineral soil profile.

Burning: Broadcast burning and pile burning both have the potential to alter soil functions to the point of being considered detrimental. Both the intensity of heat and the time under heat affect soil's ability to function by altering soil structure, burning organic matter, and sterilizing beneficial microbes. The severity of burning is directly correlated to the change in color of the soil, and the depth to which the effects of burning are present.

Compaction: Compaction of soil is the collapse of pore spaces that were previously filled with air or water. A compacted soil has a reduced functionality as both a plant-growing medium and a water storage apparatus. Detrimental compaction can be caused by ground-based yarding, road building, and landing construction. Soils at higher moisture contents are compacted with less force. Compaction can be partially remediated to the point that it is no longer considered detrimental, through subsoiling with or without soil amendments (e.g., biochar, compost, etc.). In measuring compaction as a visual indicator, the depth to which compaction can be detected determines whether compaction is detrimentally impacting the soil.

Structure: Soil structure is the naturally occurring arrangement of soil particles into aggregates that results from pedogenic processes. When disturbed, soil structure becomes platy or massive, which indicates a reduction in pore sizes and decreased functionality. While massive and platy structures occur naturally, they are uncommon in undisturbed forest soils. The depth to which the structure change is evident determines the amount of site-detrimental disturbance.

The percent area of detrimental soil disturbance caused by each treatment type was estimated based on literature examining prior treatments. Mechanical thinning was split into three different categories which were used based on broad slope classes and distances from established roads.

Different yarding methods cause differing amounts of detrimental soil disturbance. While applicable best management practices (BMPs) (refer to Appendix I) would be applied, it cannot be assumed that all disturbance would be eliminated. Furthermore, site-specific analysis of conditions is unknown and not addressed at the plan level. Therefore, for the purpose of this analysis, conservative estimates of detrimental soil disturbance caused by each yarding system were assumed. These estimates shown in Table 3-42 are typically smaller when BMPs are applied.

Table 3-42. Percent area of detrimental soil disturbance by yarding type

Yarding Type	Percent Detrimental Soil Disturbance
Ground-based	20
Tether Assisted	13
Cable/Skyline	2
Aerial	1

Source: Allen, Taratoot, & Adams (1999); Reeves, Page-Dumroese, & Coleman (2011); Brame & Jimenez (2019)

Distributions of mechanical thinning in the alternatives are split into various categories from the management direction based on broad slope classes, the distribution of those slope classes within the decision area, assumptions about road network distributions, and assumptions about suitability of sites for tethered equipment. Slopes less than 35 percent (20 percent in Alternative D) would be thinned using ground-based equipment. Half of slopes between 35 and 50 percent would be thinned using tethered equipment under Alternative B. Slopes greater than threshold for ground-based systems would be thinned using skyline or helicopter treatments based on road network availability. To create a conservative analysis, it is assumed that the road network within the planning area where treatment is happening allows for three-quarters of slopes to be treated with cable-based methods instead of aerial methods.

Prescribed fire can cause detrimental disturbance by heating soil to temperatures lethal to soil microbial life, thereby disrupting the main method by which nutrients are cycled from soil organic matter into growing vegetation. Hot enough temperatures in soil over enough time can also burn off organic matter in the mineral horizons of the soil, as opposed to surficial organic horizons. Physical effects include destroying soil structure, thereby altering hydraulic properties of soil such as structure, infiltration rates, and water holding capacities. Ash left behind after a high-intensity wildfire can also alter the pH and nutrients of the soil to levels unsuitable for native vegetation growth, leaving little chance of revegetation until the pH and nutrients are normalized (Johnson et al., 2005).

Not all fuels treatments would result in detrimental soil disturbance. Hand pile burning of small diameter material does not typically reach temperatures or burn for long enough of a duration to cause detrimental disturbance. Machine pile burning typically happens on areas that have already had detrimental soil disturbance accounted for on the site-specific level from thinning activities and should therefore not be double-counted. Mastication practices are also happening on areas already disturbed from thinning activities, with equipment that creates lower ground pressures than other mechanical harvest equipment over fewer passes, and with proper implementation of BMPs

associated with limiting mulch thickness in the treatment area, these practices won't cause detrimental soil disturbance.

The fuels treatment type to be used in the treatment area that would cause detrimental soil disturbance is underburning. This occurs from imperfect rehabilitation of control lines, or areas where fire lingered long enough around large diameter coarse-woody debris to cause soil temperatures lethal to microbial life. For the purposes of analysis, it is assumed that five percent of the area treated with underburning would have some form of detrimental soil disturbance under each alternative.

Each action can be assumed to cause a percentage of ground that has been detrimentally disturbed, which can then be extrapolated to the number of acres expected to be treated over the life of this plan, based on acres targeted for ecological restoration and the historic trends in the frequency of use for each management action. Precise acreage estimates for treatment during the life of this plan and their justifications can be found in Appendix N. For example, underburning is assumed to cause 5 percent detrimental soil disturbance (DSD) to areas in which it is applied, and over the life of an RMP, approximately 1,000 acres of land would be treated using underburning techniques. Therefore, 50 acres of detrimental soil disturbance would occur over the life of the plan within the planning area. This method would produce a conservative estimate of detrimental soil disturbance because it is known that 1) not all detrimental soil disturbance is permanent on timescales encompassing the life of the plan, and 2) BMPs (such as those that restrict operations when soil moistures are above certain limits) used while implementing ecological restoration can reduce detrimental soil disturbance to near 0 percent.

Grazing Management

Impacts from livestock grazing are analyzed using a combination of historical AUM data from the past 20 years, AIM plot data, and projected use of grazing allotments within the decision area. Projected utilization of the grazing allotments are estimated to be at or below current levels. For this analysis, the BLM used the current level of grazing use to conservatively estimate qualitative environmental impacts from grazing over a quantitatively produced acreage.

Lands and Realty Management

Management direction for lands and realty actions would allow for a variable amount of ROW authorizations throughout the decision area. Most ROW authorizations are to provide access and utilities to intermingled non-federal lands. Access is generally provided over surfaced roads, which can adversely impact soil resources. All lands in the decision area would continue to be available for access to valid existing rights holders and to provide reasonable access to non-federal landowners. Most ROW authorizations would occur in ROW avoidance areas, as opposed to ROW exclusion areas.

Transportation Management

For this analysis, the BLM assumed development of public motorized and non-motorized travel routes would continue to some degree under all alternatives. While there are currently no mileage estimates on route development, a qualitative analysis was conducted to evaluate the impacts of various forms of transportation management, the benefits from road decommissioning, and their impact on soil resources.

Environmental Consequences

Quarries

Management direction in Alternatives B, C, and E (Proposed RMP) would allow for the expansion of existing quarries within the decision area. The effects of quarry expansion would be a loss of two acres of productive soil over the course of a decade under Alternative B, and a loss of one acre of soil per decade in Alternative C and the Proposed RMP. The loss of soil productivity described in the management direction would not impact the ability of soil to function on the landscape scale. Under Alternatives C, D, and the Proposed RMP, there would be the potential to reclaim these existing quarry sites, either as developed recreation sites as sites for building soil resources back to productive habitat for vegetation.

Invasive Plant Management

Damage to soil resources from invasive plant management is dependent on which chemical treatments the BLM is allowed to use, and what areal extent manual treatment methods are used. Refer to Appendix F, Issues Not Analyzed in Further Detail, and Appendix O, Invasive Plant Management, for the BLM's invasive plant management strategy. Analysis at the implementation level is necessary to determine site-specific effects on soils from treating invasive plants.

Transportation Management

The development of recreation trails for non-motorized travel would incorporate best management practices (Appendix I) to mitigate adverse impacts to soil resources. Examples of current impacts from existing trails and recreation opportunities in the CSNM are limited in scope and are not adversely impacting soil function on a landscape scale.

Impacts from illegal OHV use cause excessive amounts of erosion where disturbances happen on steep slopes as linear features. Although limited in scope, effects from illegal OHV have the potential to remain on the landscape indefinitely. Due to its illicit nature, it is unknown how widespread illegal OHV use is. Dispersed camping is in a similar category. Dispersed camping is limited to areas that have already been disturbed (existing roads and campsites). Illegal camping in new areas would result in soil compaction and general clearing of vegetation, which leads to soil erosion. As with illegal OHV use, the current conditions and future effects of such illegal camping are impossible to quantify due to their criminal nature.

Roads, road maintenance, and road use directly impact soil resources by shifting soil function from productive vegetative habitat to an engineered construction medium. Future travel management planning would identify opportunities to decommission roads in alignment with protecting CSNM objects and values. While roads can be returned to functioning habitat, conditions are slow to recover even when recontouring the slope to match original topography, otherwise known as obliteration (Larson & Rew, 2022). Limiting public motorized use to existing roads reduces the amount of soil erosion and compaction by off-road travel. Under all alternatives, motorized use would be limited in the original monument boundary, and the Soda Mountain Wilderness would remain closed to all motorized use. While no true quantitative analysis can be done of the magnitude of effects due to a lack of travel management planning at this level of NEPA, implementing any of the action alternatives in this plan would reduce the adverse impacts of roads by unifying management direction under an RMP that clarifies road use limitations.

Ecosystem Management

Common to All Alternatives

Various thinning and harvest treatments in forested landscapes have direct effects on soil moisture. In soils, water content is constantly in flux. Factors that influence water content in soil are numerous and creating and examining an exhaustive list would be difficult. Real-world experiments can incorporate all variables while controlling for different amounts of thinning. A literature review reveals that real-world thinning experiments that monitor soil moisture show an increase in soil moisture post-thinning. Zhu et al. (2017) found that thinning in a semi-arid environment (15 inches of precipitation) created an overall net gain in water content within the lower portion of the soil profile. In Lassen National Forest, Hood, Cluck, Jones, & Pinnell (2018) found that soil moisture was more highly elevated relative to a control plot for at least five years after post-stand thinning of Ponderosa and Jeffery pine forests. More recently, a study performed in Arizona found profound positive effects from forest thinning in terms of soil moisture reservoirs through spring dry-down (Sankey & Tatum, 2022). Gray, Spies, and Easter (2002) conclude that soil moisture was more abundant in gaps than controls in a coastal Douglas-fir forest.

While literature looking at the surface of the soil profile (generally <10cm depth) shows soil drying (Zhu et al., 2017), extensive research on the topic of how harvest and thinning alter soil moisture availability at depth throughout the year has concluded that the increases in soil moisture from lack of rainfall interception and lack of vegetative transpiration outweigh the decreases from increased direct solar radiation on soil. This is particularly true in experiments where gap sizes were small enough that windspeed did not drastically increase evaporation of moisture. The gap sizes proposed in management direction are comparably sized to the studies referenced here.

Alternative A (No Action)

Under the No Action alternative, lands would continue to be managed under multiple RMPs. Of the three current RMPs encompassing the CSNM, the only RMP with appreciable guidance on soil resource management is the 2016 SWO RMP (USDI BLM, 2016a), which covers the 2017 expansion area lands in Oregon. The BLM assumes under Alternative A that vegetation management would continue to occur and be split between the current plans. No vegetation management treatments are expected to occur in CDMAs; therefore, those areas are not included in the slope distribution used to model treatments. Over the next 20 years, it is estimated that 26,268 acres would be treated (Appendix N, Vegetation Modeling and Assumptions). Of those acres, it is estimated that 15,600 acres would be subject to thinning of all diameters and prescribed fire, whereas approximately 10,600 acres would be subject to small diameter thinning and prescribed fire. All acres treated in the decision area could experience multiple treatment types—e.g., an area could be thinned and subsequently underburned. The treatment that causes the greatest amount of disturbance was used for analysis. For example, an area that had an all-diameter thinning treatment and a prescribed fire treatment would have detrimental disturbance counted from the all-diameter thinning treatment. Based on the amount of detrimental soil disturbance caused by treatment type, Alternative A would result in 2,917 acres of new detrimentally disturbed soil per decade, or 2.6 percent of the total decision area. The acres of treatment and the acres of new detrimental soil disturbance they would cause are split out in Table 3-43.

Table 3-43. Acres of new soil disturbance by treatment type, Alternative A

Treatment Type	Acres Treated	New Acres DSD
Ground-based thinning	11,622	2,332
Underburning	10,664	533
Tethered Thinning	1,173	152
Cable/Skyline Thinning	2,400	48
Aerial Thinning	409	4
TOTAL	**26,268**	**2,917**

Alternative B

Alternative B represents the most active management scenario, where at least 20 percent of the total ground targeted for restoration would be treated per decade. The following assumptions were made for this analysis: Treatment would only be happening in the EMAs; the expected life of this plan is two decades; and of the 27,028 acres targeted for treatment, 17,624 acres would be potentially thinned at all diameters and have prescribed burning treatments applied. The remaining 9,404 acres would only have small-diameter thinning treatments and prescribed burning treatments (Appendix N). All areas could experience multiple treatment types. The treatment that causes the greatest amount of disturbance was used for analysis. For example, an area that had an all-diameter thinning treatment and a prescribed fire treatment would have detrimental disturbance counted from the all-diameter thinning treatment.

Based on the amount of detrimental soil disturbance caused by treatment type, Alternative B would result in approximately 3,326 acres of new detrimentally disturbed soil per decade, or 2.9 percent of the total decision area. The acres of treatment and the acres of new detrimental soil disturbance they would cause are split out in Table 3-44.

Table 3-44. Acres of new soil disturbance by treatment type, Alternative B

Treatment Type	Acres Treated	New Acres DSD
Ground-based thinning	13,126	2,625
Underburning	9,404	470
Tethered Thinning	1,325	172
Cable/Skyline Thinning	2,711	54
Aerial Thinning	462	5
TOTAL	**27,028**	**3,326**

Alternative C

Alternative C differs from Alternative B in two ways relevant to analysis of this issue: only 10 percent of the area targeted for treatment would happen per decade, and the use of tethered ground-based equipment would be prohibited. The following assumptions were made for this analysis: treatments would be limited to within the EMAs; the expected life of this plan is two decades; and of the 12,310 acres targeted for treatment, 8,088 acres would be potentially thinned at all diameters and have prescribed burning treatments applied. The remaining 4,222 acres would only have small-diameter thinning treatments and prescribed burning treatments (Appendix N). It is estimated that Alternative C would result in an estimated 1,452 acres of new detrimentally disturbed soil per decade, or 1.3 percent of the total decision area. The acres of treatment and the acres of new detrimental soil disturbance they would cause are split out in Table 3-45.

Table 3-45. Acres of new soil disturbance by treatment type, Alternative C

Treatment Type	Acres Treated	New Acres DSD
Ground-based thinning	6,024	1,205
Underburning	4,222	211
Tethered Thinning	-	-
Cable/Skyline Thinning	1,548	31
Aerial Thinning	516	5
TOTAL	**12,310**	**1,452**

Alternative D

Alternative D differs from Alternative C in two ways relevant to analysis of this issue: it is assumed that up to five percent of the area targeted for restoration treatments would occur per decade; and the use of ground-based equipment would be limited to slopes less than 20 percent. The following assumptions were made for this analysis: treatment would only be happening in the EMAs; the expected life of this plan is two decades; and of the 6,182 acres targeted for treatment, 4,058 acres would be potentially thinned at all diameters and have prescribed burning treatments applied. The remaining 2,124 acres would only have small-diameter thinning treatments and prescribed burning treatments (Appendix N). Based on the amount of detrimental soil disturbance caused by treatment type it is estimated that Alternative D would result in an estimated 520 acres of new detrimentally disturbed soil per decade, or 0.5 percent of the total decision area. The acres of treatment and the acres of new detrimental soil disturbance they would cause are split out in Table 3-46.

Table 3-46. Acres of new soil disturbance by treatment type, Alternative D

Treatment Type	Acres Treated	New Acres DSD
Ground-based thinning	1,882	376
Underburning	2,124	106
Tethered Thinning	-	-
Cable/Skyline Thinning	1,632	33
Aerial Thinning	544	5
TOTAL	**6,182**	520

Alternative E (Proposed RMP)

Alternative E, the Proposed RMP, shares the same management direction as Alternative C concerning the decadal target (10 percent) for ecological restoration activities, such as thinning and prescribed fire, as well as restrictions on the creation of openings (limited to 2 acres). Additionally, Alternative E adheres to the same soils management guidelines as Alternative C, which prohibit the use of tethered equipment in ecosystem management and impose a 35 percent slope limit for other ground-based equipment. Due to these similarities, Alternative E is expected to have the same environmental effects as Alternative C.

Conclusion

Due to the addition of tethered ground-based equipment as an allowable tool and a more proactive management approach, Alternative B is expected to cause the most short-term detrimental soil disturbance, impacting an estimated 3,326 acres over the life of the plan. Alternative C and the Proposed RMP would lead to less disturbance, affecting an estimated 1,452 acres, and Alternative D would result in the least soil disturbance, impacting only an estimated 520 acres.

Management direction to limit detrimental soil disturbance to less than 20 percent of the operational area would apply across all alternatives. This would be achieved through the implementation of appropriate best management practices (refer to Appendix I). The 20 percent

threshold includes legacy disturbances that existed prior to management actions. Quantification of legacy disturbances would take place during RMP implementation, with project-level NEPA analysis conducted before any management actions are implemented. In areas where practices have significantly reduced organic matter in the mineral horizon of the soil, the application of organic matter would be utilized. Organic matter plays several critical roles in enhancing site productivity, such as reducing bulk density, improving water storage capacity, and increasing nutrient availability. This organic matter may consist of any material originally produced by living organisms at various stages of decomposition, including needle cast, leaf litter, coarse woody debris, or biochar/charcoal from the pyrolysis of woody debris.

The BLM aims to reduce the acreage of detrimental soil disturbance through management practices that limit initial compaction levels, remove existing or newly created compacted surfaces, and enhance soil water and organic matter content. To achieve this goal, the BLM would implement the best management practices outlined in Appendix I as needed to maintain overall detrimental soil disturbance at 20 percent or less. However, the extent and effectiveness of these mitigation efforts depends substantially on site-specific and project-specific factors, making it impossible for the BLM to quantify reductions in detrimental soil disturbance in this programmatic analysis.

Detailed site assessments would be conducted during RMP implementation, ensuring the application of site-specific best management practices. Treating areas under the current management practices outlined in the Proposed RMP and alternatives would help reduce existing disturbances from previous management, which focused on sustained-yield timber harvests that were more intensive before the designation of the monument. Management direction stipulates that any increase in detrimental soil disturbance must remain within 20 percent of each treatment area.

While all alternatives would lead to an increase in detrimental soil disturbance by varying percentages, mitigation efforts through best management practices would be required to address these impacts. Analysis for the Western Oregon RMPs (USDI BLM, 2016a) covering the expansion area lands in Oregon assumed that a treatment area with 20 percent detrimental soil disturbance would only result in a 10 percent reduction in vegetative growth. By adding the acres of detrimental soil disturbance from the most active alternative (Alternative B), overall detrimental disturbance levels would remain below this threshold for all action alternatives, including the Proposed RMP, ensuring the sustainable production of vegetation throughout the decision area.

Cumulative Impacts

The cumulative impacts analysis for soil resources takes into account direct, indirect, and reasonably foreseeable future actions by both the BLM and neighboring landowners. This encompasses a mix of human activities and natural events and trends. All soils within the CSNM have been previously inventoried, and this information is publicly accessible, as noted earlier in this section's discussion of the affected environment.

Most soils within the monument are functioning within the range of natural variability, though a small percentage are degraded due to past management actions. The effects of current BLM actions are designed to restore degraded soils to a healthy and functional state while also safeguarding against adverse impacts from high-severity wildfires. Additionally, the impacts of neighboring landowners on soil resources within the Cascade-Siskiyou National Monument are not

considered reasonably foreseeable, as ground disturbing activities on BLM land by adjacent landowners are prohibited.

The cumulative effects of ecosystem management on soil function and productivity can be assessed through measurements of detrimental soil disturbance and estimates of various treatment types across treatment acres. Each alternative's proposed ecosystem management actions would temporarily increase the overall detrimental soil disturbance on the landscape. However, limits and restrictions on management actions would ensure that the total new and existing detrimental disturbance in any single project area does not exceed 20 percent. The maximum additional detrimental disturbance any alternative could introduce over the life of the plan is 3,326 acres.

It is reasonably foreseeable that there would be high-severity wildfires in the CSNM over the life of this plan. While the precise acreages of detrimental soil disturbance caused by wildfire is impossible to predict given the nature of the issue, it is assumed that any high-severity fire would cause a reduction in soil functionality through the stripping of surficial organic matter, topsoil erosion, and soil sterilization. The likelihood of a high-severity wildfire occurring is assumed to be lower in the most active management scenarios given the increased fuel reduction activities that would occur.

Livestock Grazing

Impacts to soil resources from livestock grazing depend on the intensity of grazing, the areal extent on which grazing is permitted, and site conditions such as climate and soil types. Grazing can cause soil compaction, erosion, vegetative losses, and overall declines in soil functionality. The impacts from grazing are reduced through careful monitoring of grazing intensity, restricting seasonal use of allotments, and installation of structural improvements such as fencing around vulnerable resources.

Historically, rangelands within the planning area were grazed much more intensely than current levels. Soil functionality since the Monument's designation has been returning, though some impacts are still visible (Whitridge, Elvington, & Southworth, 2015), such as altered vegetation communities, areas of concentrated use that show compaction, and so forth.

Alternatives A (No Action), B, C and E (Proposed RMP)

Where available, grazing would continue at current levels (refer to Section 3.7, Livestock Grazing). AIM plot data showing high amounts of vegetative cover (average one percent bare ground) and high aggregate stability confirm that current levels of grazing within the decision area are not adversely impacting soils such that upland range habitat needs remediating intervention—e.g., by mandating rest periods from grazing.

Soil-stability ratings are tested by submerging a soil aggregate in water for a pre-determined length of time, and subsequently dipping it in water repeatedly. A rating of six indicates that 75–100 percent of soil aggregate remains on the sieve after five dipping cycles, after being submerged for five minutes (Herrick, Van Zee, Havstad, Burkett, & Whitford, 2005). Soil-stability tests, like all other tests, are performed over multiple plots within each grazing allotment, for a total of 23 plots over 8 allotments.

Table 3-47 displays an average of selected tests relevant to soil resources over these plots. Management direction offers several trigger points for removing stressors caused by livestock

grazing to rangelands (refer to Appendix E, Objectives and Management Direction). These stressors include both natural disturbances such as fire and poor livestock management practices.

Table 3-47. Selected AIM data by allotment, Alternatives A, B, C, and E

Allotment Name	Average Percent Bare Soil Cover	Average Percent of Total Foliar Cover	Average of Soil Stability Rating
Conde Creek	1	95	5
Cove	3	73	6
Cove Creek	0	82	5
Deadwood	1	73	6
Dixie	3	62	4
Grizzly Creek	1	92	6
Lost Creek	0	92	6
N Cove Creek	0	90	6
AVERAGE	**1**	**82**	**5**

Quantifying the precise magnitude of the effects on soil resources from grazing would be completed during the rangeland health assessment process at the implementation level. The AIM plot data collected at current management levels shows that the impacts to soil resources from grazing would result in similar effects under these alternatives.

Alternative D

Under Alternative D, all lands in the decision area would be unavailable for livestock grazing. Rangelands would continue to recover from grazing until they are disturbed from other sources such as climate change, drought, or wildfire.

Cumulative Impacts and Conclusion

The current state of soil resources within the CSNM's rangelands ranges from degraded to fully naturally functioning ecosystems, largely influenced by the intensity and recency of grazing. Many areas have shown recovery from the historical impacts of grazing, while others that were negatively affected continue to improve. Additionally, actions taken by adjacent landowners on non-Monument lands are not expected to adversely affect soil resources within the CSNM.

Adjacent landowners are likely to continue authorized grazing on rangeland allotments within the CSNM on BLM-administered lands, which would continue to adversely impact BLM soil resources. The effects to soil and other resources would be monitored through further collection of AIM and rangeland health assessment data. Adaptive management actions, described in the management direction for Alternatives A, B, C, and the Proposed RMP (Alternative E) (refer to Appendix E), taken in response to monitoring and data collection would ensure the functionality of the rangeland soils in the CSNM. Those actions include, but are not limited to, adjusting seasonal timing of grazing, ensuring conscientious placement of salt and mineral supplements, and making

range improvements to adjust use levels. Monitoring of rangeland health conditions would continue as it relates to the overall ecological functioning of the CSNM lands.

Lands and Realty Management

Alternatives A (No Action) and B

Under Alternatives A and B, there would be 88,799 acres of ROW avoidance areas and 24,700 acres of ROW exclusion areas. Acres considered ROW avoidance areas would have the greatest potential for impacts to soil resources in the form of roadside vegetation management, road construction, facility construction and structural improvements, grading, and excavation. These activities cause erosion, soil compaction, and topsoil removal. These actions would not occur over all 88,799 acres of ROW avoidance area. The historic average for ROW approvals in the planning area has been two per year. All management actions would comply with the protection of CSNM objects and values by conducting site-specific NEPA analysis and through the proper application of best management practices.

Alternative C and E (Proposed RMP)

Under Alternative C and the Proposed RMP (Alternative E), there would be 80,258 acres allocated as ROW avoidance areas and 33,248 acres allocated as ROW exclusion areas. Lands allocated as ROW avoidance areas would have the greatest potential for impacts to soil resources where land use authorizations would include roadside vegetation management, road construction, facility construction and structural improvements, grading, and excavation. These activities cause erosion, soil compaction, and topsoil removal. However, these actions are not expected to occur over all 88,799 acres of ROW avoidance area. The historic average for ROW approvals in the planning area has been two per year. All future management actions would need to be consistent with the protection of CSNM objects and values and would be determined by conducting site-specific NEPA analysis.

Alternative D

Under Alternative D, the entire decision area, approximately 113,500 acres would be allocated as a ROW exclusion area. While this substantially reduces the chance of adverse impacts to soil resources, there would still be the potential for adverse impacts associated with valid existing rights authorizations and also with providing reasonable access to non-federal landowners across BLM-administered lands. The BLM anticipates similar impacts to soil resources from these actions as described for ROW avoidance areas, albeit less likely. The historic average for ROW approvals in the planning area has been two per year. All future management actions would need to be consistent with the protection of CSNM objects and values and would be determined by conducting site-specific NEPA analysis.

Cumulative Impacts and Conclusion

Continuing to provide reasonable access to non-federal landowners is expected to only slightly increase the miles of road in the decision area over time, which would reduce soil functionality on those lands. Given the low number (two per year) historic average of ROW authorizations granted, and assuming that the same trend continues, the impacts would be minimal across the range of alternatives.

3.14. Travel and Transportation Management

Key Points

- Alternative C and the Proposed RMP (Alternative E) provide the most restrictions on public motorized access with more than 35,000 acres allocated as closed to public motorized access. The Proposed RMP provided slightly more seasonal restrictions on road use than Alternative C (5,887 acres compared to 5,801acres).
- Alternative B is the only alternative that would allow for cross-country snowmobile use in the Surveyor Mountain ERMA.

Analysis Issue

1. How would area OHV (or off-road vehicle [ORV]) allocations under 43 CFR 8342 and management direction affect public access?

Travel and Transportation Management Analysis Issue 1

How would OHV (or off-road vehicle [ORV]) area allocations under 43 CFR 8342 and management direction affect public motorized access?

During land use planning, the BLM is required to make decisions regarding public motorized access (i.e., OHV area allocations) for all lands in the decision area per 43 CFR 8342, BLM Manual 1626, Travel and Transportation, and BLM Handbook H-8342-1, Travel and Transportation Management. The BLM did not consider an allocation of open to OHVs as it is prohibited. Proclamation No. 7318 prohibits motorized and mechanized vehicle use off road within the original boundary of the CSNM. Proclamation No. 9564 carried forward the prohibition, with the following exception: "the Secretary may issue a travel management plan that authorizes snowmobile and non-motorized mechanized use off of roads in the area being added by this proclamation, so long as such use is consistent with the care and management of the objects identified above [in the proclamation]."

The BLM identified Travel Management Areas (TMAs) to serve as areas where Travel Management Planning would be conducted. These areas play a crucial role in managing travel-related activities within public lands. While the entire Monument would undergo travel management planning at a future date, the BLM has separated the CSNM into two preliminary TMAs. The first TMA - Priority 1 encompasses the original boundary area (as designated in 2000), while the second TMA - Priority 2 comprises the 2017 expansion area. TMA-Priority 1 would be the focus of initial travel management planning efforts, since prior surveys and inventory data have been completed for that area.

The BLM has been actively updating road and trail databases since 2016, but data are still lacking for some parts of the expansion area. While the expansion area lacks comprehensive data, the BLM is actively updating road and trail databases and would conduct extensive inventories in TMA - Priority 2 to assess roads and trails. This strategy would allow time for additional inventory work to occur on roads and trails within the expansion area. The schedule would be detailed in an implementation plan after the ROD is signed.

Under 43 CFR 8342.1, all OHV allocations shall be based on the protection of the resources of the public lands, the promotion of the safety of all the users of the public lands, and the minimization of conflict among various uses of the public lands. The BLM also based the allocations on the following criteria, keeping in mind that travel Management planning (road allocations) is considered implementation-level planning and would occur after this RMP is completed. The definitions for, OHVs, closed areas, and limited areas are defined in 43 CFR 8340.0-5 as follows:

- **OHVs** are any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding:
    - Non-amphibious registered motorboats;
    - Military, fire, emergency, or law enforcement vehicles being used for emergency purposes;
    - Vehicles whose use is expressly authorized by the authorized officer, or otherwise officially approved;
    - Vehicles in official use;
    - E-bikes:
        - While being used on roads and trails upon which mechanized, non-motorized use is allowed;
        - That are being used in a manner where the motor is not exclusively propelling the e-bike for an extended period of time;
        - Where the authorized officer has expressly determined, as part of a land-use planning or implementation-level decision, that e-bikes should be treated the same as non-motorized bicycles; and
        - Any combat or combat support vehicle when used in times of national defense emergencies.
- **Closed** areas are areas where off-road vehicle use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons, but only with the approval of the authorized officer.
- **Limited** areas are areas that are restricted at certain times, in certain locations, and/or to certain vehicular use. These restrictions may be of any type but can generally be accommodated within the following type of categories: Numbers or types of vehicles, time or season of vehicle use, permitted or licensed use only, use on existing roads and trails, use on designated roads and trails, or other restrictions.

The criteria for analysis of areas and trails (roads) as to whether they warrant designation as open, closed, or limited to off-road vehicles is defined in 43 CFR 8342.1 and as follows:

- Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
- Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered or threatened species and their habitats.

- Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations would not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.
- Minimizing impacts is limiting the degree or magnitude of an action and its implementation under 43 CFR 8342.1.

Affected Environment

Except for the Soda Mountain Wilderness, all lands within the CSNM are currently designated as limited to existing roads and trails, which means only existing roads and trails can be used for public motorized access. The CSNM has approximately 836 miles of roads, and 58 miles of trails over 113,500 acres of BLM-administered lands (refer to Map 3-4, Existing Travel and Transportation Network). Of those 836 miles of roads, 425 miles are naturally surfaced. Some roads are associated with valid existing rights (refer to Section 3.6, Lands and Realty).

In terms of OHV use, there are currently no prohibitions on the use of non-street legal vehicles within the CSNM (except in the Soda Mountain Wilderness), and winter snowmobile use occurs in two areas on existing roads; in the Buck Prairie cross-country ski trail system, and in the Hyatt Lake Recreation Area (refer to Section 3.11, Recreation and Visitor Services).

Summary of Analytical Methods

The BLM compared the amount of road mileage, acres of OHV allocations, and the effects of area allocations on public access. Under 43 CFR 8342.1(a-d), the agency addresses effects of area allocations. For an RMP, only area allocations are addressed.

A. Under the area allocations proposed, soil, watershed, vegetation, and air quality would benefit from an additional 8,548 acres closed to motorized use. Soil would also receive less compaction by closing natural surfaced roads during the wet season (December-May), while less sedimentation during that period would enter watersheds. Refer to respective sections (3.2, Aquatic and Riparian Habitat; 3.5, Hydrology; 3.13, Soils; and 3.15, Vegetation) for further analysis.

B. Under all action alternatives, wildlife, and wildlife habitat would receive substantially less disruption during critical winter periods by closing natural surfaced roads from December-May, while those 8,548 acres of additional wilderness and ACEC closures in wilderness characteristic areas and ACECs would provide an additional benefit for Threatened and Endangered wildlife species. Refer to Section 3.18, Wildlife, for additional analysis.

C. Under Alternative C, 35,516 acres would be closed to non-street legal off highway vehicles (except in hunting season). This closure, along with seasonal closures of natural surfaced roads, would reduce conflict among users significantly while protecting CSNM objects and values. Refer to Section 3.11, Recreation and Visitor Services, for further analysis.

D. Under Alternative C, an additional 8,548 acres of lands with wilderness characteristics would be closed to motorized use, additionally preserving that acreage for their natural, esthetic, scenic, or other values for which such areas are established. Refer to Section 3.8, Lands with Wilderness Characteristics, for further analysis.

Environmental Consequences

Table 3-48 displays the total amount of lands allocated as closed, limited, or open to public motorized access under each alternative.

Table 3-48. Acres proposed as limited, closed, or open to motorized use by alternative

Public Motorized Access OHV Area Allocation	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Closed	32,043	27,819	35,516	33,792	35,256
Limited to Existing - Seasonally Restricted	72,094	10,342	5,801	0	5,887
Limited to Existing	9,368	75,346	72,190	79,715	72,365
Open	0	0	0	0	0
Limited - Cross-country Snowmobile Use Allowed	0	11,133 (Surveyor Mtn. ERMA)	0	0	0

Alternative A (No Action)

Under Alternative A (No Action), 32,043 acres of the CSNM would continue to be closed to public motorized use (including the Soda Mountain Wilderness); 72,094 acres would be limited to existing roads and trails; and 9,368 acres would be seasonally limited (Table 3-48). User conflict would remain between snowmobile use and wheeled vehicles on the same routes in winter, and sensitive areas with roads would remain accessible by motor vehicle.

Alternative B

Under Alternative B, public motorized road use would be limited to street legal motorized vehicles only throughout the CSNM, excluding closed areas. All sensitive areas outside of the Soda Mountain Wilderness would remain accessible by motor vehicle. Natural surfaced roads would remain in use during the wet season. Also under Alternative B, cross-country snowmobile use would be considered, as allowed for by Proclamation No. 9564, within the Surveyor Mountain ERMA. This use would occur only with sufficient snow depth ($\geq$12 inches), and the Surveyor Mountain ERMA would remain a limited area designation. Under this alternative, 27,819 acres of the CSNM would be closed to public motorized use; 10,342 acres would be limited seasonally (Surveyor Mountain); and 75,346 acres would be limited to existing roads and trails (Table 3-48).

Alternative C

Under Alternative C, 35,516 acres would be closed to public motorized use; 72,190 acres would be limited seasonally by road type (natural surface limitation); and 5,801 acres would be limited by a seasonal closure (Table 3-48). All natural surfaced roads in the CSNM would be closed from around December 1 to May 1, except for snowmobile use and use associated with valid existing rights and private property access. Public motorized use would be limited to street legal vehicles only (except during hunting season). In addition, snowmobile use on existing routes would remain in place during the snow season north of Highway 66, while wheeled vehicles would be prohibited on managed snowmobile routes during snowmobile season at the Hyatt Lake Recreation Area SRMA and the Buck Prairie ERMA. In addition to the Soda Mountain Wilderness, all ACECs, RNAs, lands managed for their wilderness characteristics, and the Buck Rock Tunnel ERMA would be closed to public motorized use. The public would have to reach these areas by foot, or possibly bicycle.

Alternative D

Under Alternative D, public motorized use would be limited to street legal vehicles only throughout the year, with no exception for hunting season, and no seasonal limitation on natural surfaced roads. Under this alternative, 33,792 acres would be closed to motorized use, while 79,715 acres would be limited to existing roads and trails (Table 3-48).

Alternative (Proposed RMP)

Under Alternative E, the Proposed RMP, 5,887 acres would be limited seasonally, with no wheeled vehicle use from November 1 through April 30 annually at the Buck Prairie ERMA, the Table Mountain Snow Play Area SRMA, and the Hyatt Lake Campground SRMA. Road closures would be in place for the Pokegama wintering deer range of 85 acres from November 20 through April 1 annually. A total of 35,256 acres would be closed to public motorized use, including the Soda Mountain Wilderness (CDMA-wilderness), ADMA-lands managed for their wilderness characteristics, the Buck Rock, Pilot Rock, Shale City, and Grizzly Peak Trail ERMAs, and Cottonwood Glades, a riparian area adjacent to the Buck Prairie ERMA (Table 3-49). All remaining lands would be limited to existing routes (Table 3-48).

Table 3-49. Areas allocated as Closed or Limited-Seasonally Restricted - Proposed RMP (Alternative E)

Designation	Rationale	Acres
Public Motorized Access, OHV – Closed		
CDMA – Wilderness	Required by the Wilderness Act and 43 CFR 8342.1(a) wilderness suitability.	24,700
ADMA – Lands managed for their wilderness characteristics	To support meeting objectives identified in Appendix E and per 43 CFR 8342.1(a) wilderness suitability & (d) natural, esthetic, scenic, or other values.	8,548
ERMA – Buck Rock	To minimize conflicts between motorized and non-motorized use (refer to Appendix M, p. 18) and per 43 CFR 8342.1(c) minimize user conflict.	1,272*

Designation	Rationale	Acres
ERMA – Pilot Rock	Required by the Wilderness Act and 43 CFR 8432.1(d) natural, esthetic, scenic, or other values.	26
ERMA – Shale City	43 CFR 8342.1(c) minimize user conflict between motorized and pedestrian use.	76
ERMA – Grizzly Peak Trail	Appendix M, page 27, hiking & equestrian use, 43 CFR 8342.1(c) minimize user conflict.	521*
Cottonwood Glades area	43 CFR 8342.1(c) to minimize user conflict and to minimize the potential for resource damage in a sensitive wetland area surrounded by the Buck Prairie ERMA.	115
Public Motorized Access – Limited – Seasonally Restricted		
Buck Prairie ERMA Roads – closed to wheeled vehicles November 1 to April 30	CFR 8342.1(c) to minimize conflicts between groomed snowmobiles routes and wheeled vehicles.	5,401
SRMA – Table Mountain Snow Play Area Roads – closed to wheeled vehicles November1 to April 30	43CFR 8342.1(a)(c) minimize user conflict between winter sports users. Open to over-snow vehicles and non-motorized use.	9
SRMA – Hyatt Lake Campground Roads – closed to wheeled vehicles November1 to April 30	43CFR 8342.1(c) to minimize user conflict between winter sports users.	394
Pokegama Wildlife Area OHV closure (motorized vehicles) from November 20 to April 1	43 CFR 8342.1(b) wintering deer range.	85

* This acreage includes the lands within these ERMAs, which are designated as more of a linear feature, as well as the lands surrounding it.

Cumulative effects

Visitation to the CSNM, development on private lands in the area, and vehicle traffic are expected to increase throughout the life of this plan (approximately 20 years). Developments could mean more rights-of-way would be authorized, which would add to road mileage on BLM-administered lands. Future travel management planning would likely reduce road (motorized) mileage within the CSNM in the future. Although motorized access would decrease, it is a foreseeable outcome that opportunities for mechanized use (bicycle) as well as pedestrian and equestrian use would increase over the years. A reduction in public motorized use would likely benefit monument objects and values throughout the life of the plan while still allowing public access.

3.15. VEGETATION

Key Points

- With climate change anticipated in the planning area, restoring forests closer to NRV would improve both stand-level resistance and landscape-level resilience. Alternative B would provide the most flexibility to promote and maintain stand conditions more resilient to disturbance than the other Alternatives by proposing more effective treatments and treating more forest acres. However, all action alternatives would, to varying degrees, reduce stand density, accelerate the development of heterogeneous stand structure, increase species diversity, and contribute to improving overall resilience of dry forests.
- All proposed alternatives would enhance stand-level resistance on BLM-administered lands within the CSNM compared to the Grow alternative. However, the alternative treating the most acres (Alternative B, then Alternatives C and E (Proposed RMP) would improve and maintain more stands with a mix of species better suited for fire, less competition, and closer to NRV. In the long term, these treatments would foster greater resilience to natural disturbances, protect a range of habitats, and provide better protection from large-scale, high-severity disturbances in the CSNM.
- Under all alternatives, the amount of late-successional forest would increase, primarily via growth rather than from proposed management activities.
- The BLM's management approach would aid in creating more open canopy late-successional forest than would otherwise occur without management. Under Alternatives B, C, and E (Proposed RMP), the management approach would provide for nearly equal proportions of open and closed canopy late-successional forest, while Alternative D would be dominated by closed canopy late-successional forest.
- Invasive plants are likely to remain a permanent part of the CSNM plant communities given the high rates of sustained treatment needed. Expected treatment rates are expected to be lower than spread rates, although Alternative A and E (the Proposed RMP) may come closest to at least maintaining the status quo.
- Alternative B followed closely by the Proposed RMP are most likely to enhance ecological functioning across the nonforest vegetation apart from chaparral, where no treatment is allowed under the Proposed RMP.
- Alternative D with its generally passive approach to management, especially in the nonforest vegetation would result in declining ecological functioning except in riparian areas where removal of livestock grazing is expected to increase ecological functioning.
- Chaparral, which comprises nearly half of the nonforest vegetation, would likely see improved ecological functioning under Alternatives A, B, and C with restoration treatments and the opportunity to experiment with different treatments and treatment combinations to better understand this poorly studied ecosystem.

Analysis Issues

1. How would the alternatives affect landscape-level resiliency of dry forests?
2. How would the alternatives affect the ability of dry forests to resist large scale, high severity disturbance at the stand-level?

3. How would the alternatives contribute to the development of late-successional forest structure?
4. How would the alternatives affect the ecological functioning of nonforest plant communities?

Background (for Issues 1 and 2)

Fire suppression has dramatically altered current forest characteristics compared to historic levels, rendering these forests more susceptible to disturbances than in the past (Bennet, Shaw, & Lowrey, 2023; Hessburg et al., 2000; Hessburg, Agee, & Franklin, 2005; Hessburg et al., 2015; Haugo et al., 2015; Laughlin et al., 2023; Stine et al., 2014).

Currently, many of the dry forest stands are overly dense, lacking large fire-resistant trees, and facing risks from encroachment or fire-induced mortality The composition of dry forest species has shifted, resulting in reduced diversity of fire-adapted conifers, hardwoods, shrubs, and herbaceous species (USDI BLM, 2016b, p. 226, *internal citations omitted)*. Shade-tolerant species have become more prevalent relative to fire-tolerant species, and small trees now outnumber large ones. The abundance of densely forested conditions has compromised individual tree vigor, leading to slow growth and hindering the development of structurally complex forest.

Additionally, open areas, such as forest gaps, shrublands, savannahs, grasslands, and hardwood woodlands, have transformed into closed areas due to conifer recruitment. Increased surface, ladder, and canopy fuels raise the risk of larger-scale crown and stand-replacing fires. Overall, previous land management practices have homogenized vegetation patterns and fuel conditions across various scales, threatening overall forest health, and resistance and resilience to disturbance from fire, insects, and disease. Local climatic patterns exacerbate these stresses, and the incidence and severity of forest declines are predicted to rise as climate change stresses local tree populations (Kliejunas, 2009).

Historically, the CSNM contained similar forest types, albeit in different concentrations and locations compared to present day (USDI BLM, 2023a, pp. 172–173). Historically, ponderosa pine, Shasta fir-white fir, and oak communities dominated most of the forested land in the CSNM. However, due to changing disturbance patterns, particularly shifts in fire regimes, the composition of the forest has evolved. Areas once dominated by pine forests have transitioned to mixed conifer forests (Table 3-53 in *Affected Environment*).

Spatially explicit historical data for this project area is limited to records from 1900 and 1930, and only provide metrics included in survey records. Figure 3-7 provides a visual representation of the proportions of different forest types recorded in 1930. Figure 3-8 shows historic volume estimates from 1900. While volume is not the ideal metric to describe forest density levels, it is the data that was available in historic records. Figure 3-9 shows the spatial distribution of forest types in 1930, while Figure 3-10 displays historic versus current forest density levels.

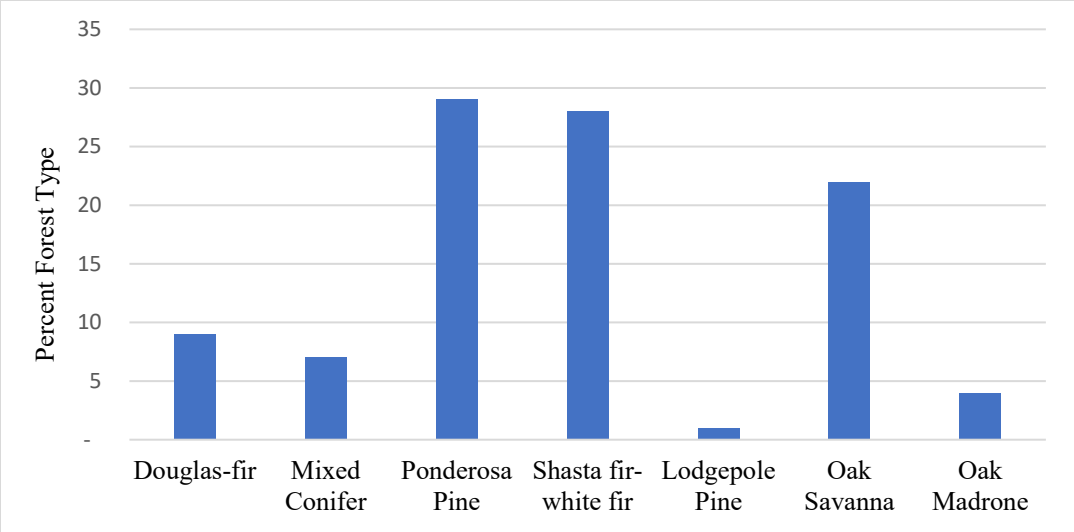


Figure 3-7. Historic CSNM Forest Types 1930

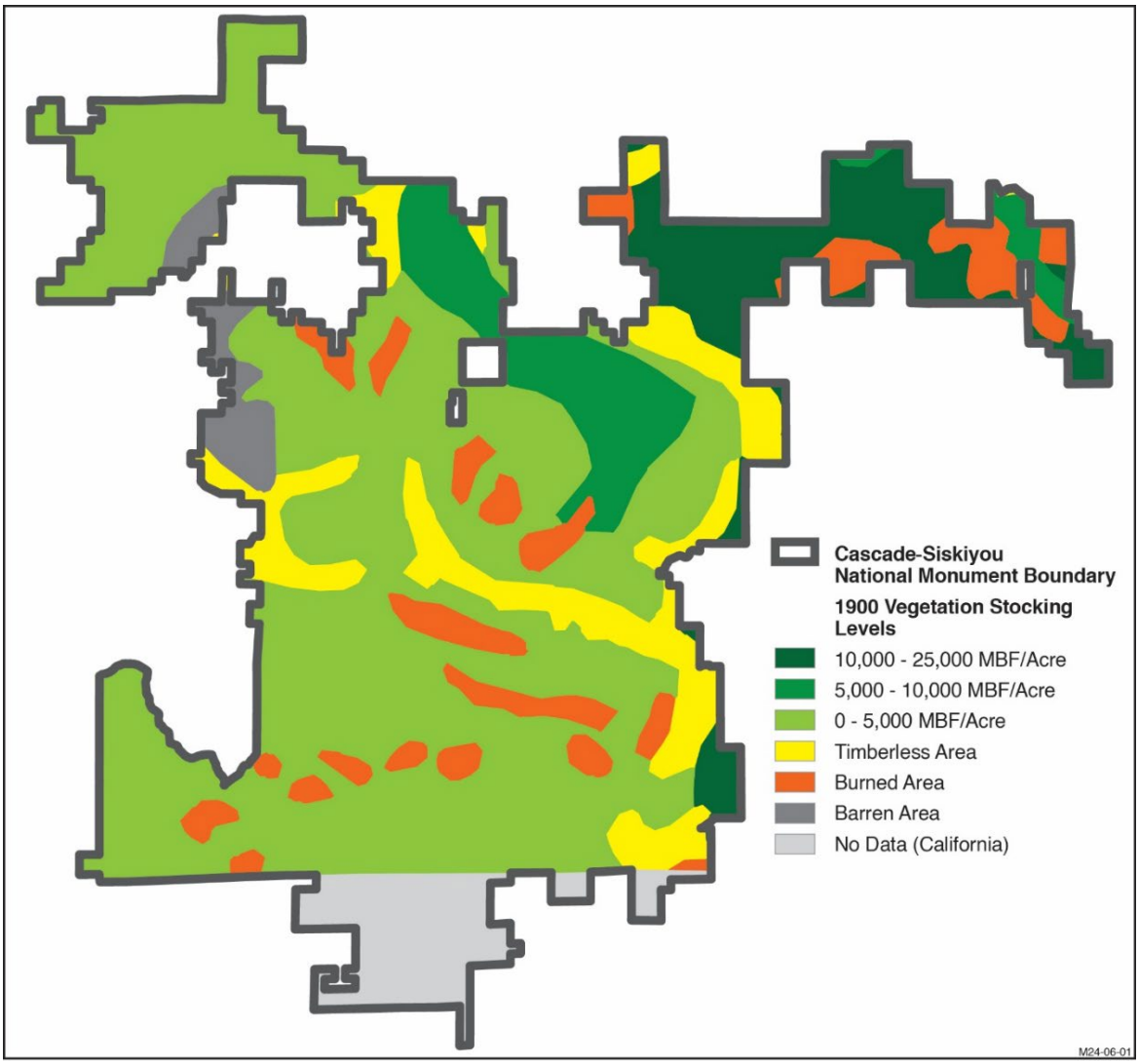


Figure 3-8. Map of historic volume estimates 1900

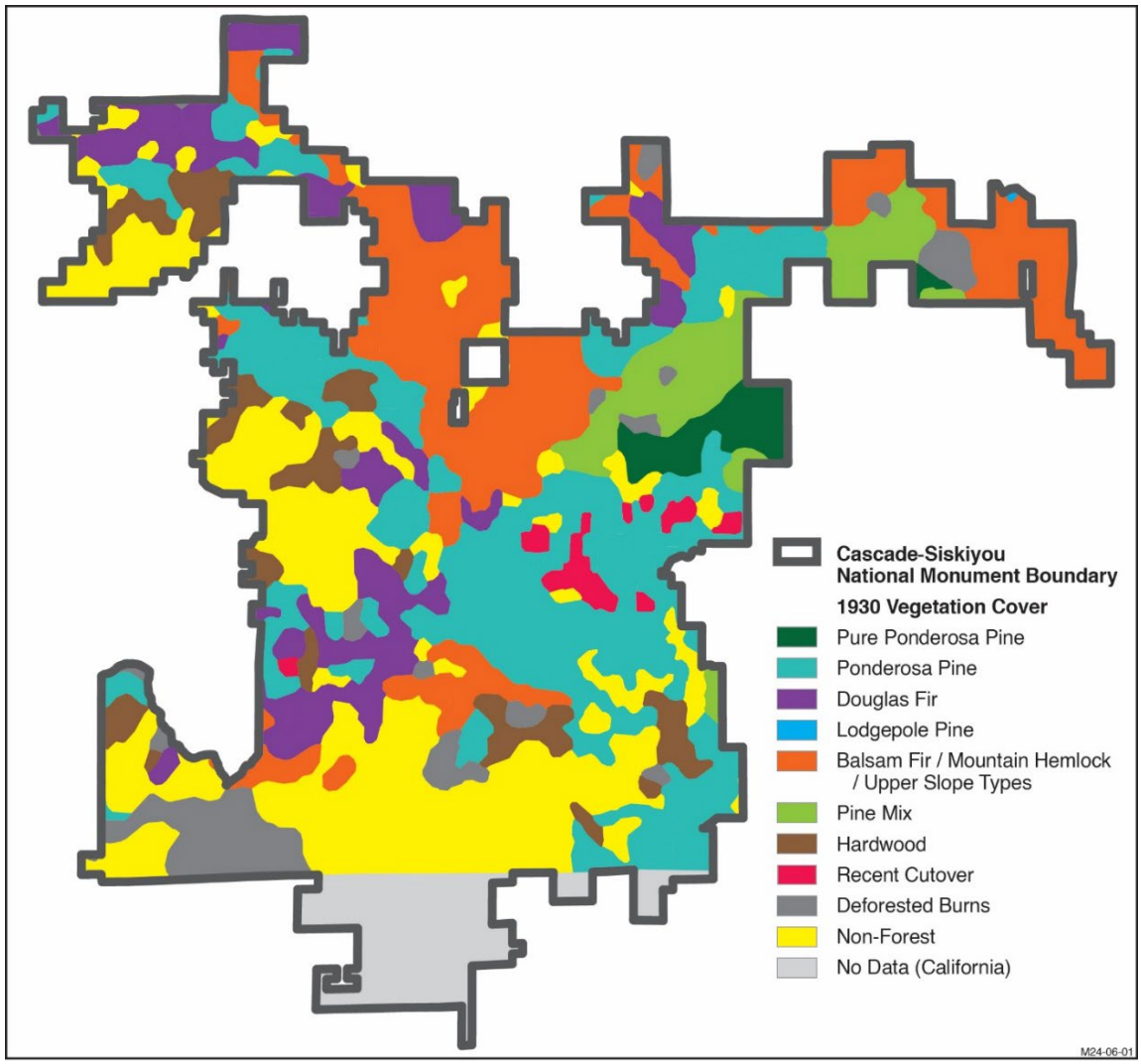


Figure 3-9. Map of historic CSNM Forest Types 1930

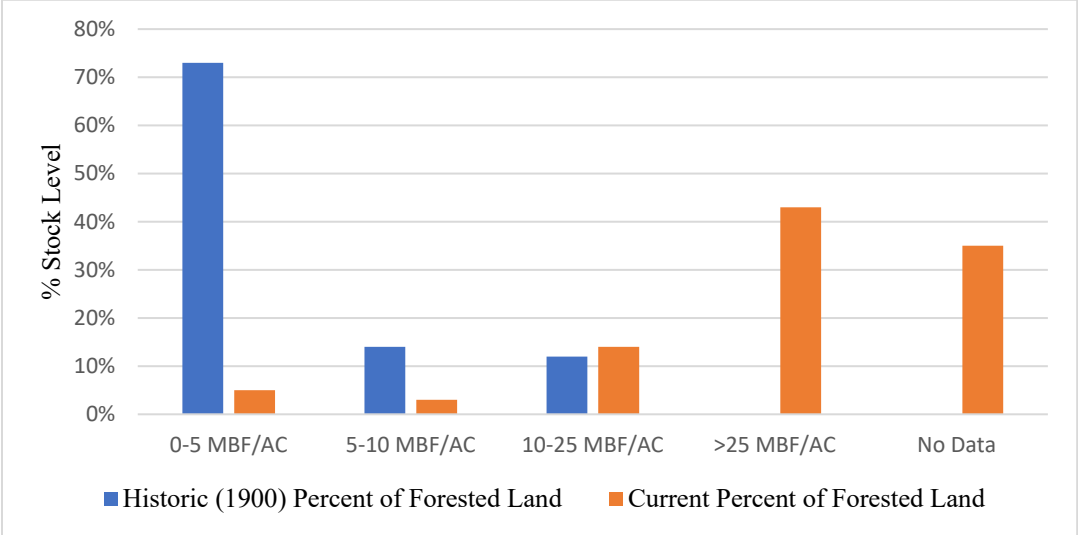


Figure 3-10. Comparison of current and historic forest stocking levels

According to Leiberg (1900) the townships within the CSNM in Oregon were comprised of 71.5 percent forested land and 28.5 percent nonforest. A recent GIS analysis of current vegetation reveals that forests and woodlands now make up approximately 70.6 percent of the CSNM and 76.7 percent of the BLM-administered area. This suggests that the relative proportion of forested and nonforested areas has remained relatively stable. Historically, "yellow" pine (likely ponderosa pine with some Jeffrey pine) dominated half of the townships, while Douglas-fir or "red" fir dominated the other half. Sugar pine was present in 12 of the 14 townships, white fir in 10 townships, and oak in six townships. Lodgepole pine was listed in only two townships on the eastern edge and was not abundant.

In the late 1890s, approximately 30 percent of the surveyed area within the CSNM had experienced fire, and 7 percent had already been logged. Previous burn scars and areas of past harvest are also evident in the historic data, accounting for 12 percent of the CSNM in 1900 and 8 percent in 1930. These findings highlight the common occurrence of disturbances in the past, which play a crucial role in maintaining the ecological balance of forest plant communities in the CSNM. Notably, the shift from open stands dominated by pine and oak to dense stands of shade-tolerant firs has resulted from fire exclusion. Restoring these areas to a composition closer to historical species distribution is essential for enhancing stand-level resistance and landscape-level resilience to disturbance.

Various disturbance agents have substantially shaped the current vegetation landscape pattern in the planning area (USDI BLM, 2023a, p. 175). Among these agents, insects and pathogens play a crucial role. They are predictable biotic disturbances currently affecting the planning area and its surroundings. These agents can reduce tree growth and cause mortality at the individual tree level. At a broader landscape scale, they impact stand structure, composition, and overall function within forest ecosystems. For instance, they create canopy gaps, influence plant succession, and contribute to decay columns and snags, which in turn provide down woody material to the forest floor and nearby streams.

In the past decade, Douglas-fir mortality has increased significantly in southwestern Oregon due to the flatheaded fir borer, an insect that thrives under drought conditions. Between 2015 and 2019, more trees died than in the previous four decades (Bennett et al., 2023). Notably, approximately 20 percent of the Douglas-fir basal area has succumbed to mortality in the past 5-10 years, particularly in areas historically mapped as ponderosa pine or oak types in the 1936 records. This suggests that about half of contemporary Douglas-fir mortality has occurred in areas where it was not the dominant species historically but has encroached on or increased in abundance due to fire exclusion" (Bennett et al., 2023). Much of the CSNM landscape falls into this category, with historically ponderosa pine and oak types (51 percent) now encroached upon by Douglas-fir.

Additionally, areas below 4600 feet elevation, receiving less than 39 inches of annual precipitation (which constitutes the majority of the CSNM), face moderate to high risk of Douglas-fir mortality (Bennett et al., 2023). These areas reflect some of the greatest departure from the natural range of variability (NRV). While forests are likely to recover, the species composition may shift away from Douglas-fir viability, favoring pine, oak, and incense cedar (Bennett et al., 2023). Ecological restoration efforts targeting this transition could benefit these areas substantially.

The BLM analyzed for how climate change interacts with BLM management actions to alter the potential outcomes for key natural resources (USDI BLM 2016a, pp. 180–211). Specifically, the BLM considered the indirect effects of changes in temperature, precipitation, and snow within

western Oregon and how these factors affect forest productivity and species composition, habitat for terrestrial and aquatic wildlife, and key disturbance regimes. In that analysis, the BLM concludes that climate change and ongoing drought conditions are anticipated to persist. Forest scientists predict that while background tree mortality would increase due to climate shifts, major die-offs of mature trees are not solely attributed to changing climate. Instead, tree mortality is expected to result from the interplay between climate change and disturbance events, such as drought, fire, or intensified competition for water and carbon. Following events like prolonged drought, insect outbreaks, or wildfires, vegetation changes can occur abruptly, leading to mature tree mortality and regeneration failure.

To mitigate damage from disturbances, reducing stand densities—thereby alleviating density-dependent stress and enhancing tree vigor—becomes crucial (Halofsky et al., 2016; Haugo et al., 2015; Bottero et al., 2017; Metlen et al., 2021; Vernon, Sheriff, Van Mantgem, & Kane, 2018; Young et al., 2020).

This analysis examines how the proposed alternatives would respond to the purpose and need to "protect and restore landscape-scale resilience for the area's critically important natural resources." Specifically, the BLM assessed how the alternatives would affect vegetation resilience (both forest in the CSNM as indicated by their ability to restore forest structure classes across the landscape to within the range of historical variability.

Fire has played a major role as a natural disturbance agent shaping vegetation patterns and structures across the western Oregon and northern California landscapes for millennia (Agee, 1991a, b; Hessburg & Agee, 2003). Prior to Euro-American settlement the Indigenous people burned the landscape for a variety of purposes (LaLande, 1989, p. 18; LaLande & Pullen, 1999; Frost & Sweeney, 2000; Anderson, 2002, p. 56; Pyne, 2010; Lake, 2007, 2013; Crawford, Mensing, Lake, & Zimmerman, 2015). Indigenous communities burned lower elevation sites more frequently than high elevation sites (Lieberg, 1900; Frost & Sweeney, 2000). These lower elevation burns affected a larger portion of the landscape compared to higher elevation burns (*Id*.). Regardless of elevation, the fires were mostly small to moderate in size and had low severity levels (*Id*). In most settings, both fires set by Indigenous communities and those started by lightning shaped the vegetation communities (Anderson, 2002).

The number of fires and average annual acres burned since at least 2002 are well below that implied by pre-settlement conditions and information. Approximately 96 percent of modern fires burn ten acres or less whereas pre-settlement fires had much wider variability in size and severity (USDI BLM, 2023a, pp. 196–197). These large fires tend to burn during more extreme fire weather conditions, when fire behavior and growth potential exceed or challenge suppression resource availability and capabilities (Planning Level 4 and 5; NIFC 2014).

This pattern of fire on the landscape is contrary to historic patterns of frequent fires burning throughout the dry season under various weather conditions across the landscape. The vegetative structure and landscape composition patterns in the CSNM reflect similar degree of departure from historical fire regimes of the pre-settlement era (Metlin, Skinner, Olson, Nichols, & Borgias, 2018; Haugo, et al., 2019; Hessburg et al., 2005).

In fire-adapted ecosystems, fire on the landscape can benefit fire-dependent species and promote rich, biologically diverse successional stages and vegetation patterns (Agee 1993; Agee 2005; Odion et al. 2010; Swanson et al., 2011; DellaSala & Hanson, 2015).

However, during extreme fire weather events with plume-dominated fire behavior, even areas with fuel profiles and vegetation structures resembling historical fire regimes may have a reduced impact on altering fire behavior (Lydersen et al., 2014). However, under extreme fire weather events and plume-dominated fire behavior, even fuels profiles and vegetation structure representative of historic fire regimes, including previously treated areas may also become less effective at altering fire behavior (Ewell et al., 2015), leading to large areas of high severity. Refer also to Section 3.17, Wildland Fires Analysis Issue 1. On the other hand, Kennedy and Johnson (2014) and Ewell et al. (2015) found that such treatments can enhance fire management opportunities. These managed vegetation structures, particularly under less extreme fire weather conditions, could provide opportunities to utilize wildfire strategically for land use and resource objectives (North et al., 2015).

Recognition of both the spatial and temporal process and vegetative structure is necessary to promote resilience in frequent fire-adapted forests (Agee, 2002; Jain et al., 2012). In the absence of utilizing natural fire as a disturbance agent, management activities can serve as a partial surrogate to promote and maintain desired spatial and temporal structural and composition. Despite a presumed low probability that wildfires would intersect treatments (Rhodes & Baker, 2008), recently, there has been a growing body of evidence throughout the western states (Martinson & Omi, 2013; Ewell et al., 2015), Pacific Northwest (Prichard et al., 2010; Shive et al., 2013, Prichard et al., 2014), and in southwest Oregon (local observations) that they do. This evidence demonstrates that vegetation management, incorporating mechanical and prescribed fire treatments, has successfully moderated fire behavior and fire effects, even under extreme weather events (Prichard & Kennedy, 2014), and has contributed toward more resilient future forest structure (Stevens-Rumann et al., 2013).

Given ongoing climatic trends and associated effects, such as drought, forested lands could become less resilient to disturbances. In several instances within and around the CSNM, these lands have demonstrated increased susceptibility to large-scale mortality events. Consequently, existing forest types and habitat for late-successional dependent species may be compromised due to increased fuel loading, resulting in elevated fire hazard. For further details, refer to Section 3.17, Wildland Fire Management, and the Analysis of the Management Situation (AMS) (USDI BLM, 2023a, pp. 171–182).

Moreover, the threat of deforestation, stemming from a combination of drought, wildfire, and insect and disease damage, are no longer theoretical. Research conducted in the dry forests of the Sierra Nevada revealed that 50 percent of mature forest habitat and 85 percent of high-density mature forests either shifted to lower density or other nonforest vegetation types due to disturbances between 2011 and 2020 (Steel et al., 2023). Similarly, another study found that these conditions led to an 89 percent mortality rate of ponderosa pines in the three largest size classes within the area (Fettig, Mortenson, Bulaon, & Foulk, 2019).

In the face of an increasingly less resilient landscape, adaptability and active management are found to be effective tools for forest management (Agee & Lolley, 2006; Knapp, Bernal, Kane, Fettig, & North, 2021; North et al., 2022). Landscape-level resilience depends on maintaining heterogenous patches of forest stands across the landscape (Haugo et al., 2015; Hessburg et al., 2015; Laughlin et al., 2023). At the stand-level, resistance to disturbances serve as foundation for maintaining this heterogeneous landscape. To achieve this, restoration efforts should consider the broader landscape context, aiming to break up the current continuous, closed canopy in many

areas. Leveraging topographical features—such as aspect, ridges, valley bottoms, and elevation—can effectively enhance landscape-level resiliency (Hessburg et al., 2015; Haugo et al., 2015; Metlen et al., 2021).

Managing and maintaining forest stands within the NRV can mitigate the effects of disturbances such as insects, disease, drought-based mortality, and density-dependent mortality (Haugo et al., 2015; Hessburg et al., 2015). NRV encompasses the historical range of forest conditions and is associated with both stand-level resistance and landscape-level resilience. Landscapes functioning within NRV are assumed to be more sustainable and resilient to disturbances than those outside this range. NRV serves as a reference point, often used interchangeably with Historic Range of Variability (HRV). In fire-prone forests, HRV typically features low stand densities, substantial patch diversity, and landscape heterogeneity, which reduce the likelihood of large, severe wildfires (Laughlin et al., 2023, citing Hessburg et al., 2015; Murphy et al., 2021). Although climate change impacts remain uncertain, restoring forests to NRV is believed to enhance resilience and adaptive capacity (Agee, 2003; Hessburg et al., 1999; Keane, Hessburg, Landres, & Swanson, 2009; Miller & Hammond, 2007; Stephens et al., 2013; Steel et al., 2023). Prioritizing ecological restoration efforts in areas furthest from NRV can help restore landscape-level resilience.

Vegetation Analysis Issue 1

How would the alternatives affect landscape-level resiliency of dry forests?

Summary of Analytical Methods

For this both Issues 1 and 2, the BLM focused on all forest plant communities within the CSNM planning area, examining them at a landscape scale. The analysis spans a temporal scale of 100 years. The BLM used CVS plots, EVT, and forest modeling (refer also to Appendix N). This analysis relies heavily on the departure analysis of the CSNM landscape performed by the USFS (Appendix N) to determine benchmarks that restoration efforts should attempt to meet. Departure in this project is defined as the surplus or deficiency of acres of s-classes when compared to the ideal NRV range. NRV provides a modeled reference condition to compare to the current conditions and future modeled conditions in percentages of acres. The BLM examined if the management direction for each alternative moves the proportion of each s-class closer to NRV, focusing on increases in open s-classes and decreases in closed s-classes.

Additionally, the BLM refers to descriptions of vegetation condition, fire regimes, and departure in the Analysis of the Management Situation, which are incorporated here by reference (USDI BLM, 2023a, pp. 194–196).

The BLM analyzed forest conditions by spatially stratifying Current Vegetation Survey (CVS) plot data based on LANDFIRE-Existing Vegetation Type (EVT). These EVT layers were generated using predictive landscape models that incorporate field-referenced data, satellite imagery, and biophysical gradient layers through classification and regression trees (LANDFIRE, 2022). The BLM conducted a 100-year assessment to account for varying timeframes between vegetation management treatments and to capture forest structural development. This extended analysis period is necessary to observe meaningful changes in forest condition resulting from the combined effects of vegetation management and natural forest growth across the landscape.

This analysis examines two different sets of current conditions. There are current conditions based on EVT and the departure analysis and current conditions as modeled based on the CVS plots and fed into FVS. There are variations between modeled current conditions and current conditions based on EVT and the departure analysis. Current conditions based on EVT, and departure analysis are used for discussions of s-classes and departure from NRV. Current conditions based on modeling are used for comparisons of modeling results and most of the metrics in Issue 2.

In describing forest structure, a structural/successional (s-class) layer is used to characterize current vegetation conditions with respect to vegetation species composition, cover, and height ranges of successional states that occur within each biophysical setting (Haugo et al., 2015). The five s-classes based on these factors are the following:

- Early development (early)
- Mid-development closed canopy (mid closed)
- Mid-development open canopy (mid open)
- Late development open canopy (late open)
- Late development closed canopy (late closed)

Given natural processes, like disturbance frequencies, a biophysical setting would have a characteristic range of variation in the proportion in each s-class. An effective indicator of ‘‘ecological condition’’ for a given landscape is the relative abundance of each s-class within each biophysical setting, and a comparison made to the Natural Range of Variation (NRV) for a biophysical setting. As departure from the NRV increases, stand-level resilience decreases. To determine the NRV for the CSNM, the BLM relied on a departure analysis conducted by the USFS using 2022 LANDFIRE data. For a more detailed understanding of the successional stage classification system, please refer to Appendix N.

The landscape-level analysis focuses on how the management direction in each alternative adjusts the distribution of s-classes over time. Ideally, management would shift s-class distributions towards NRV and decrease the overall departure. In order to shift s-class distributions towards NRV, restoration efforts that concentrate on increasing open s-classes and reducing closed s-classes is needed.

Assumptions

The BLM considers the natural range of variability (NRV) as a reasonable benchmark for assessing landscape-level resilience and stand-level resistance (refer to USDI BLM, 2023a, p 57–60, 171–187, 194–206). In the 2016 Resource Management Plan/Environmental Impact Statement (RMP/EIS), the BLM explains that the vegetation patterns propagated under natural disturbance regimes, primarily wildfire, represent an NRV of s-class reference conditions that would be resilient to fire (USDI BLM, 2016a, pp. 228–231 and pp. 1305–1308). Additionally, the BLM acknowledges that various perspectives exist regarding historic vegetation reference conditions and natural range of variability. To address this, the analysis relies on LANDFIRE biophysical settings (LANDFIRE, 2022), which provide comprehensive reference conditions for all seral states based on literature review, local data, and expert estimates.

Restoring forest habitat toward NRV enhances both stand-level resistance and landscape-level resilience. This can be demonstrated by:

- Shifting species composition toward fire-resistant species like pine or oak.
- Reducing stand densities.
- Lowering percentages of elevated risk from drought, disease, and insects.
- Adjusting s-class proportions to decrease mid-closed stands and increase mid and late open stands.

The BLM assumed that the future distribution of forest structure conditions on non-BLM-administered lands would continue to reflect the current distribution of forest structure conditions, consistent with assumptions made and incorporated by reference in the 2016 Final EIS for Western Oregon (USDI BLM, 2016a, pp. 232–233).

The BLM assumed that wildfire is expected to continue to be a major change agent, interacting with other disturbance agents (e.g., drought and insect outbreaks) and affecting ecosystems and vegetation structure. Forecasts indicate that the number of fires escaping initial attack is likely to increase, along with area burned, and the occurrence of very large fires (greater than 5000 ha or approximately 12,000 acres) (Halofsky et al., 2022).

Appendix N details the assumptions regarding acreages used for wildfire, vegetation modeling and departure. The BLM assumes the magnitude of ecological restoration among Alternatives would follow management direction, including direction regarding area treated per decade (Appendix E). The BLM applied common assumptions related to management direction and the Alternative description in Chapter 2 to derive estimated decadal treatment types and acreage (Appendix N – Table N-2).

General concepts addressing the departure analysis process are described in Appendix H of the Western Oregon Proposed RMPs/Final EIS (USDI BLM, 2016a, pp. 1305–1319) and are incorporated here by reference. This appendix includes explanation of the use of biophysical setting, LANDFIRE data and the concepts behind departure from NRV.

Without modeling future wildfires, the BLM made assumptions based on historical data. The BLM assumed that wildfires would persist at the same rate observed from 2012 to 2022, an average of four wildfires per year of any size. Additionally, the BLM projected that large fires (greater than 1,000 acres) would remain responsible for only one percent of the ignitions but would account for most of the burned acreage (USDI BLM, 2016a, Table 3-30, p. 227).

Affected Environment

As shown in Figure 3-11, the CSNM is currently deficit in early seral and late open s-classes and has a surplus of mid closed, mid open and late closed s-classes. The departure analysis assesses if disturbances (i.e., fire or thinning) or succession (growth) is needed to move the landscape towards the natural range of variability (NRV) for each of these s-classes. To move the CSNM planning area towards NRV, approximately 80 percent of mid closed stands, 10 percent of mid open stands and 30 percent of late closed stands are in need of disturbance. Following that disturbance, approximately 70 percent of mid closed stands and <10 percent of mid open stands need succession to fall into the NRV.

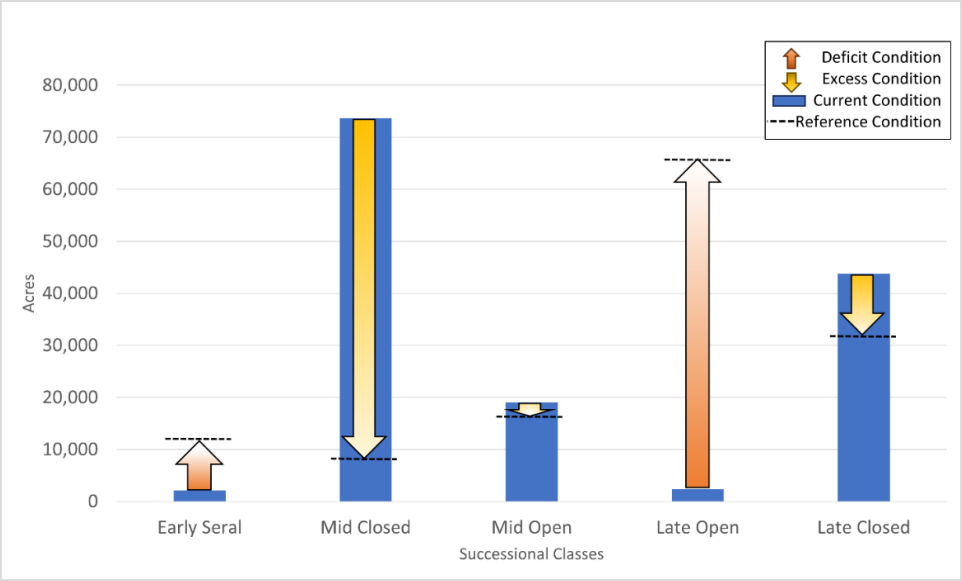


Figure 3-11. Natural range of variability of forests in the CSNM and restoration needs by s-class based on EVT and departure analysis

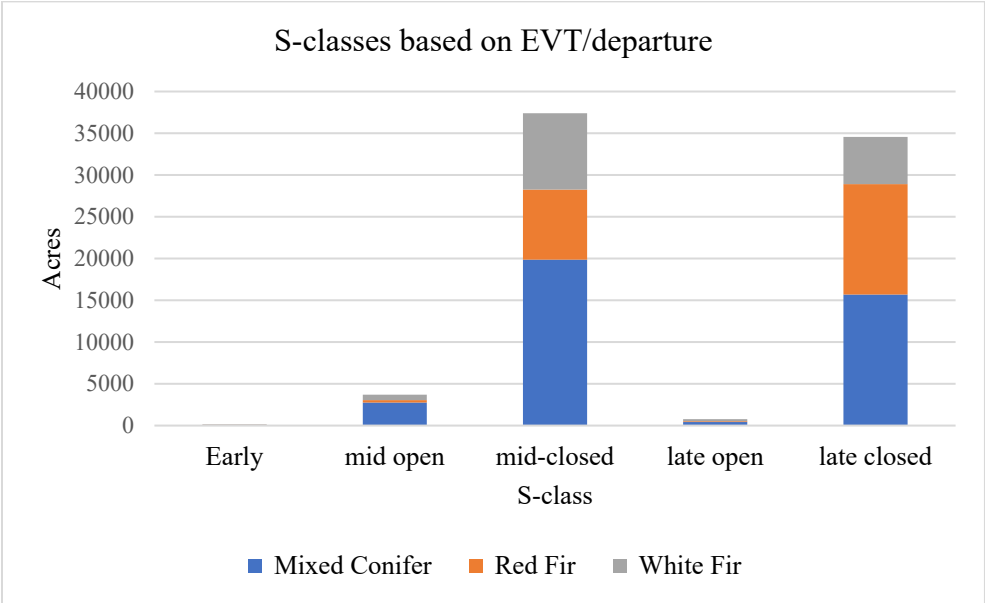


Figure 3-12. Current mix of successional classes in each forest type based on EVT and departure analysis

As shown in Figure 3-12, most of these disturbance treatments would ideally be concentrated in mixed conifer stands, however all forest types show an excess of mid closed and late closed stands. Mixed conifer forest types also show an excess of mid open stands. To move the CSNM planning area towards NRV, it is necessary to perform treatments that would provide the necessary restoration disturbance on approximately 60,000 acres of mid closed stands and 14,000 acres of late closed stands. While it is difficult within this model to track the exact acres moved from one s-class to another based on treatments, the total proportion of s-classes resulting from treatments were used to indicate how those disturbance needs are addressed by each alternative.

Environmental Consequences

Recreation, livestock grazing, transportation management, lands and realty, and minerals management direction are not considered factors affecting forest resiliency in this analysis. Any changes in management of these resource programs would have localized effects on forested vegetation but would not impact landscape resiliency. The primary focus of this analysis is the application of management direction within the Ecosystem Management Areas.

While it's understood that disturbances can create early seral habitat, the model does not account for any early seral habitat resulting from management activities. Due to the unpredictability of the extent and severity of disturbances, this aspect was excluded from the model. Consequently, there are no early seral acres available to transition into mid-seral stages. Over the 100-year period, the mid-seral stages evolve into late seral stages, and by the end of this period, only late seral stages are expected. However, the ratio of open to closed structural classes (s-classes) offers insight into how management activities may impact deviations from the natural range of variation (NRV). Variations in mid-seral stages are discussed in relation to individual alternatives.

Alternative A

Under Alternative A (No Action), the BLM would treat approximately 20 percent of the landscape per decade (refer to Appendix N). On lands within the original monument, treatments would continue to be focused primarily on young stands and in WUI areas with minimal management within other forested areas. On lands within the expansion area in Oregon, treatments would continue to be focused primarily on thinning and fuels treatments within forest stands to meet objectives identified for Late-Successional Reserve-Dry and Riparian Reserve land use allocations.[28] In this analysis, the BLM assumed minimal to no forest management actions would occur on lands in the California portion of the expansion area.

Figure 3-13 below illustrates the change in acres of s-classes over 100 years for Alternative A. Figure 3-13 indicates that the late closed s-class would increase as much as 30 percent over time, however, there is minimal change in the other s-classes. The late open s-class does increase by 10% towards the end of the 100-year period to a little over 20 percent. The percentage of mid seral classes begins to drop after 30 or 40 years as the mid seral classes transition to late seral.

Of the action alternatives, Alternative A would do the least to enhance landscape-level resilience through restoration by increasing the percentage of acres of open s-classes. The management approach in the original monument area under this alternative includes prioritizing treatment in young stands (about 3,865 acres) and stands that do not provide late-successional or old-growth habitat (approx. 1,600 acres). The primary focus of these treatments includes reducing fire hazard, enhance ecological integrity, and promote the development of stands that would more closely pattern historic forest development (USDI BLM, 2008, pp. 36–38). This approach limits the amount of treatment that would occur in overstocked mid-closed and late-closed stands, which would limit opportunities to develop landscape resiliency. The BLM's management approach for the expansion area lands under Alternative A provides very limited opportunities for adjusting s-class structure.

[28] For analysis purposes and to meet the direction of the Proclamation, it was assumed that management within the expansion areas under Alternative A would be managed as described in the SWO RMP (USDI BLM, 2016a) under LSR-Dry (pp. 74–75) and applicable direction for riparian reserves (pp. 75–77, 82–87).

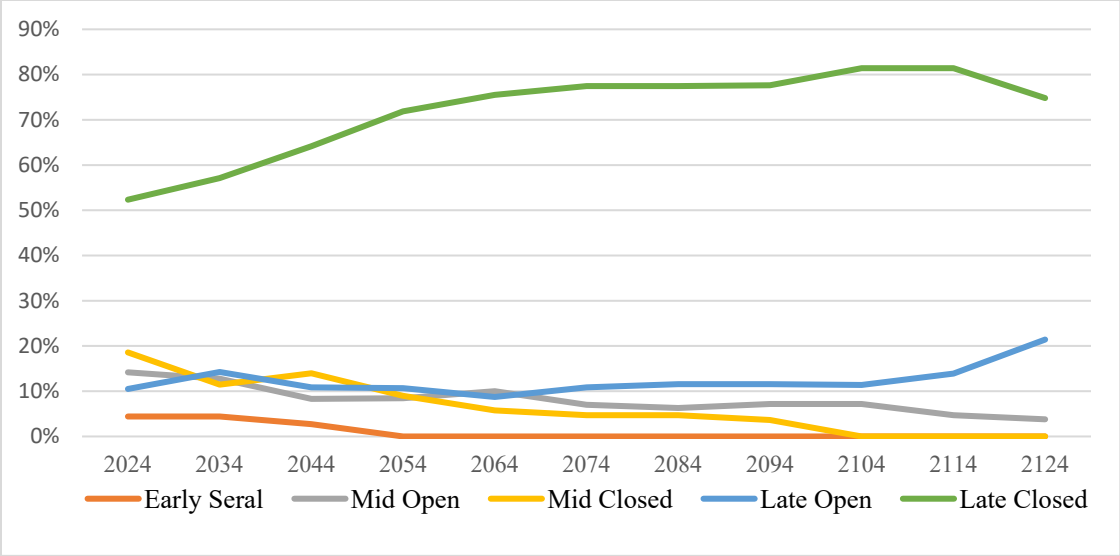


Figure 3-13. Changes in s-classes over 100-year modeling period - Alternative A

Alternative B

Under Alternative B, the BLM would treat 20 percent of the landscape in need of restoration per decade. Consequently, within 50 years, all areas in need of restoration would receive treatment. Given a thoughtful approach that prioritizes the most critical restoration needs, this timeline appears reasonable for landscape-level restoration.

Under Alternative B, the late closed s-classes would be reduced to a 43 percent by year 100, which is a 13 percent reduction from current conditions (Figure 3-14). Additionally, open s-classes increase from 25 percent to 56 percent by year 100, which represents a 31 percent increase from current conditions.

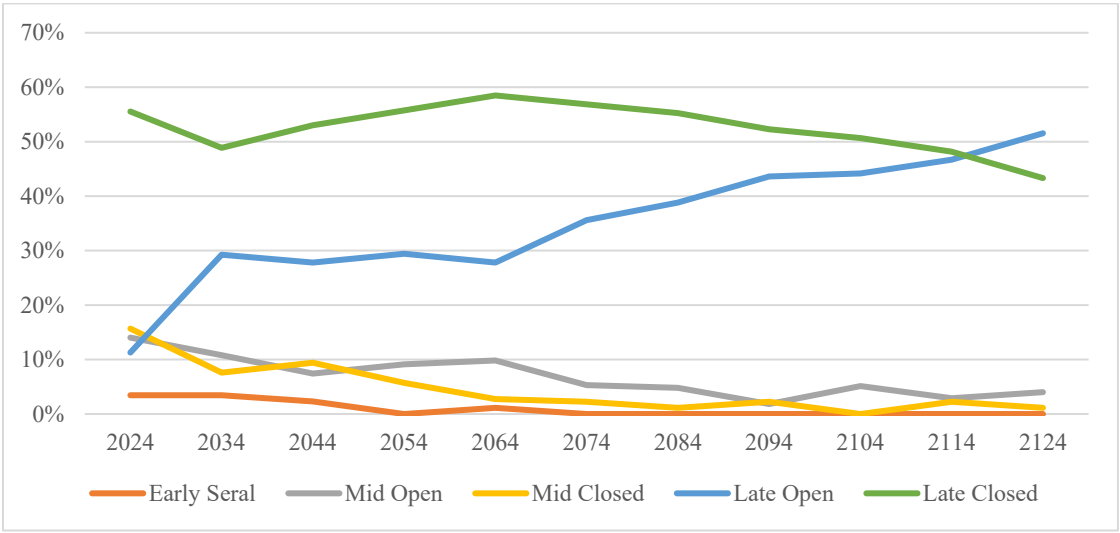


Figure 3-14. Changes in s-classes over 100-year modeling period - Alternative B

As described in Vegetation Analysis Issue 2, at the stand-level, Alternative B would lead to the most substantial reduction in stand density and shift in species composition and structure toward the NRV. Consequently, when stands undergo restoration, Alternative B increases stand-level resistance the most out of the alternatives. This enhanced stand-level resistance would increase landscape-level resistance by providing islands of resistance, which provide the heterogeneity needed across the landscape to allow resilience from disturbance.

Alternative C

Under Alternative C, the BLM would treat 10 percent of the landscape in need of restoration per decade. Consequently, within 100 years, all areas in need of restoration would receive treatment.

According to Figure 3-15, under Alternative C, the late closed s-class would increase over time but drop towards the end of the modeling period. This would still result in a 2 percent increase in the late closed s-class. Beginning about 40 years into the modeling period, the late open s-class would increase by 29 percent. This increase starts at about the same time that it takes for the mid seral classes to begin to be eliminated.

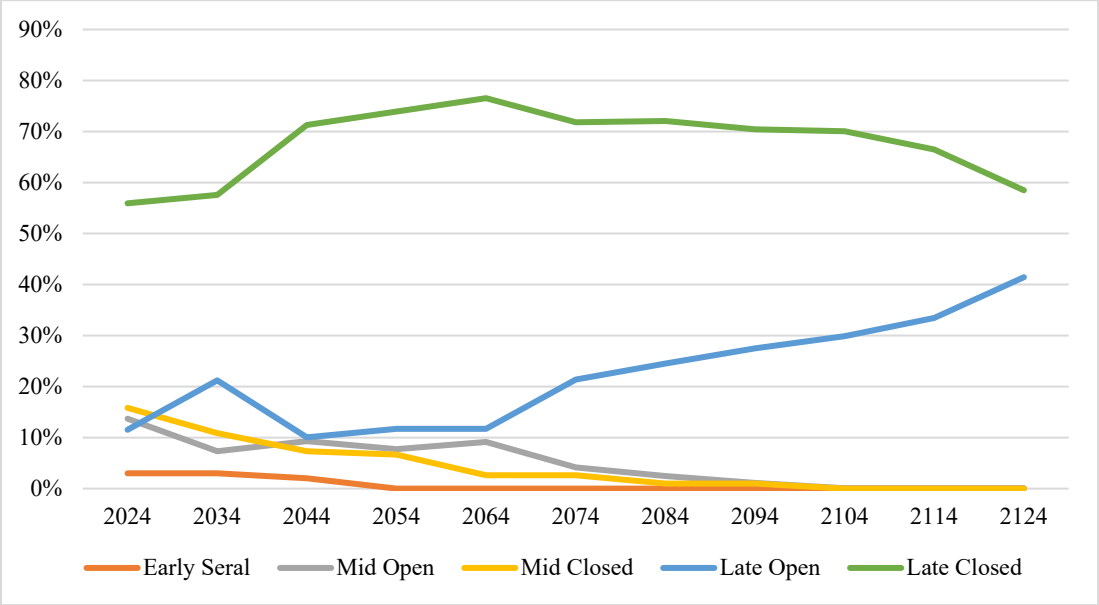


Figure 3-15. Changes in s-classes over 100-year modeling period - Alternative C

As described in Vegetation Analysis Issue 2, at the stand level, Alternative C is unlikely to effectively restore stands containing Douglas-fir. Since Douglas-fir is a dominant or codominant species on approximately 60 percent of the area, stands that are not thinned enough to break up the canopy, reduce density related stress, and provide more growing space for fire-tolerant species does not provide the heterogeneity needed to affect the spread of disturbances, such as fire and insects.

Alternative D

For Alternative D, the BLM does not establish a minimum target for treatment, however, for purposes of this analysis, the BLM assumed that approximately 5 percent of landscape in need of restoration would be treated per decade (refer to Appendix N). Alternative D would increase the late closed s-classes on the landscape by 9 percent and the late open s-class by 20 percent over the modeling period (Figure 3-16). This alternative would do very little to encourage landscape-level resiliency.

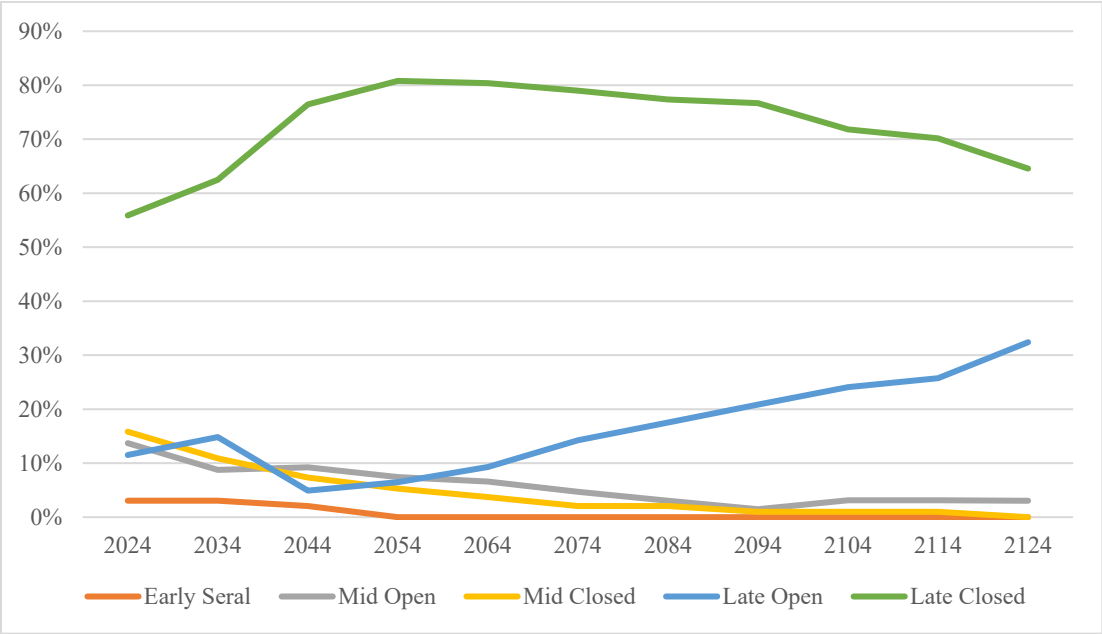


Figure 3-16. Comparison of shifts in s-classes over 100-year modeling period - Alternative D

Alternative E (Proposed RMP)

Under Alternative E the BLM would treat 10 percent of the landscape in need of restoration per decade. Consequently, within 100 years, all areas in need of restoration would receive treatment.

As shown in Figure 3-17, the late closed s-class would increase over time to a maximum of 21% more than currently modeled in about 60 years. After that, the late closed s-class would decrease to about the same percentage as it began. The late open s-class would increase to about 31% more than what is modeled for 2024. This increase would start at about the same point that the mid seral s-classes begin to decline. Landscape-level resilience produced by this alternative would be similar to that described under Alternative C.

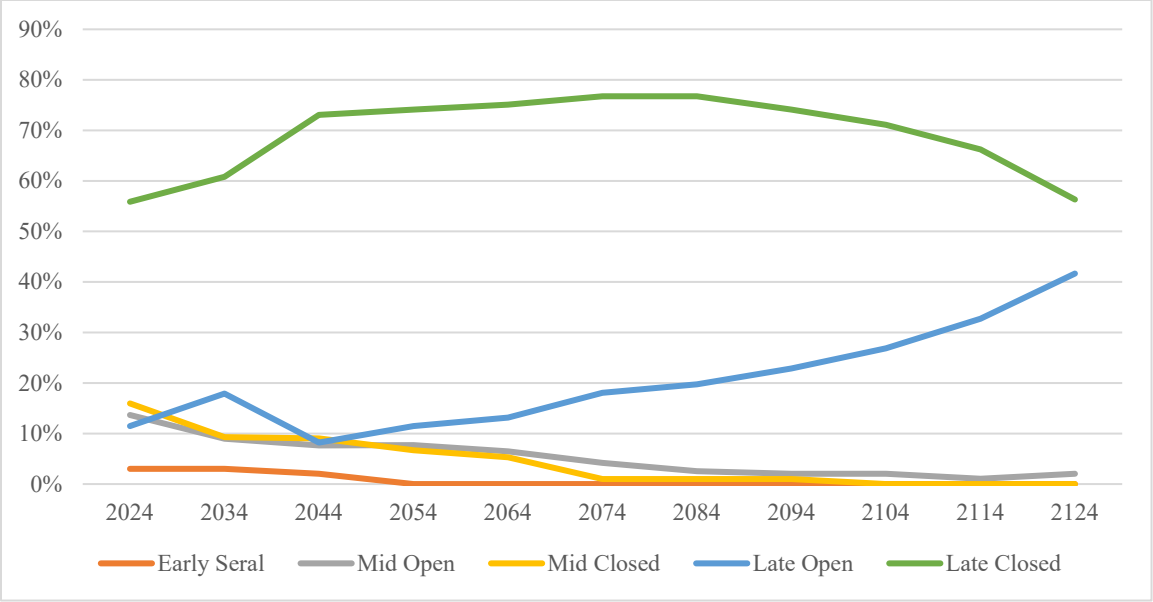


Figure 3-17. Comparison of shifts in s-classes over 100-year modeling period - Alternative E

Figure 3-18 presents the projected distribution of successional classes (s-classes) for each alternative in 100 years and includes the current distribution of s-classes as defined by EVT classes on the ground for comparison purposes. The s-class estimates for 2024 in Figure 3-18 may differ from those shown in Figures 3-13 through 3-17 as those are modeled s-class distributions. Figure 3-18 also displays the Grow modeling run, which shows the progression of s-classes over time with no management. This diagram shows that all alternatives increase the percentage of late seral s-classes, in both the open and closed categories. All alternatives produce more acres of late open than the 16 percent produced in the Grow run. Alternative B creates the highest percentage of acres in open s-classes at 52 percent, followed by Alternative E, C, D, and A, respectively.

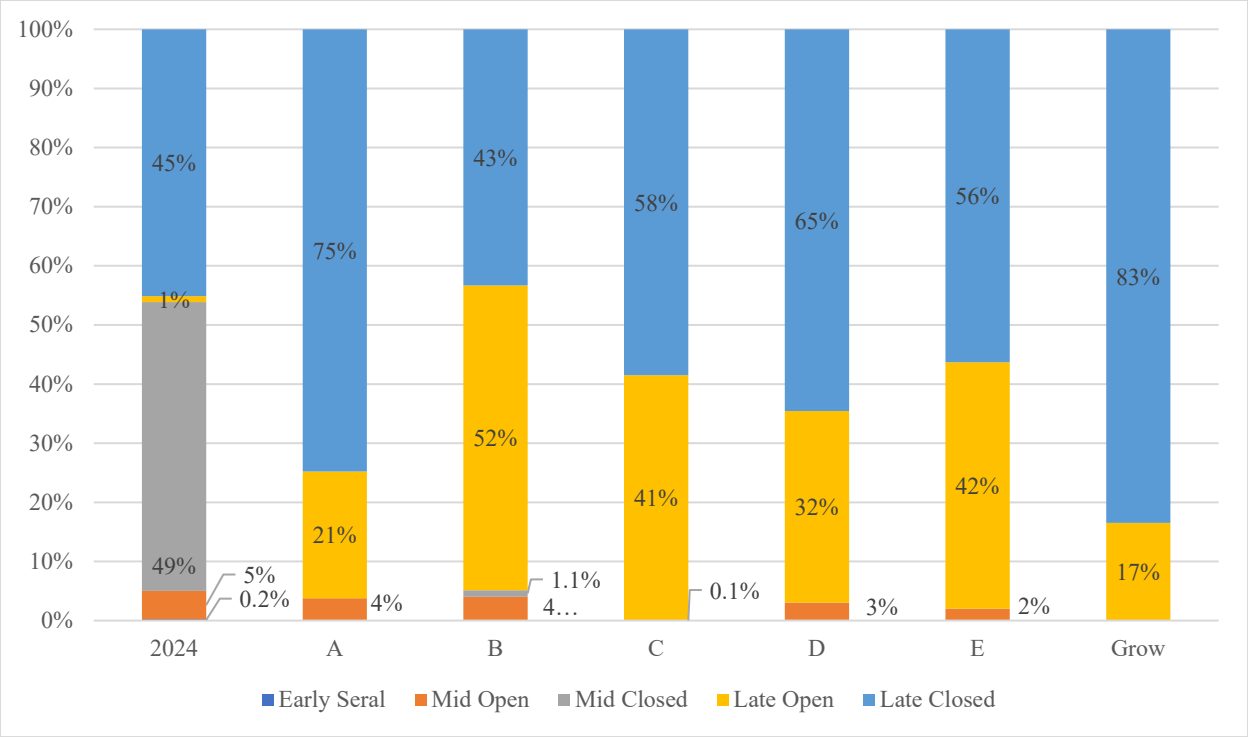


Figure 3-18. Comparison of the percentage of total successional classes (s-classes) for each alternative at the end of the 100-year modeling period compared to current s-class distribution (taken from EVT and departure analysis) and a grow-only modeling alternative

The distribution of forest stands types, or the transition from current forest types to those resembling NRV, relies heavily on changes in density and species composition. This information is detailed in Vegetation Analysis Issue 2. Although the modeling lacks spatial details about treatment locations, maintaining flexibility in implementing treatments at the landscape scale would lead to a more effective distribution of forest types and stand structures, better equipped to withstand and respond to disturbances.

Cumulative Effects

Restoration efforts aimed at increasing heterogeneity and enhancing structural diversity closer to NRV contribute to landscape-level resilience. All proposed alternatives offer some degree of landscape-level resilience, which extends to non-BLM lands adjacent to, within, and surrounding the CSNM. While treatments directly targeting BLM lands to break up homogeneous canopies may not directly impact neighboring areas, they still enhance resilience against disturbances at various scales. For instance, the risk of wildfire or insect and disease damage decreases across a diverse landscape. Effective restoration practices disrupt fuel continuity and decreases stressed forest stands, thereby mitigating the spread of specific disturbances.

Adjacent and surrounding private lands would benefit from effective restoration. The assumption was made that current management would continue on non-BLM land in and around the CSNM. As a result, we expect private commercial forest land to continue to harvest and provide areas of lower density or early seral habitat. On non-BLM-administered lands, the BLM assumed future distribution of nonforest vegetation structure and species compositions would continue to reflect

the current structure and compositions. This assumption is consistent with the assumption used in the analysis of forest structure and spatial pattern in the 2016 Western Oregon RMP Final EIS, which describes the limitations on analyzing future changes on non-BLM-administered lands and is incorporated here by reference (USDI BLM, 2016a, pp. 232–233). Areas where private landowner management creates heterogeneity would improve landscape-level resilience, as would areas where BLM restoration creates heterogeneity adjacent to private lands.

Climate change is a foreseeable force that is already shaping landscapes worldwide. In the Pacific Northwest (including Oregon, Washington, Idaho, and western Montana), evidence of these changes abounds. Since 1895, the region has warmed by 1.3 ºF, with significant increases in temperature across all seasons except spring. The climate in southwest Oregon is expected to become warmer, with drier summers. Depending on future greenhouse gas emission levels, summer temperatures in Medford are projected to increase by 4.5°–6° F by mid-century and 6°–10° by 2100 (Bennett & Adlam, 2023). The frost-free period has extended by 35 days, and spring precipitation has risen while summer and fall precipitation declined. Evapotranspiration potential has increased, leading to a growing climatic water deficit. Notably, extreme high nighttime temperatures have become more frequent, particularly west of the Cascade Mountains. However, other temperature extremes show no clear trend. Annual precipitation remains variable, and snowpack fluctuates widely, but overall, snow accumulation is decreasing. Spring snowmelt occurs earlier, affecting streamflow patterns in snowmelt-influenced streams. For the BLM, the indirect impacts of changing temperature, precipitation, and snow are critical considerations. These factors influence forest productivity, species composition, terrestrial and aquatic wildlife habitats, and disturbance regimes (USDI BLM, 2016a, pp. 181–182).

As the climate shifts, forest scientists anticipate an increase in background tree mortality. However, they do not foresee widespread die-offs of mature trees solely due to changing climate. Instead, die-offs are expected to result from the interplay between climate change and disturbance events, such as droughts and fires (Allen et al., 2010; Peterson et al., 2014), or from the interaction between climate change and heightened competition for water and carbon (Clark et al., 2014). Abrupt changes in vegetation can occur following events like prolonged droughts, insect outbreaks, or wildfires, leading to the death of mature trees and failed regeneration. The bioclimatic conditions suitable for seedlings of montane species (such as Douglas-fir and ponderosa pine) typically differ from those allowing established trees to persist. Species with broad distributions often have ecotypes or climatypes adapted to local conditions. However, as local conditions shift, a given climatype may struggle to reestablish after a disturbance. Climate variables analyzed by Rehfeldt et al. (2014a, 2014b) suggest that the varieties of Douglas-fir and ponderosa pine found in western Oregon are likely to persist, although they may not fare as well in an area that includes the Klamath Falls Field Office (USDI BLM, 2016b, p. 194).

Scientists expect a substantial loss of suitable habitat for Douglas-fir at low- to mid-elevations around interior valleys as they become hotter and drier (Bennett & Adlam, 2023). They state that "Even with no changes in precipitation, this increased summer warmth would translate into greater drought stress for Douglas-fir and other trees. Douglas-fir would continue to decline and die at higher rates." This effect would be due to increased effective dryness as warmer temperatures increase evapotranspiration demand.

Bennett and Adlam (2023) also expect a gain in habitat at higher elevations in the Cascades as these areas warm (Bennett & Adlam 2023, p.18, Figure 19). In high-elevation habitats, climate

change would probably alter species composition of both plants and animals because of decreasing snowpack. Minimizing new stressors on high-elevation ecosystems may help to increase their resilience (Halofsky et al., 2022). For a better understanding of the projected changes in Douglas-fir habitat in southwest Oregon under a different climate change scenario refer to the "Species Potential Habitat Tool" (https://specieshabitattool.org/spht/).

Generally, recommended actions for responding to climate change consist of reducing existing stresses, increasing resistance and resilience to climate change and other stressors, and enabling change where it is inevitable (Joyce et al., 2009; Spies et al., 2010; Peterson et al.; 2011; Vose et al., 2012; Peterson et al., 2014; Stein et al., 2014). As summarized by Joyce et al. (2009), Spies et al. (2010), and Peterson et al. (2011), the specific types of recommended actions include:

- Thinning forest stands to reduce competition and drought stress, increase diversity (species, structure, age classes, sizes, patch sizes, spacing) at the stand and landscape scales, and increase resistance to fire, insects, and pathogens;
- Protecting large old trees, large snags, and large downed wood;
- Planting new genotypes/ecotypes/climatypes and species to aid development of communities that can persist under both the current and expected future climate; and
- Identifying potential climate change refugia at regional and local scales

These approaches are known as 'no regrets' decisions and bet-hedging, given the large uncertainties over the rate and magnitude of climate change in any one location (Vose et al., 2012). (USDI BLM, 2016b, p. 199). These recommended actions are included at various levels within the scope of the alternatives. Implementing these actions would heighten landscape-level resilience for the CSNM and the surrounding landscape.

Conclusion

In conclusion, all alternatives show similar trends in s-class shifts that increase both late s-classes and reduce early seral and other s-classes. Alternative B is the only alternative that reduces the closed s-classes and increases the open s-classes from current modeled numbers. Under Alternative B, open s-classes are increased to 56 percent of the landscape, by the end of the modeling period, followed by the Proposed RMP (Alternative E) (44 percent), Alternative C (41 percent), Alternative D (35 percent) and Alternative A (25 percent). Alternative B provides the greatest landscape-level resilience as it most effectively increases the proportion of open s-classes on the landscape.

Vegetation Analysis Issue 2

How would the alternatives affect the ability of dry forests to resist large-scale, high severity disturbance at the stand-level?

Summary of Analytical Methods

Refer to Summary of Analytical Methods for Analysis Issue 1 for a description of the forest inventory and modeling used in this analysis and for relevant assumptions that also apply to this analysis. For analysis of effects of vegetation management treatments at the stand-level, the BLM took the modeling inputs and compared them across the alternatives.

The BLM assessed stand composition by comparing the dominant and co-dominant species in the output stands and describing trends that occur in each alternative due to the implementation of management direction. The presence of individual shade-tolerant, less fire-resistant trees within a stand indicates a departure from the NRV caused by fire exclusion. Restoration of species composition closer to NRV would enhance stand-level resistance by allowing fire-resistant tree species to dominate in areas adapted to their specific composition (Hagmann et al., 2013; Hickman & Christy, 2011; Merschel et al., 2014). In different stand types, higher percentages of pine, oak, Douglas-fir, or Shasta red fir indicate progress toward natural range variability (NRV), making stands more resistant. Additionally, within each forest type, higher percentages of the basal area occupied by the desired fire-tolerant species signal a shift in species composition toward NRV. The desired fire-tolerant species for each forest type are as follows:

- Mixed conifer forest type: oak and ponderosa pine
- White fir forest type: oak, ponderosa pine, and Douglas-fir
- Red fir forest type: oak, ponderosa pine, Douglas-fir, and red fir

In describing forest structure, five successional classes (s-classes) are utilized, based on tree canopy cover and size classes (Haugo et al., 2015). These classes include the following:

- Early development (early)
- Mid development closed canopy (mid closed)
- Mid development open canopy (mid open)
- Late development open canopy (late open)
- Late development closed canopy (late closed)

For a more detailed understanding of the successional stage classification system, please refer to Appendix N.

The BLM assessed changes in forest stand structure by analyzing the output of s-classes over time, along with changes in stand metrics such as quadratic mean diameter (QMD). As departure from the Natural Range of Variation (NRV) decreases, both landscape-level resilience and stand-level resistance improve. To determine the NRV for the CSNM, the BLM relied on a departure analysis conducted by the USFS using 2022 LANDFIRE data.

The distribution of s-classes represents how departed the current landscape is from the NRV. A more detailed description of the impact of changes in structure class (s-class) distribution on landscape-level resilience is provided in Vegetation Analysis Issue 1. Potential changes in late-successional forest habitat are described in Vegetation Analysis Issue 3.

At the stand level, the BLM compared modeling inputs across different alternatives to assess the effects of vegetation management treatments. Stand density was a key factor examined, using two metrics: Basal Area (BA) and Stand Density Index (SDI). SDI values for individual forest types were categorized based on their percentage of maximum SDI:

1. Free of competition (<25 percent)
2. Low competition (25-34 percent)
3. Full competition (35-59 percent)
4. Imminent mortality (>60 percent)

For stand resistance purposes, the target would be to achieve the two lowest competition categories (free of competition or low competition).

The BLM assessed changes in forest health by comparing how management direction influenced the percentage of the landscape with elevated levels of drought, disease and insect risk. Increased acreage with elevated risk levels indicates reduced stand resistance. The presence of standing snags and standing or downed dead material reflects the extent of mortality within the stands. Higher mortality, as indicated by levels of standing snag/dead material, corresponds to lower stand resistance. Table 3-50 below outlines these stand metrics used to measure forest stand-level resistance.

Table 3-50. Indicators and metrics used to evaluate the effects of management actions

Objective	Indicator	Metric	Predicted Outcome
Stand-Level Resistance (cumulative measure of stand density, stand structure, species composition, stand health and the subsequent ecosystem functions (i.e. Disturbance events) that result from modifications to any of those measurement indicators.)	**Species Composition**	Percentage of Basal Area (BA) of fire-resistant species within stands.	Increase in proportion of fire-resistant species.is areas with restoration treatments. No change in untreated areas.
	Stand Structure	Size class distribution of trees and measure of average tree diameter (QMD); percentage of each forest type in each s-class.	An increase in mid open and late open s-classes and a reduction in mid closed. QMD increase post- restoration activities. No change in untreated areas.
	Stand Density	BA; Stand Density Index (SDI); and SDI competition classes	Reduction in stand density to promote increased growth and vigor in remaining trees No change in untreated areas.
	Stand Forest Health	Percentage of elevated risk of drought, disease, and insect damage.	Reduction in acreage of areas of elevated risk. Higher elevated risk in areas that are not treated.

Affected Environment

Species Composition

Currently, forested plant communities cover 68 percent of lands in the analysis area. These communities include mixed conifer/hardwood forests and conifer dominated forests (as detailed in Table 3-51). Forest vegetation varies based on elevation, climate, and past disturbance patterns. These resulting forest conditions span a wide range, as depicted on Map 3-2, Cascade-Siskiyou National Monument – General Vegetation Types (Appendix C).

Table 3-51. Forested – Existing Vegetation Types (EVT) in CSNM with percents in decision area and BA in fire-tolerant species

Forest Type (Assoc. Tree Species)	Percent in Decision Area	Elevation	Percent of BA in Fire-Tolerant Species	Forest Characteristics
White Fir (Douglas-fir, white fir, Shasta red fir, ponderosa pine, sugar pine)	14%	>4500 ft	25%	White fir is considered the climatic climax species. Regular seed crops and very fast growth allows white fir to outcompete other tree species and brush following disturbance. In some areas the dominance of white fir is caused by the selective logging of pine in the past, subsequently removing it as the fire climax species. Fire exclusion has also contributed to the dominance of white fir in these areas and is likely to continue to favor white fir dominance in other forest types where it is present.
Mixed Conifer (Douglas-fir, ponderosa pine, lodgepole pine, sugar pine, true fir, western white pine, incense cedar, various hardwoods)	35%	3000-6000 ft	32%	Species composition is highly variable in this forest type. White fir is nearly always present especially on northern slopes and at higher elevations. Ponderosa pine may dominate at lower elevations and on southern slopes. Disturbance favors pines and Douglas-fir and a lack of disturbance favors white fir and incense cedar, although it can vary based on the species composition of individual stands. After clearcutting or fire the abundance of shrubs such as manzanita and ceanothus tend to favor white fir for the first 30-50 years. Stands tend to be composed of clumps of trees of various species. Oak occurs occasionally, often on harsher sites.
Red Fir (Shasta red fir, Western white pine, sugar pine, white fir)	19%	5400-7500 ft	38%	Generally pure but can mix with white fir and other listed species at different elevations. Red fir is considered a climatic climax species and tends towards dense, even aged stands. In this landscape, much of the ground categorized as red fir is actually high elevation white fir stands.
TOTAL	**68%**			

Note: Analysis based in part on Eyre (1980). The BLM also used LANDFIRE-Existing Vegetation Type (EVT) data to identify forest plant communities.

Each forest type described in Table 3-51 has secondary species, such as pine and incense cedar. These species are vanishing from forest stands in the planning area due to competition from shade-tolerant species. Due to decades of fire suppression, the most shade-tolerant species—typically white fir or Douglas-fir—dominate forested stands in the planning area. The replacement of ponderosa pine by Douglas-fir or white fir increases the percentage of drought-susceptible trees in a stand; therefore, the risk of beetle infestation and/or wildfire also increases.

Although most forest stand types displayed in Table 3-51 are observed in elevations above 3000 feet in the planning area, there is still concern of insect outbreaks, such as the flatheaded fir borer (*Melanophila drummondi*). In southwest Oregon, this beetle is most common and severe on hot,

dry sites under 3,500 in elevation feeding on Douglas-fir (Bennett & Adlam, 2023). More uncommon in higher elevation forest, this insect has expanded to trees on more favorable sites, including on north slopes and in riparian zones (Bennett & Adlam, 2023). These recent observations are a concern, especially during the warming trends southwest Oregon is experiencing due to a changing climate. This presents a challenge in protecting wildlife habitat and forest health at the stand and landscape level because Douglas-fir is such a dominant feature of dry forests in southwest Oregon. Species such as these tend to produce conditions that favor fire because it is self-pruning, often sheds its needles, and tends to increase the rate of fuel buildup and drying (Atzet & Wheeler, 1982).

A shift in species composition from more drought tolerant and fire adapted species to less can have a negative impact in terms of the level of resistance that stand has to natural disturbances. The relatively high percentage or composition of shade tolerant species in comparison to more shade intolerant species (i.e. ponderosa pine) in the planning area have left these forests more vulnerable to drought, fire, and insects.

Stand Density

The forest types described in Table 3-51 are experiencing limited growth due to resource and growing space constraints due to stands being too densely populated. While trees may grow taller, diameter growth slows or stagnates. High-density stands experience mortality resulting from overcrowded stand conditions and associated competition for water and nutrients, resulting in higher fuel loading.

Various scientific methods developed over the decades predict or identify a threshold when a forest stand would decline in production and health. Basal area can be used as a basis for assessing relative density if expressed relative to some expected or maximum value for a species and site, but in absolute form they are not relative density measures (Tappeiner, Maquire, & Harrington, 2007, p. 165). However, SDI is a relative density measurement and is used here to describe the level of competition among trees or site occupancy in a stand, relative to a theoretical maximum based on tree density, size, and species composition. (Reineke, 1933). Reineke concluded that an SDI of 500 for example, means that a species can attain a maximum of 500 10-in trees/ac. These correlative density index ratings are used to indicate the initial point of imminent mortality and suppression of a forest stand.

Currently, the density levels in the respective forest types are below the level of imminent mortality. Figure 3-19 displays the number of acres that fall into each of the three lower density categories. In addition, average BA for each of the forest types is displayed below in Table 3-52.

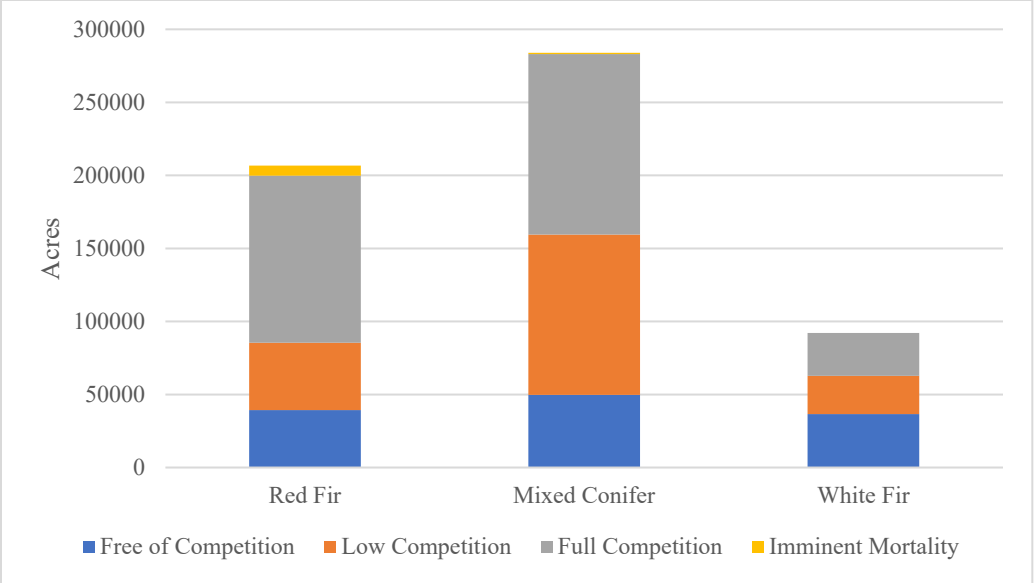


Figure 3-19. Current distribution of acres within density ranges (SDI class) by forest type

Table 3-52. Current (2024) average basal area (BA) by forest type

Forest Type	Average BA (sq. ft./ac.)
Red Fir	179
Mixed Conifer	129
White Fir	134

Stand Structure

Beyond the dominant vegetation, understanding the stand structure of these vegetation types provides insight into restoration needs for the planning area (USDI BLM, 2023a, pp. 173–175). Figure 3-19 illustrates the current distribution of s-classes in the planning area. Currently, the CSNM predominantly consists of (86 percent) closed canopy (mid closed and late closed) forest successional classes. Historically, a larger portion of this landscape was composed of open canopy forest areas (refer to Figure 3-17). Refer to Issue #1 in Section 3.15 for detailed analysis of these s-classes to better understand the historical distribution of s-classes for this landscape in which open canopy stands were more prevalent than today.

As shown in Figure 3-18 and 3-19, the CSNM is deficit in early seral and late open s-classes and has an excess of mid closed, mid open and late closed s-classes compared to the NRV. Notably, stand-level resistance is higher in open stands. Therefore, the presence of more open stands reflects a higher level of stand-level resistance resulting from management direction (USDI BLM 2016c, p. 243)

Based on the assessment of current conditions, to restore the habitat, the recommended approach involves disturbance, and in some cases, followed up with succession. Disturbance treatments would bring the stands closer to the NRV. Approximately 80 percent of mid-closed stands, 10 percent of mid-open stands, and 30 percent of late closed stands need disturbance. Following disturbance, about 70 percent of mid-closed stands and less than 10 percent of mid-open stands need succession to align with NRV.

Based on historical data, most of the disturbance treatments should focus on mixed conifer stands, as they are most departed from NRV. However, all forest types exhibit an excess of mid- closed and late closed stands. Additionally, mixed conifer forest types also have an excess of mid-open stands. To bring stands in the CSNM closer to the NRV, restoration treatments would be necessary on approximately 60,000 acres of mid-closed stands and 14,000 acres of late closed stands.

Forest Health

Current forest health levels are displayed in Figure 3-20 and show that 47 percent of the lands available for restoration are currently at an elevated risk for damage from drought, while 25 percent are at elevated risk from disease or insects.

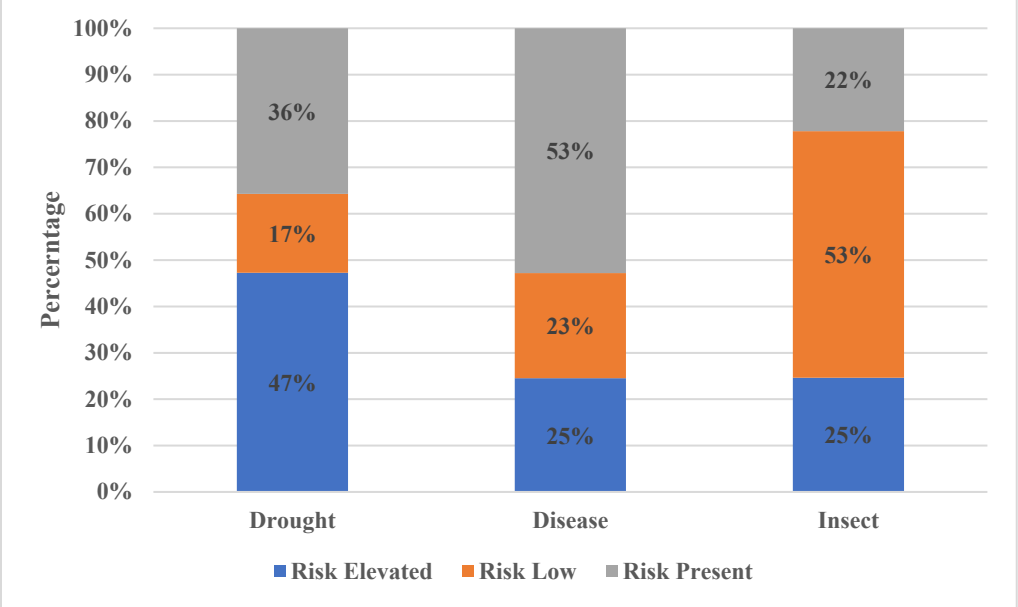


Figure 3-20. Percentage of acres at each risk level for drought, disease, and insects

Environmental Consequences

This analysis specifically concentrates on the effects of implementing management direction in the Ecosystem Management Areas (Appendix E, Section 2.C). The proposed management decisions associated with recreation and visitor services, livestock grazing, minerals and quarry use, lands and realty, and travel and transportation management were not analyzed in detail. This is because the changes in management by alternative would primarily result in localized effects on forested vegetation and would not substantially impact stand-level composition, density, structure, successional stages, or overall forest health.

Common to All Alternatives – Untreated Stands

The BLM modeled a "Grow" alternative to use for reference analysis, which modeled growth from current condition without any future treatments. These model results represent untreated stands for all forest types. Even under the action alternatives (Alternative B, C, D, and E), most of the landscape would consist of untreated stands that would follow the trajectory of the Grow modeling.

Species Composition

Figure 3-21 displays that, without any treatment, fire-tolerant species experience a decline of 6 to 7 percent in mixed conifer and white fir stands over the next 100 years. Conversely, these species show a slight increase in red fir stands, which aligns with the constraints of the model. It is probable that secondary fire species also decline in red fir stands, but both Douglas-fir and red fir are recognized as fire-tolerant. Within stands classified as red fir forest types, about 60 percent are primarily comprised of a Douglas-fir/white fir mix, while only 40 percent include Shasta red fir. In these areas, Shasta red fir typically dominates, with secondary species playing a minor role. As density rises in any of these stands, the more shade-tolerant (and less fire-resistant) species—generally fir—would prevail, as they are the only species capable of regenerating beneath a dense canopy.

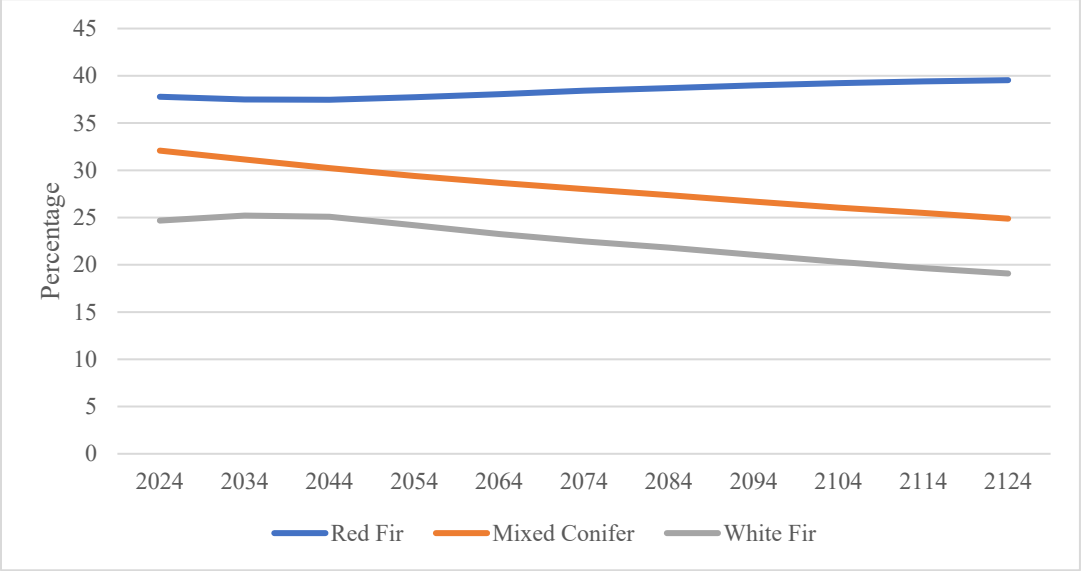


Figure 3-21. Percentage of basal area of fire-tolerant species by forest type over 100-year period under Grow Alternative

Stand Structure

Figure 3-22 displays the comparison of open and closed s-classes at selected decades of the 100-year period under the Grow alternative. Closed s-classes increase from 72 percent to 95 percent over the first 50 years, while open class decrease by 20 percent. By year 100 (2124), closed s-classes show a decline from 2074 levels, but still an increase of 11 percent from 2024. Open s-classes show an overall decline of 8 percent. Early seral habitat is not considered in this comparison (or for other alternatives) but makes up the remaining 3 percent in 2024 and is non-existent in future decades.

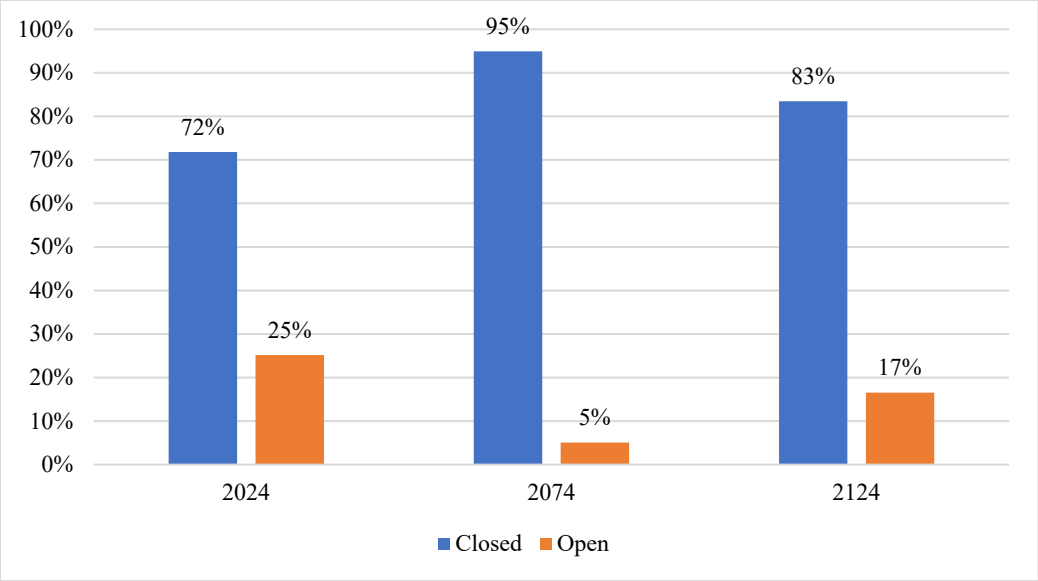


Figure 3-22. Acres in open and closed s-classes in selected decades under Grow alternative

In Figure 3-23, the average tree size increases over time for all forest types. Both red fir and mixed conifer increase by about 7 inches, while the white fir stands drop by about 4 inches between 2034 and 2054 and increase after that point for a net increase of about 4 inches.

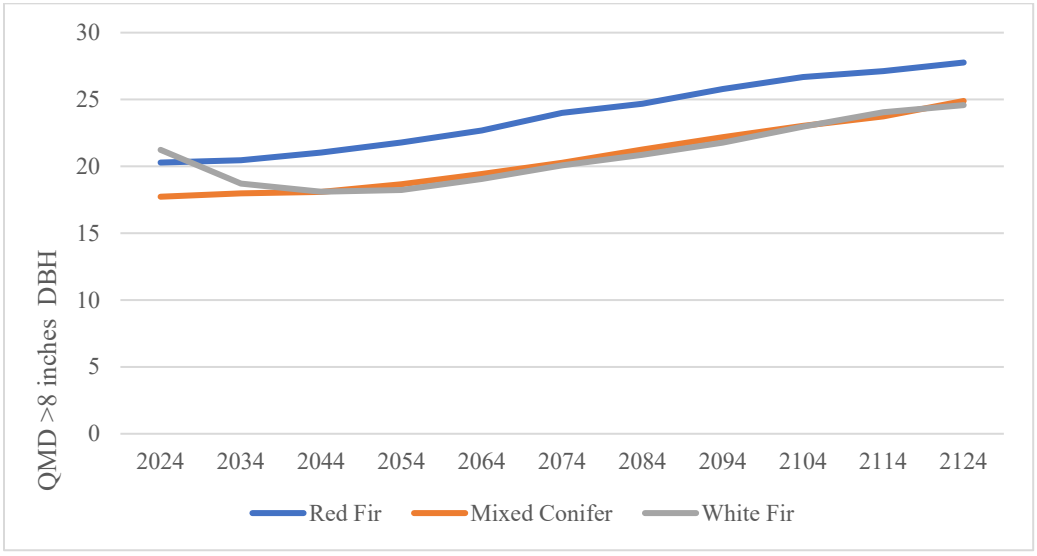


Figure 3-23. Average QMD over time by forest type in Grow alternative

Stand Density

In all forest types, untreated stands frequently become densely populated. This high density restricts growth due to limitations in resources and space. Figure 3-24 illustrates a gradual increase in density across all forest types over time. The initial 40 to 50 years see a rapid rise in density, after which the availability of space and resources constrains further increases. While trees may continue to grow taller, their diameter growth tends to slow or stagnate. These high-density stands face density-dependent mortality, leading to increased fuel loading.

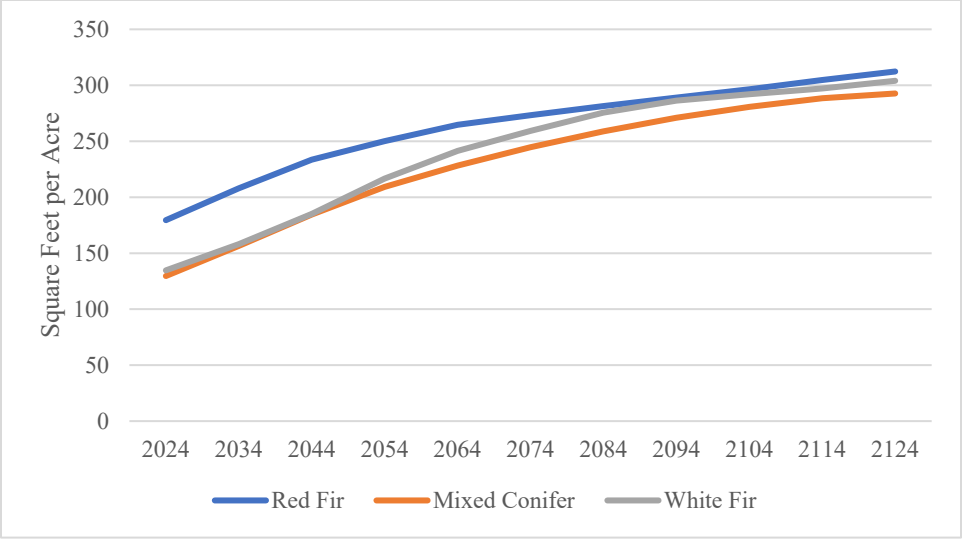


Figure 3-24. Average basal area over time for each forest type for the Grow Alternative

Figure 3-25 displays this phenomenon, showing a sharp decline in trees per acre starting in 2044, followed by a gradual slowdown in the decline by 2084.

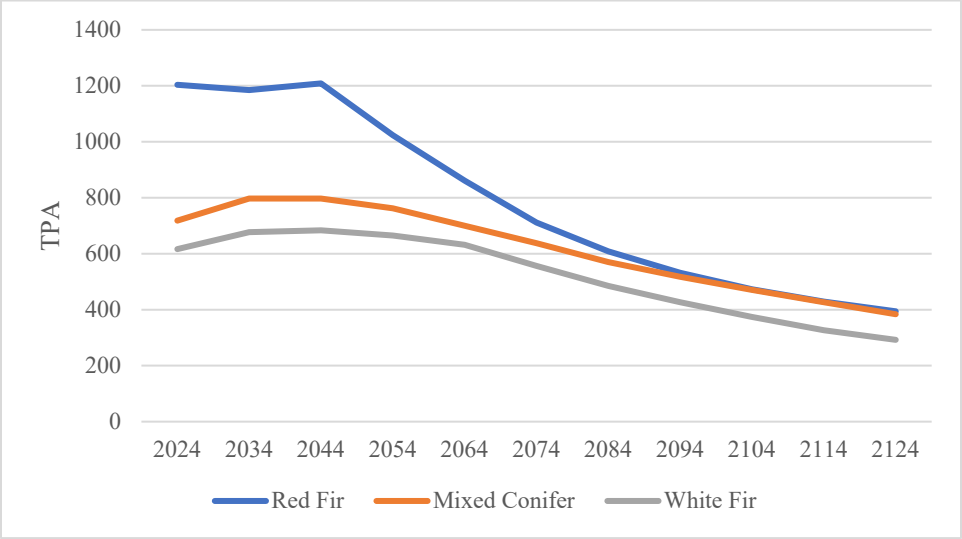


Figure 3-25. Average trees per acre over time for each forest type for the Grow alternative

Figure 3-26 displays the acres in each SDI competition class and shows a sharp decline (10,000-15,000 acres) in the stands that are free of competition or have low competition for the first thirty years, during which time stands in full competition rise dramatically (35,000 acres). There is a more gradual increase in acres in the imminent mortality category over time, however only a little more than 5,000 acres is included in that category by the end of the 100-year period. More than 40,000 acres remain in the full competition category for most of the period, leading to increased stress and susceptibility to density-dependent and disturbance mortality.

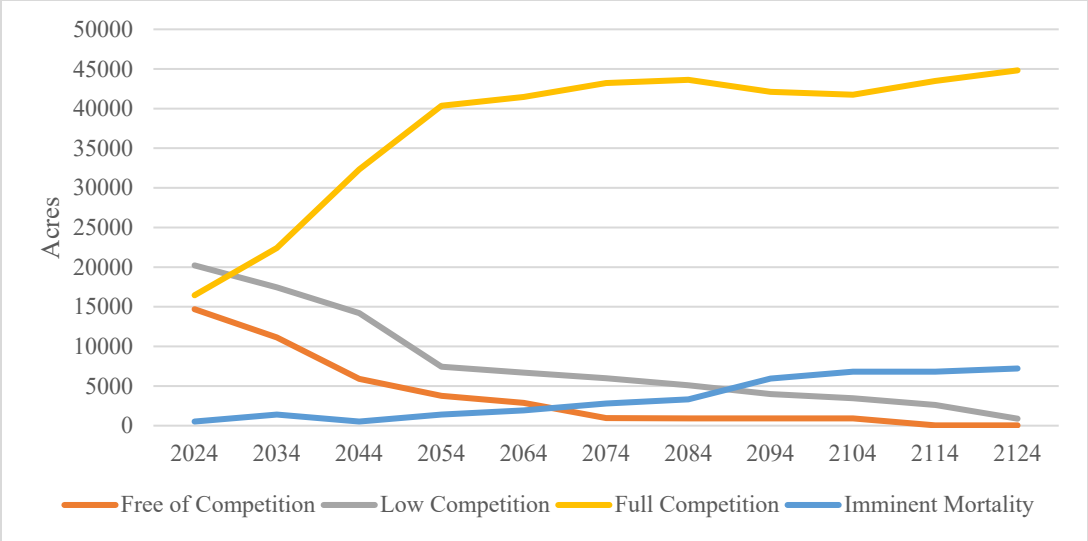


Figure 3-26. Acres in each of the SDI competition classes for the Grow Alternative

Note: Target categories are Low Competition or Free of Competition

Forest Health

Table 3-53 shows a very high drought risk for all forest types, averaging 79 percent overall. Disease risk is highest in red fir stands, followed by mixed conifer and white fir stands, respectively. The risk of damage from insects is highest in mixed conifer stands, followed by white fir stands. Insect risk is relatively low in red fir stands.

Table 3-53. Percentage of acres at elevated risk from drought, disease, and insects in Grow modeling

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
Red Fir	75%	45%	9%
Mixed Conifer	83%	29%	50%
White Fir	81%	13%	25%
AVERAGE	79%	29%	28%

Alternative A (No Action)

Species Composition

Figure 3-27 shows little variation in the percentage of basal area made up of fire-tolerant species under Alternative A. In the expansion area, fire-tolerant species in mixed conifer stands increase in the first two decades, then begin to gradually decrease below initial levels by 2124. In white fir stands in the original monument there is a slight 2 to 3 percent increase over the 100-year period. Otherwise, there is little change. This indicates that there would be little alteration in species composition over time in this alternative.

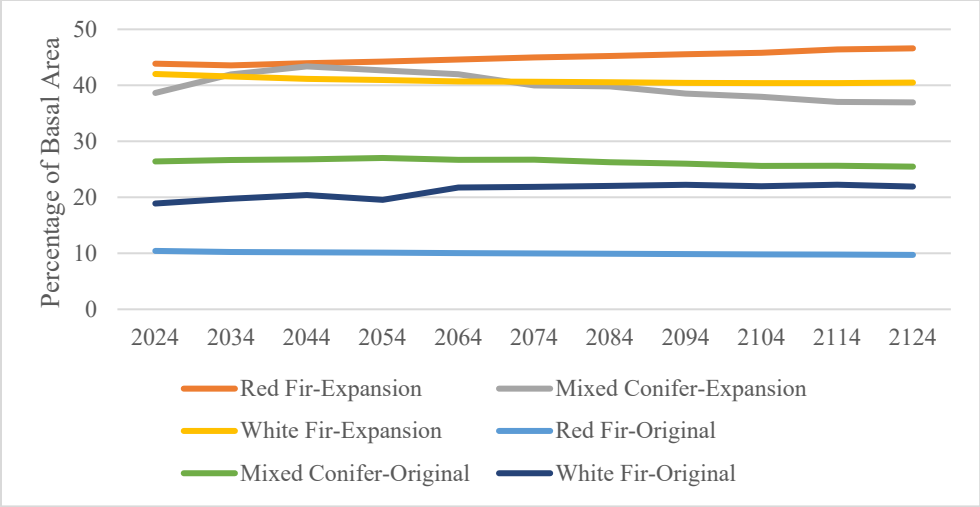


Figure 3-27. Percentage of basal area comprised of fire-tolerant species over 100-year period - Alternative A (No Action)

Stand Structure

Figure 3-28 shows the modeled proportions of open and closed s-classes in both the original and expansion areas of the monument. For the first 50 years, there would be an 11 percent increase in closed s-classes and a 7 percent decrease in open s-classes. Also, early seral habitat is eliminated during this period, moving all habitat in to mid or late seral classes. By the end of the period, closed s-classes decline from 2074 levels, but are still 4 percent greater than in 2024, while open s-classes return to the same level.

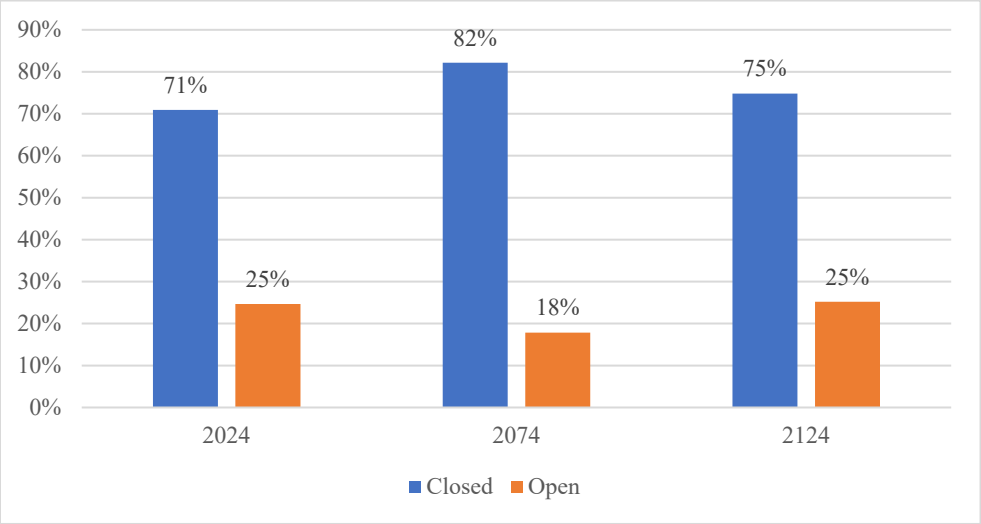


Figure 3-28. Acres of open and closed s-classes at selected decades of the 100-year period

Figure 3-29 shows the average increase in tree size (QMD) over time in the expansion area. Trees in red fir stands increase by a total of 8 inches, mixed conifer increases by 10 inches and white fir increases by 7 inches. In both mixed conifer and white fir, the trees increase in size more in the second half of the 100-year period, likely because overly dense stands have begun to self-thin and allow more diameter growth.

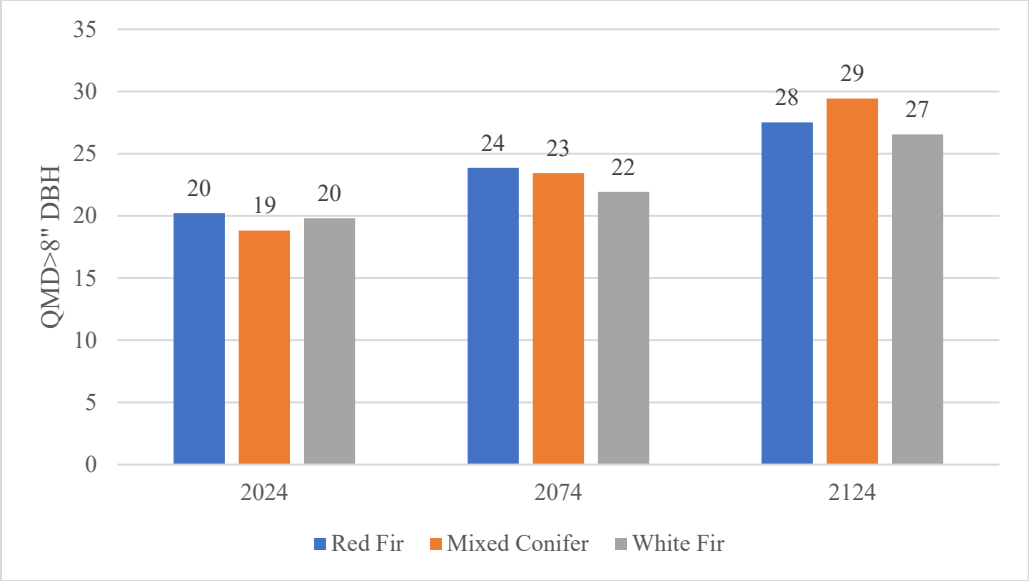


Figure 3-29. Estimated Forest Type QMD by selected decade within the CSNM expansion area (USDI BLM, 2016c)

Figure 3-30 shows the same measurement for the original monument area. In this area trees in red fir stands increase by 10 inches, mixed conifer increases by 7 inches and white fir increases by 4 inches. The same trend of increasing more towards the end of the 100-year period is true for red fir and mixed conifer. White fir, on the other hand decreases by 2 inches and then gains six inches in the second half of the period. This could be tied to the fact that there are more open s-classes in the second half of the period, or to the reduction in trees per acre as a result of self-thinning.

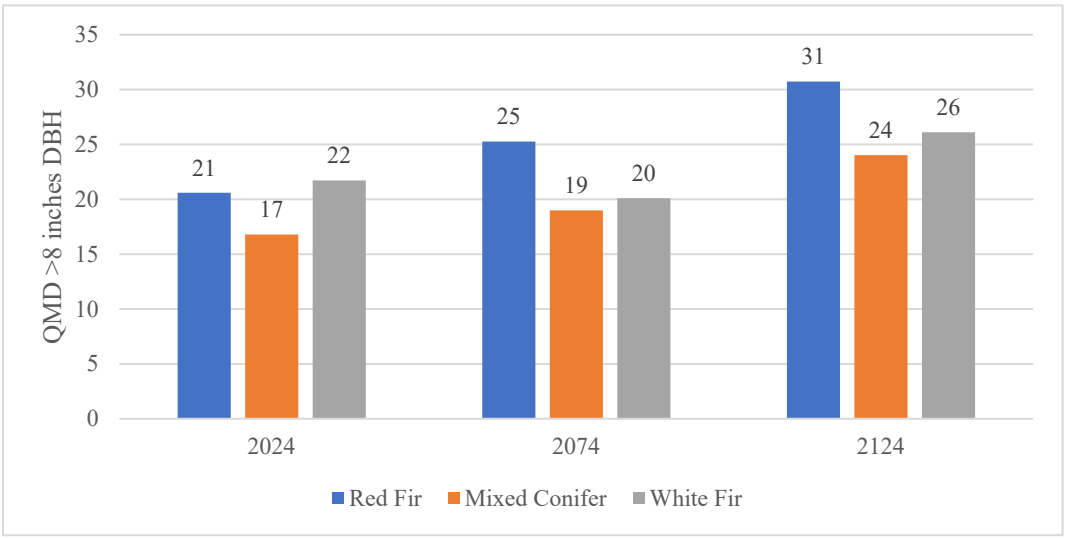


Figure 3-30. Estimated Forest Type QMD by selected decade within the CSNM Original Boundary (USDI BLM, 2008)

Stand Density

Figures 3-31 and 3-32 below show trees per acre (TPA) and basal area (BA), respectively, for the different forest types in the two monument boundaries (original and expansion areas). Mixed conifer stands in both areas and white fir in the original area show lower values for both TPA and BA. Red fir stands and white fir in the expansion show higher BA and TPA. These stands are usually located at higher elevations with more productive growing conditions than the drier areas in the original monument and in the mixed conifer areas. In all stands, TPA decreases as BA increases. Increased BA causes density dependent mortality, or self-thinning, where trees with less vigor are outcompeted and die.

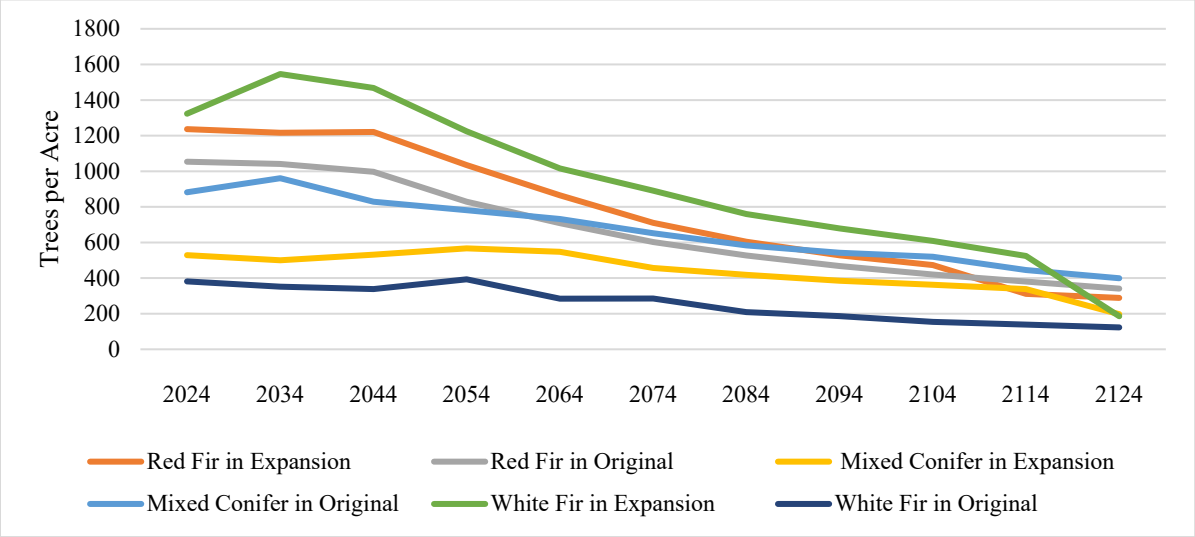


Figure 3-31. Comparison of average stand density (TPA) by forest type - Alternative A

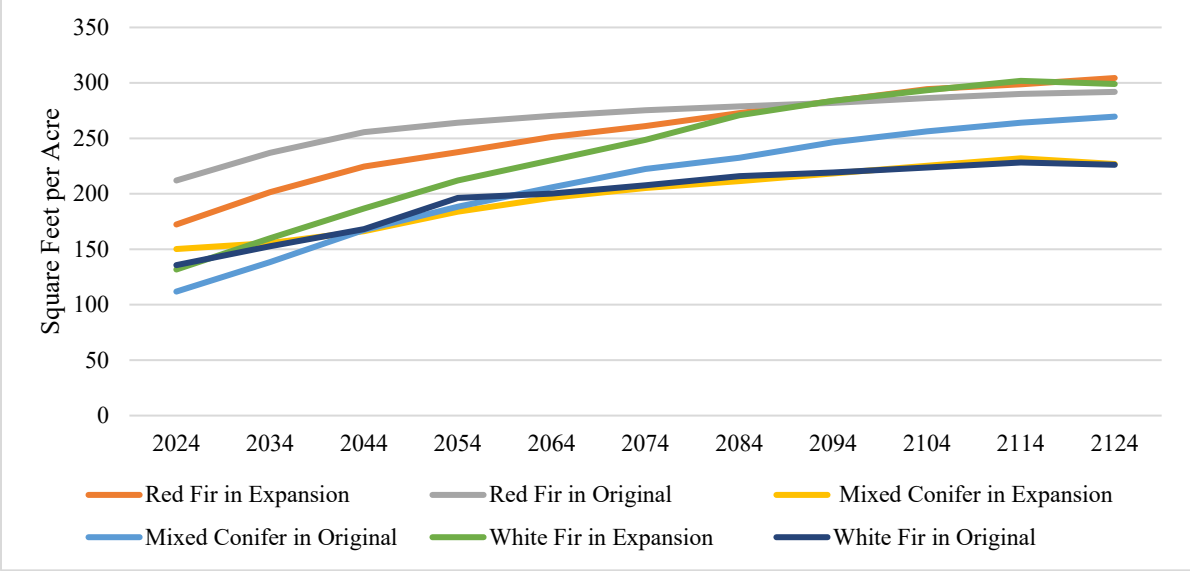


Figure 3-32. Comparison of average basal area (BA) by forest type - Alternative A

Figure 3-33 shows a comparison of the density competition classes under Alternative A. Low competition and free of competition classes allow for the most growth and the least mortality due to competition. Acres of stands in the full competition and imminent mortality categories begin to increase immediately as the acres of stands in the free of competition and low competition categories immediately begin to decrease. After 2054 more than 50,000 acres are in the full competition category and by the end of the 100-year period almost 70,000 acres are in either the full competition or the imminent mortality categories with about 13,000 acres in the target lower categories. This alternative does little to steer stands towards the target density categories and build resilience based on lower densities.

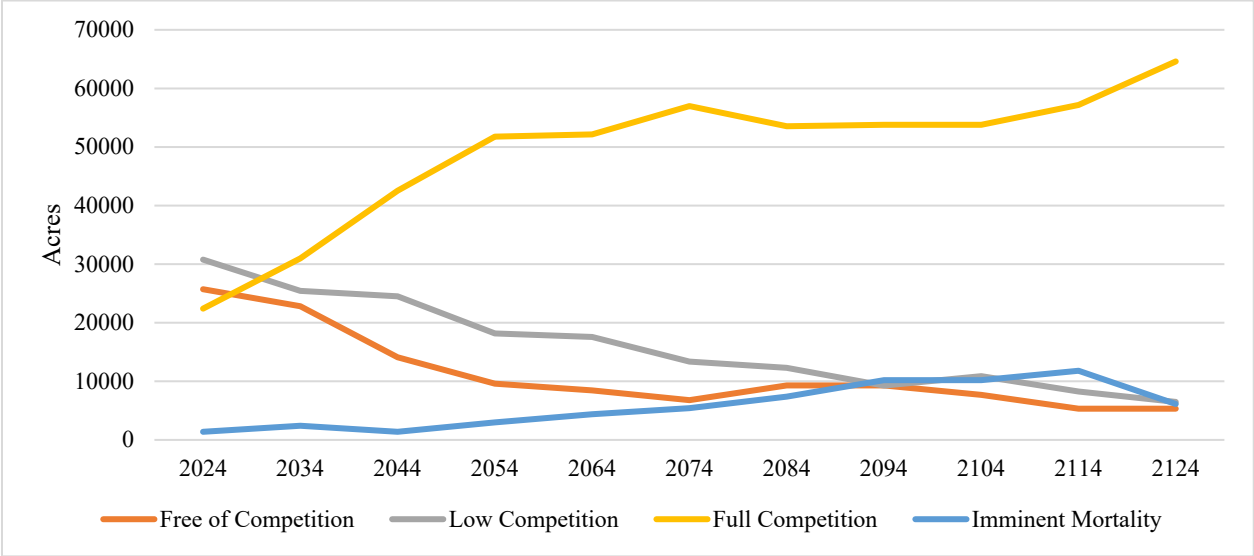


Figure 3-33. Acres in each of the density competition categories for Alternative A

Note: Target categories are Low Competition or Free of Competition.

Forest Health

The BLM evaluate forest health by looking at risk levels for drought, disease, and insects based on a variety of stand metrics (Table 3-54). Overall, under this alternative, drought risk averages 71 percent, disease risk averages 40 percent, and insect risk averages 29 percent.

Table 3-54. Percentage of acres at elevated risk from drought, disease, and insects - Alternative A

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
Red Fir-Expansion	71%	33%	11%
Red Fir-Original	95%	100%	0%
Mixed Conifer-Expansion	64%	31%	58%
Mixed Conifer-Original	72%	27%	39%

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
White Fir-Expansion	59%	50%	50%
White Fir-Original	62%	0%	17%
AVERAGE	**71%**	**40%**	**29%**

Alternative B

Species Composition

Shifts in species composition towards more fire-tolerant, or fire-resistant, species are shown in Figure 3-34. Red fir stands increase by about 3 percent, mixed conifer stands decrease by about 3 percent, and white fir stands increase by about 4 percent over the 100-year period.

The thirty-six-inch diameter limit on pines, Douglas-fir, and incense cedar would increase the amount of volume available to be harvested from a stand, which would increase the effectiveness of treatments aimed at modifying species composition. Management direction for variably sized and spaced openings, and openings up to 4 acres in size, would support the more shade-intolerant pine, incense cedar, and oak and increase the success of restoration efforts aimed at shifting species composition to more fire-resistant species. Douglas-fir would occupy less available growing space, providing more space to support the shade-intolerant species.

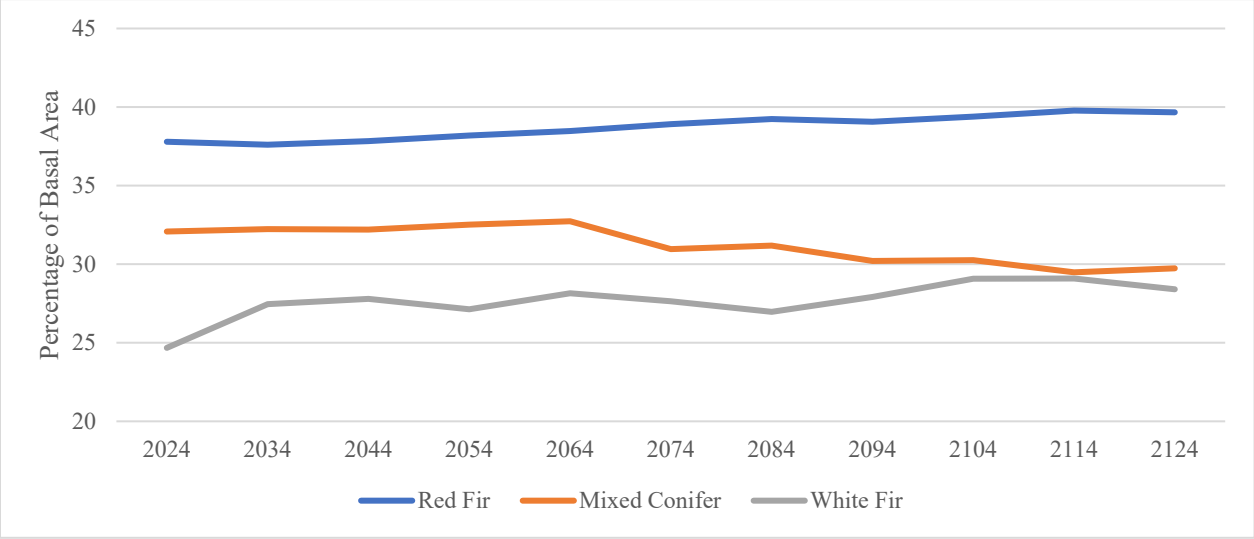


Figure 3-34. Percentage of basal area made up of fire-tolerant species over time - Alternative B

In some red fir stands, vegetation treatments may not significantly alter species composition. However, in other areas, white fir and Douglas-fir stands may transition to Douglas-fir dominance following thinning that targets white fir. In treated areas, an increase in sugar pine is anticipated.

Mixed conifer stands are among the more complex types, as they host a greater diversity of species and are typically found in the drier regions of the CSNM, where changes in species composition can significantly contribute to restoration and the return to NRV. By maintaining secondary or minor species (such as pines, incense cedar, and oaks), or even allowing them to dominate, along

with prescribed fire, it is possible to keep pine or incense cedar as the dominant species in stands that would otherwise shift to white fir or Douglas-fir dominance without intervention. Thinning approximately every 20 years, coupled with prescribed fire, would preserve these secondary or minor species that would otherwise be outcompeted by shade-tolerant species, including white oak. In stands dominated by Douglas-fir and white fir that lack minor species, species composition remains stable.

Implementing management strategies that allow for treatments aimed specifically at modifying species composition would facilitate these shifts. Creating openings would aid in changing the species dynamics in stands with shade-tolerant species, providing space for shade-intolerant species like pine and oak to establish.

Stand Structure

Alternative B shows a steady reduction in closed s-classes and a steady increase in open s-classes, leading to an almost 30 percent shift at the end of the 100-year period (Figure 3-35). This alternative shows progress towards restoration goals of establishing an s-class distribution closer to NRV. Thinning opens up the canopy to allow mid open or late open successional classes to exist for a period of time, however continued treatments are necessary to prevent treated stands from reverting to mid closed or late closed s-classes.

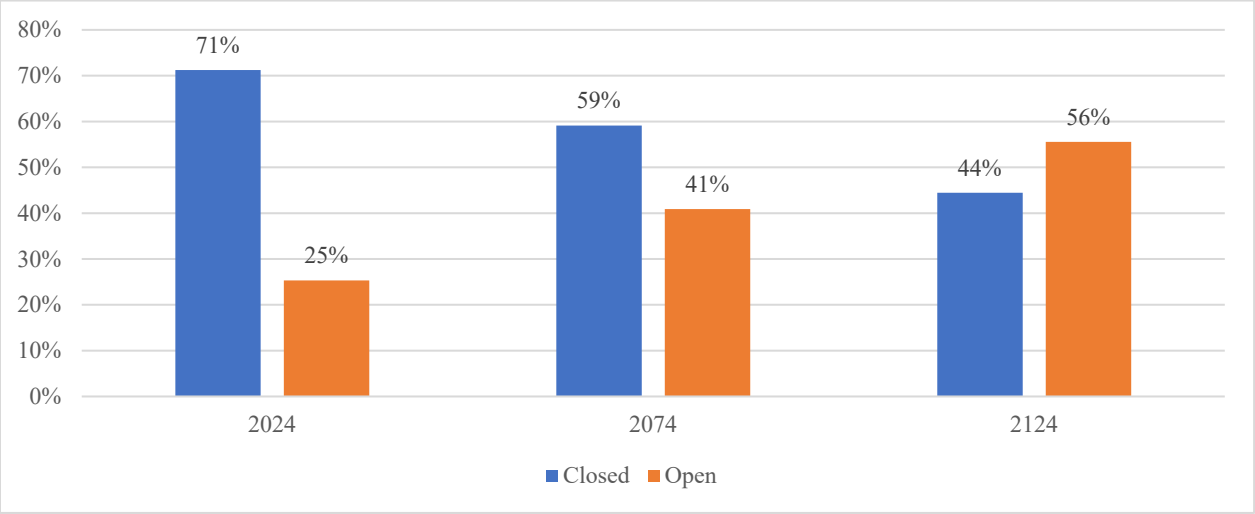


Figure 3-35. Acres of open and closed stands in select decades of the 100-year period - Alternative B

Shifts in stand structure towards more open stands is likely what leads to the large increase in tree size shown in Figure 3-36. Trees in all forest types increase by an average of 12 inches over the 100-year period.

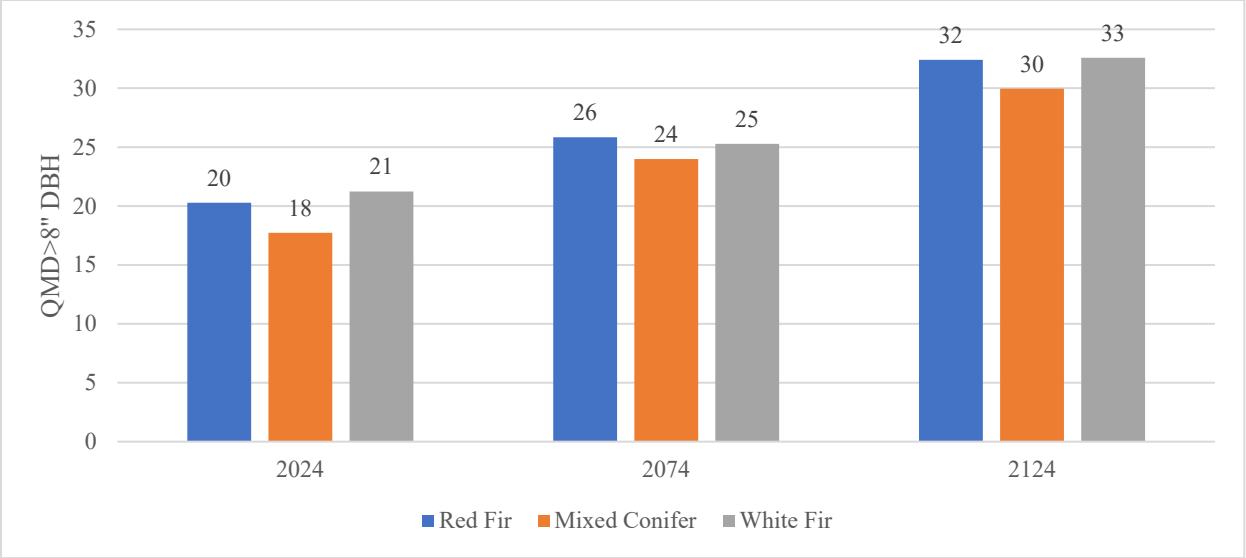


Figure 3-36. Estimated forest type QMD for trees greater than 8 inches for select decades - Alternative B

Stand Density

Figures 3-37 and 3-38 present the comparison of BA and TPA, respectively, by forest type for Alternative B. All forest types increase in BA and decrease in TPA over time. Towards the end of the period BA and TPA for mixed conifer and white fir stands both stay below 200 TPA. Red fir is maintained at a higher BA and TPA, however red fir is typically found on better sites and tends to form very densely populated stands.

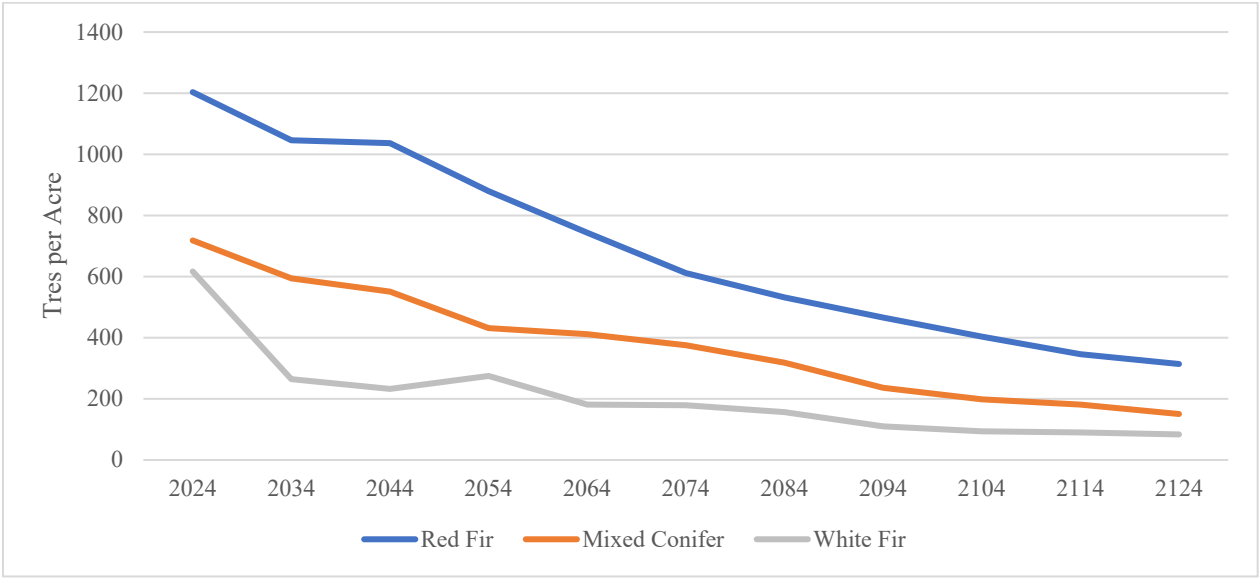


Figure 3-37. Change in average TPA over time by forest type for Alternative B

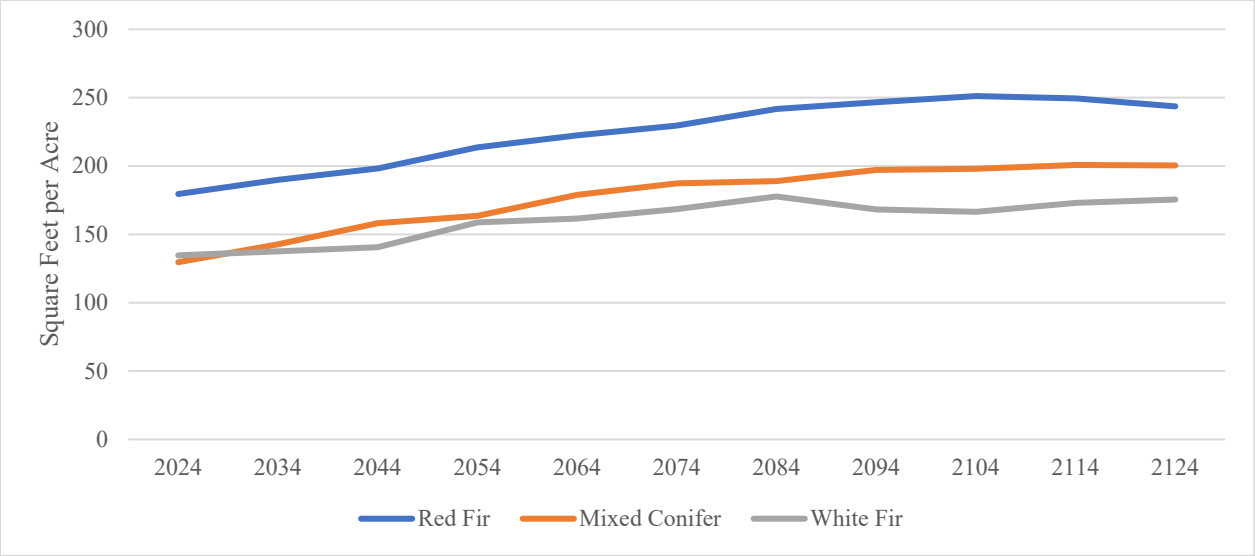


Figure 3-38. Change in average BA by forest type over time for Alternative B

When SDI competition categories are compared (Figure 3-39), stands that are free of competition decrease by about 5,000 acres over time, but by the end of the 100-year period, have rebounded to the same level of 15,000 acres that they began at. Low competition stands vary over time, but ultimately decrease by about 10,000 acres. Full competition stands vary over time as well, but ultimately increase by about 10,000 acres. Imminent mortality stands increase by about 1,500 acres. This alternative maintains about half of its acreage in the target density categories by the end of the 100-year period. Lower overall density reduces density dependent mortality, increases growth, and increases overall forest resilience.

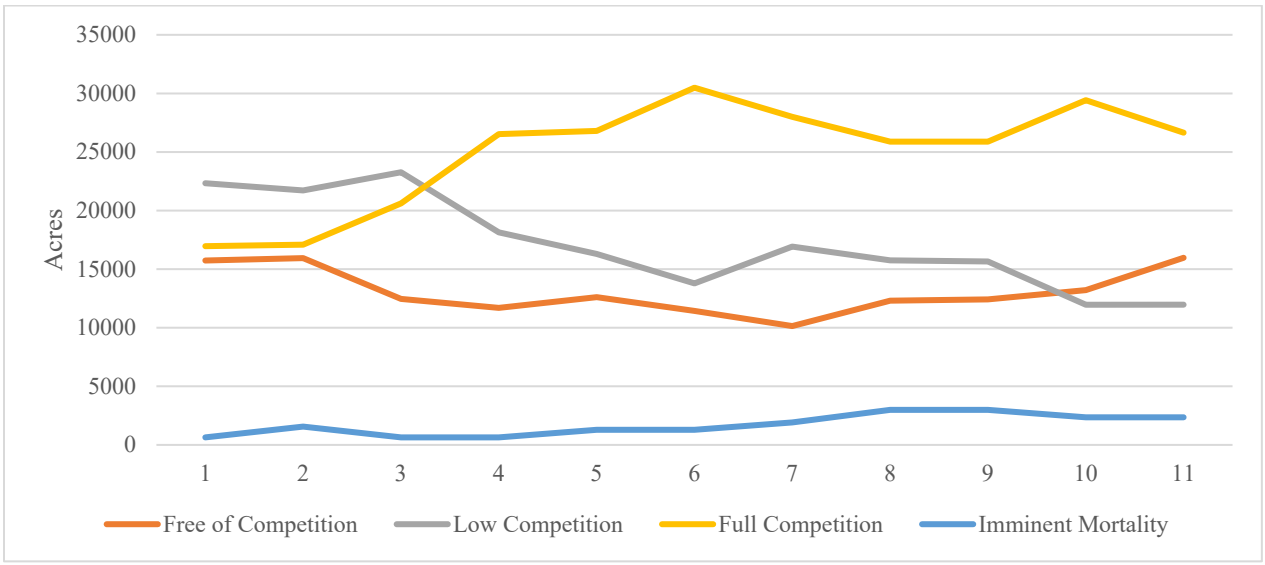


Figure 3-39. Acres in each of the density competition categories for Alternative B. Target categories are Low Competition or Free of Competition

Stand Health

Average drought risk for the forest types under Alternative B (Table 3-55) is 50 percent, disease risk is 29 percent, and insect risk is 25 percent. Drought and disease risk is highest in the red fir stands, which are the densest stands.

This alternative would also have the fewest snags within the stands which indicates the lowest level of within stand mortality. Forest openings of up to 4 acres would allow for species conversion in diseased areas, and in some cases would assist in reducing the spread of disease when applied in locations that would create a barrier.

Table 3-55. Percentage of lands at elevated risk from drought, disease, and insects - Alternative B

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
Red Fir	57%	45%	9%
Mixed Conifer	55%	29%	41%
White Fir	38%	13%	25%
AVERAGE	**50%**	**29%**	**25%**

Alternative C

Species Composition

Figure 3-40 shows that fire-tolerant species increase in red fir stands by about 3 percent under this alternative. They decrease in mixed conifer stands by about 4 percent and even out in white fir stands after a slight increase.

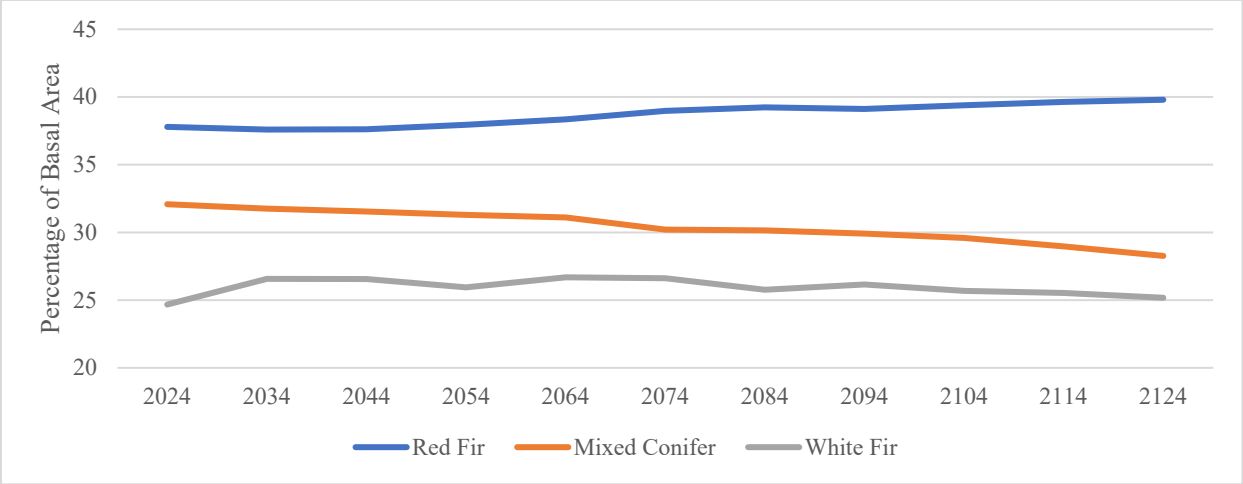


Figure 3-40. Percentage of basal area comprised of fire-tolerant species over 100-year period - Alternative C

The twenty-inch diameter limit on Douglas-fir limits the amount of volume that would be harvested from a stand, which would reduce the effectiveness of treatments aimed at modifying species composition. The restrictions on removing larger Douglas-fir in areas that would naturally support more pine, incense cedar, and oak diminishes the success of restoration efforts aimed at shifting species composition to more fire-resistant species. Douglas-fir would continue to occupy available growing space and serve as a seed source for shade-tolerant species, which may outcompete the shade-intolerant species in the same environment. The effects of creating forest openings would be the same as Alternative B, however openings would be limited to 2 acres or less.

Stand Structure

Figure 3-41 shows that under this alternative, closed s-classes are maintained on more 70 percent of the area for the first 50 years. By the end of the 100-year period, the amount of lands in closed s-classes reduces to 58 percent, and lands in open s-classes increases to 42 percent. The second half of 100-year period yields some positive shift in s-classes towards NRV.

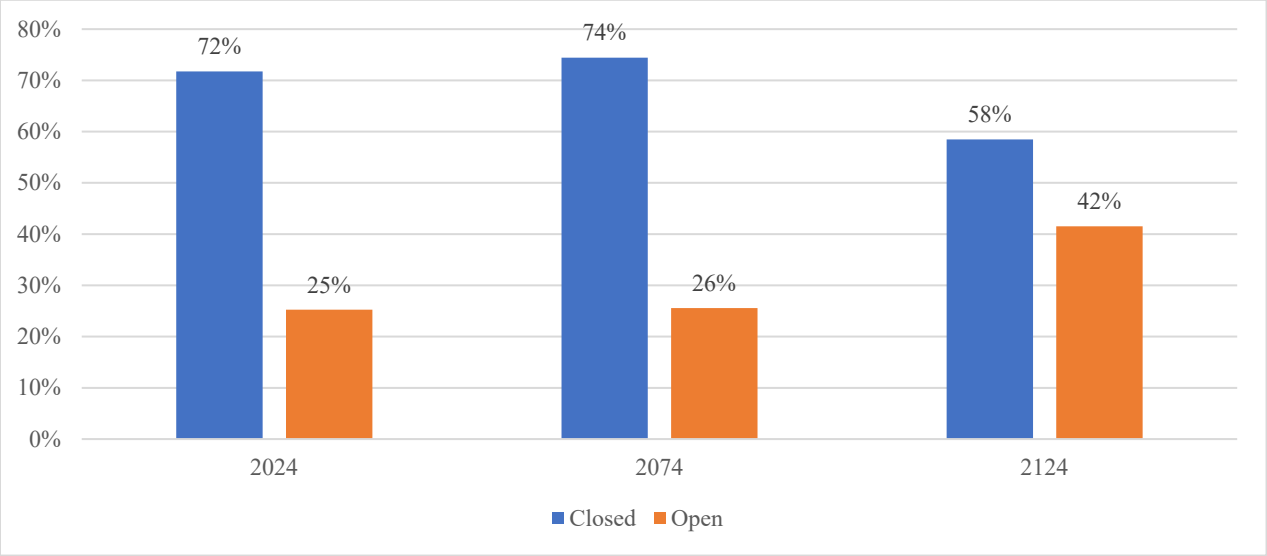


Figure 3-41. Acres of open and closed stands for selected decades of the 100-year period - Alternative C

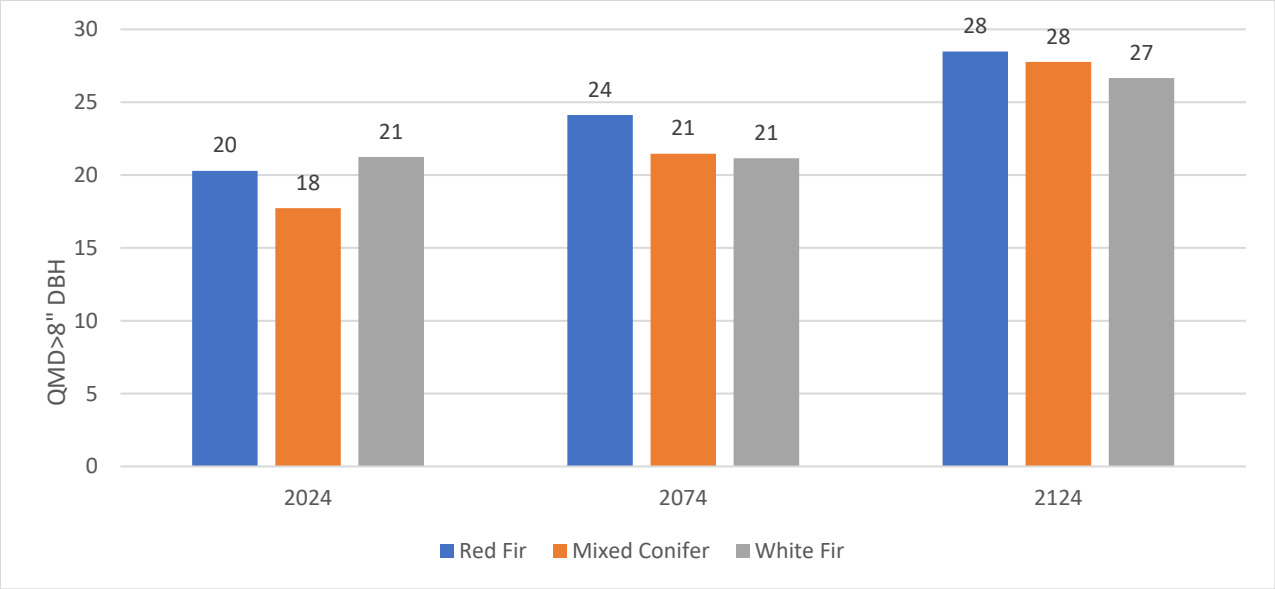


Figure 3-42. Estimated forest type QMD for trees greater than 8 inches BDH for select decades - Alternative C

Figure 3-42 shows the increase in tree size to be 8 inches for red fir stands, 8 inches for mixed conifer stands, and 6 inches for white fir stands. In both mixed conifer and white fir stands, tree size increases more in the second half of the 100-year period when there is more acreage of open s-classes, which allows for greater diameter growth.

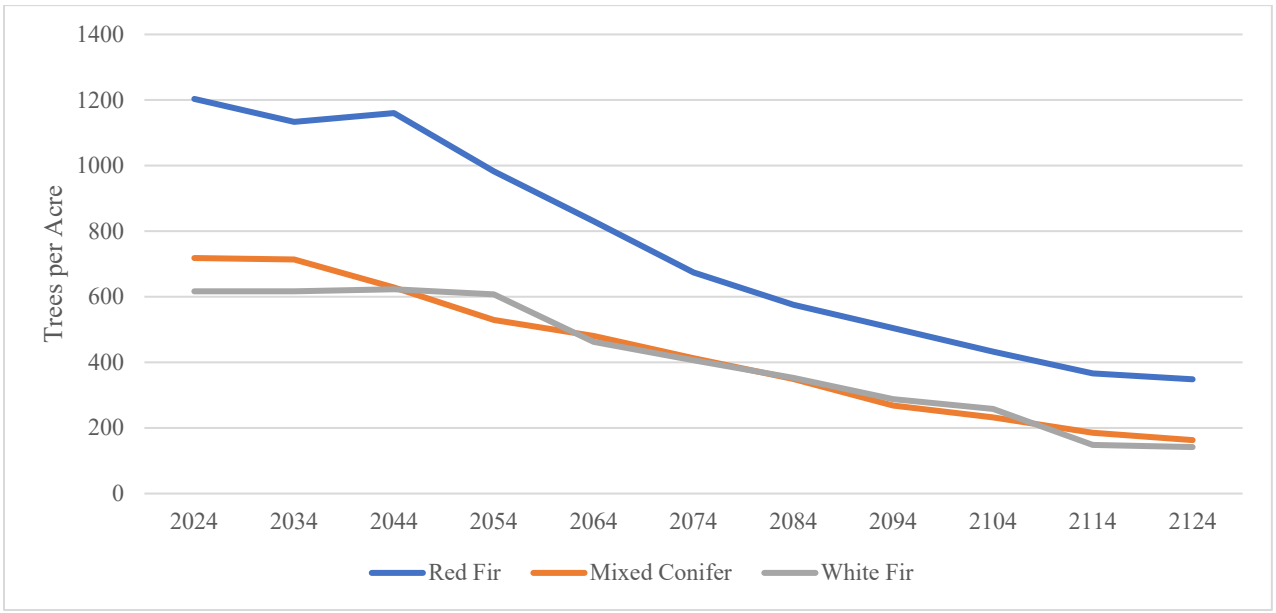


Figure 3-43. Changes in TPA over time by forest type - Alternative C

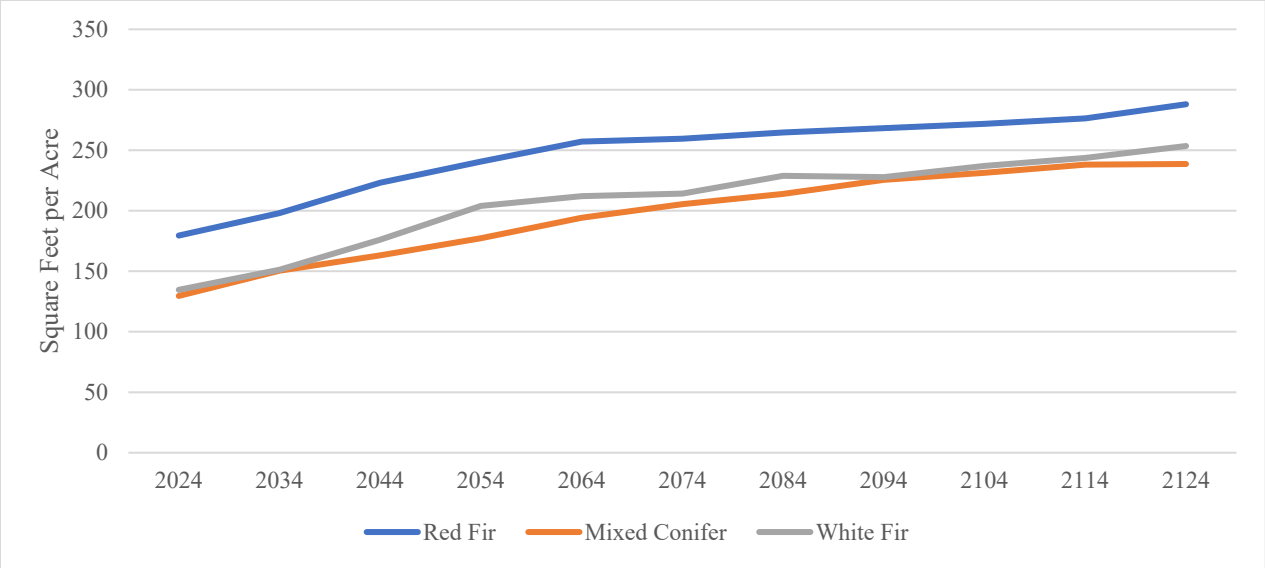


Figure 3-44. Changes in average BA over time by forest type - Alternative C

Stand Density

Figures 3-43 and 3-44 illustrate that all forest types experience an increase in density (BA) over time while showing a decrease in TPA. Red fir maintains a density exceeding 250 sq. ft./ac for the last 60 years. White fir and mixed conifer sustain densities greater than 200 sq. ft./ac for 70 and 60 years, respectively. White fir and mixed conifer stands only fall below 200 TPA in the last decade, whereas red fir stands remain just under 400 TPA.

Figure 3-45 demonstrates that the target density categories decrease from 35,000 acres just over 10,000 acres by the end of the period. Meanwhile, the full competition and imminent mortality categories rise by approximately 25,000 acres, reaching 40,000 acres.

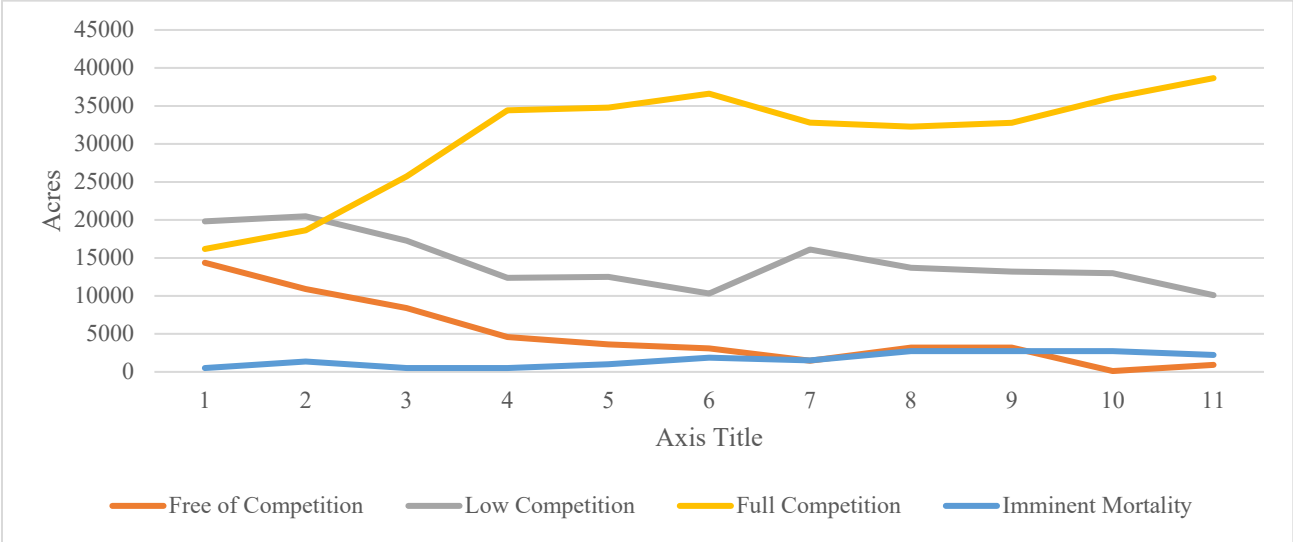


Figure 3-45. Acres in each of the density competition categories for Alternative C. Target category is Low Competition or Free of Competition

Stand Health

Under this alternative, the average drought risk is 66 percent, with all forest types exceeding 60 percent (Table 3-56). The risk of disease is 29 percent, and the risk of insect infestation is 25 percent.

Table 3-56. Percentage of acres at elevated risk from drought, disease, and insects – Alternative C

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
Red Fir	67%	45%	9%
Mixed Conifer	66%	29%	42%
White Fir	64%	13%	25%
AVERAGE	66%	29%	25%

Alternative D

Species Composition

Figure 3-46 indicates a reduction in fire-resistant species within mixed conifer (9 percent) and white fir (3 percent) forest types. Red fir, however, shows a consistent 2 percent increase, similar to Alternatives B, C, E (Proposed RMP), and the Grow Alternative.

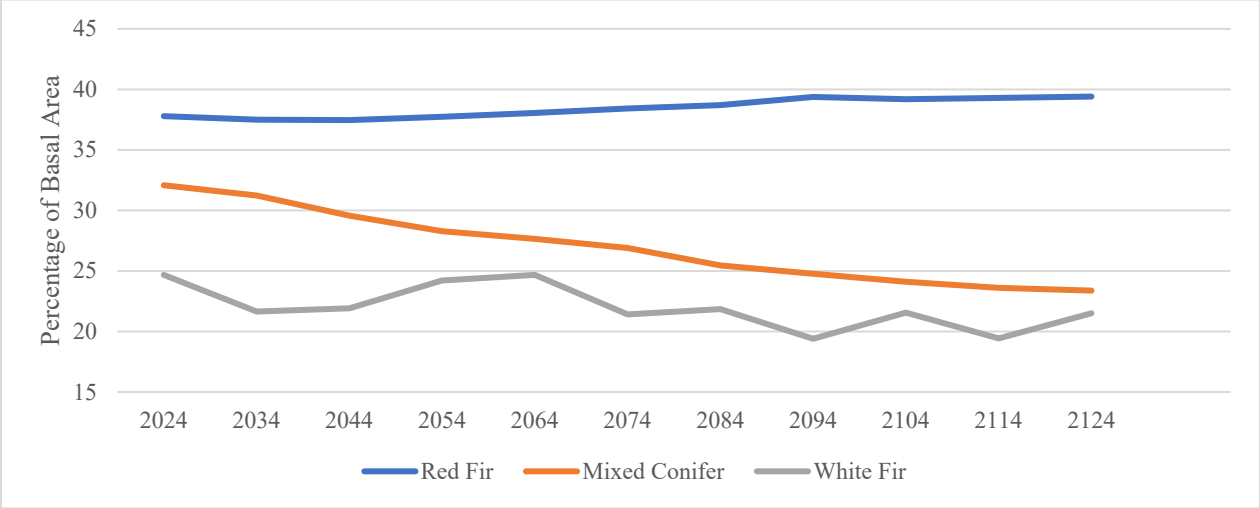


Figure 3-46. Percentage of basal area of fire-tolerant species over time - Alternative D

The 8-inch DBH diameter limit for all species in this alternative would have a similar impact as described in Alternative C, but with more stringent treatment limitations. Under these conditions, both white fir and Douglas-fir exceeding 8 inches DBH would remain in the stand in high proportions and would only be reduced through prescribed fire. Consequently, this alternative would not effectively restore species composition to NRV.

Stand Structure

Figure 3-47 reveals a similar trend in open and closed s-classes as seen in Alternative C. Closed s-classes increase to 80 percent in the first 50 years, then decrease to just over 60 percent in the following 50 years. Meanwhile, open s-classes rise to about 10 percent more than their current modeled existence by the end of the 100-year period.

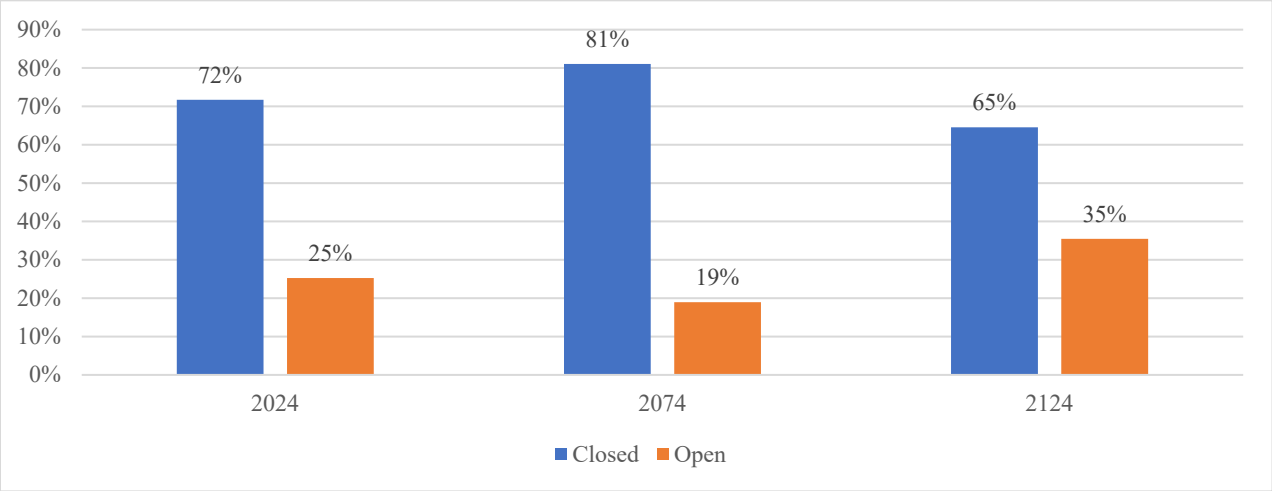


Figure 3-47. Acres of open and closed stands at the end of the 100-year period - Alternative D

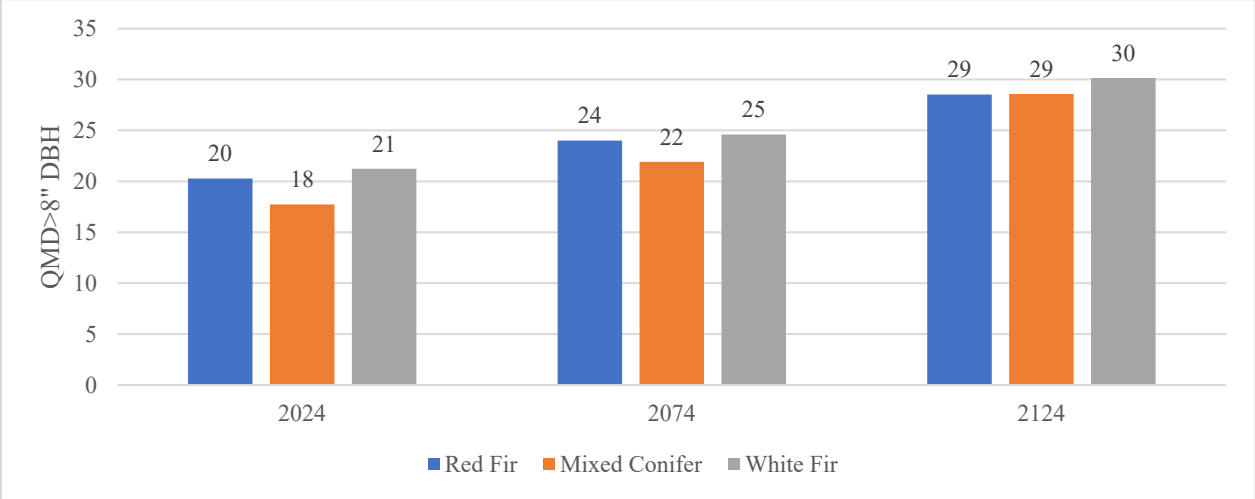


Figure 3-48. Estimated forest type QMD for trees greater than 8 inches DBH for selected decades - Alternative D

Figure 3-48 indicates that mixed conifer tree diameters increase by 11 inches, while both red fir white fir increase by 9 inches. This growth occurs more gradually over time compared to the other alternatives.

Stand Density

Stand density in Alternative D follows similar trends to Alternative C, but with higher basal areas towards the end of the 100-year period (Figure 3-50). Red fir approaches 300 sq. ft./ac, while mixed conifer and white fir approach 250 sq. ft./ac. White fir shows a more dramatic drop in TPA to 200 in 2064 (Figure 3-49), likely due to faster density increases, leading to earlier self-thinning in the timeline.

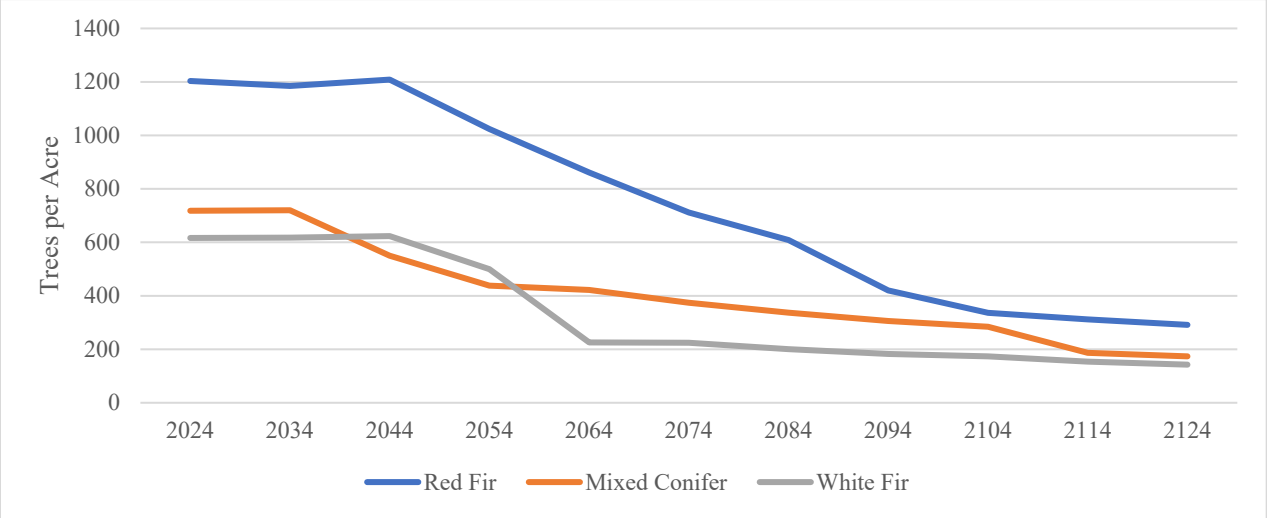


Figure 3-49. Changes in TPA over time by forest type - Alternative D

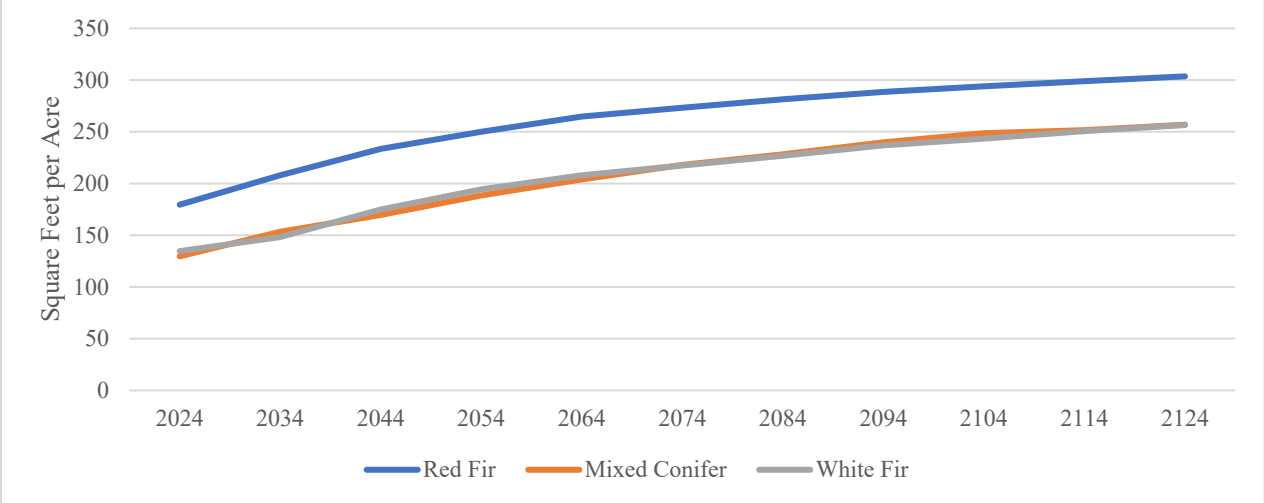


Figure 3-50. Changes in average stand density (BA) over time by forest type - Alternative D

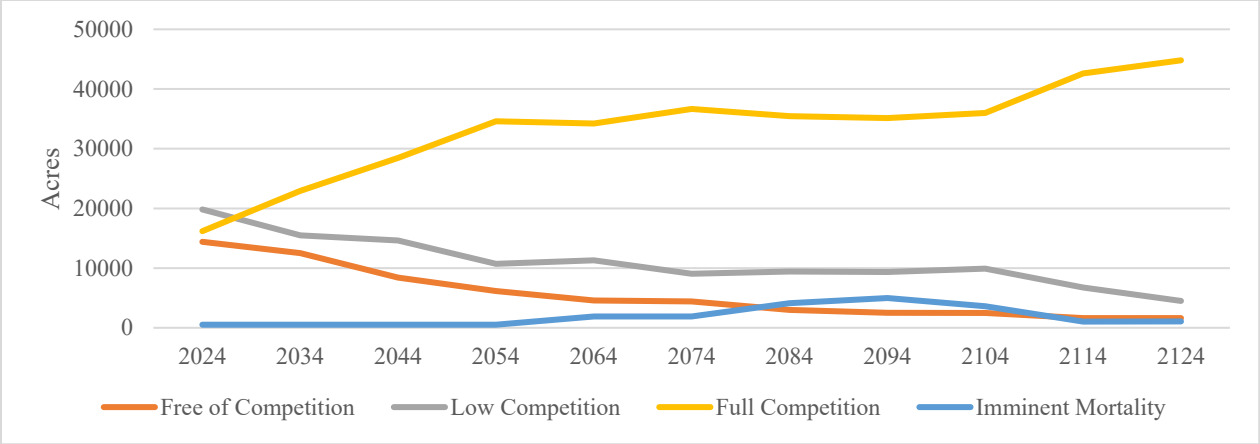


Figure 3-51. Acres in each of the density competition categories for Alternative D. Target category is Low Competition or Free of Competition

Trends in density competition categories are similar to those in Alternative C (Figure 3-51). Target categories start to decline immediately, dropping from 35,000 acres to about 6,000 acres. Meanwhile, acres of full competition increase by 30,000 acres, rising from 15,000 acres to 45,000 acres.

Forest Health

Table 3-57 indicates that, on average, 65 percent of acres at elevated risk from drought. The average percentages for insects and disease risks are 26 percent and 29 percent, respectively.

Table 3-57. Percent of acres at elevated risk from drought, disease, and insects - Alternative D

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
Red Fir	73%	45%	9%
Mixed Conifer	71%	29%	46%
White Fir	52%	13%	25%
Average	65%	29%	26%

Alternative E (Proposed RMP)

Species Composition

Figure 3-52 illustrates a 4 percent rise in fire-resistant species within the red fir forest type, a 4 percent decrease in mixed conifer forests, and a 3 percent increase in white fir forests.

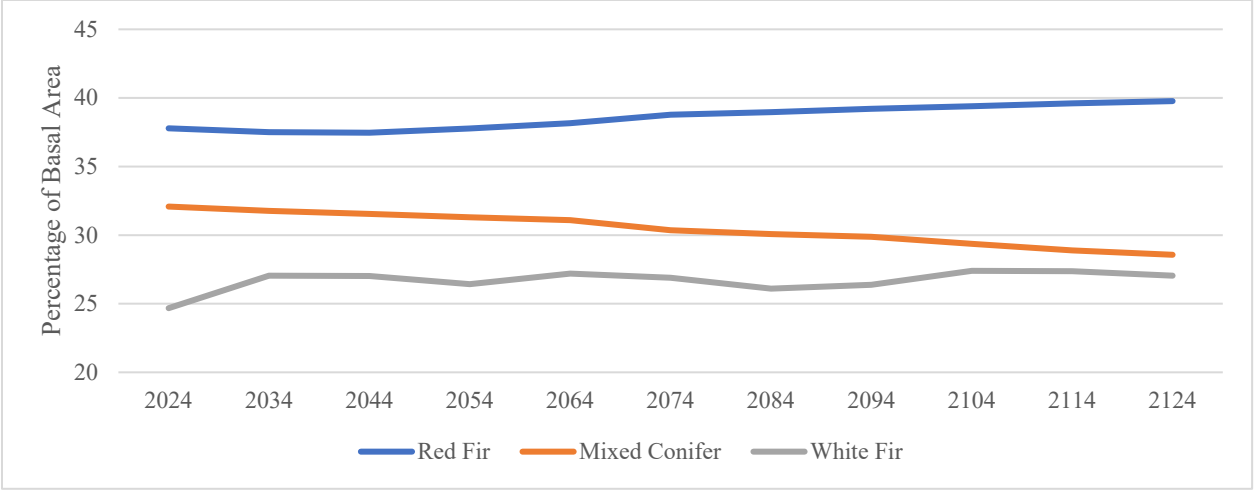


Figure 3-52. Percentage of basal area made up of fire-tolerant species over time - Alternative E (Proposed RMP)

Management direction for this alternative would favor the retention of fire- and drought-tolerant species (e.g., pine, incense cedar, and oak species if present) and larger-sized trees and favor removal of fire-intolerant species (e.g., white fir) across size classes that directly compete with fire-tolerant trees for moisture, nutrients, and growing space. Compared to Alternative C, the twenty-nine-inch diameter limit on shade-tolerant species, such as Douglas-fir, would increase the amount of volume available to be harvested from a stand, which would increase the effectiveness of treatments aimed at modifying species composition. Removing larger Douglas-fir in areas that would naturally support more pine, incense cedar, and oak increases the success of restoration efforts aimed at shifting species composition to more fire-resistant species. Douglas-fir would occupy less available growing space, providing more space to support the shade-intolerant species. Same as Alternative C, openings would be limited to 2 acres or less.

Stand Structure

Figure 3-53 shows a similar trend to Alternatives C and D. The higher diameter limits under this alternative, including the twenty-four-inch diameter limit on fire- and drought-tolerant and shade-intolerant conifers, like pine and incense cedar, would allow more open conditions compared to Alternative C. The percentage of closed s-classes rise by 8 percent in the first 50 years, then declines in the following 50 years, resulting in a net decrease of 16 percent. Meanwhile, open s-classes increase by 19 percent over the 100-year period.

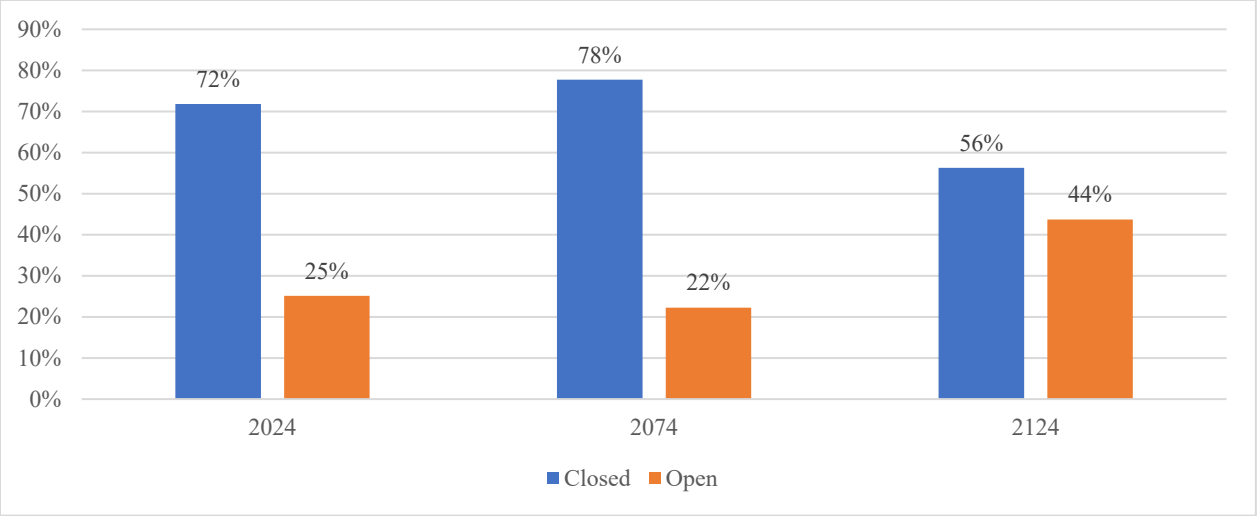


Figure 3-53. Estimated acres of open and closed s-classes for each forest type - Alternative E (Proposed RMP)

Figure 3-54 indicates an 8-inch growth in the size of both red fir and white fir trees along with a 10-inch increase in the size of mixed conifer trees.

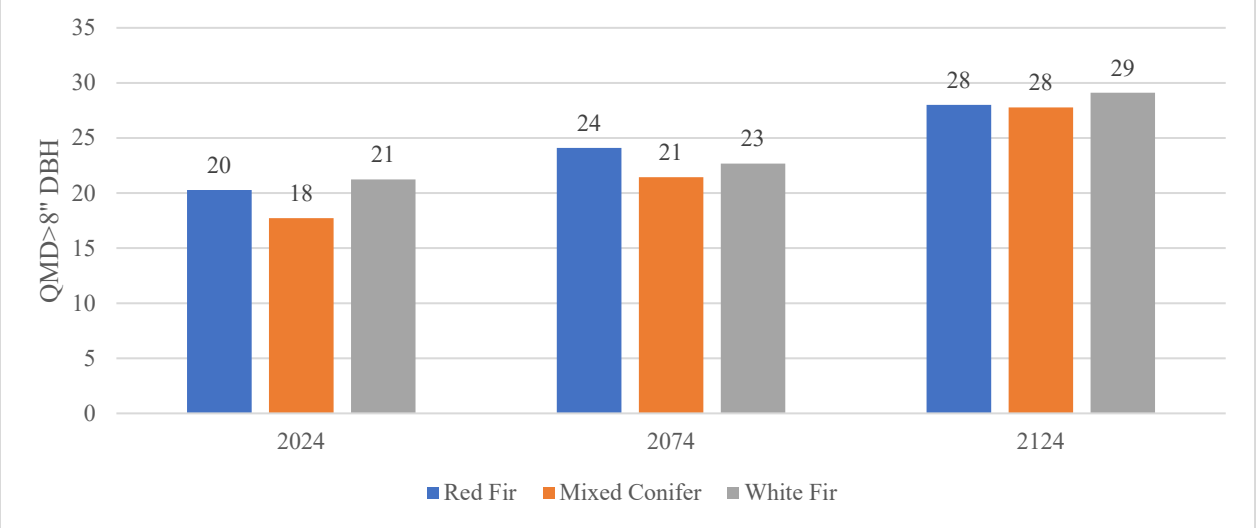


Figure 3-54. Estimated forest type QMD for trees greater than 8 inches DBH for selected decades - Alternative E (Proposed RMP)

Stand Density

Figures 3-55 and 3-56 show that the Proposed RMP exhibits trends like Alternative C. By the end of the modeling period, the BA for red fir nears 300 sq. ft./ac, while the BA for mixed conifer and white fir approaches, but do not reach, 250 sq. ft./ac. The TPA for red fir remain at 400 during the last decade, and mixed conifer and white fir at 200 and below, respectively.

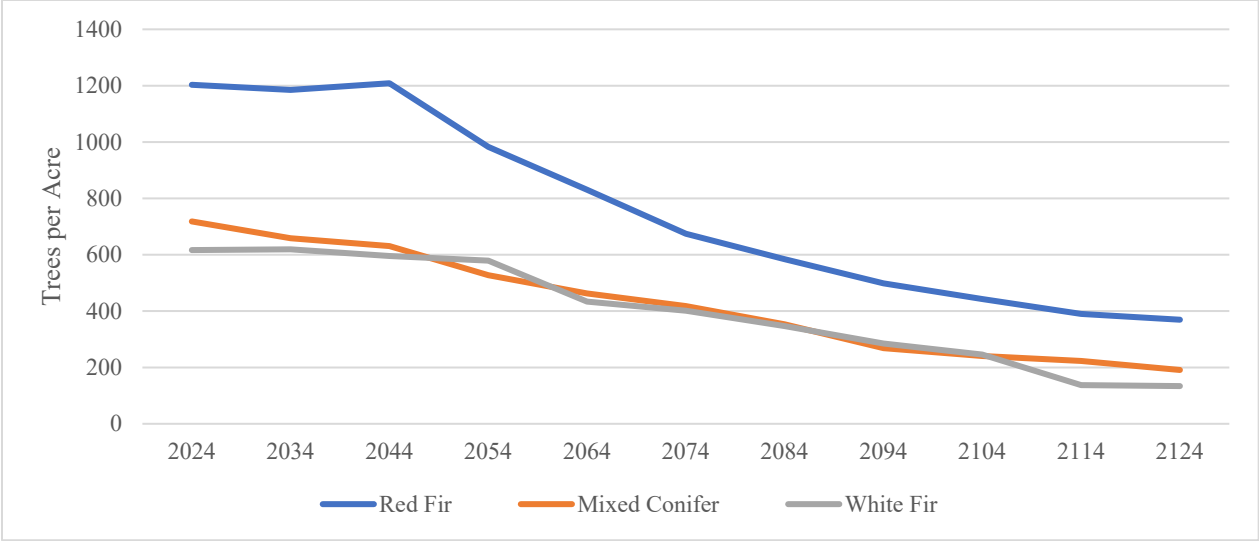


Figure 3-55. Changes in average TPA over time by forest type - Alternative E (Proposed RMP)

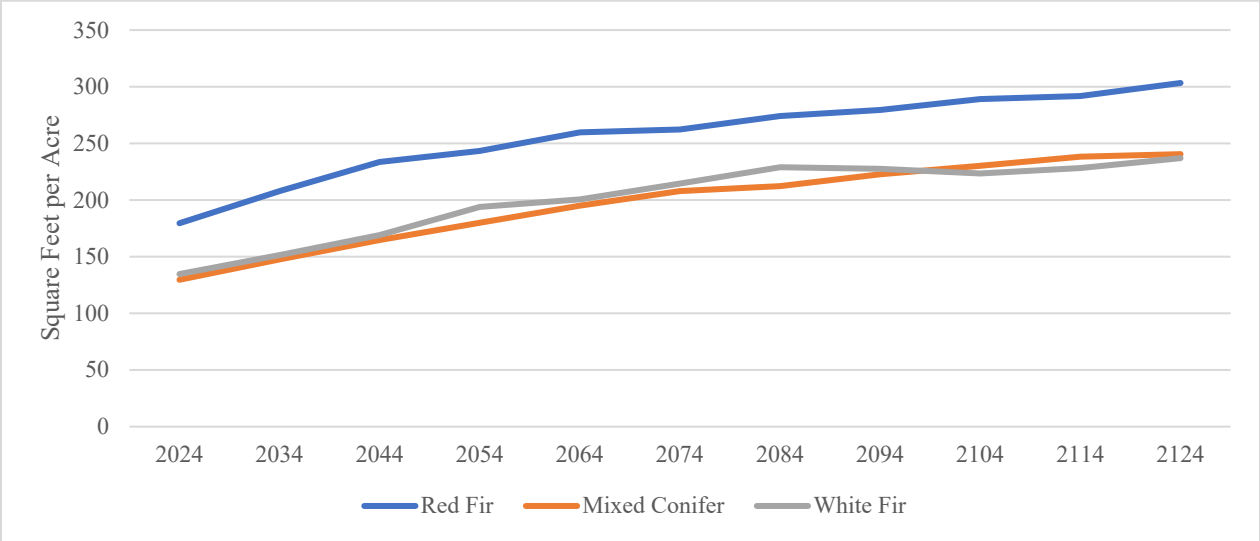


Figure 3-56. Changes in average BA over time by forest type - Alternative E (Proposed RMP)

Figure 3-57 illustrates a decline in the target categories, accompanied by an increase in full competition and imminent mortality. The area free of competition decreases to approximately 2,500 acres, while low competition remains above 10,000 acres. Full competition exceeds 35,000 acres from 2054 onwards, ending just below 40,000 acres.

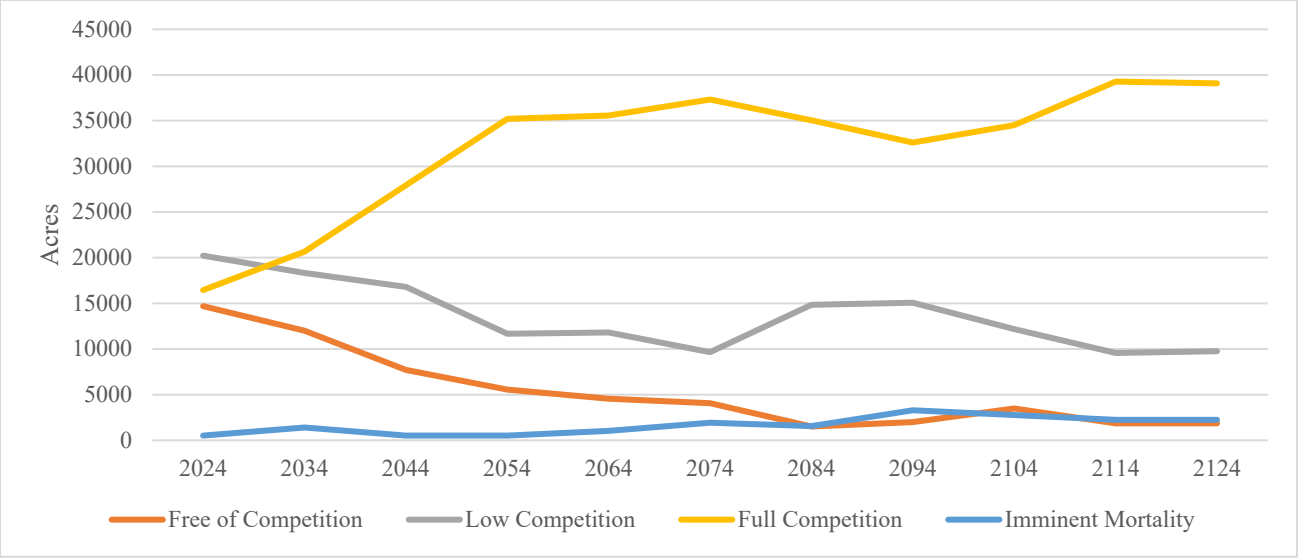


Figure 3-57. Acres in each of the density competition categories for Alternative E (Proposed RMP). Target category is Low Competition or Free of Competition

Stand Health

Table 3-**58 displays the percentage of acres at elevated risk for drought (65 percent), disease (29 percent), and insects (25 percent), which are similar to Alternatives C and D.**

Table 3-58. Percentage of acres at elevated risk from drought, disease, and insects - Alternative E (Proposed RMP)

Forest type	Drought Risk (percent elevated)	Disease risk (percent elevated)	Insect risk (percent elevated)
Red Fir	71%	45%	9%
Mixed Conifer	65%	29%	42%
White Fir	58%	13%	25%
AVERAGE	65%	29%	25%

Cumulative Effects

Restoration treatments occurring on additional lands within the decision area, or on private lands within the planning area, would contribute toward overall resistance of dry forests, as well as reduce wildfire risk (refer to Section 3.17, Wildland Fire Analysis Issue 1).

Where there is a lack of frequent, low to moderate disturbance (e.g., prescribed fire or low to moderate severity wildfire), understory vegetation would continue to grow, surface and ladder fuels would re-accumulate, and tree mortality would occur. This accumulation of fuel brought on by overly dense stand conditions would contribute toward increasing surface fuels, ladder fuels and canopy fuels, available to burn, when intersected by a wildfire.

In historically low-to moderate-severity fire regimes, such as the planning area, tree regeneration would continue to occur from more shade-tolerant species (i.e. white fir). Within dense stands, understory fire and shade-intolerant species (i.e. Ponderosa pine) would be deficit of sunlight. Shade-intolerant understory vegetation would likely be replaced by shade-tolerant species, given a seed source is available or the site supports these species. As mentioned in the Affected Environment, a shift in species composition that reduces drought-tolerant and fire-adapted species can reduce stand-level resilience to natural disturbances. Over time stand conditions would by on a trajectory toward imminent mortality, further from the NRV, and less adapted to resist large-scale, high severity disturbance.

Climate changes anticipated in the planning area that would contribute toward future wildfire risk include increasing temperatures, increasing drought frequency and severity, reduced snowpack, and fewer but more extreme precipitation events (Halofsky, Peterson, & Gravenmier, 2022). These trends are already taking hold in meaningful ways across southwestern Oregon, including increased conifer mortality as described in the AMS (USDI BLM 2023a, p. 201).

Conclusion

All action alternatives would, to varying degrees, reduce stand density, accelerate the development of heterogeneous stand structure, increase species diversity, and contribute to improving overall resilience of dry forests.

Figure 3-58 compares the amount of acres the BLM would treat across the different alternatives. Under Alternative B, the BLM would treat the largest area, followed by Alternatives A, C, E (Proposed RMP), and D, respectively. Under Alternative B, the BLM would treat twice as many acres as Alternatives D and E (Proposed RMP), and 50,000-60,000 more acres than Alternatives A and C over a 100-year period. The remaining acres would develop as earlier described for untreated stands.

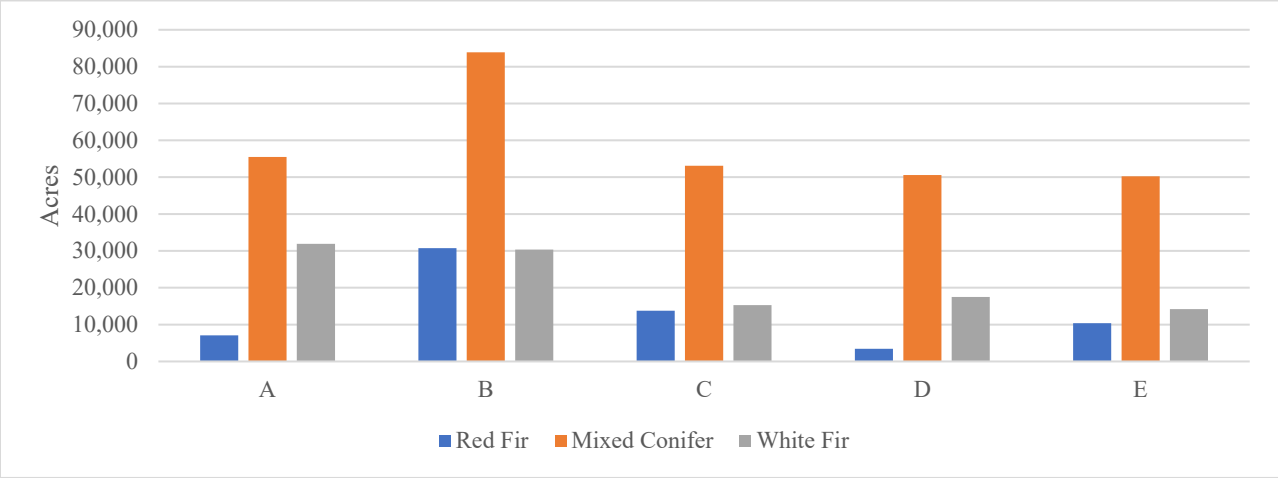


Figure 3-58. Estimated acres of forest type treated (harvest and prescribed fire) by alternative over a 100-year period*

*These acres represent harvested and prescribed burned areas, so are double counted in some cases. These are only meant for comparison to each other and are not prescriptive of treatment acres under this plan.

Species Composition

Figure 3-59 illustrates the comparison of treated acres across the alternatives and the change in species composition of fire-tolerant species over time. Alternative B maintains the most fire-tolerant species over the 100-year period, followed by Alternatives A, E (Proposed RMP), C, and D, respectively. Alternative B is the only alternative that increases the percentage of fire-tolerant species (8 percent). Under all other alternatives, the fire-resistant species would decline from 2 to 5 percent.

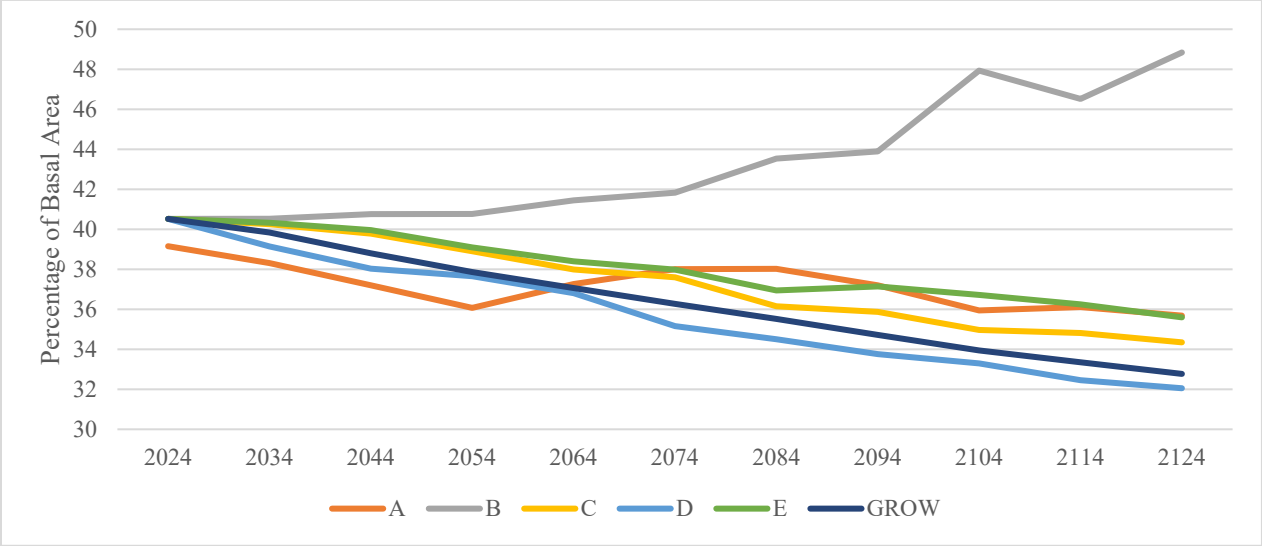


Figure 3-59. Comparison of alternatives by percent basal area of fire-tolerant species

Stand Structure

Figure 3-60 illustrates that all alternatives would result in more open s-classes than the Grow alternative. Alternative B produces the most acre of open s-classes, followed by Alternatives E (Proposed RMP), C, A, and D. Alternative B produces almost 10,000 more acres of open s-classes than the next closest alternative.

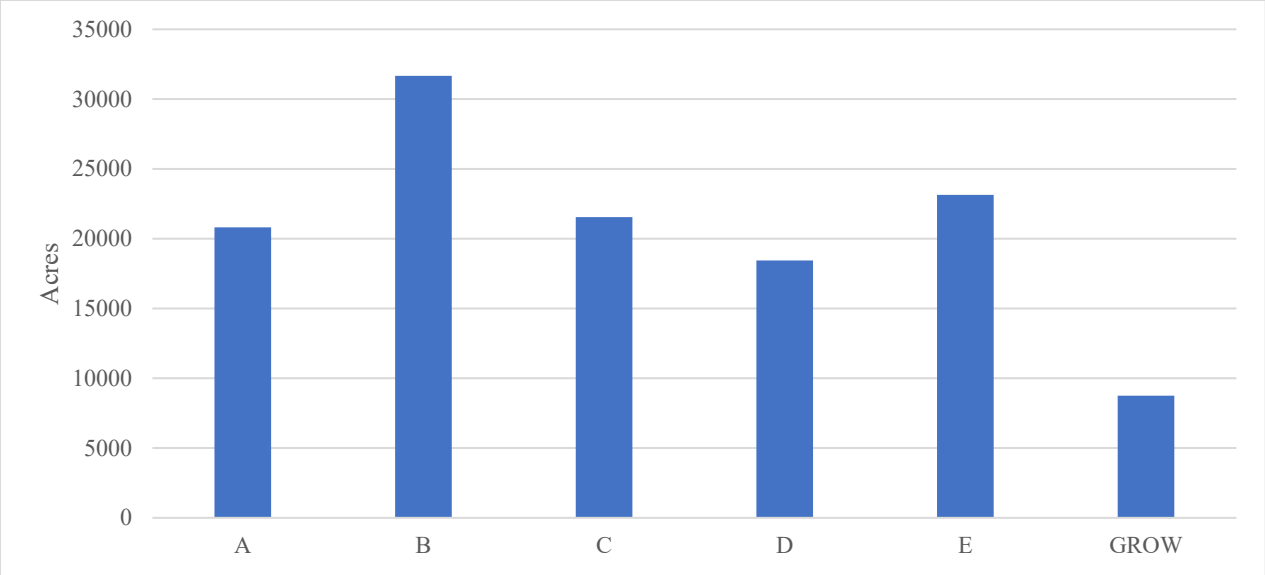


Figure 3-60. Comparison of the total acres of open s-classes resulting from modeled treatments

Figure 3-61 indicates that Alternative B yields the largest trees, followed by Alternatives D, E (Proposed RMP), C, and A. Alternative B produces trees almost 2 inches larger than the other alternatives. Figure 3-62 displays that despite the larger tree size, the density is lowest under Alternative B, followed by Alternative E (Proposed RMP), C, D, and A, respectively.

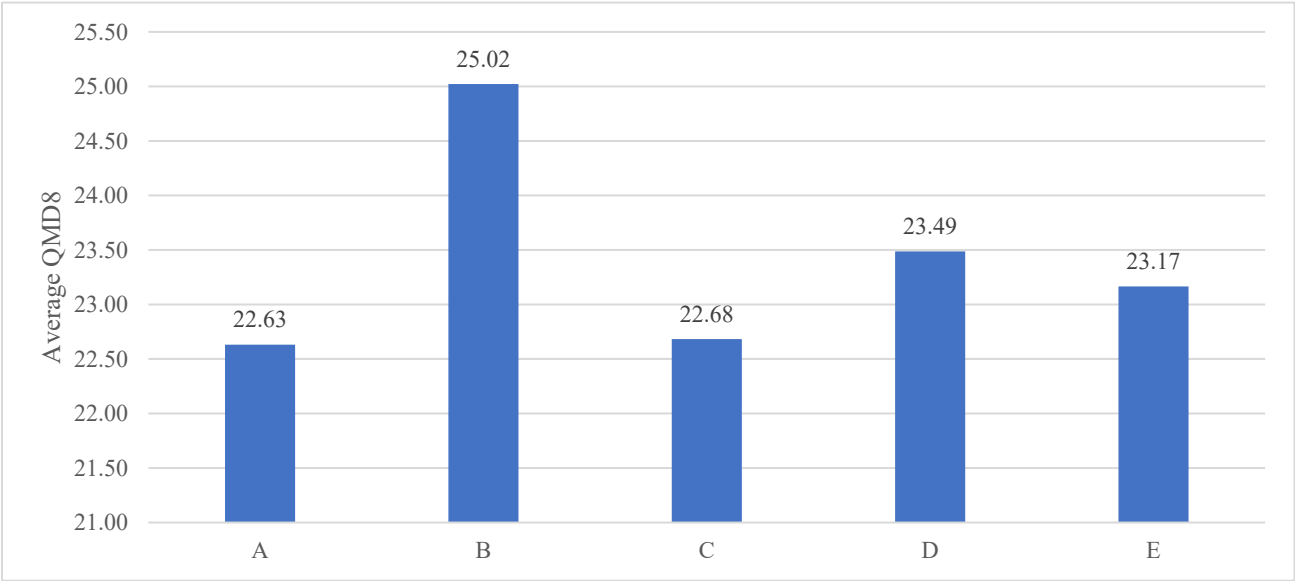


Figure 3-61. Comparison of the average QMD resulting from modeled treatments

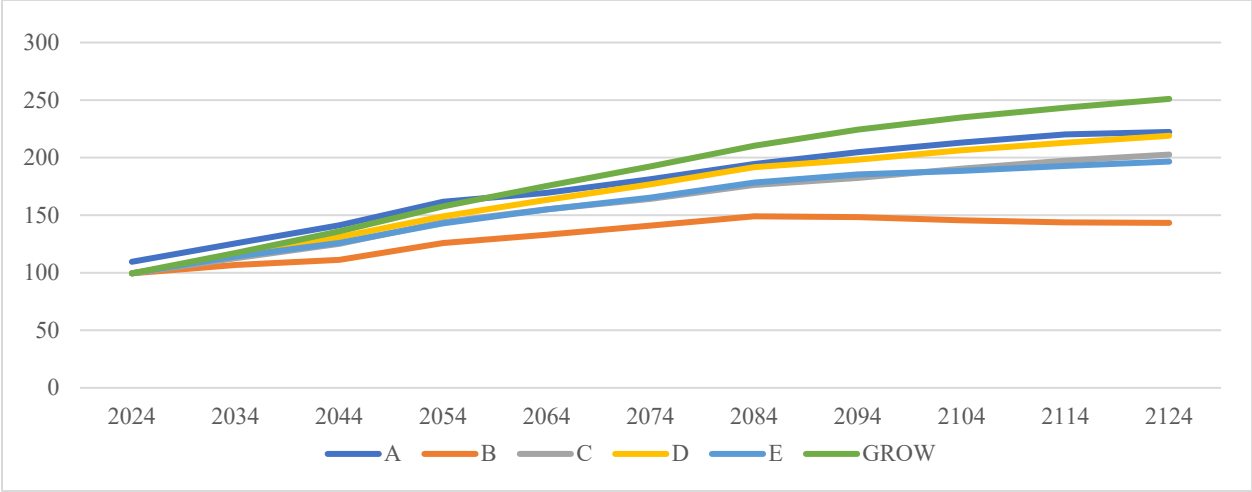


Figure 3-62. Basal area of trees greater than 8 inches (sq ft/ac) over time for each alternative

Stand Density

Figure 3-63 compares the density (BA) of forest stands across the alternatives over time. Average stand density increases for all alternatives. Over the 100-year period, Alternative B maintains the lowest density, followed by Alternatives E (Proposed RMP), C, D, and A. During the last 40 years of the modeling period, Alternative B's density hovers around 150 sq. ft./ac. In contrast, all other alternatives surpass 150 sq. ft./ac shortly after 2054 and remain between 150 and 250 sq. ft./ac for the next 70 years.

Figure 3-63 shows that Alternative B has the lowest percentage of acres in the full competition or imminent mortality categories, followed by Alternatives C, E (Proposed RMP), D, A, and Grow. After 30 years, Alternative B has just over 50 percent of its acres outside the target density category. The next lowest alternative has 15 percent more acres outside the target categories.

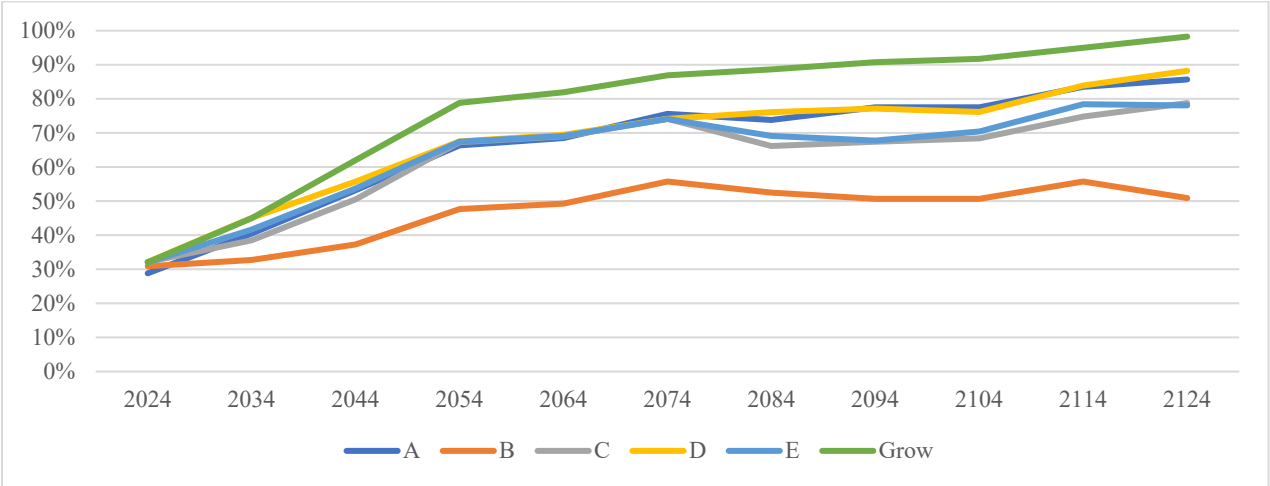


Figure 3-63. Percentage of acres in either the full competition or imminent mortality density competition categories for each alternative

Stand Health

Figures 3-64 and 3-65 compare the acres at elevated risk of drought and insect damage. Alternative B consistently shows the lowest acres of elevated drought risk, approximately 10 percent lower than the other alternatives. Alternatives C, E (Proposed RMP), D, and A fluctuate over time. In terms of elevated insect damage risk, Figure 3-65 indicates that Alternatives B, C, and E (Proposed RMP) have similar risk levels at various points, with Alternatives A and D following. According to Table 3-59, Alternative A has the lowest average disease risk (28 percent), followed by Alternative B (30 percent). Alternatives C, D, E (Proposed RMP), and Grow would have the same level of risk (31 percent).

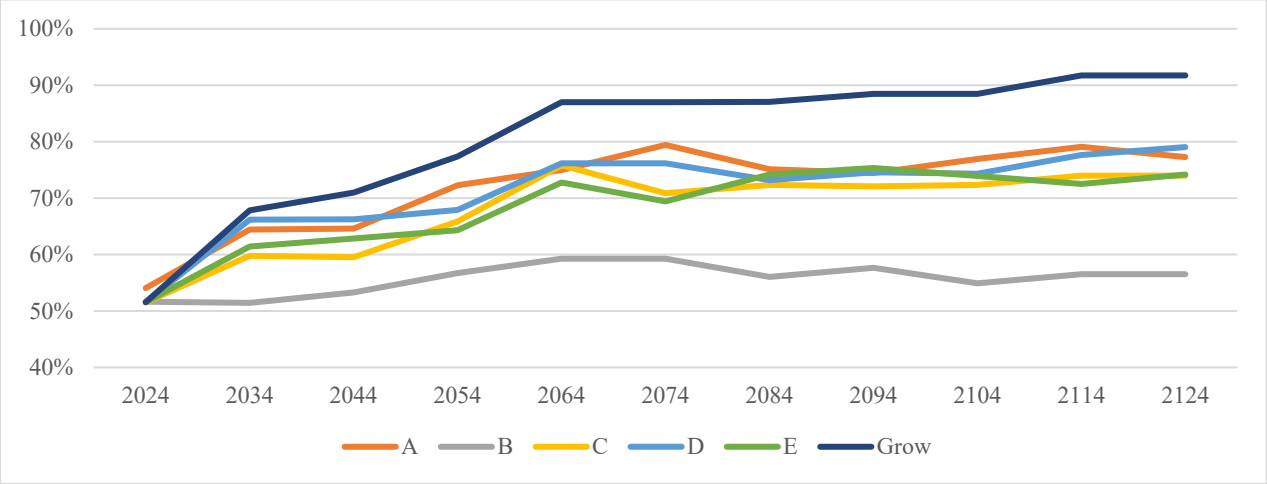


Figure 3-64. Estimated drought risk over time by alternative

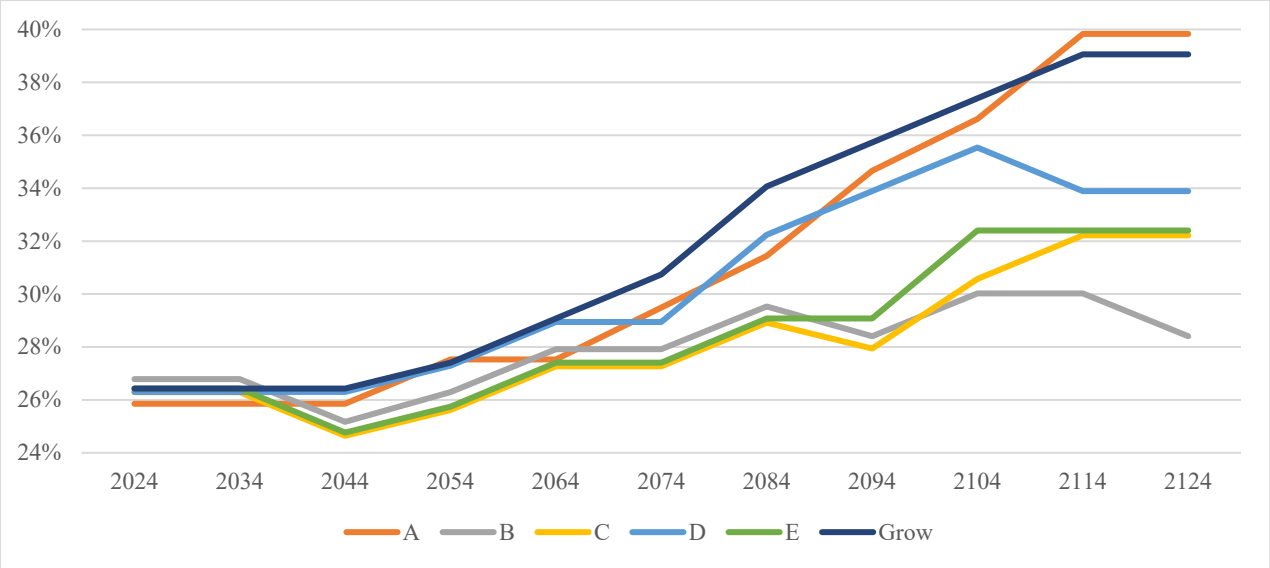


Figure 3-65. Estimated insect risk over time by alternative

Table 3-59. Average disease risk for each alternative

Average Disease Risk					
Alternative A (No Action)	**Alternative B**	**Alternative C**	**Alternative D**	**Alternative E (Proposed RMP)**	**Grow**
28%	30%	31%	31%	31%	31%

All proposed alternatives include restoration treatments aimed at guiding forest stands towards conditions better suited for warmer and drier climates. By creating skips and gaps, these treatments would enhance species diversity within the stands, facilitating the persistence of shade-intolerant species like pine and oak. The skips would help preserve the largest trees and key habitat features, while thinning would be focused on areas with smaller trees.

Each alternative aims to reduce stand density at the stand-level while gradually increasing across the landscape over time. These actions would accelerate the development of heterogeneous stand structure, enhance species diversity (composition), and contribute to overall health and resilience of forested stands. However, the intensity, number of acres treated, and management direction would vary for each action alternative, influencing the outcomes within the stands.

When comparing these alternatives, Alternative B offers the greatest flexibility in promoting and maintaining stand conditions that are more resilient to disturbances. Additionally, Alternative B treats more acres over the plan's duration. In terms of forest metrics, Alternative B provides the most flexibility to alter species composition, the highest percentage of fire-resistant species within stands, the most acres of open s-classes, the largest trees, the lowest stand densities, the most acres in the target density competition categories, and the fewest acres at elevated risk from drought and insect damage. Alternative A results in the fewest acres at elevated disease risk Alternatives C and the Proposed RMP (Alternative E) would provide similar, albeit less beneficial results, as Alternative B.

Limitations under Alternative D, such as only treating young stands (<60 years old) and around legacy trees, and restrictions on tree diameter limits, would hinder the protection of large fire-tolerant trees from competition with large shade-tolerant trees, like white fir.

All proposed alternatives would enhance stand-level resistance on BLM-administered lands within the CSNM compared to the Grow alternative. In areas surrounding or adjacent to CSNM lands, this increased resistance would reduce fire hazard and risk, benefiting those to varying degrees (refer to Section 3.17). Stand-level resistance, as part of landscape-level resilience, would help all surrounding lands adapt to changing conditions, drought, disease, and insects. However, the alternative treating the most acres would improve and maintain more stands with a mix of species better suited for fire, less competition, and closer to NRV. In the long term, these treatments would foster greater resilience to natural disturbances, protect a range of habitats, and provide better protection from large-scale, high-severity disturbances in the CSNM.

Vegetation Analysis Issue 3

How would the alternatives affect the abundance of late-successional forest?

Background

The definition of late-successional forest is complex, as there are varied approaches to determining at what point a forest is considered "late" in its development. Some definitions of "late-successional" include both mature and old-growth stages, while others refer only to the latter (Roberts, van Wagtendonk, Miles, & Kelt, 2011; USDA FS & USDI BLM, 2023). For this analysis, the BLM used the definitions in the recent report responding to Executive Order 14072, section 2(b) (USDA FS & USDI BLM 2023; Table 3-1), Although mature forest may display some, but not all, of the characteristics of old-growth forest, it is generally younger (Davis et al., 2015; USDA FS & USDI BLM, 2023).

Late-successional forest structure depends partly on site productivity and the species present. It typically includes one or more canopy layers, large live trees often with broken tops and/or cavities, large snags, a diversity of tree sizes, and at least some large, downed logs (USDI BLM, 2000; USDI BLM, 2016; USDA FS & USDI BLM, 2023).

Various papers and reports define the structure of late-successional forest. Some focus on age as a defining feature, as in the Jenny Creek Late-Successional Reserve Assessment (USDI BLM, 2000), while others commonly use tree size as a measure that can be correlated with age (Moeur et al., 2005). However, relying solely on tree size as an indicator can be misleading because growth rates differ across species and a tree's size may be influenced by suppressed growth despite its old age, as noted in Hessburg et al. (2022).

The northern spotted owl's nesting, roosting, and foraging habitat requirements are often employed to define late-successional forest. However, these definitions are ecologically more suitable in white fir and Shasta red fir types within the CSNM. In general, late-successional forest characteristics are based on potential vegetation groupings rather than existing vegetation types (Table 3-60). Nonetheless, the development of late-successional characteristics in dry forests can be associated with frequent fire, which may favor earlier successional species over the theoretical climax type (Hessburg et al., 2022). For instance, late-successional ponderosa pine can thrive on a Douglas-fir site under historical fire regimes (Hessburg et al., 2022).

Table 3-60. Minimum characteristics of late-successional forest by forest type*

Structure Characteristics	Forest and Woodland Type				
	Oak Woodland	Ponderosa Pine	Douglas-fir	White Fir	Shasta Red Fir
Minimum Large Tree Diameter (inches)	19.7	29.5	29.5	29.5	29.5
Minimum Large Trees per Acre	6	4	3	6	10
Minimum Snag Diameter (inches)	NA	NA	19.7	19.7	19.7

Structure Characteristics	Forest and Woodland Type				
	Oak Woodland	Ponderosa Pine	Douglas-fir	White Fir	Shasta Red Fir
Minimum Large Snags per Acre	NA	NA	1	4	4
Minimum Cover Large Downed Logs**	NA	NA	1%	2%	1%
Minimum Age (years)	100	150	150	200	200
Canopy Density	Open	Open	Open	Open, Closed	Closed

*Based on Davis et al. (2015) and USDA FS & USDI BLM (2023)

**Logs at least 9.8 inches diameter on the large end and 10 feet long

Although Table 3-60 lists specific characteristics of late-successional forest structure, the mature forest aspect of late-successional forest may lack some of these attributes (USDA FS & USDI BLM, 2023). For instance, large dominant and co-dominant trees may not meet the minimum diameter, or the stand may have fewer than the minimum number of large snags. Additionally, late-successional forest includes other features such as the presence of rot in the form of cavities, large branches, dwarf mistletoe on conifers, and rounded to flat tree crowns, as well as broken or spike tops, as reported in USDI BLM (2000, pp. 2–19 to 2–22); Van Pelt (2008); USDI BLM (2016b, p. 314, footnote 55); and USDI BLM (2016a, p. 70, footnote 24).

Table 3-60 does not provide information that pertains exclusively to the oak-conifer ecotone. It is probable that this ecotone would be an amalgam of oak woodland and either ponderosa pine or Douglas-fir, depending on site productivity and the prevalence of oak or conifer species.

Historically, late-successional forests developed under the influence of fire, periodic insect outbreaks, disease, wind, and wildlife browsing (Fitzgerald, Emmingham, Filip, & Oester, 2000). In dry forests, fire was the primary influence due to its frequency (Fitzgerald et al., 2000; Johnston, Bailey, & Dunn, 2016; Hessburg et al., 2022; Johnston et al., 2023). Studies in eastern Oregon indicate that the fire-return intervals were very similar across a range of site productivities, creating and maintaining very similar stand densities and basal area (Johnston et al., 2016). Similarly, even in the southern Willamette Valley, farther to the north, it appears that frequent burning by local Tribes contributed to the creation and maintenance of more open stands than previously recognized (Merschel, 2021; Johnston et al., 2023). The discrepancies in species composition, basal area, and density were primarily attributable to differences in topography and soil moisture (Johnston et al., 2016).

Past dry forests were characterized by a shifting mosaic of patches of varying size (Hessburg et al., 2022). Fires were mostly low and moderate severity, leaving relatively few snags and downed logs, particularly on the drier end of dry forest (Fitzgerald et al., 2000; Johnston et al., 2016; Merschel, 2021; Hessburg et al., 2022; Johnston et al., 2023). Individual patches tended to be even-aged, resulting in patches of single-canopy, but with landscapes comprised of multiple-canopies.

In recent years, restoration of late-successional conditions has become a focus of federal land management agencies, leading to considerable research on restoration approaches. For instance, the Density Management Study (DMS) has been conducted in western Oregon and on the Blacks Mountain Experimental Forest (BMEF) in northern California. On the BMEF, the removal of most seedlings, saplings, and small poles resulted in an unbalanced diameter distribution that favored large trees (Oliver, 2001). Preliminary DMS results revealed that moderate density and variable density thinning promoted greater spatial variability in tree density and diameter growth in edge trees, and maintained deeper crowns (Dodson, Ares, & Peuttmann, 2012). Larson and Churchill (2008) found that thinning that releases both single large trees and clumps of large trees replicates more typical spatial patterns of large trees, as uniform spacing of such trees occurs more frequently when moisture conditions are favorable.

Franklin and Johnson (2012) formulated a restoration framework for late-successional forests grounded in their studies of ecological forestry practices. Moist forests, such as in the red fir zone of the CSNM, typically do not require restoration unless an old growth stand is embedded in a younger plantation area. Conversely, in dry forests, some degree of disturbance is necessary to promote the development of late-successional forest in areas where disturbance has been mostly absent (Franklin & Johnson, 2012; Haugo et al., 2015; DeMeo et al., 2018). Disturbance can take the form of prescribed fire, thinning, wildfire, small-scale insect outbreak, disease patch, or a combination of natural disturbances (Haugo et al., 2015; DeMeo et al., 2018). However, while the identification of areas where restoration may be warranted is based on Fire Regime Condition Class (FRCC), this approach does not factor in species composition (Franklin & Johnson, 2012; DeMeo et al., 2018). In dry forests, trees that can withstand fire and drought should be preserved to maintain or increase resistance to and resilience from natural disturbances and climate change (Franklin & Johnson, 2012; DeMeo et al., 2018). Time is also a noteworthy aspect, as treatments cannot recreate late-successional conditions immediately but may entail creating the conditions needed for the development of late-successional conditions (Oliver, 2001; Franklin & Johnson, 2012; Dodson et al., 2012; Haugo et al., 2015; DeMeo et al., 2018).

Summary of Analytical Methods

The BLM used Haugo s-classes (Haugo et al., 2015) to evaluate current condition and departure from the historical range of variability and used vegetation modeling of each alternative to estimate changes in the expected amount of late-successional forest arising from the management direction. Refer to Appendix N for more information on the vegetation modeling. Since management of forests and woodlands takes time to become apparent, the BLM compared the proportion of the EMA classified as late-successional in year 20, the expected life of the plan, year 50, and year 100. The BLM also evaluated the management direction for each alternative against the recommended restoration strategies discussed in the literature (e.g., Franklin & Johnson, 2012; Haugo et al., 2015). The analysis area is the entire CSNM but the modeling data cover only the BLM-administered lands.

Strategies recommended in Franklin and Johnson (2012) for developing late successional forests in dry forests include:

- Reduce fuels and competing vegetation around older trees;
- Retain and protect large hardwoods, snags, and logs; some protective cover may be needed for cavity-bearing trees and snags in active use;

- Reduce stand density to reduce basal area, increase average stand diameter, favor fire- and drought-tolerant species, and provide replacements for older trees;
- Retain or create spatial heterogeneity by creating canopy gaps and patches of denser forest and providing for wider spaced single trees and clumps; and
- Plan and implement at the landscape scale, incorporating spatial heterogeneity in forest vegetation and restoring nonforest ecosystems as needed.

The BLM also considered what types of actions would be needed to develop for both types of late development forest from other s-classes (Table 3-61).

Table 3-61. Strategies to increase Late Development Open and Late Development Closed s-classes

S-Class	Late Development Open	Late Development Closed
Early Development	Grow with fire	Grow without fire
Mid-development Closed	Thin/Low severity prescribed fire + grow with fire	Grow without fire
Mid-development Open	Grow with fire	Grow without fire
Late Development Open	----------	Grow without fire
Late Development Closed	Thin/Low severity prescribed fire	----------

Source: Haugo et al. (2015)

For vegetation modeling purposes, the BLM classified forests and woodlands into oak, mixed conifer, white fir, and red fir. Mixed conifer includes the ponderosa pine, Douglas-fir, and dry white fir forest types (Table 3-60). The white fir type consists of moist white fir plant associations. The late development s-classes are the equivalent of late-successional forest.

The BLM assumed that the late-successional descriptions for ponderosa pine, Douglas-fir, and white fir (Table 3-60) represent the mixed conifer type in the CSNM. The mixed conifer type is generally dry forest characterized by Fire Regime I (refer to Section 3.17, Wildland Fire Management Analysis Issue 1, and the AMS [USDI BLM, 2023a, p. 195] for more details).

Based on the widespread presence of Fire Regime I and the current condition of much of the forest in the CSNM, the BLM assumed that Late Development Closed s-class in drier forest (Oak woodland, Mixed Conifer, and White Fir) represents a condition at high risk of loss from fire, insects, disease, and drought due to high levels of stress.

In forest research and analysis of remotely-sensed data, riparian areas are often not mapped or studied independently due to their small size—characterized by narrow corridors, small polygons, and the “rinds” surrounding wet areas. Consequently, the BLM assumed that late-successional riparian conditions are comparable to those of the adjacent uplands, and incorporating them into the broader vegetation types. However, the BLM recognizes that the species composition in riparian areas may exhibit some important differences from the nearby uplands, such as the presence of hardwood trees other than oak and a higher density of shrubs.

Affected Environment

Currently, approximately 63 to 67 percent of the forests and woodlands are classified as late successional. In general, the CSNM is lacking in the Late Development Open s-class and has a surplus of the Late Development Closed s-class (Table 3-62), although there are some important differences between forest types. The Dry-Mesic Mixed Conifer lies on the ecotone between normally open-canopied forest and closed-canopy forest, so has a shortage in both late-successional classes, albeit the deficit in the Late Development Closed is minor. The red fir forest type also straddles the ecotone between open and closed canopy late-successional forest and has a shortage in both categories, although Late Development Closed is considered more typical.

Table 3-62. Degree of departure in the amount of late-successional forest within the CSNM

Biophysical Setting	Late Development Open	Late Development Closed
Oak Woodland	-17,817 acres	+682 acres
Ponderosa Pine	-3,568 acres	+1,212 acres
Mixed Conifer	-40,280 acres	+11,865 acres
Dry-Mesic Mixed Conifer	-3,995 acres	-38 acres
Red Fir	-2,446 acres	-548 acres

In all cases with a surplus of Late Development Closed and a shortage of Late Development Open, the surplus cannot make up for the shortage out of the Late Development Closed s-class, even if all of the Closed s-class was converted to Open. Further, all biophysical settings naturally include at least minor amounts of Late Development Closed conditions (Haugo et al., 2015, Appendix A.3). Such conditions would typically occur in areas with higher moisture and lower heat load, such as steep north aspects, riparian areas, and sites protected by natural barriers (Franklin & Johnson, 2012).

Haugo et al. (2015, Appendix B.4) identified how many acres within specific watersheds would benefit from different approaches to restoration (Table 3-63). Since the Haugo et al. (2015) analysis covers southwest Oregon but not California, two watersheds that lie fully or primarily in California (USDI BLM, 2023a, p. 89) were not specifically analyzed. Jenny Creek watershed covers much of the CSNM with the Bear Creek watershed covering the second highest area. Only small portions of Spencer Creek and Little Butte Creek watersheds lie within the CSNM boundary.

Table 3-63. Acres and percentages of certain watersheds that would benefit from disturbance or succession to restore the mix of s-classes to the historical range of variability

Watershed	Disturbance		Disturbance + Succession		Succession	
	Acres	Percent	Acres	Percent	Acres	Percent
Spencer Creek	3,299	6%	6,600	13%	5,300	10%
Jenny Creek	11,000	8%	47,100	34%	4,300	3%
Cottonwood Creek	1,400	7%	8,100	42%	1,400	7%

Watershed	Disturbance		Disturbance + Succession		Succession	
	Acres	Percent	Acres	Percent	Acres	Percent
Little Butte Creek	29,900	15%	65,399	33%	7,200	4%
Bear Creek	14,800	10%	59,000	41%	7,500	5%

Not all the acres identified in each watershed falls within the CSNM, although the percentages may be relevant. Acres that need both disturbance and succession likely include earlier s-classes than Late Development Open or Late Development Closed. Most watersheds need both disturbance and time to grow into another s-class (Table 3-63). The areas that need time without disturbance represent areas where the characteristic late-successional forest is Late Development Closed (Haugo et al., 2015).

The existing management approach for Alternative A entails direction from three separate RMPs prepared between 1993 and 2016, and with differing degrees and types of management direction. The 2016 Southwestern Oregon (SWO) RMP provides the most comprehensive management direction, whereas the 1993 Redding RMP contains very limited details. The 2008 CSNM RMP provides comprehensive direction but does not provide the same level of detail as the SWO RMP for vegetation management. For the purposes of analyzing the consistency of Alternative A with the recommendations of Franklin and Johnson (2012), the BLM assumed that the more specific direction in the SWO RMP for Late-Successional Reserve-Dry land use allocation provides a useful framework consistent with the direction in the 2008 CSNM RMP and the limited direction in the 1993 Redding RMP.

Environmental Effects

Common to All Alternatives

The land base for Alternative A differs from that of Alternatives B through E due to differences in land designations in three RMPs verses a single RMP. Because of this difference in the land base, the current proportion of late successional forest differs between Alternative A and the action alternatives and has an unknown effect on the proportion of late successional forest under Alternative A as compared to the action alternatives. Under all alternatives, natural processes would govern the development of forests and woodlands where active management is not proposed.

All alternatives contain management direction that is consistent with all the strategies from Franklin and Johnson (2012) but to varying degrees on the last three strategies. Management direction that is consistent with the first two strategies includes:

- Thin around legacy trees;
- Retain three snags greater than 20 inches dbh and 7 snags greater than 10 inches dbh; and
- Retain down woody material greater than 6 inches in diameter at the large end and greater than 20 feet long.

Management direction common to all alternatives that is consistent with part of the third strategy include:

- Favor pines, Douglas-fir, incense-cedar, and hardwoods and provide for diverse understories and structural heterogeneity; and
- Protect closed old refugia forests that occur in cooler, moister sites (e.g., drainage bottoms, lower slopes, and cool midslopes) that provide for refugia persistence by prohibiting vegetation management activities.

The deficits and surpluses outlined in Table 3-62 pertain to the entire CSNM, not only BLM-administered lands. However, none of the alternatives address the deficit of Late Development Open in oak and mixed conifer (represented as pine and mixed conifer in Table 3-62), and the surplus of Late Development Closed continues to increase. In the white fir type (classified as dry-mesic mixed conifer in Table 3-62), while the deficit in Late Development Open remains, the deficit in Late Development Closed is eliminated. For the red fir type, the deficits in both Late Development Open and Closed are resolved, with a temporary increase in the deficit of Late Development Open under Alternatives A, C, D, and E (Proposed RMP).

Refer to Vegetation Analysis Issue 2 which describes how the alternatives would affect quadratic mean diameter and stand density. Refer to Section 3.17, Wildland Fire Management Analysis Issue 1, which describes how the alternatives would affect fire risks.

Alternative A (No Action)

The BLM assumed that forest management actions in the Oregon expansion area would follow LSR-Dry land use allocation management direction, even if the action were to take place on lands allocated as harvest land base under the Southwest Oregon RMP. Under Alternative A, which represents carrying forward current management, an estimated 63 percent of forests are classified as late-successional with the majority in Late-Development Closed (Figure 3-66). By year 20, the amount of late-successional forest would increase to 73 percent of the EMA and by year 100 reach 96 percent of the forested area. The proportion of Late-Development Open would increase but remain a small proportion of late successional forest.

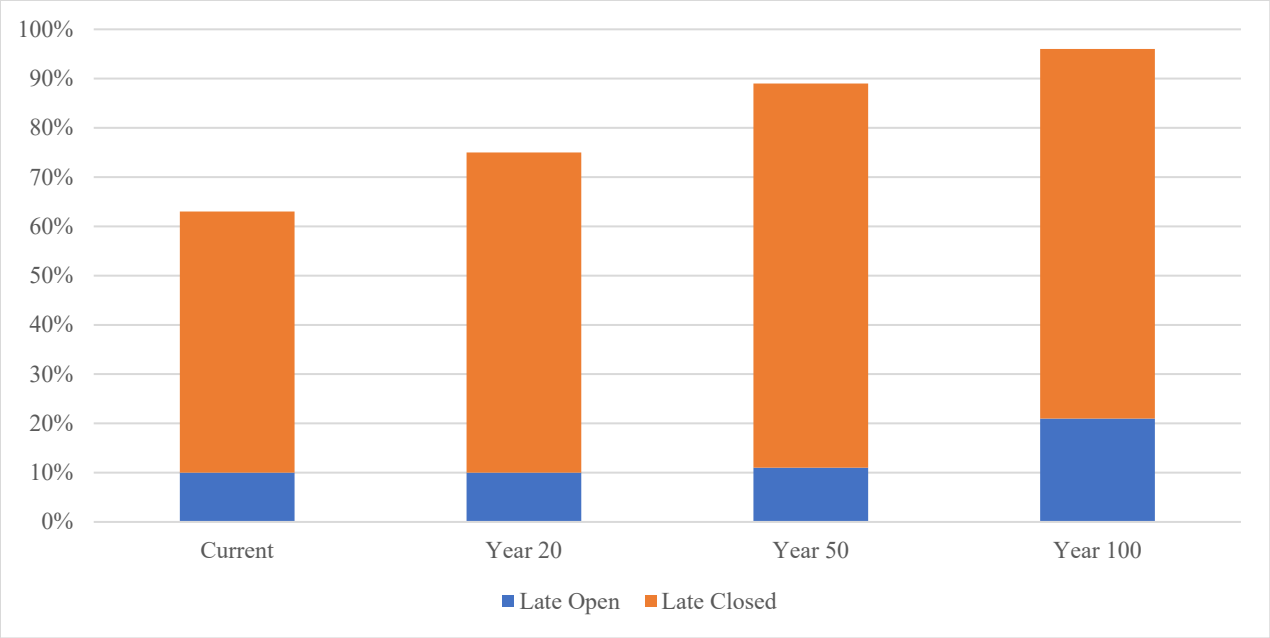


Figure 3-66. Proportion classified as late-successional forest under Alternative A

Figures 3-67 and 3-68 display the composition of Late Development Open and Late Development Closed through time. White fir and red fir comprise the majority of Late Development Open, collectively accounting for over 50 percent of the category but varying in which type is more common than the other. Mixed conifer comprises the largest proportion of Late Development Closed, fluctuating between 43 and 49 percent of the category.

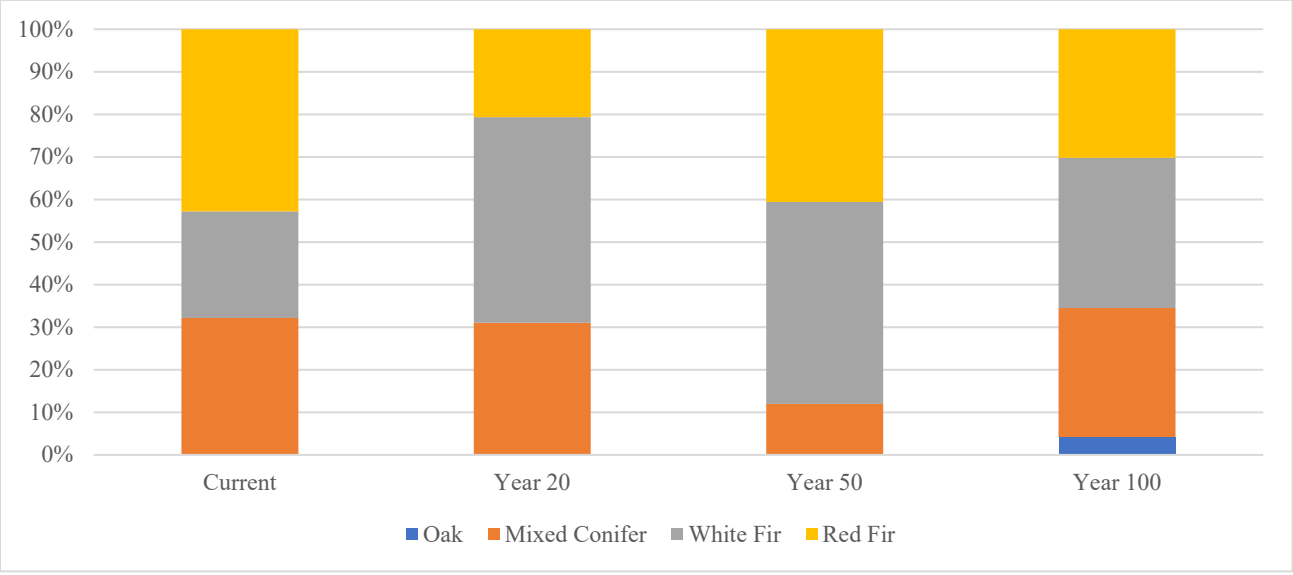


Figure 3-67. Proportion of different forest and woodland types in Late Development Open over time in Alternative A

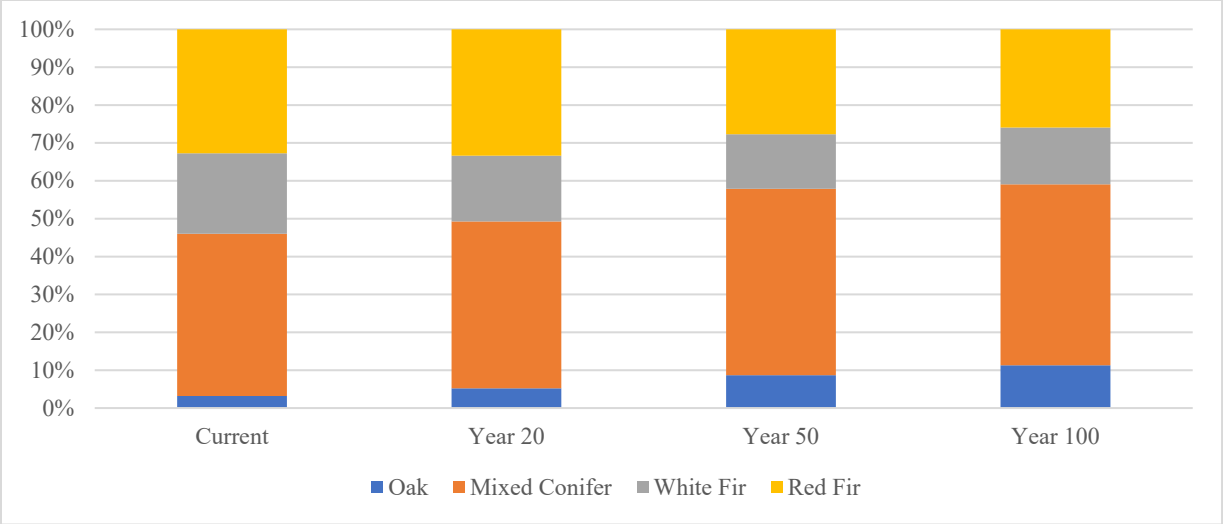


Figure 3-68. Proportion of different forest and woodland types in Late Development Closed over time in Alternative A

The BLM's management approach under Alternative A aligns with Franklin and Johnson (2012) third strategy by emphasizing the creation of growing space to support the persistence and regeneration of pine and hardwood species. It also focuses on promoting or enhancing structure diversity and fostering the development and retention of large, open-grown trees and multi-cohort stands. In addition, the 2008 CSNM RMP (USDI BLM, 2008, p. 32) specified thinning from below, thinning around legacy pine trees, and creating more natural spacing in even-aged and densely stocked stands. These actions would serve to reduce stand densities, favor larger trees, and favor fire- and drought-tolerant species, at least on the dry end of the forests. However, it is uncertain if this management direction would provide for replacements for older trees.

The BLM's management approach under this alternative also aligns with Franklin and Johnson's (2012) fourth and fifth strategies by limiting opening sizes to 2.5 and 4 acres, depending whether stand size was greater or less than 10 acres, leaving 10 percent of the area untreated (also known as "skips"), retaining large trees (e.g. Douglas-fir and pine $\geq$ 36 inches dbh and hardwoods $\geq$ 24 inches dbh; USDI BLM, 2016b, p. 74), promoting or enhancing structural diversity, and retaining old-growth conifer patches embedded in oak woodlands while removing encroaching, younger conifers from oak woodlands.

Alternative B

Approximately 67 percent of forests are currently classified as late-successional (Figure 3-69). Under Alternative B, late-successional forest would increase to an estimated 95 percent by year 100. Most (84 percent) of the late-successional forest falls into the Late Development Closed at present time but would transition to more Late Development Open by year 100 (Figure 3-69).

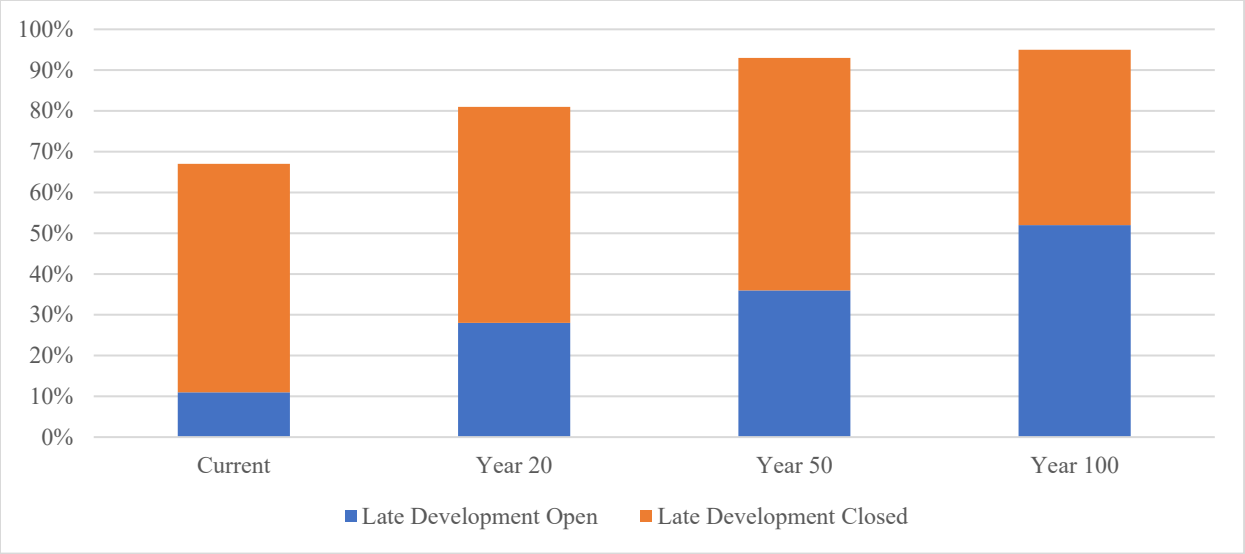


Figure 3-69. Proportion classified as late-successional forest under Alternative B

Figures 3-70 and 3-71 display the composition of Late Development Open and Late Development Closed through time. Red fir comprises most of Late Development Open but decreases over time to 29 percent by year 100. By year 20 mixed conifer comprises the largest proportion of both Late Development Closed and Open. By year 100 red fir increases to 42 percent of Late Development Closed.

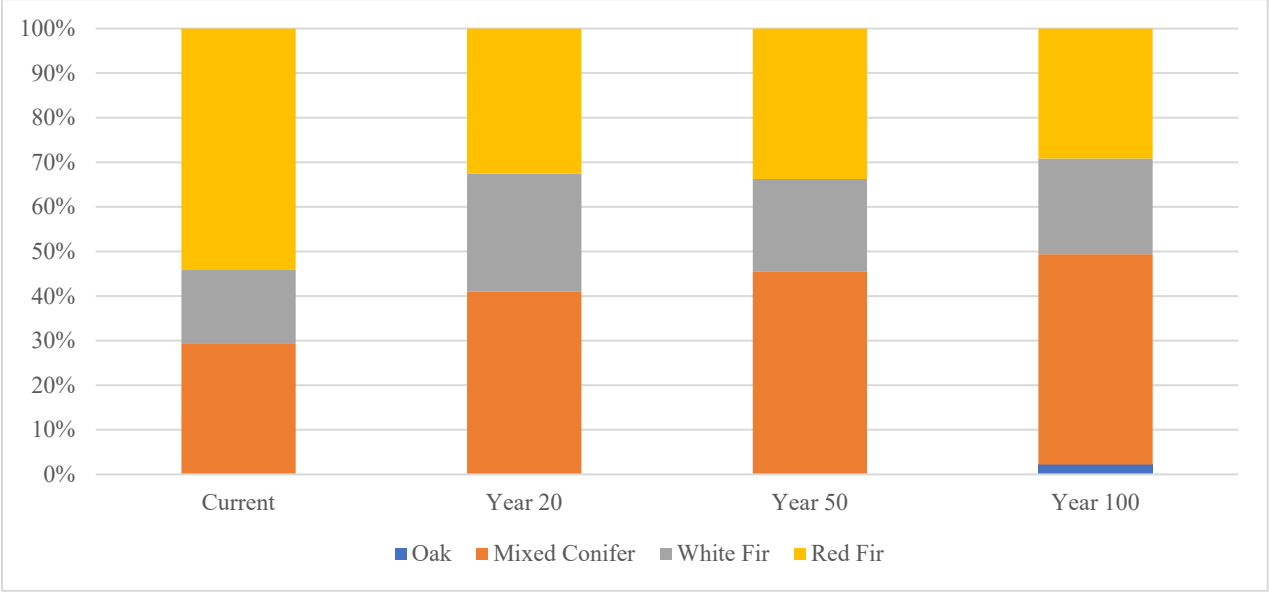


Figure 3-70. Proportion of different forest and woodland types in Late Development Open over time in Alternative B

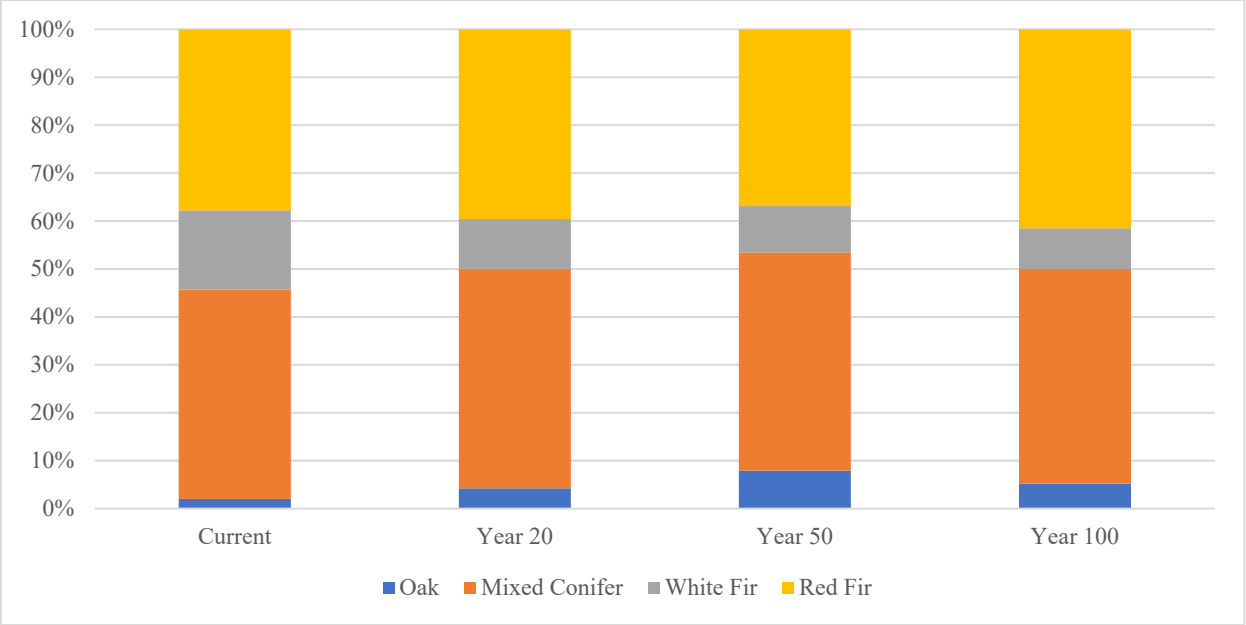


Figure 3-71. Proportion of different forest and woodland types in Late Development Closed over time in Alternative B

The BLM's management approach under Alternative B aligns with all the strategies outlined by Franklin and Johnson (2012). The first two strategies are discussed under "Common to all alternatives." The third strategy is addressed through management direction to retain pines, Douglas-fir, and incense cedar greater than 36 inches DBH and hardwoods greater than 24 inches DBH, thereby retaining the largest trees and favoring fire- and drought-tolerant species. However, it is less certain whether enough replacement trees would remain after treatment. The fourth strategy is fulfilled by incorporating "skips and gaps" with at least 10 percent of the stand left untreated and created openings that are no more than four acres in size; the BLM expects that most openings would be around two acres. Larger openings might necessitate some planting, particularly for rust-resistant sugar pine and western white pine (Jain et al., 2004, York, Heald, Battles, & York, 2004; Waring et al., 2011; Hood et al., 2022; Hirsch et al., 2023).

Whether a mix of wider-spaced single trees and clumps would be provided would be determined at the project scale based on stand composition and the distribution of large trees. This alternative aligns with the fifth strategy by incorporating management direction that targets treating stands at higher stress levels due to density and fuel arrangement that are susceptible to high severity fire, insect and disease outbreaks, and drought.

In addition, whether and how northern spotted owl habitat or potential habitat would be treated would aid in creating spatial heterogeneity. For example, northern spotted owl habitat rated at high fire hazard and high burn probability that was not NR habitat would be thinned to reduce fire severity, and areas of low fire hazard and burn probability that currently were not NRF but have NRF potential would be treated to accelerate the development of NRF. Northern spotted owl habitat currently providing NR but at low fire hazard and burn probability would not be treated.

Alternative C

Currently, 67 percent of forests are classified as late-successional forest (Figure 3-72). Under Alternative C, by year 100, all forests would be classified as late-successional forest. While Late Development Open increases over time by approximately 30 percent, the proportion of Late Development Closed initially increases slightly (1.0 percent) and then decreases, it still comprises most of the late-successional forest for all time periods (current, years 20, 50, and 100).

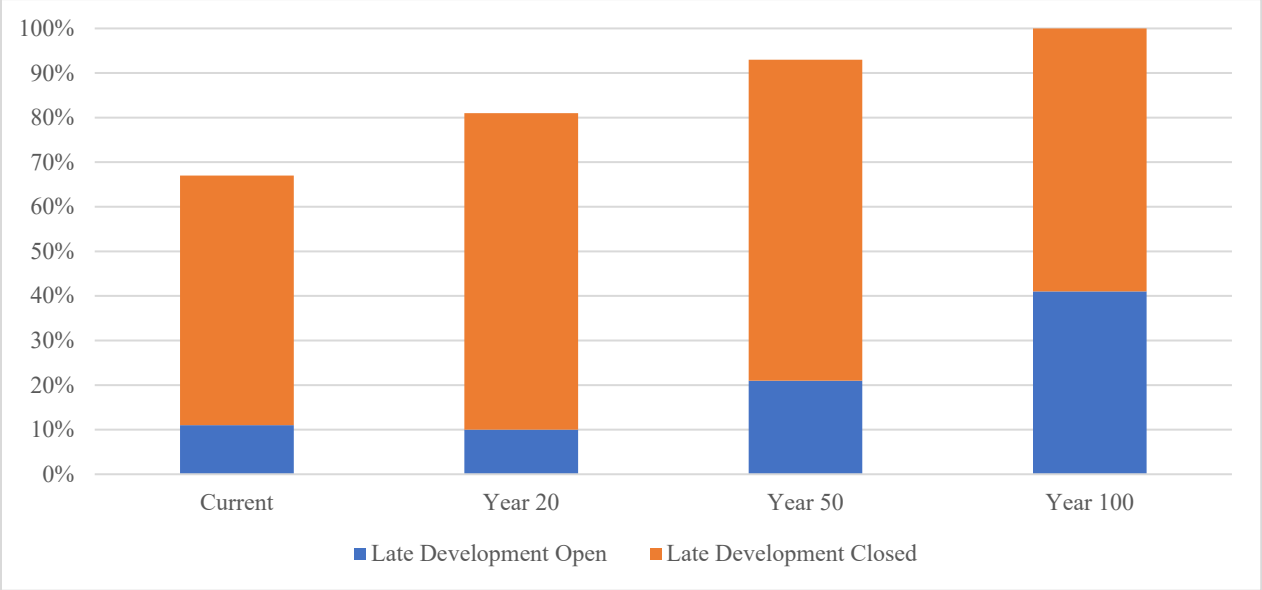


Figure 3-72. Proportion classified as late successional forest under Alternative C

Figures 3-73 and 3-74 illustrate the composition of Late Development Open and Late Development Closed over time. Mixed conifer is the most abundant type in both categories, with red fir being the second most abundant in each. White fir temporarily disappears from Late Development Open, shifting to Late Development Closed. Mixed conifer gradually increases to 48 percent of the category by year 100, while red fir decreases to 34 percent. In Late Development Open, mixed conifer initially increases to 70 percent by year 20 but then declines, fluctuating between 47 and 56 percent in years 50 and 100, respectively. Red fir initially decreases in Late Development Open by year 20 but then increases, ranging between 40 and 47 percent through year 100.

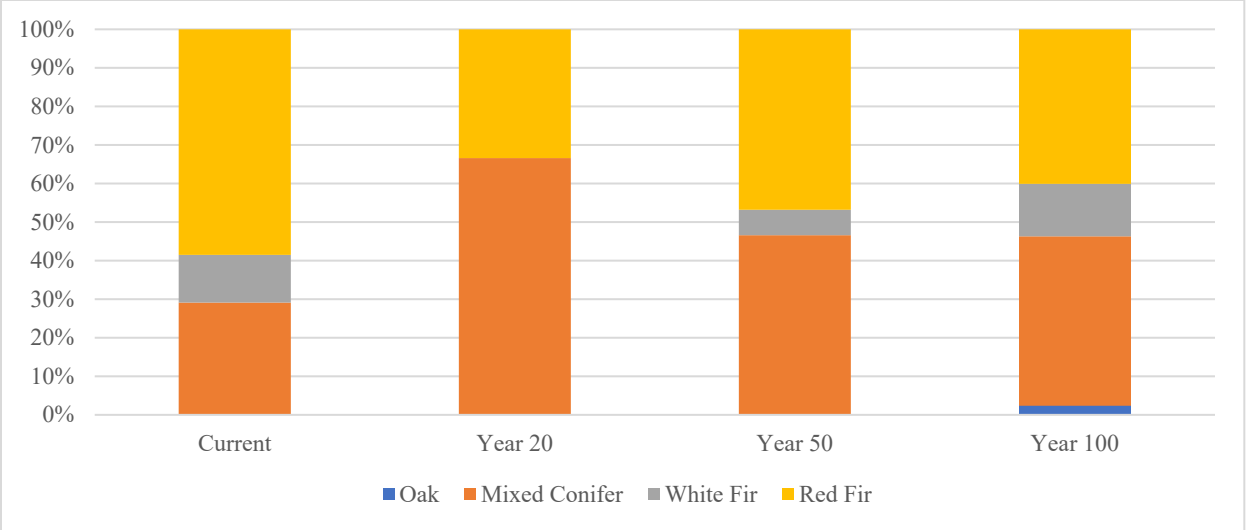


Figure 3-73. Proportion of different forest and woodland types in Late Development Open over time in Alternative C

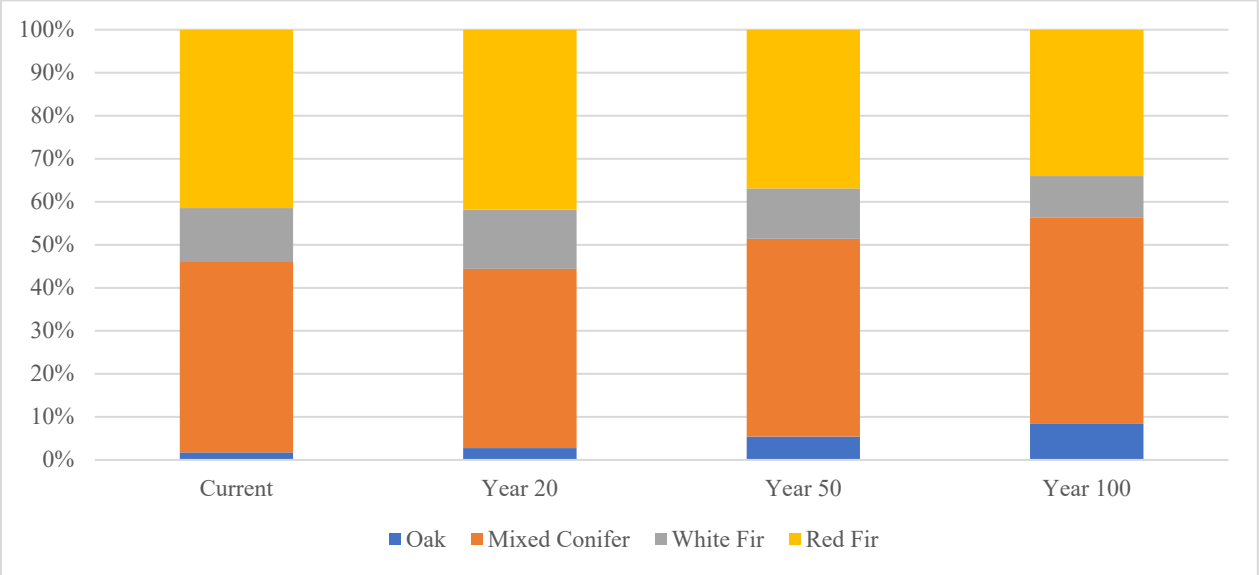


Figure 3-74. Proportion of different forest and woodland types in Late Development Closed over time in Alternative C

The BLM's management approach for Alternative C is consistent the with the third, fourth, and fifth strategies outlined by Franklin and Johnson (2012), although there are some differences. Retaining pine, Douglas-fir, and incense cedar with a DBH greater than 20 inches, along with hardwoods exceeding 13 inches DBH ensures retention of the largest and replacement trees. In younger stands, treatments would retain all trees larger than 12 inches DBH, which could lead to reduced spatial heterogeneity and the retention of some shade-tolerant as well as fire- and drought-intolerant species. Untreated skips could range up to 30 percent of the stand and created openings would be restricted to no more than two acres. The presence of larger untreated skips may diminish

spatial heterogeneity, depending on the specific site. Openings limited to two acres are more likely to regenerate naturally, promoting greater diversity in size classes and species composition (McDonald & Abbott, 1994; Shatford, Hibbs, & Puettmann, 2007; Kemp, Higuera, & Morgan, 2016; Peeler & Smithwick, 2020). However, openings of up to two acres may not be sufficient to allow natural regeneration of western white pine (Jain, Graham, & Morgan, 2002, 2004) and may limit the BLM's ability to respond to large-scale insect and disease outbreaks (refer to Vegetation Issue 2 for more details). The denser stands and lower treatment objectives may increase the likelihood of experiencing higher drought stress across much of the area, consequently raising the risks of insect and disease outbreaks, as well as larger and more severe wildfires (refer to Section 3.15, Vegetation Issue 2, and Section 3.17, Wildland Fire Issue 1, for more details).

Alternative D

Under Alternative D, by year 100, the amount of late-successional forest in the EMA would increase from 67 percent to 98 percent (Figure 3-75). The amount of Late Development Open would decrease to 5 percent by year 20 and then increases to 32 percent by year 100. In contrast, Late Development Closed would increase by 2 percent through year 50 and then decline about 14 percent by year 100 but would continue to comprise the majority (66 percent) of late-successional forest.

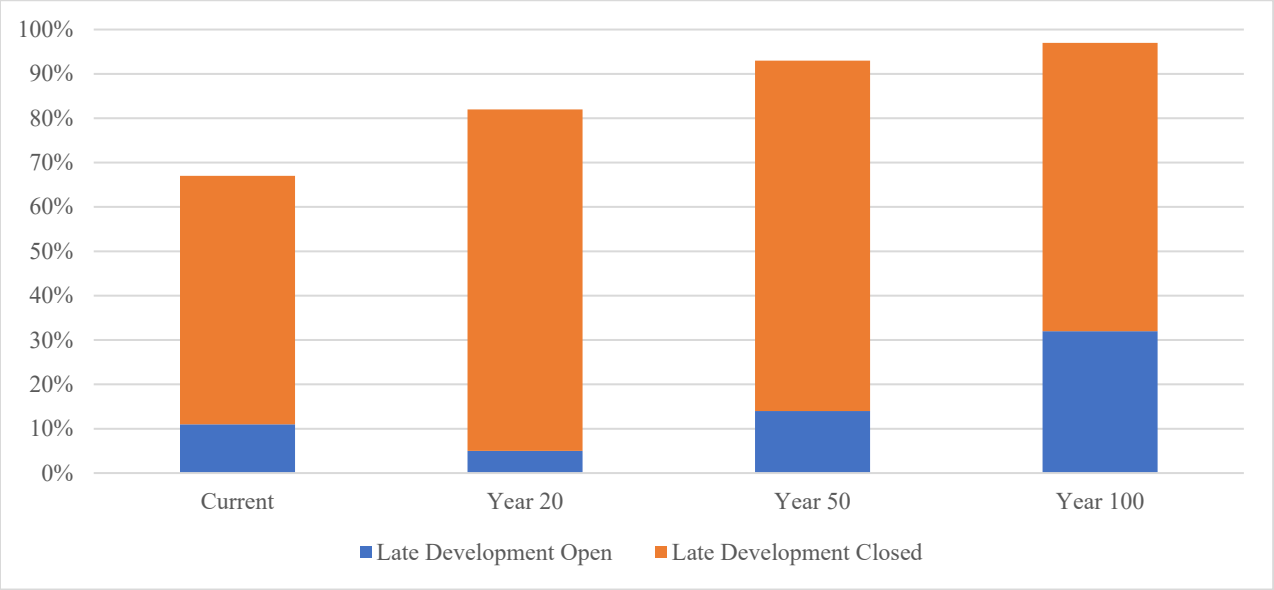


Figure 3-75. Proportion classified as late successional forest under Alternative D

Figures 3-76 and 3-77 illustrate the species composition of Late Development Open and Late Development Closed through time. Initially, red fir is the most abundant type in Late Development Open but by year 50 mixed conifer becomes the dominant type. Red fir is absent from Late Development Open by year 20, shifting to Late Development Closed and then later redeveloping from a combination of growth into the category either from Mid-Development Open or from treatment of Mid-Development Closed and some Late Development Closed. Oak is completely absent from Late Development Open. Mixed conifer and red fir are present in nearly equal proportions in Late Development Closed over time. White fir in Late Development Closed decreases slightly over time while oak increases.

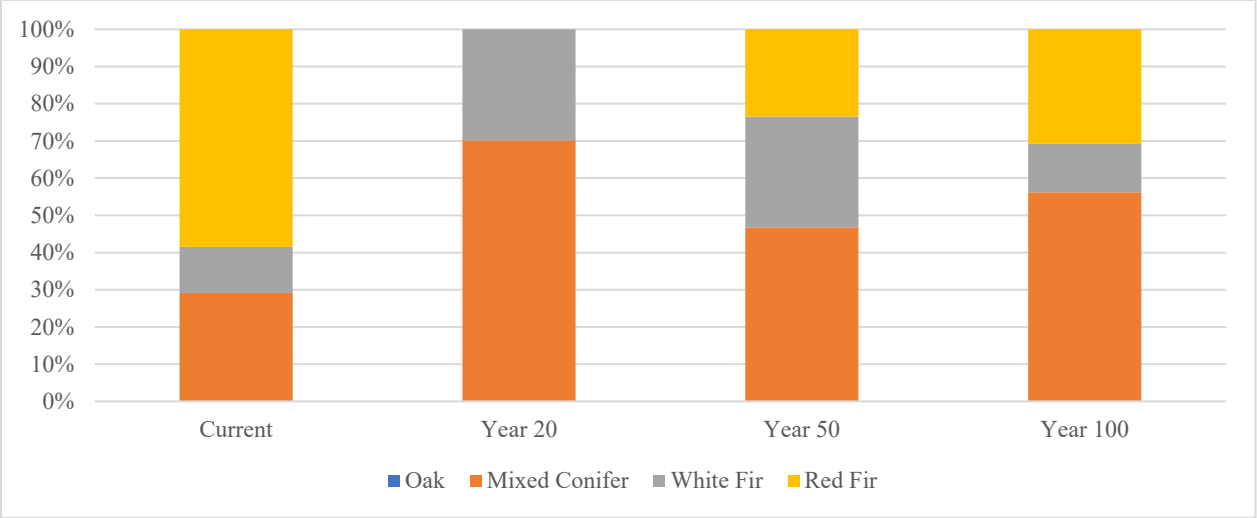


Figure 3-76. Proportion of different forest and woodland types in Late Development Open over time in Alternative D

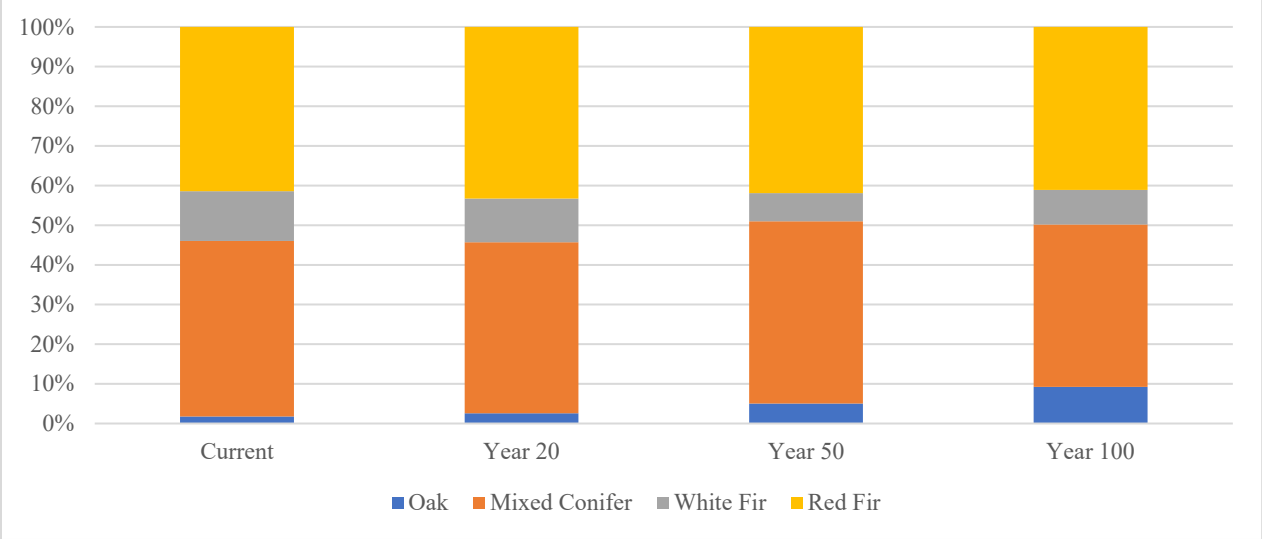


Figure 3-77. Proportion of different forest and woodland types in Late Development Closed over time in Alternative D

The BLM's management approach under Alternative D relies mostly on natural processes, with management direction to focus primarily on treating younger stands less than 60 years old, around legacy trees, and along evacuation routes and strategic fuel breaks. All trees greater than eight inches DBH would be retained; as would all pines, Douglas-firs, and incense cedars larger than 20 inches DBH; and all hardwoods greater than 13 inches when thinning around legacy trees. The management direction is unlikely to generate substantial spatial heterogeneity or lower stand density to alleviate stress. As a result, the largest trees and their replacements would remain more susceptible to drought, high severity wildfires, and insect and disease outbreaks compared to any other alternative (Filip, Schmitt, Scott, & Fitzgerald, 2007; DeSiervo, Jules, Bost, De Stigter, & Butz, 2018; van Mantgem, Falk, Williams, Das, & Stephenson, 2018; Wang et al., 2021).

Alternative E (Proposed RMP)

Under the Proposed RMP, by year 100, nearly all (98 percent) of forests would be classified as late-successional forest (Figure 3-78). The distribution of Late Development Open and Closed is comparable to Alternative C; however, the relative proportions of Open and Closed differs slightly between the two alternatives. For example, at year 50, the Proposed RMP would result in 5 percent more Late Development Closed than Alternative C; however, at year 100, the amount would decrease to 3 percent less than Alternative C.

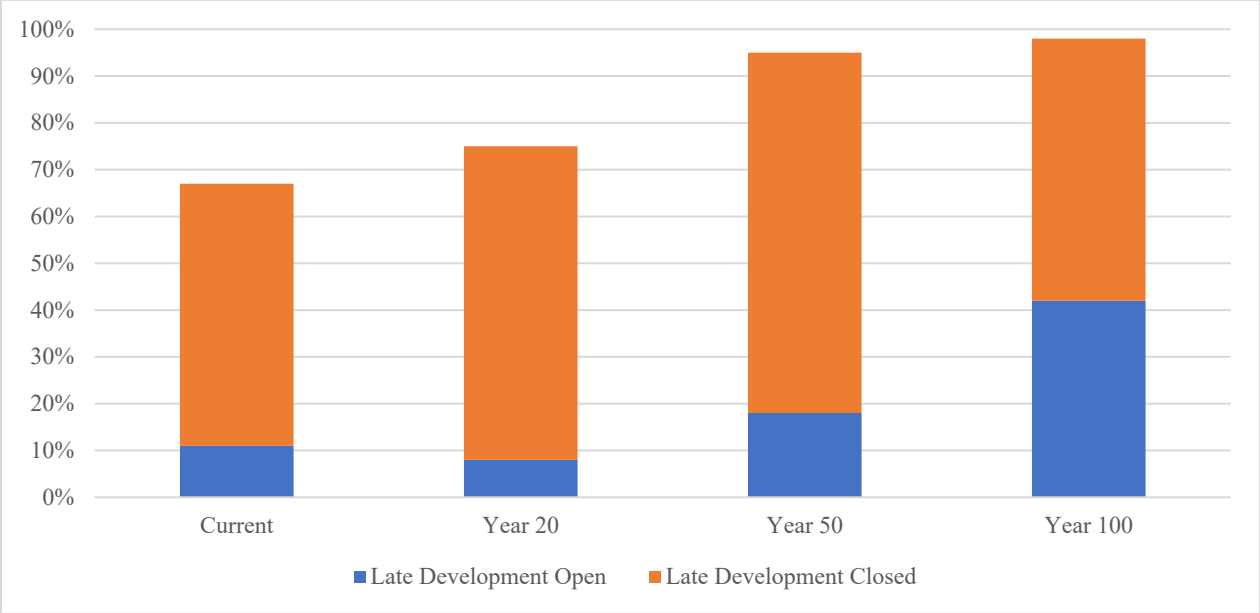


Figure 3-78. Proportion classified as late successional forest under Alternative E (Proposed RMP)

Figures 3-79 and 3-80 illustrate the composition of Late Development Open and Late Development Closed through time. The Proposed RMP varies in the specifics of which forest types are categorized into which s-class from Alternative C, despite the management being quite similar in both alternatives. The distribution of forest types in Late Development Open aligns more closely with Alternative D, although there are notable differences in acreages and proportions. For example, the Proposed RMP includes some oak by year 100, while Alternative D does not. Conversely, the composition of forest types in Late Development Closed bears a closer resemblance to Alternative C, though there are some differences in details. Over time, the amount of red fir in Late Development Closed decreases gradually, while mixed conifer increases steadily.

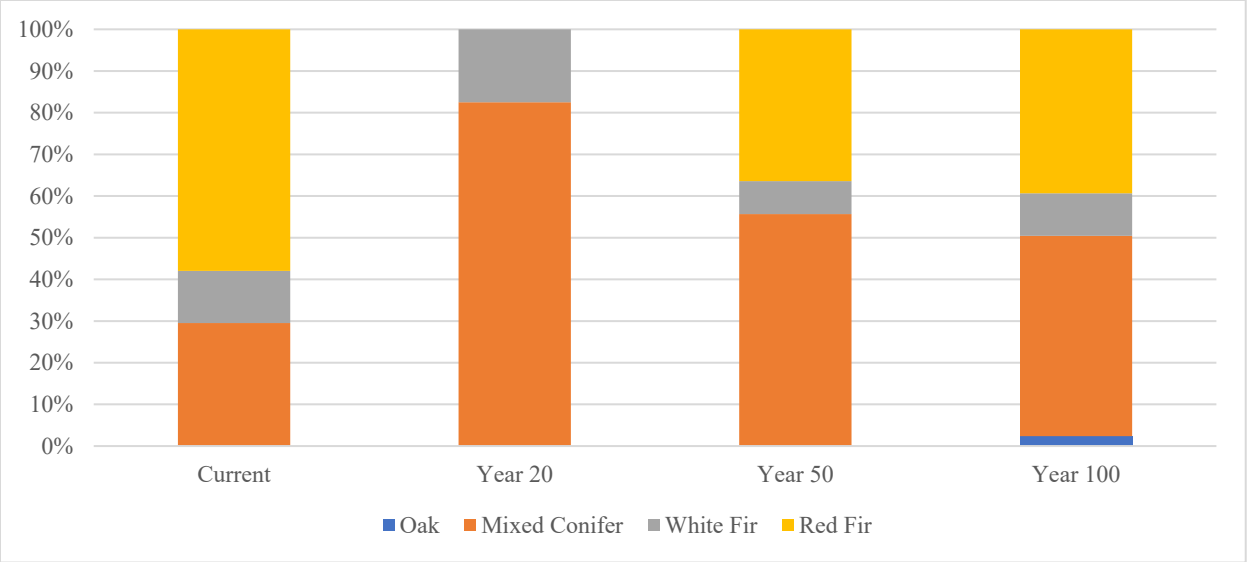


Figure 3-79. Proportion of different forest and woodland types in Late Development Open over time in Alternative E (Proposed RMP)

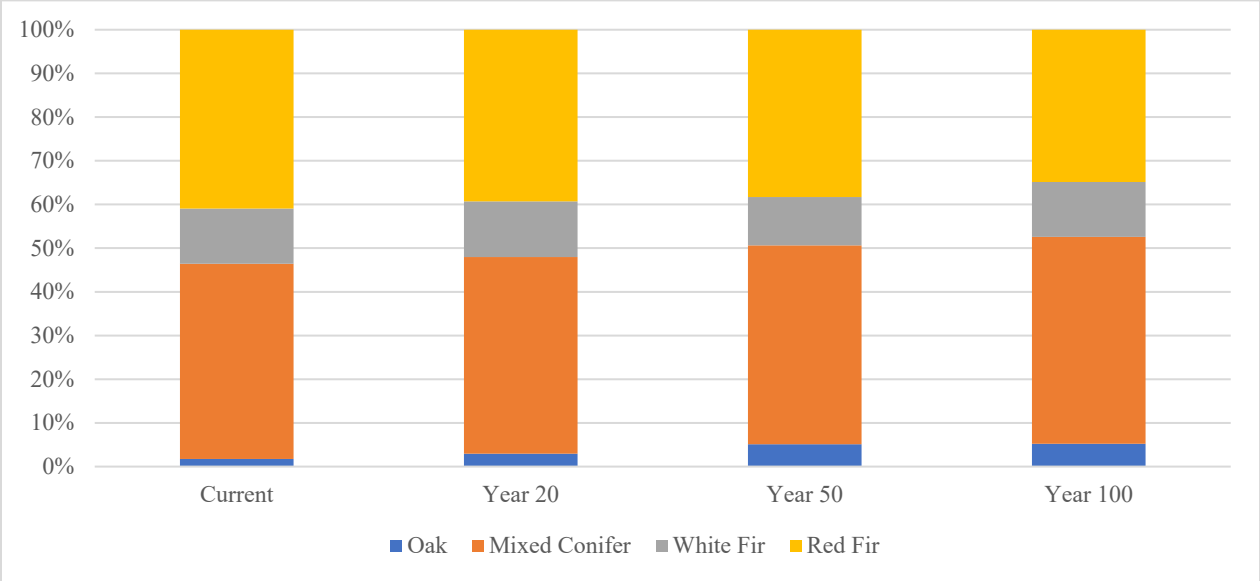


Figure 3-80. Proportion of different forest and woodland types in Late Development Closed over time in Alternative E (Proposed RMP)

The BLM's management approach for the Proposed RMP incorporates elements of management direction from Alternatives B, C, and D. Key differences in the Proposed RMP that are relevant to the late-successional strategy outlined by Franklin and Johnson (2012) include the retention of pines and incense cedar greater than 24 inches DBH, as well as Douglas-fir and white fir greater than 29 inches DBH, which is within the range of what is proposed in Alternatives B and C. These retention levels were derived based on a literature review of tree sizes by species that would ensure the BLM retains important legacy trees on the landscape (Fitzgerald et al., 2000; Keeton & Franklin, 2005; Sensenig, Bailey, & Tappenier, 2013; KBO & Lomakatsi Restoration Project,

2020; Hessburg et al., 2021; Johnston et al., 2021; Klamath Siskiyou Oak Network, 2023; USDA FS & USDI BLM, 2023).

The Proposed RMP incorporates from Alternative C management direction to limit opening size to 2 acres, to retain hardwoods greater than 13 inches, and to treat 10 percent of the EMA per decade. Stand conditions targeted for restoration work would be the same as under Alternatives B and C. Under the Proposed RMP, the BLM would retain more shade-tolerant and fire- and drought-intolerant white fir than the other alternatives. This level of retention of large white fir is more likely to keep trees that were present prior to Euro-American settlement or established shortly thereafter and also trees on moister, more productive sites. The Proposed RMP would improve spatial heterogeneity similar to Alternative B. Similar to Alternative C, limiting created openings to 2 acres or less is likely insufficient to establish rust-resistant western white pine, but it may be large enough to establish rust-resistant sugar pine (Jain et al., 2002, 2004; York et al., 2004; Waring et al., 2011; Hood et al., 2022; Hirsch et al., 2023).

Cumulative Effects

The vegetation modeling for the alternatives did not take into account potential impacts of natural disturbances, such as fire, insects, disease, and drought, on the abundance of late-successional forest or the relative proportions of Late Development Open and Closed stands. Consequently, the actual extent of late-successional forest is likely to be lower than indicated for all alternatives, especially in the long term. Climate change, along with warming temperatures, an increased likelihood of large wildfires, and more frequent, severe, and prolonged droughts, are expected to reduce the extent of late-successional forest by undetermined amounts. Currently, late-successional forests in southwest Oregon are assessed as being in poor or very poor condition due to the changing climate, uncharacteristically severe fires in low and moderate severity systems, high road density, and the amount of uncharacteristic mortality from insects and disease that is present (USDA FS & USDI BLM, 2024).

Climate change increases the uncertainty on restoration treatment success rates, as predictions about the timing of various natural events are only feasible in the short term (e.g., for the next growing season). One increasing concern is the impact of "flash droughts." These droughts develop rapidly due to elevated temperatures and reduced precipitation during the growing season, potentially negating the positive effects of wet winters.

The EMA or its approximate equivalent ranges from 77 percent (Alternative A) to 70 percent (Alternatives C and D) of the forest on BLM-administered lands. Since treatments would primarily or exclusively take place within the EMA, forest growth and changes in s-class within a substantial portion of the CSNM occur in the model as a result of growth. While not illustrated, a "let-it-grow" modeling scenario suggested that the amount of late-successional forest would not differ significantly from the action alternatives, indicating that much of the increase in late successional forest is attributed primarily to growth.

Conclusion

All alternatives would lead to the development of substantial amounts of late-successional forests in the long term, but this would come at the expense of younger s-classes. The treatment rates are insufficient for management to generate these younger s-classes; therefore, natural processes would likely contribute to much of the necessary spatial and vegetative heterogeneity required by

various forest-associated wildlife species. Nonetheless, proposed management would facilitate creation of more open-canopy late-successional forests than would occur naturally.

Alternatives B, C, and E (Proposed RMP) would provide nearly equal proportions of open and closed canopy late-successional forests, suggesting enhanced species diversity within these forests and lower density-related stress. This reduced stress, along with a blend of open and closed canopy forest, would also promote greater variability in fire severity and the effects of insect and disease outbreaks.

Alternative D would result in the least amount of open canopy late-successional forest, indicating low species and spatial heterogeneity. The largest trees and their replacements would remain more susceptible to drought, high-severity wildfires, and insect and disease outbreaks compared to any other alternative (Filip et al., 2007; DeSiervo et al., 2018; van Mantgem et al., 2018; Wang et al., 2021). The low heterogeneity also suggests an increased risk of larger and more frequent patches of high-severity fire, along with fewer and smaller areas of low- and moderate- severity fire (Taylor, Harris, & Drury, 2021; Buonanduci, Donato, Halofsky, Kennedy, & Harvey, 2023).

Vegetation Analysis Issue 4

How would the alternatives affect the ecological functioning of nonforest plant communities?

Background

Nonforest plant communities play a crucial role in the biodiversity and ecological functioning of the CSNM. The 2000 Presidential Proclamation No. 7318 highlights oak groves, woodlands, meadows, juniper scablands, and rosaceous chaparral as important features within the CSNM, along with numerous rare and endemic plants. Many of these rare and endemic plant species thrive in nonforest habitats (as detailed in Appendix J, Special Status Species in the CSNM). The 2017 Presidential Proclamation No. 9564, which expanded the CSNM, further emphasizes the importance of these nonforest plant communities for maintaining biodiversity and ecological functioning.

Proclamation Nos. 7318 and 9564 emphasize the need to maintain and enhance the ecological functioning of nonforest plant communities. Ecological functions within any plant community include energy and water flows, nutrient and carbon cycling, geomorphological processes, productivity, decomposition, and trophic interactions (Chapin IIII, Matson, & Mooney, 2002; Kollman et al., 2016). The diverse mosaic of plant communities and their structural types influence these ecological functions, as well as essential ecosystem services like wildlife habitat, clean water, and clean air (Chapin III et al., 2002). Furthermore, human activities and land use patterns impact ecological functions by altering species composition, community structure, and plant density.

Numerous studies have highlighted the importance of biodiversity for ecological functioning (e.g., Oliver et al., 2015a; Lewandowska et al., 2016; Craven et al., 2016; Meyer et al., 2016). Biodiversity manifests in various ways, including species richness (the number of species present), complementarity (how species interact with the environment), and functional or structural diversity (variations in plant traits such as rooting depth and plant height) (Lewandowska et al., 2016; LaRue, Hardiman, Elliott & Fei, 2019; Wang et al., 2021). While species richness has traditionally served as a measure of ecological functioning, recent ecological literature emphasizes factors like complementarity and structural/functional diversity (hereafter diversity). Nevertheless, studies

consistently highlight the importance of species richness in assessing multiple ecological functions (Zavaleta, Pasar, Hulvey, & Tilman, 2010; Kollmann et al., 2016; Minden et al., 2016).

Complementarity plays a crucial role in assessing ecosystem stability, especially in the context of climate change, nitrogen deposition, and carbon dioxide enrichment (Craven et al., 2016; Isabell et al., 2018; Wang et al., 2021; Hong et al., 2022). It is closely linked to species richness and diversity. Complementarity relies on the diverse traits within a community, allowing a broader range of species to efficiently utilize site resources, such as water, nutrients, and light (Isabell et al., 2018; Wang et al., 2021).

Yet even sites with high biodiversity do not always exhibit high ecological functioning due to interannual climate variability, climate change, habitat degradation, invasive species, and pollution (Zavaleta et al., 2010; Oliver et al., 2015b). Thus, ecological functioning across the landscape depends on the presence of several different community types and species mixes that take advantage of differences in soils and topography (Oliver et al., 2015a; Wright, Ames, & Mitchell, 2016; van der Plas, 2019; Xu et al., 2020).

Before approximately 1850, Indigenous communities regularly burned many nonforest plant communities to provide a variety of resources and to reduce fire risks to winter communities and favored campsites (LaLande & Pullen, 1999; Frost & Sweeney, 2000; Lake, 2007; Crawford, Mensing, Lake, & Zimmerman, 2015; Roos et al., 2021). These practices influenced species richness by favoring species with a higher fire tolerance. However, with Euro-American settlement starting in the mid-1800s, these burning practices ceased (Lieberg, 1900; Frost & Sweeney, 2000; Pyne, 2010). Over time, the absence of regular burning allowed species less tolerant of fire to encroach upon various nonforest plant community types, altering their composition and distribution.

In addition to the cessation of burning, numerous nonnative plant species have established and increased within the CSNM boundaries. Nonnative invasive grasses and forbs tend to grow faster and acquire resources such as water and nutrients earlier in the growing season than the native grasses and forbs (Flores-Moreno et al., 2016). As an invasive species becomes dominant on a site, ecosystem stability and functioning declines (Wright et al. 2016; Craven et al. 2016; Wang et al. 2021; Yan et al. 2023). Invasive species are possibly the greatest threat to the functioning of the nonforest and riparian plant communities.

Fire exclusion allowed conifers to establish and move downward in elevation, similar to the conifer encroachment seen in the sagebrush communities of the Great Basin (Burkhardt & Tisdale, 1976; Coates et al., 2017). Pure oak communities are now predominantly restricted to soils too dry to support conifers. Oregon white oak thrives in soils with high clay content but is susceptible to invasion by medusahead and ventenata. In contrast, California black oak prefers moister and cooler sites compared to Oregon white oak (Riegel, Smith, & Franklin, 1992; Frost, 2017). Oak community structure varies from open savannahs to more closed woodlands, with woodlands being the more common structure (USDI BLM, 2023a, p. 184). Juniper woodland is scarce and primarily found in rocky areas within the Horseshoe Ranch Wildlife Area and the southern part of the Soda Mountain Wilderness (USDI BLM, 2023a, p. 184).

Over time, historical grazing, fire exclusion, and past land and forest management practices have greatly transformed most nonforest plant communities. Among these communities, chaparral appears to be the least affected and may remain relatively unchanged, as suggested by age-

structure research conducted in the mid-2000s (Muir & Hosten, 2006; Duren & Muir, 2010). Yet local observations of how fires have interacted with treated and untreated chaparral calls into question the degree to which chaparral has not been affected by fire exclusion (J. Volpe, personal communication, 21 August 2024). Many native perennial bunchgrass grasslands and grass understories have given way to annual grasslands and poison oak thickets. Invasive forbs are also widespread within nonforest areas. Oak savannah, although likely never extensive, has largely vanished due to denser oak communities. Conifers have encroached upon oak woodlands, leading to a shift in some mixed oak-conifer communities towards conifer dominance. California black oak is at risk of disappearing altogether, and large open-grown oaks are becoming increasingly rare. Table 3-64 presents the major nonforest plant community types in the CSNM.

Effective control measures are crucial to limit the spread of invasive plants in nonforest plant communities. These measures, implemented promptly following vegetation and fuels management activities, including prescribed fire and wildfire, are essential to limit spread. The invasive plants of greatest concern are ruderal species that thrive in disturbed sites and have seed dispersal mechanisms allowing rapid spread (USDI BLM, 2023a, pp. 140–141). Some species, like yellow starthistle and cheatgrass, maintain seeds in the seedbank, although their viability varies greatly (Innes & Zouhar, 2021; Innes, 2021; Innes, 2022; Zouhar, 2003a).

Chemical Control Measures: Pre-emergent herbicides are mostly used to control annual grasses by killing seeds that have germinated but not emerged from the soil (Lazarus, Germino, & de Graaff, 2024). A variety of post-emergent herbicides are used to control invasive forbs and grasses by killing the plant before seed dispersal (DiTomaso, Enloe, & Pitcairn, 2007). Recent studies indicate that herbicides can increase nitrogen availability, reducing resistance to invasion (Lazarus et al., 2024). To date, chemical control measures taken in the CSNM have been ground-based spot application of post-emergent herbicides.

Fire: Use of fire to control invasive plant species is limited, in large part because fire tends to favor most invasive plant species. It can be used to control medusahead and yellow starthistle (DiTomaso, 2006a). Fire is more commonly used as a site preparation method to remove litter and expose bare ground. Prescribed burning before the application of a pre-emergent herbicide can increase the effectiveness of the herbicide (Di Tomaso, 2006b; Davies & Johnson, 2017). Managing fire frequency can assist in resisting invasion by annual grasses; both burning too frequently or too infrequently favors invasion by reducing the native bunchgrasses, although the mechanisms by which reduction occurs differs (Davies, Leger, Boyd, & Hallett, 2021). Contrary to the common narrative, fire is not needed to spread invasive annual grasses. Annual grasses can assume site dominance in areas that have not burned in decades, facilitated by overgrazing by cattle or feral/wild horses, high levels of recreation use, and changing climate (Smith et al., 2023). Most such transitions have occurred since the early 1990s (Smith et al., 2023).

Mechanical Control Measures: Mechanical control measures consist of activities such as hand labor, mowing, and tillage. Hand labor includes hand pulling, digging, weed whacking, and similar activities to remove the entire plant. Hand labor can work on small patches of annual and biennial invasive plants but rarely on perennial plants (DiTomaso et al., 2007). Mowing and clipping are intended to prevent seed formation and are most effective when conducted during flowering and when soils are dry enough to prevent new growth or germination from the seed bank (DiTomaso et al., 2007). Mowing can reduce annual grasses but often increases invasive forbs (Prevéy, Knocjel, & Scastedt, 2014). Mowing is limited by steep slopes and rockiness, can decrease the effectiveness

of biocontrols, damage native species, and reduce winter forage for wildlife. Tillage is mostly used in agricultural systems but can be used in the early stages of restoring farmland to grassland (DiTomaso et al., 2007).

Biological Control Measures: Biological control measures typically consist of the release of agents such as insects and pathogens, some of which may also be nonnative (DiTomaso et al., 2007), and the use of targeted grazing. Release of insects has been the most common form of biocontrol to control invasive forbs but has had mixed success. Of the problematic species within the CSNM, studies elsewhere indicate that biocontrols have low success for Canada thistle and yellow starthistle and moderate control of spotted and diffuse knapweeds (DiTomaso et al. 2007). Pathogens have been studied to control annual grasses, but success rates have been low, or the agent has not yet been approved for use (Meyer, Nelson, Clement, & Beckstead, 2008; Tekiela, 2020; Lazarus et al., 2024).

Targeted grazing consists of using domestic livestock to prevent seed development. Considerations include selecting the right livestock species and the timing and duration of grazing to reduce the target invader while minimizing impacts to nontarget native species (Mosley & Roselle, 2006; Olson & Launchbaugh, 2006; Firn, Price, & Whalley, 2013; Freitas, Roche, Weixelman, & Tate, 2014; Mason, Nelson, & Vallient, 2018; Marchetto, Wolf, & Larkin, 2021). Cattle are typically used to control annual grasses while sheep or goats are typically used to control forbs.

Spring grazing of annual grasses by cattle can reduce fine fuel loadings and potential seed production but can be difficult to accomplish in high production years. Fall and winter grazing of annual grasses can reduce the fine fuel loading in the next year by reducing the previous year's production (Davies et al., 2021). High intensity, short duration grazing on a rotational basis provides the most effective control but requires the use of electric fencing to keep the animals confined to the target area and careful monitoring to limit impacts to nontarget plants (DiTomaso et al., 2007; Mason et al., 2018). Targeted grazing can take several years to achieve control (DiTomaso et al. 2007).

Seeding and Planting: Seeding may occur via hand spreading, aerial spreading, or mechanically most commonly using a rangeland drill. Aerial spreading is mostly used on large wildfires, particularly in unroaded areas. Following control of large areas of invasive plants, reseeding or replanting with desired species is essential to avoid reinvasion. Most research has focused on annual grasses given the issues with invasion in greater sage-grouse habitat although the same concepts likely apply to controlling invasive forbs. Because of the expense of native seed, many researchers conclude that use of perennial nonnative bunchgrasses cannot be avoided, particularly when large areas are involved (e.g. Davies et al., 2021). In addition, native perennial grasses have lower establishment rates than nonnative perennial grasses (Clenet, Davies, Johnson, & Kerby, 2020). Recent studies indicate that use of seed coats with activated carbon coatings can allow simultaneous use of one or two pre-emergent herbicides and seeding, instead of waiting for a year between these two treatments (Clenet et al., 2020; Svejcar, Clenet, Guetling, & Davies, In press). Waiting a year between these two activities can allow for reinvasion between the time of herbicide spraying and seeding (Clenet et al., 2020; Svejcar et al., In press). Some invasive plants can exploit unused resources in the plant community even in restored plant communities and during wetter years (Allen & Meyer, 2014; Chambers et al., 2019). However, successful restoration of perennial plant communities can limit the density and production of some invasive plant species (Davies, Johnson, & Nafus, 2014; Davies & Johnson, 2017).

Livestock grazing has the potential to affect ecological functioning of nonforest ecosystems. As noted in several grazing studies, high intensity and long duration grazing can result in significant ecological damage to nonforest vegetation (e.g. Freitas, Roche, Weixelman, & Tate, 2014; Lindenmeyer, Blanchard, Crane, Michael, & Sato, 2018; Vernon, Campos, & Burnett, 2022). However, Curtin (2002) noted that most grazing studies have significant methodological flaws that do not allow determination of cause-and-effect relationships between grazing, plant community responses, and plant invasion.

Over time, livestock grazing alters plant community composition by favoring short plants over tall, prostrate over erect plants, stoloniferous over rosette or tussock architecture, and annual over perennial plants (Díaz et al., 2007). As grazing intensity increases, species richness and diversity tend to decrease (Chillo, Ojeda, Capmourteres, & Anand 2017). Studies indicate that livestock grazing tends to reduce litter, cover, seedling survival, and total vegetation biomass, although most grazing studies do not account for differences in grazing intensity, timing, and stocking rates, which can affect plant responses (Jones, 2000).

Studies also indicate that restricting forage utilization to "moderate" levels (variously defined as 40-50 percent and 40-60 percent utilization) uplands and to 40 percent or less in riparian areas and wet meadows (Freitas et al., 2014; Vernon et al., 2022) does not necessarily result in the loss of species richness and diversity beyond what occurred prior to the 1950s (Nelson, Gray, and Evans, 2011; Copeland, Davies, Boyd, & Bates, 2021; Davies et al., 2021). Additional practices can better assure that livestock grazing does not promote the spread of invasive plants, favor recovery in riparian areas and wetlands/wet meadows and maintain or improve upland species richness and diversity. These include adjusting the timing of grazing and spatial distribution of livestock, limiting the duration, and allowing for rest in different seasons (Freitas et al., 2014; Davies et al., 2021; Copeland et al., 2022; Vernon et al., 2022).

There are few studies examining the potential impacts of recreation use on species richness and diversity of nonforest vegetation. Most of those studies focus on alpine and subalpine vegetation, wilderness, and Europe. However, what exists indicates that recreational impacts to nonforest species richness and diversity arise from trampling by visitors and packstock, grazing by packstock, plant collection, maintenance and construction of visitor infrastructure, introduction and spread of invasive plants, and starting wildfires (Cole & Knight, 1990; Ballantyne & Pickering, 2013). Areas of concentrated visitor use, such as campgrounds, day-use areas, and frequently used dispersed camping sites, can create compacted soils and bare ground, supporting the loss of native plants and expansion of invasive plants. Shallow soils with abundant naturally bare ground, steep slopes subject to erosion, wet meadows, and wetlands are particularly susceptible to damage from overuse or improper use by visitors, reducing disturbance-sensitive native plants and favoring disturbance-tolerant native and nonnative species.

Impacts from roads on nonforest vegetation include use of herbicides and mowing to control vegetation height and presence along road shoulders, dust (Anderson & Gesford, 2007; Jakobsson, Bernes, Bullock, Verheyen, & Lindberg, 2018), deicers on paved roads (Baltrėnas, Kazlauskienė, & Zaveckytė, 2006; Terry, Conaway, Rebar, & Graettinger, 2020), and fragmentation (Gelbard & Belnap, 2003; Soons, Messelink, Jongjans, & Heil, 2005). Habitat degradation from road noise and the presence of people may be a bigger impact than habitat loss or fragmentation, particularly from dense networks of lightly used roads (Forman, 2005).

The primary impacts from the BLM-administered roads are dust, fragmentation, and impacts of maintenance on invasive plant spread. Invasive plants and ruderal native plants typically grow along the road edges and down the centerlines, with extent at least partly dependent on road maintenance types and frequency and partly dependent on traffic levels and the number and types of invasive plants "hitchhiking" on the undercarriages of vehicles. Road maintenance typically consists of grading to smooth the road surface, application of additional gravel as needed on gravel roads, and mowing of centerlines and road edges to reduce fire hazards and improve travel (Anderson & Gesford, 2007).

This analysis focuses on the potential impacts of wildfire and the use of natural ignitions and prescribed fire to maintain, enhance, or restore nonforest vegetation communities and not on the effects of prescribed burning to remove debris generated by other vegetation management activities. Responses to unplanned ignitions, use of natural ignitions to meet resource objectives, and fuels treatments can affect nonforest species richness and diversity. Unplanned ignitions, regardless of how they are managed, and use of prescribed fire carry a well-known risk of facilitating the spread of invasive plants. The greatest risks occur in grasslands that are still relatively intact with abundant bunchgrass, but that have missed two or more fire cycles (Davies et al., 2009; Davies et al., 2021). In these areas, fuel buildup in the crowns of the bunchgrasses can lead to long-term smoldering and lethal heating of grass meristems (Davies et al., 2010). In areas where invasive plants are already established, fire may not be needed to facilitate further spread as both drought and wet periods, overgrazing by livestock or feral/wild horses, heavy recreation use, and changing climate can create growing space or make resources available that allow spread in the absence of fire (Chambers et al., 2019; Smith et al., 2023).

Summary of Analytical Methods

The scope of this analysis encompasses nonforest vegetation throughout the CSNM, with a primary focus on the Ecosystem Management Area – Diversity Emphasis (EMA-DE). The temporal scale considered is 20 years, the expected life of the plan. Given the more rapid rates of change in nonforest vegetation as compared to forest vegetation, assessing potential changes beyond 20 years becomes increasingly speculative.

To analyze the effects of the alternatives on the ecologically functioning of nonforest vegetation, the BLM used a combination of approaches tailored to the specific vegetation types. For desired conditions, the BLM examined existing descriptions of historical conditions in the area (Lieberg, 1900; LaLande, 1989; LaLande & Pullen, 1999; Muir & Hosten, 2006; Hosten, Hickman, & Lang, 2007; Hickman & Christy, 2011; Lake, 2013) and extrapolated from similar community types described in ecological literature (e.g., Hessburg et al., 1999; Crawford et al., 2015; Copes-Gerbitz, Arabas, & Gildhaus, 2017). Additionally, the BLM considered information on characteristic biophysical settings from sources like Nature Serve Explorer and LANDFIRE (NatureServe, 2018; NatureServe, 2023; LANDFIRE, 2022).

Based on the management direction for the Ecosystem Management Areas, the BLM anticipates minimal to no vegetation management in marshes and swamps, juniper woodland, sagebrush and other shrub types, except in the Wildland-Urban Interface/Fuels Emphasis area under Alternatives A, B, and C. Under those three alternatives approximately 91 percent of the nonforest vegetation might be treated. Along with the four vegetation types not anticipated for treatment in Alternatives A, B, and C, Alternatives D and E would not treat in chaparral and oak chaparral, reducing the area

of nonforest vegetation that might be treated to about 50 percent of the area. These estimates include the potential to treat invasive plants in the Soda Mountain Wilderness.

The BLM conducted an assessment to understand the impact of different management approaches on oak communities and the oak-conifer ecotone using the Forest Vegetation Simulator (FVS) along with spatially stratified plot data to model changes in species composition, structure, and density. The BLM then compared these changes to historical records, considering factors like tree structure, species richness, and structural diversity. Refer to the Summary of Analytical Methods for Vegetation Analysis Issue 2 and Appendix N, Vegetation Modeling and Assumptions, for additional details regarding vegetation modeling.

To assess the impacts on shrubland and grassland communities, the BLM reviewed the ecological literature on effectiveness and impacts of restoration activities on structure and species composition. To assess the impacts on species richness and diversity, the BLM conducted a review of ecological literature on the effects of vegetation management, livestock grazing, roads and trails, and recreation.

Ecological functions consist of elements such as nutrient and carbon cycling and water and energy flows (Chapin III, Matson, & Mooney, 2002). However, directly measuring or modeling these functions can be challenging. As a practical approach, the BLM considered species richness and diversity as useful proxies for ecological functions (Chapin III, Matson, & Mooney, 2002, pp. 268–277).

Vegetation management direction for the Horseshoe Ranch area is to improve deer winter range, allow riparian areas to naturally recover to Class II or better (term undefined), and allocate all forage to wildlife unless the BLM determines that livestock grazing would enhance wildlife habitat (USDI BLM, 1993, p. 33). Vegetation management direction for Jenny Creek is to allow riparian areas to naturally recover to Class II or better and close the Jenny Creek RNA to livestock grazing (USDI BLM, 1993, p. 34). In the absence of clear direction on how 4,038 acres of the BLM-administered lands in California are managed under the 1993 Redding RMP and for the purposes of this analysis, the BLM assumed these lands are and would be managed similar to lands in the Diversity Emphasis Area under the 2008 CSNM RMP. This assumption applies to Alternative A (No Action).

Most active vegetation management would occur in the Ecosystem Management Areas, although some management may occur in Congressionally Designated and Administratively Designated Management Areas. Most commonly, management actions in these areas would consist of habitat restoration, hazard tree removal, wildland fire management, and control of invasive plants. In nonforest vegetation areas, most vegetation management actions would occur in oak communities to enhance the presence of large oak trees, remove encroaching conifers, and control invasive plants in the understory; in grasslands to control invasive plants; and in riparian areas to control invasive plants and remove encroaching conifers, particularly to enhance potential beaver habitat.

Regardless of the alternative, the BLM would prioritize management activities within the EMA in areas that are highly departed from historical conditions. These areas likely require restoration or intervention to improve ecological function. The exact extent and distribution of these conditions are not fully known. Therefore, for this analysis, the BLM estimated the number of treatment acres per decade in the EMA by alternative. Specific details and assumptions related to these estimates can be found in Table N-2 in Appendix N.

Without modeling future wildfire explicitly, the BLM made certain assumptions regarding fire occurrence. For this analysis, the BLM assumed that wildfires would continue to occur at the same rate as observed during 2012 to 2022. On average, there were four wildfires per year of any size. In addition, the BLM assumed that large fires (greater than 1,000 acres) would continue to account for only one percent of the ignitions but most of the acres burned (USDI BLM, 2016b, Table 3-30, p. 227).

- On BLM-administered lands where active vegetation management is either prohibited or allowed but not planned, the BLM assumed the plant communities would continue along their current trajectory in the absence of additional disturbances, such as fire. While other disturbances are likely over time, the BLM cannot predict the specific types of disturbances, their timing, frequency, or severity—factors that could potentially alter trajectories (Chapin, III et al., 2002).
- On non-BLM-administered lands, the BLM assumed future distribution of nonforest vegetation structure and species compositions would continue to reflect the current structure and compositions. This assumption is consistent with the assumption used in the analysis of forest structure and spatial pattern in the 2016 Western Oregon RMP Final EIS, which describes the limitations on analyzing future changes on non-BLM-administered lands and is incorporated here by reference (USDI BLM 2016b, pp. 232–233).

This analysis focuses on the management direction for the EMA-DE, EMA-RH, invasive plant control methods, livestock grazing, habitat management for Franklin's bumblebee (representing all pollinators), recreation and visitor services, travel and transportation management, and wildland fire management (including prescribed fire and wildfire). Quantitative vegetation modeling isn't feasible due to insufficient data and models for nonforest vegetation. Consequently, the analysis relies on literature review, experience in similar ecosystems, and professional expertise. The BLM lacks quantitative data to support a more detailed description of species richness and diversity.

Management activities anywhere in the CSNM must protect cultural resource sites and special status species (refer to the management direction for Cultural Resources, Special Status Plants/Lichens/Fungi, Terrestrial Wildlife in Appendix E for more details). Management direction for all other resource programs is not expected to have any direct or indirect effects on nonforest vegetation species richness or functional diversity.

Affected Environment

Nonforest vegetation can be classified into general categories (Figure 3-81), each with specific variations (Table 3-64). Nonforest vegetation occurs primarily in the southern, far western, and eastern parts of the CSNM, including the Soda Mountain Wilderness. Dry and wet meadows, marshes, and swamps are scattered throughout the northern part of the CSNM. Grasslands are largely restricted to shallower soils not capable of supporting woody vegetation (USDI BLM, 2023a, p. 184). Collectively, this nonforest vegetation covers approximately 28 percent of the BLM-administered lands within the CSNM. Nonnative grasslands comprise 55 percent of the grassland category (refer to Map 3-2, General Vegetation Types in the CSNM).

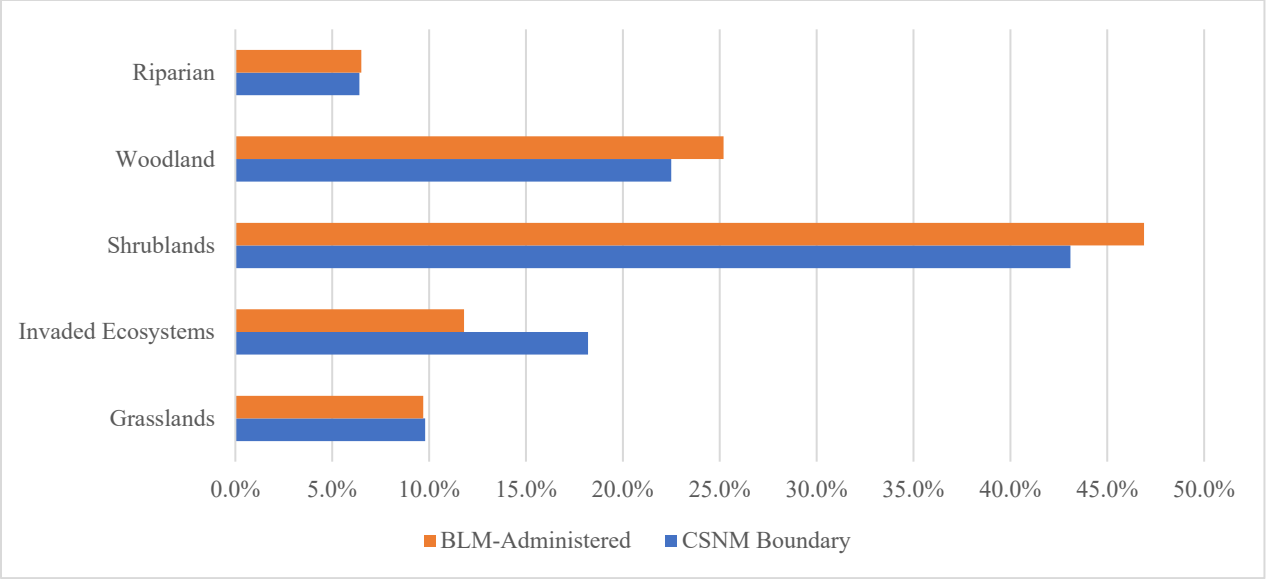


Figure 3-81. Percentage of general nonforest vegetation types within the CSNM as a whole and within BLM-administered lands

Table 3-64. Percent of nonforest vegetation by major plant community type*

Major Plant Community Type	CSNM	BLM-administered Lands
Grassland	**28.0%**	**21.5%**
Native Grassland	9.8%	9.7%
Invaded Grassland	18.2%	11.8%
Shrublands	**43.1%**	**46.9%**
Chaparral	37.2%	41.7%
Other Shrub	5.9%	5.2%
Woodland	**22.5%**	**25.2%**
Oak Woodland	20.9%	23.1%
Juniper Woodland	1.6%	2.1%
Riparian**	**6.4%**	**6.5%**
Riparian Woodland and Shrubland	4.4%	5.0%
Marshes and Swamps	2.0%	1.5%

*Due to how the vegetation was classified, the BLM was unable to distinguish the oak-conifer ecotone community type

**The vegetation classification used did not allow a breakout of Riparian Shrub and Riparian Woodland types

Shrublands tend to be patchy in distribution with chaparral, both evergreen sclerophyllous and rosaceous types, comprising roughly 89 percent of the shrubland category on BLM-administered lands. Other shrub types are minor components of the shrubland type. Sagebrush is very limited in extent and found mostly in California and the far eastern edge of the CSNM (USDI BLM, 2023a, p. 184). Poison oak thickets occur in association with annual grasslands and oak woodlands (Frost, 2017). Other shrubland communities often contain manzanita, mountain mahogany, or both, along with a variety of other species.

Mixed hardwood-conifer woodlands lie in the ecotone between nonforest and forest and may be classified either way, depending on which species are dominant and the stand density. Oak species present include Oregon white oak or California black oak, and conifer species present typically include ponderosa pine, Douglas-fir, and incense cedar. California black oak is more likely to co-occur with Douglas-fir and incense cedar while Oregon white oak is more likely to co-occur with ponderosa pine.

These nonforest communities have key characteristics in terms of species richness and general vegetation structural and functional composition that influence ecosystem functions (Table 3-65) (Craven et al., 2016; Isbell et al., 2018; Xu et al., 2020; Hong et al., 2022). For this analysis, the BLM characterizes structural composition using general plant traits such as rooting depth, resprouting versus seeding, and general life form. Table 3-64 lists the proportion within each general nonforest vegetation type (grassland, shrubland, etc.) for the CSNM as a whole and for the BLM-administered lands within the CSNM boundary.

Table 3-65. Key characteristics of the major nonforest community types under non-invaded conditions

Community Type	Species Richness	Diversity
Native grasslands		
Dry Grasslands	Moderate, grass dominated but can be forb rich	Deep- and shallow-rooted bunchgrasses Legumes Perennial and annual forbs Scattered shrubs (<10% cover) Biological soil crust
Wet Meadows	Moderate, near equal domination by grasses and forbs	Deep-rooted and rhizomatous grasses Legumes Sedges and rushes Perennial forbs
Subalpine Meadows	High, forb dominated	Sedges and rushes Perennial forbs Scattered low shrubs
Upland Shrublands		

Community Type	Species Richness	Diversity
Sclerophyllous chaparral	Moderate, dominated by evergreen shrubs	Obligate seeding evergreen shrubs N-fixing shrubs and legumes Perennial forbs Deep-rooted bunchgrasses Resprouting shrubs
Rosaceous chaparral	Moderate to High, dominated by deciduous shrubs	Resprouting deciduous shrubs Small trees Deep – and shallow-rooted bunchgrasses Perennial forbs Legumes
Mountain shrub	High near equal domination by resprouting and reseeding shrubs	Resprouting shrubs Reseeding shrubs Tall shrubs Short shrubs N-fixing shrubs and legumes Perennial forbs Deep- and shallow-rooted bunchgrasses Biological soil crust
Sagebrush	Moderate	Semi-evergreen obligate seeding shrubs Resprouting shrubs N-fixing shrubs and forbs Deep- and shallow-rooted bunchgrasses Perennial forbs Biological soil crust
Woodlands		
Juniper Woodland	Low to Moderate depending on juniper density, understory is grass and forb dominated	Evergreen conifer Obligate seeding shrubs Resprouting shrubs Deep- or shallow-rooted bunchgrasses Perennial and annual forbs
Oak Woodland	Moderate to High, grass dominated understory	Nut-bearing trees Deep- and shallow-rooted bunchgrasses Perennial forbs

Community Type	Species Richness	Diversity
		Legumes
Oak-conifer Ecotone	Moderate to High Grassy understory where oak is dominant, forb and shrub understory where conifers are dominant	Nut-bearing trees Evergreen conifers Deep-rooted bunchgrasses Legumes Perennial forbs
Riparian		
Riparian Shrubland	Moderate to High depending on stream order	Deciduous, resprouting shrubs and small trees Perennial forbs Shallow-rooted bunchgrasses Rhizomatous grasses
Riparian Woodland	Moderate to High depending on stream order and tree density	Tall, resprouting trees Tall, resprouting shrubs Rhizomatous grasses Sedges and rushes Perennial forbs
Marshes and Swamps	Low to moderate	Conifers (swamps) Shrubs Tall graminoids (cattails, bulrushes, etc,) Aquatic forbs

Invasive plants are non-native plants that cause or are likely to cause economic or environmental harm, as well as harm to human health. For this analysis, the BLM uses the term “invasive plants” to include noxious weeds, which are a subset of invasive plants that are county-, state-, or federally listed as injurious to public health, agriculture, recreation, wildlife, or any public or private property. Invasive plant species are widespread throughout the nonforest vegetation types, particularly in grasslands and oak woodlands (refer to Map 3-5, Documented Populations of Invasive Plant Species by Vegetation Type).

The most problematic plants pose serious threats to biodiversity and ecological functioning. They often thrive on disturbed soil, produce large quantities of seeds, and may have aggressive root systems that spread over long distances. Invasive plants compete with native species for resources like moisture, sunlight, nutrients, and space, leading to decreased species richness and diversity. Invasive plants have the potential to displace native species, transform plant and animal habitats, and alter ecological processes in plant and animal communities. Invasive plants are often early and prolific seeders and may produce fruits capable of long-distance dispersal by various means, such as wind, water, or animal transport. Disturbances that facilitate the spread of invasive plants include, but are not limited to, drought and wet periods, fire, wind, rising atmospheric carbon

dioxide concentrations, rising temperatures, agriculture (past or present), recreation use, development (infrastructure and structures), improper grazing (past or present), nitrogen deposition, movement of wildlife and livestock, and vehicles (land and water) (Chambers et al., 2019). The soil moisture and temperature regimes of most soils supporting nonforest plant communities indicate low to moderate resistance and resilience to invasion (Chambers et al., 2019; USDA, 2019).

The AMS (USDI BLM, 2023a), which is incorporated here by reference, provides detailed information and discussion of the current condition of invasive plants on the CSNM, including the representative invasive plant species selected for this analysis. The species selected for this analysis are the most common invasive species on BLM-administered lands within the CSNM (Table 3-66).

Table 3-66. Most problematic invasive plants of the Cascade-Siskiyou National Monument

Scientific Name	Common Name	Life Form	Longevity
Bromus tectorum	**Cheatgrass**	Grass	Annual
Centaurea debeauxii	**Meadow knapweed**	Forb	Perennial
Centaurea diffusa	**Diffuse knapweed**	Forb	Annual
Centaurea solstitialis	**Yellow starthistle**	Forb	Annual
Centaurea stoebe	**Spotted knapweed**	Forb	Biennial
Cirsium arvense	**Canada thistle**	Forb	Perennial
Isatis tinctoria	**Dyer's woad**	Forb	Perennial
Linaria dalmatica	**Dalmatian toadflax**	Forb	Perennial
Taeniatherum caput-medusae	**Medusahead**	Grass	Annual

Source: Records of documented invasive plants species in BLM's corporate GIS database Vegetation Management Action Portal (VMAP), accessed January 31, 2024; selection cut to occurring within the CSNM boundary, and crosswalked to the Oregon Department of Agriculture Noxious Weed List (ODA, 2022).

As invasive plant management is vitally important to maintaining ecological functioning, it is a concern across all vegetation types throughout the CSNM, but especially problematic in the nonforest vegetation communities. Throughout forested and nonforested plant communities, yellow starthistle and Canada thistle are the most prevalent invasive forbs, with 1,582 and 193 acres documented respectively (USDI BLM, n.d.[a]). These two species along with spotted knapweed are able to invade even undisturbed sites (Zouhar, 2001; Innes & Zouhar, 2021; Bielski, 2022). Dyer's woad, Dalmatian toadflax, spotted knapweed, and diffuse knapweed are also common on the CSNM. Invasive annual grasses such as medusahead and cheatgrass, have been observed across the CSNM in a variety of vegetation communities, yet infestations have not been surveyed in entirety. On Map 3-5 much of the Invaded Ecosystems Vegetation Type is assumed to be infested with annual grass species, encompassing approximately 14,500 acres.

Little to no information is available on the extent of riparian and aquatic invasive species. The AMS indicates that reed canarygrass (*Phalaris arundinacea*) is present in Jenny Creek, but the extent of infestation is not known. Purple loosestrife (*Lythrum salicaria*) has been documented in the Rogue Valley but not in the CSNM (USDI BLM, 2023a, p. 141).

In the Integrated Invasive Plant Management for the Medford District Revised Environmental Assessment, the BLM estimated a 12 percent annual rate of spread of invasive plants (USDI BLM, 2018a). Currently, there are 1,858 documented net acres of invasive plant infestation, or 1.6 percent of the decision area. Thus, the 12 percent rate of spread would double the acreage to more than 3 percent of the decision area within six years. Since comprehensive and regular surveys for most invasive plant species, particularly annual grasses, have not been conducted, the BLM assumes that infestation and spread are much greater.

In the past three years, invasive plant treatments have consisted of manual pulling on 141 to 261 acres per year (USDI BLM, 2022e, 2023d, 2024) with no invasive plant control conducted in 2023 due to lack of funding (J. Brumm, personal communication, 21 August 2024). Volunteers have periodically hand-pulled yellow starthistle in the Mariposa Lily Botanical Area (USDI BLM, 2023d, p. 73). Targeted species include yellow starthistle, perennial pea, Dyer's woad, houndstongue, Canada thistle, and sulfur cinquefoil (USDI BLM, 2022e, 2023d, 2024). However, Dyer's woad and sulfur cinquefoil are taprooted (Zouhar, 2003b, 2009), Canada thistle spreads from underground roots (Zouhar, 2001), and perennial pea is both taprooted and rhizomatous (Brakie, 2020), which makes manual control methods likely ineffective.

The success rate of invasive plant treatments in the CSNM is not known. Control of invasive plants frequently requires treating the same area multiple times using multiple methods (DiTomaso, 2006b; Mosley & Roselle, 2006; Olson & Launchbaugh, 2006; Firn et al., 2013; Valliere, Balch, Bell, Contreras, & Hilbig, 2018). Reinfestation commonly occurs from the seedbank or from nearby untreated areas and control of one invasive plant may occur only to have another become dominant (Pearson, Ortega, Runyon & Butler, 2016; Innes & Zouhar, 2020, 2021; Innes, 2021; Innes, 2022; Zouhar, 2003a). Methods may include chemical control, fire, mechanical control, and biological control including targeted grazing. Although post-emergent herbicides have been used in the past in the CSNM, pre-emergent herbicides tend to be more effective at controlling annual grasses (DiTomaso et al., 2007; Lazarus et al., 2024) and may be used in the future. The current rate of invasive plant treatment is insufficient to control the spread, particularly since none of the recent treatments are aimed at invasive annual grasses and much of the CSNM remains untreated.

Current conditions of public lands that have been grazed for many decades are, in large part, a legacy of grazing practices prior to the Taylor Grazing Act and greater control of stocking levels and allowable forage utilization in permits and leases (e.g., Svejcar et al., 2014; Filazzola et al., 2020; Vernon et al., 2022, USDI BLM 2023a, p. 123). The BLM has reduced allowable stocking levels significantly since the 1800s (USDI BLM 2023a, p. 123).

As described in Section 3.12, Recreation and Visitor Services, recreational visits have been increasing since 2019, approaching an estimated 250,000 visits per year, although the actual number of annual visitors may be higher given the number of access points into the CSNM. The primary recreational activities in the area include hiking on the Pacific Crest National Scenic Trail and other trails in the area (e.g., Grizzly Peak, Hobart Bluff, Pilot Rock, and the Lone Pilot Trails); bicycling and mountain biking; camping at Hyatt Lake Campground and Surveyor Recreation Site; rock climbing at Pilot Rock; horseback riding; driving for pleasure; mushroom hunting; dispersed

camping; hunting throughout the decision area; and Nordic skiing and snowmobiling on miles of groomed trails in the winter.

The CSNM includes an estimated 58 miles of trails and 836 miles of roads on the BLM-administered portion with an unknown number of miles of roads on state, county, and private lands. Slightly over half of the BLM roads are native surface and 50 miles have a bituminous surface. Trails affect nonforest vegetation similar to the way roads do, but the effects are generally not as severe and some impacts do not occur, such as introduction of environmental toxins. Therefore, this analysis focuses on roads. The potential impacts of roads on nonforest ecological functioning include serving as conduits for the spread of invasive plants, fragmenting habitat and affecting propagule dispersal, and the introduction of environmental toxins. Additionally, many human-caused wildfires are associated with roads (USDI BLM, 2016b, p. 226; also refer to section 3.17, Wildland Fire Management).

Environmental Consequences

Common to All Alternatives

Limitations on burn timing within habitat for Franklin's bumblebee means prescribed burning would occur either in spring before green-up or fall after the grassland vegetation has cured. That timing is similar to a common timing of Indigenous burning (Frost & Sweeney, 2000; LaLande & Pullen, 1999; Lake, 2007; Muir & Hosten, 2006; Copes-Gerbitz, Daniels, & Hagerman, 2023).

Vegetation management is not expected to occur in marshes and swamps, juniper woodlands, mountain shrub, and sagebrush due to the small amount of these vegetation types under any alternative. The typical locations of these vegetation types suggest long return intervals for natural disturbance events (juniper woodland and sagebrush) or very rapid recovery following a natural disturbance (marshes and swamps and mountain shrub) or both (marshes and swamps). Natural events would continue to be the primary shapers of species richness and diversity in these community types.

Planting locally adapted seed of native species would enhance recovery of grasslands following fire and maintain or enhance species richness and diversity. Careful postfire evaluations would determine if seeding was necessary or if the community could naturally recover. Natural recovery usually requires more time than seeding, but seeding the wrong species of grasses can delay recovery (Davies & Johnson, 2017; Davies et al., 2021).

During operations for planned and unplanned fires, rare plants and fungi are protected from the adverse effects of fire to the extent practicable. The fire management plan includes practices intended to reduce the potential for invasive plant spread, such as requiring washing of vehicle undercarriages with capture of the wastewater, limiting off-road travel of fire vehicles, and post-fire restoration and rehabilitation requirements.

All alternatives call for the removal of unneeded roads from the network. Since the road network has been in place for many years to decades, many of the adverse impacts have already occurred and are part of the current condition. Appendix E outlines considerations for which roads to remove from the network, but until that planning occurs, the BLM cannot assess potential impacts to nonforest ecological functioning. Given the amount of private ownership within the CSNM and that the BLM must provide reasonable access to nonfederal landowners within the CSNM, closing enough roads to have a substantial impact on nonforest ecological functioning would be

challenging. Which roads and how roads are closed would be the main impact from roads on nonforest ecological functioning. Alternatives A and Alternative E (the Proposed RMP) explicitly include management direction to decommission or obliterate roads with no future resource management needs. Decommissioning or obliteration of roads may occur under Alternatives B, C, and D, but no management direction explicitly calls for such action. Management direction for Alternatives B, C, and the Proposed RMP provide for developing new public motorized travel routes and trails, but effects to nonforest species richness and diversity would need to be assessed at the implementation-level to determine site-specific impacts.

Where roads are placed in long-term closure, the roadbed remains in place for potential future use. The compaction can persist for decades, inhibiting what vegetation can establish and persist as well as typical road effects on surface and subsurface water flow, affecting species richness and diversity (Trombulak & Frissell, 2000). Fully decommissioning a road alleviates compaction through subsoiling, but that also disturbs soil and favors invasive plant introduction. Infiltration rates often take more than four years to recover, depending on soil type (Foltz, Rhee, & Yanosek, 2007). The general roadbed remains in place; however, with subsoiling changing infiltration rates, the impacts of the roadbed on surface and subsurface water flow is moderated. Obliterating a road restores the original land contours, but also carries a risk of the spread of invasive plants. Nearly all studies focus on forest roads where trees are replanted in the fully decommissioned or obliterated roadbed, so the impacts of road decommissioning or obliteration on nonforest species richness and diversity are less certain and largely unknown.

Alternative A (No Action)

The primary management focus for lands managed under the 1993 Redding RMP is improving deer winter range in the Horseshoe Ranch Wildlife Area and restricting wildfire response to suppression-only tactics. However, the plan allows for prescribed burning within grazing allotments and pastures on a rotational basis to maintain forage quality and quantity. The 2016 SWO RMP provides direction on managing invasive species (USDI BLM, 2016a, p. 93) and rare plants and fungi found in forests and nonforest vegetation types (USDI BLM, 2016a, pp. 106–107), including maintaining and restoring native species composition and vegetation structure in natural communities. The CSNM RMP (USDI BLM, 2008, pp. 48–49) provides management objectives for the Diversity Emphasis Area (DEA) to:

- Control the spread of noxious weeds and other invasive grasses;
- Improve riparian and wetland plant communities and habitats;
- Prevent the loss of fire-dependent plant species and communities; and
- Protect monument resources from fires originating on adjacent private lands while also reducing the risk of wildland fires spreading to residential properties in the wildland-urban interface.

Research published after the 2008 CSNM ROD was signed found that rejuvenation treatments for evergreen sclerophyllous chaparral may be unnecessary, as these shrub communities naturally maintain uneven-aged populations with continuous recruitment of new plants (Duren & Muir, 2010). Yet, local observations indicate that much of the chaparral on the Medford District contains high proportions of dead material, and many areas have not burned in over 100 years (Duren 2009; J, Volpe, personal communication, 21 August 2024). Duren and Muir (2010) acknowledge that more research is needed to better understand the ecology of chaparral in southwest Oregon.

Under Alternative A, an estimated 28,800 acres would potentially be available for treatment, assuming no treatment in marshes and swamps, juniper woodland, sagebrush, and mountain shrub communities. Not all acres likely need treatment, but the BLM cannot estimate how many acres that might be. The BLM assumed a minimum of 305 acres (2.4 percent) of the nonforest communities would be treated per decade (see Table N-2) with most of that likely going to reducing conifer encroachment in oak, thinning around large open-grown oaks, and reducing fuels in the WUI and along strategic locations (e.g., PODs and evacuation routes; refer to Wildland Fire Management Analysis Issue 1 for more details).

Woodlands

Based on vegetation modeling Early Development, Mid-development Open, and Mid-development Closed s-classes would eventually disappear and most of the oak would be in Late Development Closed (Figure 3-82). Late Development Open does not appear until year 100. This shift indicates that management of oak under this alternative would result in the long-term loss of early s-classes in the absence of natural disturbances. The consequences to species richness and diversity in the understory are poorly understood, but near complete dominance by a single s-class suggests some decline would occur and natural events would be necessary to maintain a mix of s-classes and the plant and animal species they support. Limits on the use of natural ignitions also limits the potential for that once-common natural event to help shape oak woodlands, although large wildfires managed under suppression strategies may still accomplish the same result. However, with suppression the default response with most wildfire starts, large wildfires are more likely to burn under more extreme conditions and could lead to loss of species richness and diversity where relatively recent fuels treatments had not occurred (USDI BLM, n.d.[a]).

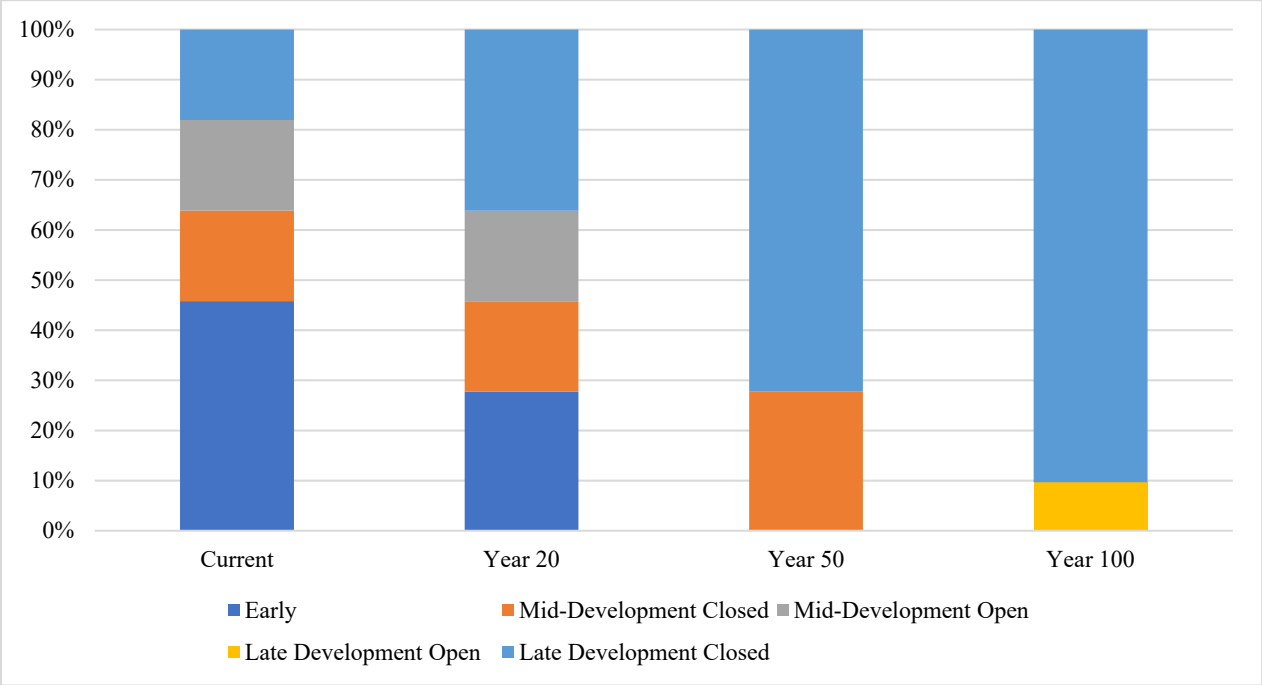


Figure 3-82. Mix of s-classes in oak woodlands over time with management and without natural events under Alternative A (No Action)

Shrublands

Alternative A promotes the use of pilot studies to assess the effects of different treatment methods and combinations of methods on chaparral age class distributions, regeneration, and species composition (USDI BLM, 2008, p. 52). Some treatment of chaparral may be warranted given the high proportion of very old chaparral and the apparent lack of younger age classes. The inclusion of chaparral in settings with shorter historical fire return intervals and observations of interactions between treatments and wildfires in oak chaparral suggests that chaparral in the CSNM may have been adversely affected by fire exclusion with unknown effects on species richness and diversity and habitat availability and quality (J. Volpe, personal communication, 21 August 2024).

Alternative A provides opportunities to use studies to evaluate how chaparral species richness and diversity may respond to different treatment methods as well as the effects of the interactions of treatments with natural events. Although use of natural ignitions is limited to the Soda Mountain Wilderness, better understanding how treatments as well as natural events affect patch size, age class distributions, recovery rates, and species richness and diversity could come from this alternative.

Grasslands

Although invasive plants can occur throughout the CSNM, most invasive species and the greatest extent occurs in grasslands. Similarly, the bulk of livestock grazing occurs in grasslands, although some also occurs in oak woodlands. Both invasive plants and livestock grazing are discussed under grasslands.

When one or more invasive species becomes dominant, it reduces species richness and both structural and functional diversity, thereby reducing ecological functioning (Zavaleta et al., 2010; Flores-Moreno et al., 2016; Wang et al., 2021). This alternative allows for the full suite of treatment options for controlling invasive plants even though three different documents provide the management direction. Native species are preferred for seeding and planting but the use of acceptable or desirable nonnative species would be allowed.

BLM Manual 6340, Management of Designated Wilderness Areas (pp. 1–47), defines invasive plant spread within designated wilderness as a human intervention in natural processes, adversely affecting wilderness character. Chemical control measures are allowed to restore wilderness character. Chemical control measures are also allowed in designated and eligible wild and scenic rivers, provided there would be no or only temporary adverse impacts to the outstandingly remarkable values. In all designations chemical control measures must follow the various Records of Decision listed under EMA (Common to All) governing the use of herbicides. Invasive plant management is not allowed in the Applegate Trail corridor or within set distances of the Pacific Crest Trail corridor.

Under Alternative A, the rate of invasive plant treatment would increase and potentially be aimed at both invasive grasses and forbs. The full range of treatment methods would also be available and more effective methods or combinations of methods may be used than just hand-pulling. Assuming the BLM were to return to treating 1000 to 2000 acres per year as occurred at least up to 2008 (USDI BLM, 2008, p. 50), some measure of control of invasive plants would be feasible, restoring species richness and diversity to part of the nonforest vegetation. Pilot studies would be used to assess the effectiveness of different control methods and combinations of control methods as well as the use of seeding or planting locally adapted native species as called for in the 2008 CSNM

RMP (USDI BLM, 2008, p, 51). Roads, trails, areas of high recreation use, areas of high intensity livestock use, and the National Historic and Scenic Trail corridors would remain as potential corridors or locations for reinvasion and new invasions.

Livestock grazing would continue with current practices. These include light to moderate utilization with a limit of no more than 60 percent utilization of available forage, placement of supplements to distribute cattle, annual maintenance of range improvements, including exclosures, and a mix of season-long and limited seasons of grazing, depending on the allotment. Refer to Section 3.7, Livestock Grazing for more information.

Although not specified in the three RMPs, often modern grazing practices are based in a utilitarian approach, aiming for even use of the entire allotment or pasture (Fuhlendorf, Engle, Elmore, Limb, & Bidwell, 2012). Homogeneous pastures and allotments are associated with decreased species richness and diversity (Toombs, Derner, Augustine, Krueger, & Gallagher, 2010; Fuhlendorf et al., 2012; Morris, 2021). Season-long grazing is more likely to result in adverse impacts to species richness and diversity, increasing risks of invasive plant spread (Freitas et al., 2014; Copeland et al., 2021; Vernon et al., 2022).

Buck Lake, Conde Creek, Deadwood, Dixie, and Grizzly allotments include exclosures to protect riparian areas, springs, aspen, Mardon skipper habitat, mollusks, western pond turtle, sensitive plants, and Oregon spotted frog. Assuming these exclosure fences are properly maintained, these exclosures protect hotspots of species richness and diversity. Invasive plants are documented in most allotments, although there is no data for Buck Lake, Buck Mountain, or Fall Creek allotments. The impact that current livestock grazing practices have on invasive plant presence and spread is unknown. Since the perennial invasive plants, such as Canada thistle and perennial pea, can spread into undisturbed areas, livestock grazing may not be a factor in their spread.

While the current grazing practices may or may not be protecting or improving rangeland health, indirect evidence suggests these practices may not be improving species richness and diversity for many taxa, not just plants (Fleischner, 1994; Díaz et al., 2007; Fuhlendorf et al., 2012; Stahlheber & D'Antonio, 2013). Conversely, there is no direct evidence that current grazing is continuing to harm species richness and diversity either. Separating the effects of past grazing on species richness and diversity from current grazing is not possible since there are no areas within the CSNM that have never been grazed (Whitridge et al., 2015).

Riparian Areas

Riparian areas have been adversely affected by the combination of invasive plants, livestock grazing, beaver extirpation, and fire exclusion, along with a variety of activities that have affected water availability and quality. This analysis focuses on addressing the impacts of livestock grazing, beaver extirpation, and fire exclusion through management actions designed to address these factors. Riparian and aquatic invasive plants have not been surveyed extensively in the CSNM, thus impacts of proposed management actions cannot be addressed fully.

Under Alternative A, riparian areas are managed under the direction of the Aquatic Conservation Strategy (ACS) from the Northwest Forest Plan within the boundaries of the original CSNM (USDI BLM, 2008, pp. 58–62). The Oregon expansion area is managed under a different set of riparian direction based on lessons learned from the ACS (USDI BLM, 2016a, pp. 75–77, 82–87). The 1993 Redding RMP contains little management direction for riparian areas, calling for natural

recovery to Class II, although Class II conditions are not defined in the plan (USDI BLM, 1993, p. 33).

Both the 2008 CSNM RMP and 2016 Southwest Oregon RMP allow for vegetation management (e.g. thinning and prescribed fire) to reduce the risk of high-severity fire and develop structurally complex stands with no-treatment areas defined. Both plans contain management direction to limit adverse impacts from livestock grazing in riparian areas. Both plans promote beaver restoration. Since no livestock grazing occurs on the Horseshoe Ranch, livestock would not hamper natural recovery of riparian areas but the presence of feral/wild horses might. The BLM does not have long-term monitoring data for riparian areas in Horseshoe Ranch to know whether natural recovery has occurred over the past 30 years or what impacts horses may be having.

Livestock exclosures along certain riparian areas have been constructed in both the original CSNM boundary and in the Oregon expansion area prior to either RMP. After exclosures had been in place for 10 years in the CSNM, Hosten and Whitridge (2007b) found improvements in the abundance of woody plants, less bare ground except around heavily used seeps, springs, and small sag ponds, increased beaver activity, and widening of some riparian zones. However, they recommended that additional changes in grazing practices were needed to reduce streambank erosion and restore proper functioning condition to the streams surveyed, but did not specify what those changes might be (Hosten & Whitridge, 2007b). Likely similar changes in riparian conditions have occurred in the Oregon expansion area where livestock exclosures have been installed. Management direction in both plans should provide for continued improvements in existing exclosures, provided fences are properly maintained, and similar improvements would be expected where any new riparian exclosures are constructed.

Recreation Use

As noted in Section 3.12, Recreation and Visitor Services, Alternative A provides for the most recreation use of all alternatives. The AMS also describes the current recreation uses and trends (USDI BLM, 2023a, pp. 143–147). The extent of plant collection would continue to be limited to personal use mushroom gathering. Firewood collection would continue to be limited to personal use for campfires, and infrequent use of packstock is expected to continue, primarily along the Pacific Crest Trail. Day-use horseback riding and cycling on existing roads and trail would continue to occur throughout the CSNM. Groups would be limited to no more than 25 people generally and no more than 12 people in the Soda Mountain Wilderness.

Damage to nonforest vegetation from visitor use would remain localized although new dispersed camping sites and expansion of existing dispersed camping sites may increase as visitor use increases. Areas most at risk of damage from any expansion of dispersed camping are riparian areas as most people prefer to camp near water and in shaded areas. Increased hiking and cycling on trails are likely to lead to more erosion, particularly on the more popular trails and trails poorly designed or not designed for mountain bike use.

The greatest threat to the species richness and diversity of nonforest vegetation from recreation use would be from the spread of existing invasive plants and introduction of new invasive plants. The level of this risk is unknown, although limits on group size would reduce the risks by limiting the potential for larger areas of trampled vegetation and soil compaction, factors which favor invasive plants.

Wildland Fire Management

Within the Oregon expansion area, the 2016 SWO RMP allows wildfire use for both lightning-caused fires and escaped prescribed fires to achieve resource objectives when expected fire effects align with the objectives for the underlying land use allocation and affected resources (USDI BLM, 2016b, p. 90). Prescribed burning is allowed to maintain or restore natural processes, native species composition, and vegetation structure (USDI BLM, 2016b, p. 106).

The 2008 CSNM RMP allows the use of prescribed fire but restricts wildfire response to suppression-only tactics on all lands. However, the 2012 Soda Mountain Wilderness Stewardship Plan modified that direction to allow use of lightning-caused fires within the designated wilderness. Prescribed fire is allowed to initiate conditions typical of historical conditions in the Diversity Emphasis Area, where most nonforest vegetation communities are located, but is limited to pilot studies no larger than 100 acres and must avoid riparian areas and sensitive plant locations (USDI BLM, 2008, p. 49–50).

The 1993 Redding RMP requires all unplanned fires be suppressed with modified suppression tactics used in ACECs, SRMAs, designated wilderness and wilderness study areas, and designated and eligible wild and scenic river corridors (USDI BLM, 1993, p. 15). Prescribed burning to maintain, enhance, or restore nonforest plant communities is not mentioned for the Horseshoe Ranch area (USDI BLM, 1993, p. 34).

By allowing wildfire use, the 2016 SWO RMP also provides potential opportunities to enhance what little nonforest vegetation is present, although the presence of large areas of private lands within the expansion area in Oregon greatly limits actual opportunities to use lightning-caused or escaped prescribed fires to meet management objectives. While the 2008 CSNM RMP provides clear guidance for restoring and maintaining nonforest species richness and functional diversity, the modified decision to disallow wildfire use outside of wilderness limits opportunities to use lightning-caused fires for improving nonforest vegetation condition. Monitoring Trends in Burn Severity (MTBS) data for the 2018 Klamathon Fire indicated a possible enhancement of nonforest vegetation condition in the southern part of the Soda Mountain Wilderness (USDA FS, n.d.[b]). The small size of the Soda Mountain Wilderness coupled with private lands within and close to the area greatly limits the opportunities to use wildfires. The full suppression direction for the California expansion area means no clear opportunities to use lightning-caused fires, although the modified suppression tactics required for the Jenny Creek ACEC could result in allowing fires to burn through the ACEC if the fire would cause less damage than suppression actions. Thus, while use of wildfires is permitted on over 42,000 acres of the CSNM, land ownership patterns and the small size of the two unconnected areas likely means very few real opportunities to take advantage of that direction. Use of natural ignitions is unlikely to serve to maintain, enhance, or restore nonforest vegetation species richness and diversity.

Fuels management for the Oregon portion of the CSNM allows for the use of prescribed fire as a restoration tool throughout the nonforest community types, except for riparian areas within the original CSNM boundary. Within the original boundary, use of prescribed fire is limited to pilot studies to better understand the impacts and burns cannot exceed 100 acres in any one drainage and 200 acres annually (USDI BLM, 2008, p. 50). Limiting prescribed burning extent in any one drainage would help create the landscape heterogeneity needed to maximize species richness and diversity. Whether limiting prescribed burning to no more than 200 acres annually would accomplish the same effect is less clear if prescribed burning was used to control invasive plants

either solely or in combination with another treatment method. This effect would depend on the size of contiguous area where invasive plants are dominant. The expansion area in Oregon has no similar size limits, although such limits could be applied. The California expansion area neither explicitly allows nor prohibits the use of prescribed fire as a restoration tool. Use of fire to maintain, enhance, or restore species richness and diversity in nonforest vegetation would need to rely on prescribed burning.

Overall, under Alternative A, some improvement in species richness and diversity is expected, assuming increased successful control of invasive plants. Testing additional treatment regimens in both invasive plants and chaparral would provide opportunities to further enhance species richness and diversity. Treatments to reduce conifer encroachment into oak and thinning around remaining large oaks would aid in preserving the presence of California black oak, increase acorn production, and enhance understory species richness and diversity provided invasive plants were controlled. However, invasive plants are still likely to remain within the CSNM and become a permanent part of the overall species composition. The trajectory for oak woodlands would result in lower species richness and diversity in that community type in the absence of natural disturbances.

Alternative B

Under Alternative B, the BLM's management approach for EMA-DE, which is comprised of nonforest plant communities such as grasslands, shrublands and oak woodlands, is substantially similar to the 2008 CSNM RMP (USDI BLM, 2008). The BLM's management direction focuses on conducting prescribed burning and thinning in oak woodlands. The proposed management direction is based on experience and monitoring of treatment results across the Medford District and recent research on managing oak communities and chaparral. For example, thinning around legacy oaks and oaks with larger but decreasing crowns would maintain the existing large-crowned oaks and allow expansion of oak crowns, increase acorn production, and enhance understory species compositions (Devine & Harrington, 2006; Devine & Harrington, 2013; Devine, Harrington, & Peter, 2007).

Incorporation of Indigenous practices as an allowable treatment method provides opportunity to test and learn techniques not previously tried. Chaparral treatment in the WUI/Fuels emphasis area would be more intensive than outside these areas, but some treatment may occur in the grassy patches within chaparral stands to maintain growing space for some special status plants and maintain species richness.

Under Alternative B, the BLM assumed it would treat an estimated 20 percent per decade of nonforest vegetation that needs restoration, or a minimum of 5,379 acres per decade, principally in oak woodlands, chaparral, riparian areas, WUI and strategic routes, and invasive plants. Additional acres of invasive plants may be treated if the BLM were able to increase treatments to 1,000 to 2,000 acres annually. At a minimum, approximately 16,175 acres of nonforest vegetation needs treatment to control invasive plants.

<u>Woodlands</u>

Over time four of the five s-classes would be present in oak woodlands, lacking only the Early s-class (Figure 3-83). However, historically the Early s-class would have been difficult to recognize and likely occurred in very small patches associated with loss of a single, large open-grown oak. By year 100, the mix of s-classes in oak woodlands may more closely resemble the historical mix, although the historical information lacks sufficient detail to be certain. Late Development Open

does not appear until year 100 in the absence of natural events. Since this alternative also allows for the use of natural ignitions, Alternative B provides the highest probability that lightning-caused fires would aid in the restoration of a mix of s-classes in oak communities, even though the probability of using natural ignitions remains low due to the mix of public and private lands within the CSNM. As with Alternative A, fuels management and other restoration activities that interact with wildfires may also aid in providing and maintaining a mix of s-classes.

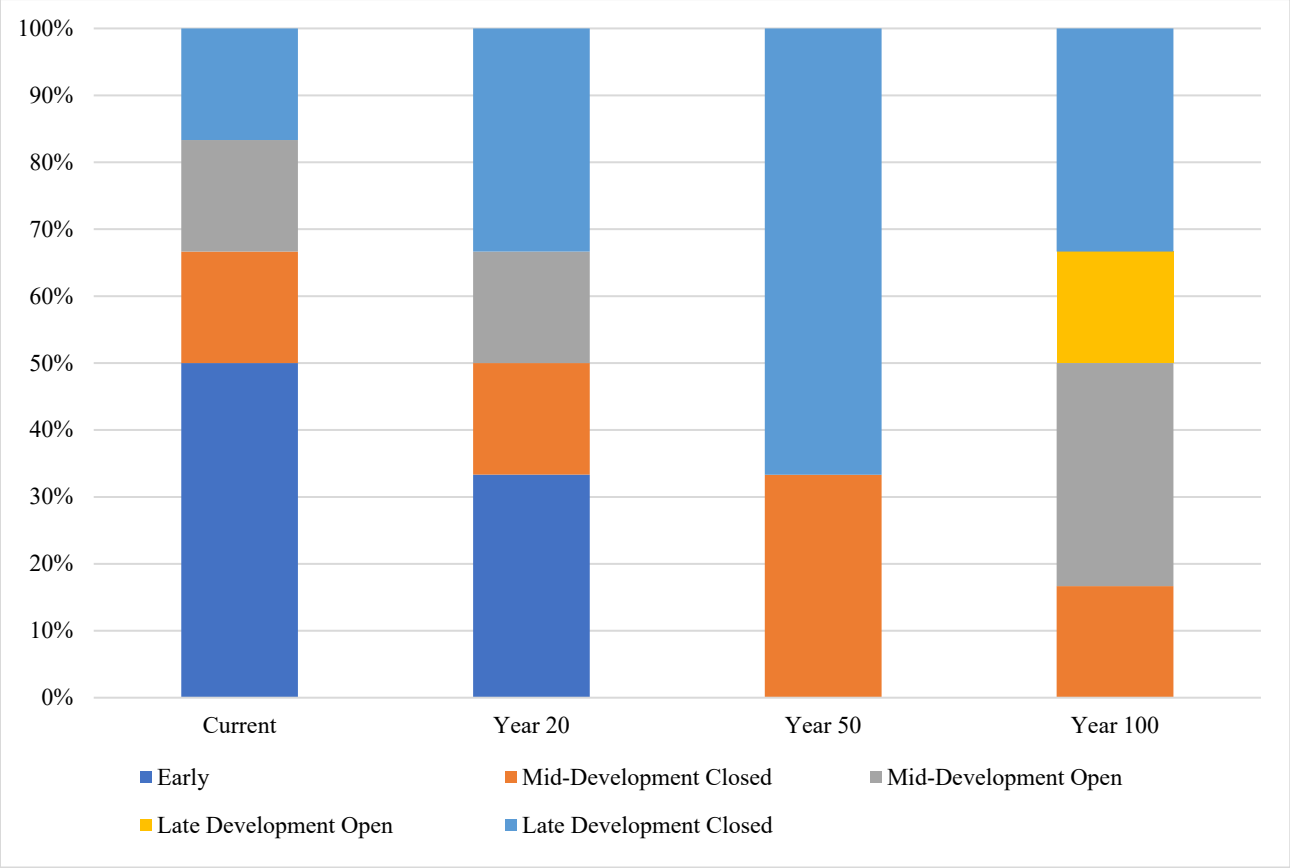


Figure 3-83. Mix of s-classes in oak woodlands over time with management and without natural events under Alternative B

Assuming the BLM uses the full suite of invasive plant methods, better control is possible of at least the most problematic species in the known locations, particularly if the treatment rate were increased substantially and multiple methods were used. Combining methods often leads to better control than application of a single method (DiTomaso, 2006b; Mosley & Roselle, 2006; Olson & Launchbaugh, 2006; Firn et al., 2013; Valliere et al., 2018). Effective control followed by seeding and planting should aid in maintaining and potentially improving species richness and diversity and reducing the risk of further spread where vegetation management and wildfire suppression activities occur. Post-fire management of invasive species risks would reduce the risk of further spread or attainment of invasive species dominance. However, careful evaluation would be necessary to determine if such actions were needed and whether natural recovery would prevent invasive species from gaining dominance (Keeley, 2006; Davies et al., 2021).

Shrublands

Management of chaparral would be similar to Alternative A. Although Alternative B does not explicitly call for the use of pilot studies, use of that or a similar approach would allow for testing different methods of treating chaparral and studying the impacts of methods on species richness and diversity over time as well as provide opportunities to better understand how restoration treatments in chaparral may interact with natural events to affect species richness and diversity.

Grasslands

Under Alternative B, the BLM's management approach for livestock grazing includes the incorporation of outcome-based principles, such as using grazing plans to adjust the timing, intensity, duration, and frequency of grazing including the use of checkpoints and triggers, and maintaining plant community heterogeneity (Jablonski et al., 2024). Recent studies indicate that grazing based on promoting landscape, allotment, and pasture heterogeneity can increase species richness and diversity across a wide range of taxa (Toombs et al., 2010; Fuhlendorf et al., 2012; Morris, 2021). While the BLM cannot determine exactly when or where grazing practices may change under these alternatives (see Appendix Q for the assessment process), the literature identifies certain practices that can promote species richness and diversity, although results are not certain (e.g. Jablonski et al., 2024). A key factor is to develop shifting mosaics of plant structure over time by varying stocking rates and grazing intensity and moving water sources and supplements to adjust livestock distribution (Toombs et al., 2010). Creating heterogeneity means some areas could be considered overgrazed while other areas are only lightly grazed or ungrazed; it also means not managing for any one condition, state, phase, or successional stage (Toombs et al., 2010; Fuhlendorf et al., 2012). The use of outcome-based grazing management is expected to increase species richness and diversity, particularly if some grazing was directed specifically at controlling invasive plants under the principle of prioritizing ecological health.

Riparian Areas

Increasing riparian and mesic/wet meadow species diversity may require somewhat different approaches than on uplands, although adjusting the intensity, timing and spatial distribution of livestock here is as important as it is in creating heterogeneity in the uplands (Frietas et al., 2014; Svejcar et al., 2014). For riparian and mesic/wet meadow species richness and diversity, reducing livestock access, limiting the duration of grazing and utilization of forage and willows, and using rotational grazing with herding are more likely to improve riparian vegetation (Frietas et al., 2014; Vernon et al., 2022). Unlike in uplands, there is little evidence that livestock grazing can improve the ecological functioning of riparian areas and mesic/wet meadows (Vernon et al., 2022).

The BLM's application of these grazing management practices would improve species richness and diversity over time, although effects may not be evident for five years or longer (Whitridge et al., 2015). Maintaining existing exclosures and installing new exclosures, where needed, would improve riparian ecological functioning in the CSNM, but changes may not be evident for five to ten years or longer (Hosten & Whitridge, 2007b; Frietas et al., 2014). Outcome-based grazing management would build on improvements in riparian conditions already documented with exclosures (Hosten & Whitridge, 2007b).

Removing conifers and favoring hardwoods in locations suitable for beaver or beaver reintroduction is expected to aid in the expansion of riparian areas and riparian-associated plant species as the water table increases behind beaver dams. In more open riparian areas, monitoring may be needed to quickly identify and treat riparian invasive species such as reed canarygrass and purple loosestrife.

Recreation Use

Under Alternative B, the BLM would designate recreation management areas (RMAs) and allow the development of new recreation opportunities within them to address growing recreational demands. New recreational developments would be limited to trails, trailheads, and toilets in four ERMAs. Most of the CSNM would be open to equestrian use and cycling. Appendix M, Recreation Management Area Frameworks, describes the types of activities and developments that would occur within each RMA. Unless a specific recreational activity is prohibited, it is allowed to occur if it does not damage CSNM objects and values. There are no limits on group size.

As with Alternative A, the greatest risk to nonforest vegetation species richness and diversity would be from the spread of existing invasive plants and introduction of new invasive plants. Developing new trails and trailheads provides for additional points and corridors for invasive plant spread and introduction given the amount of soil disturbance that occurs with construction and use. Following the recreation-related best management practices outlined in Appendix I is expected to limit the potential for spread of aquatic and riparian invasive species during trail construction. The level of risk is unknown and the lack of limits on group size increases the risk for large areas of trampled vegetation and soil compaction.

Wildland Fire Management

Use of natural ignitions is allowed across the decision area. Allowing use across the entire CSNM opens opportunities to use lightning-caused fires to maintain, restore, or enhance species richness and diversity, but also carries a higher risk to private property in the WUI and for invasive plant spread. However, few lightning-caused fires occur in the so-called shoulder seasons (late spring and fall) when wildfire use is more likely.

All wildfires, regardless of the management response, result in fireline construction and other suppression actions to keep the fire away from sensitive resources and private property. Availability of emergency funds for post-fire restoration and rehabilitation is very limited following use of natural fires, as available funding within DOI is significantly less than the need created by wildfires receiving a suppression response. Landownership patterns would still limit the decision space for using lightning-caused fires. This alternative increases the probability that some lightning-caused fires would be used to maintain, enhance, or restore species richness and diversity.

When it comes to the use of prescribed fire for nonforest vegetation species richness and diversity purposes, Alternative B focuses on oak woodlands, chaparral, tree-encroached meadows, and riparian areas. Grasslands are not specifically included in the acreage estimate but prescribed burning for restoration is not prohibited either. The primary purpose for treating oak woodlands would be to reduce conifer encroachment and enhance older, large-crowned oaks; enhancement of understory species richness and diversity may also occur. Some riparian areas might benefit from prescribed burning, but site-specific information is needed to make that determination.

Grasslands and grass understories are the main nonforest community type that could benefit from prescribed burning as a restoration and maintenance tool, but they are also the most heavily invaded by annual grasses and other invasive plants. Fire-dependent and adapted rare and sensitive plants may continue to decline due to lack of needed disturbance. Relatively intact grasslands that are not grazed would likely be at higher risk of bunchgrass loss and increases in invasive plants following a wildfire. Prescribed burning in conjunction with other treatment methods may be needed to control the invasive plants.

Given the combination of thinning to reduce conifer encroachment and competition around large oaks, at least pilot studies of treatments in chaparral, invasive plant control efforts and use of outcome-based grazing in grasslands, and additional grazing exclosures in riparian areas along with a variety of measures that would enhance beaver habitat, Alternative B is the most likely to result in increases in nonforest species richness and diversity. Greater increases would be possible if the BLM was able to significantly increase the annual acres of invasive plant control efforts, use multiple methods, and potentially use targeted grazing as part of outcome-based grazing management. If the BLM was not able to increase invasive plant treatment rates, improvements in species richness and diversity in grasslands may be minimal and more uncertain.

Alternative C

For Alternative C, the BLM's management approach is the same as Alternative B, but the minimum treatment rate of 10 percent of nonforest vegetation in the EMA-DE per decade is half the rate of Alternative B.

Woodlands

As in Alternative A, over time the oak woodlands become dominated by Late Development Closed (Figure 3-84). Late Development Open does not appear until year 100 and at a lower level than Alternative A. The Early s-class disappears by year 50. With the eventual loss of the earlier s-classes, oak woodlands would become less diverse, potentially with lower species richness and diversity in the understory.

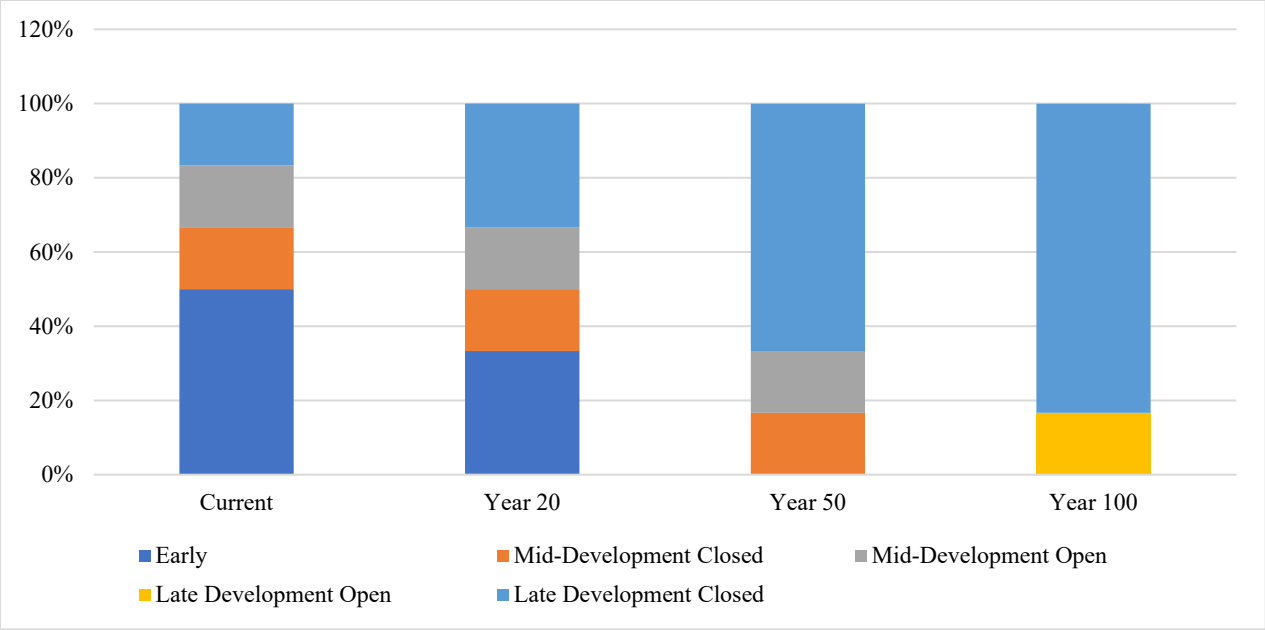


Figure 3-84. Structural stages in oak woodlands over time with management and without natural events under Alternative C

Shrublands

Proposed management for chaparral is the same as under Alternative B with the same effects and opportunities expected, although at a lower level.

Grasslands

Under Alternative C, chemical control measures would be allowed in ADMA-Lands with Wilderness Characteristics, provided such activities would reduce wilderness characteristics only temporarily and wilderness characteristics are protected over the long term. Under Alternative C, effects of using outcome-based livestock grazing principles are expected to produce the same results as under Alternative B. However, reduced treatment rates of invasive plants likely would not be sufficient to maintain the status quo. Invasive plant spread would continue except possibly where targeted grazing was used to control certain species under outcome-based grazing management and if the BLM was able to substantially increase invasive plant treatment rates to levels near those conducted prior to 2008.

Riparian Areas

The combination of maintaining existing grazing exclosures in riparian areas and adding new ones, use of outcome-based grazing practices, and enhancement of beaver habitat would increase species richness and diversity in riparian areas.

Recreation Use

Under Alternative C, the BLM would not allow the development of new recreation opportunities and focus instead on maintaining the quality of existing opportunities that did not adversely affect CSNM objects and values. Alternative C would have one less ERMA than Alternative B and

increase the Buck Prairie ERMA by 3,844 acres. New recreational developments would be limited to trails, trailheads, and toilets in four ERMAs to handle increasing visitation. Most of the CSNM would be open to equestrian use and cycling. In Appendix M, Recreation Management Area Frameworks, the BLM describes the types of activities and developments that would occur within each RMA. Unless a specific recreational activity is prohibited, it is allowed to occur if it does not damage CSNM objects and values. There are no limits on group size.

As with Alternatives A and B, the greatest risk to nonforest vegetation species richness and diversity would be from the spread of existing invasive plants and introduction of new invasive plants. Developing new trails and trailheads provides for additional points and corridors for invasive plant spread and introduction given the amount of soil disturbance that occurs with construction and use. Following the recreation-related best management practices outlined in Appendix I is expected to limit the potential for spread of aquatic and riparian invasive species during trail construction. The level of risk is unknown and the lack of limits on group size increases the risk for large areas of trampled vegetation and soil compaction.

Wildland Fire Management

This alternative is very similar to Alternative B except wildfire use is not allowed in WUI. While suppression action would likely have been taken anyway within WUI, prohibiting wildfire use reduces the opportunities to use lightning-caused fires, particularly near Highway 66 and along a north-south band that roughly bisects the northern portion of the CSNM. Opportunities would be higher south of Highway 66, in the Klamath Falls portion of the CSNM, and east of Hyatt Reservoir. Should the private landowners east of Hyatt Reservoir be willing to allow fire to burn across their property, opportunities to use lighting caused wildfires would be similar to Alternative B. In the absence of such agreements, the ability for wildfire use to improve nonforest vegetation species richness is less than Alternative B but greater than Alternative A.

The use of prescribed fire as a restoration tool is the same as Alternative B with the same expected effects. The primary difference would be the slower rate of treatment.

Alternative C is less likely to result in widespread improvement of species richness and diversity in woodlands and grasslands than Alternative B and potentially similar improvement in riparian areas compared to Alternative B and in shrublands compared to Alternative A. Given the extent of invasive annual grasses and forbs in grasslands, unless the BLM was able to substantially increase invasive plant treatment rates closer to what occurred prior to 2008 and used targeted grazing to control some invasive plants as part of outcome-based grazing management, invasive plant spread would likely continue. If the BLM were able to increase invasive plant treatment rates, especially using multiple methods, and use targeted grazing, then maintaining at least the status quo in invasive plant extent may be possible with some localized reductions.

Alternative D

Alternative D relies primarily on a passive approach to vegetation management. The BLM assumed no treatment would occur in marshes and swamps, chaparral, sagebrush, juniper, and mountain shrub. The BLM would treat a minimum of 5 percent, or 1,217 acres of nonforest vegetation per decade, primarily in oak woodlands, WUI, strategic locations for wildfire, and invasive plants. Since chaparral would not be treated, the potential land base on which treatment might occur would be half of the entire nonforest land base. Thus, actual treatment rates would be closer to Alternative C than otherwise appears.

Woodlands

Under Alternative D, all oak woodlands would ultimately transition to Late Development Closed by year 100, and Late Development Open would not occur at all (Figure 3-85). This eventual loss of all other s-classes is likely to diminish species richness and diversity. The creation or maintenance of a mix of s-classes would depend on natural events. Because Alternative D mandates a suppression response to all natural ignitions, the only ecologically significant fires would occur under more extreme conditions, leading to uncertain impacts on species richness and diversity, as well as an increased risk of invasive plant spread in the understory.

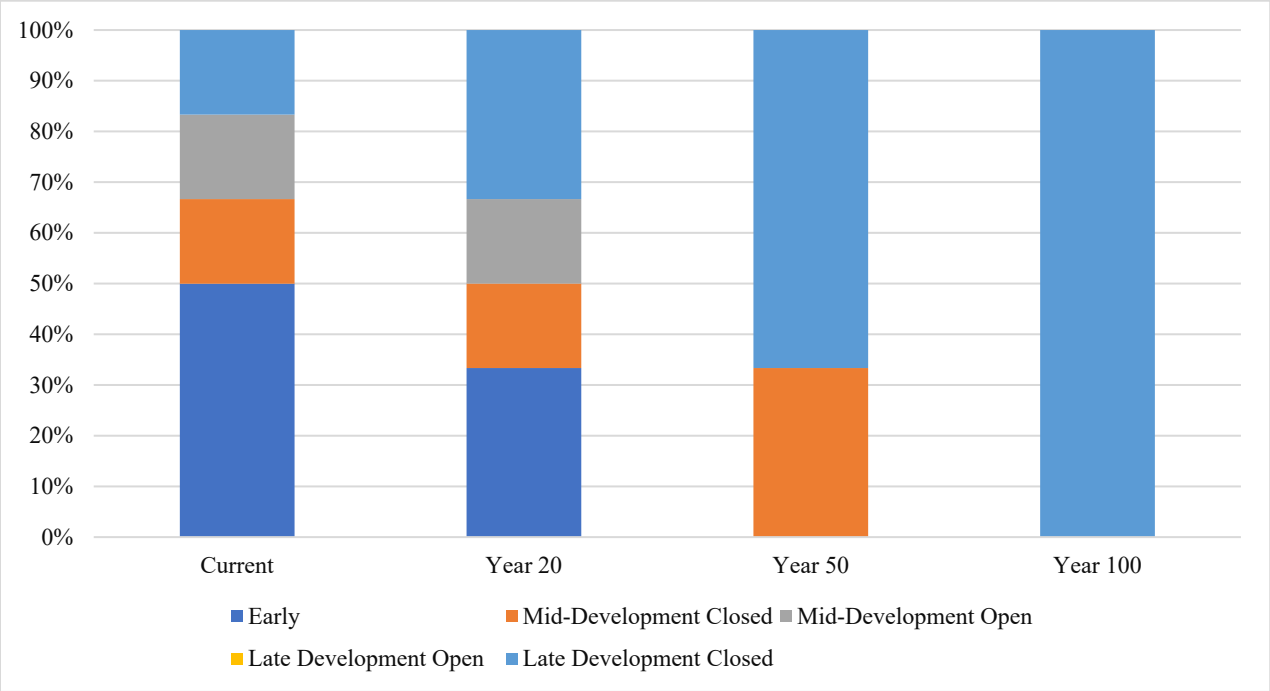


Figure 3-85. Structural stages in oak woodlands over time with management and without natural events under Alternative D

Shrublands

No treatments would take place in chaparral, so age class, structural, and species diversity would rely entirely on natural events. The potential impacts on species richness are uncertain. Alterations in patch size, age classes, structure, and species composition would depend solely on these natural occurrences. Since any unplanned fires would require a suppression response, ecologically significant fires would likely only burn under extreme conditions, leading to unpredictable effects on species richness and diversity.

Grasslands

No estimated treatment rate for invasive plants was established for Alternative D and grasslands were not targeted for restoration treatments. Some treatment likely would occur regardless, but most likely at the small scale used in recent years and aimed at a few invasive forbs only. Biological and chemical control measures could occur only if no other methods were effective. For this analysis, the BLM assumed that no biological or chemical control measures would occur.

Limiting biological and chemical control methods would slow the rate of invasive plant control since the other methods typically take more time, are more expensive, and can result in greater adverse impacts such as soil disturbance. Effective control of invasive plants often requires use of multiple methods, including biological and chemical control (DiTomaso, 2006b; Mosley & Roselle, 2006; Olson & Launchbaugh, 2006; Firn et al., 2013; Valliere et al., 2018). Further, the minimum treatment rate of vegetation in nonforest and riparian plant communities would be well under the estimated spread rate of 12 percent per year.

Under Alternative D, the BLM would no longer manage lands as available for livestock grazing and grazing leases would be retired as the terms of individual leases expire. However, the effects of ending livestock grazing are complicated. Whether simply ending grazing would improve species richness and diversity is uncertain. Grazing exclusion may increase plant or animal abundance but have little or no effect on species richness and diversity (Whitridge et al., 2015; Nelson et al., 2011; Freitas et al., 2014; Filazzola et al., 2020). Certain plant and animal species would likely benefit but others may be harmed due to changes in habitat availability (Fuhlendorf et al., 2012; Filazzola et al., 2020). The absence of grazing can promote grasses over forbs, adversely affecting specialist pollinators (Filazzola et al., 2020). Five years after livestock grazing was ended in much of the original CSNM boundary, Whitridge et al. (2015) noted a decrease in species richness, increased plant height and invasive plant cover, and no change in invasive species richness in dry meadows. Bare ground also increased, but that occurred both inside and outside exclosures, suggesting climate as a causal factor (Whitridge et al., 2015).

Grazing is one of the few tools available to manage fine fuels at the landscape-scale (Svejcar et al., 2014). While grazing exclusion can increase herbaceous cover and plant height, it also increases fuel continuity and fuel accumulation in bunchgrasses, leaving them more vulnerable to mortality from smoldering combustion (Davies, Bates, Svejcar, & Boyd, 2010). This problem is more acute in areas where fire has also been excluded for long periods.

Grazing exclusion has had mixed effects on uplands, riparian, and aquatic habitats (Hosten & Whitridge, 2007b; Whitridge et al., 2015). Exclusion can improve some stream characteristics but have inconsistent effects on others with responses affected by the time since exclusion, whether exclusion was complete or not, and the local climate, geology, and soils (Hosten & Whitridge, 2007a; Krall & Roni, 2023). Similar mixed results can occur on uplands with inconsistent results varying due to environmental complexity, precipitation amount and timing, and site history, which is often poorly documented (Yeo, 2005; Whitridge et al., 2015; Price et al., 2022; Thomas, Davies, Mata-Gonzalez, Svejcar, & Clenet, 2022). Recovery of formerly grazed areas can take several decades even in largely intact communities, with few or no observable results in the short term (Anderson & Inouye, 2001; Allington & Valone, 2011; Marty, 2015; Price et al., 2022). In an eastern Oregon study no recovery of annual grass invaded ecosystems was seen even after 10 years of exclusion (Thomas et al., 2022).

Discontinuing livestock grazing would have little or no effect on the abundance and spread of invasive plants given the level of roads, trails, recreation use, and the risks associated with vegetation management and wildfire in facilitating the spread of invasive plants, as well as introducing new invasive species.

Riparian Areas

Riparian management direction is the same as under Alternatives A, B, and C with similar effects expected from management to enhance beaver habitat. While grazing would not occur, the degree to which species richness and diversity would increase is uncertain. Hosten and Whitridge (2007b) and Whitridge et al. (2015) documented mixed results from grazing exclusion from streams and wet meadows. After 10 years of exclusion from streams, Hosten and Whitridge (2007b) noted increases in riparian shrubs and trees, a shift from bare ground to grasses and forbs and then to woody plants, and increased beaver activity. Mature aspen declined for unknown reasons. Riparian areas expanded where beaver activity raised water tables in willow-dominated wide valley bottoms. However, there was little change around seeps, springs, and small sag ponds that were heavily used, likely due to soil compaction, and yellow starthistle increased around unused stock ponds (Hosten & Whitridge, 2007b).

In wet meadows after five years of grazing exclusion, no change occurred in species richness, invasive species richness, plant height, bunchgrasss cover or height, or shrub cover (Whitridge et al., 2015). Invasive species cover increased while native species cover, forb species richness, and native forb cover declined. Aboveground biomass increased, which likely resulted in greater root biomass belowground and changes in the soil biome along with increased soil carbon storage and soil water holding capacity (Whitridge et al., 2015). Vegetation inside and outside of exclosures became more similar. Removing grazing across the remainder of the CSNM would likely have similar effects in all riparian areas. Since species richness and diversity is naturally lower in wet areas due to high water tables, the most enhancement to species richness and diversity would occur by excluding livestock from riparian areas where they currently are not excluded.

Recreation Use

Under Alternative D, the BLM would designate fewer ERMAs with new development of trails and trailheads only allowed within the Green Springs Mountain Trail ERMA. Otherwise, the effects would be similar to Alternatives B and C. The risk of invasive plant spread and introduction would be lower with fewer trails expected for development. The lack of limits on group size increases the risk for large areas of trampled vegetation and soil compaction.

Wildland Fire Management

Under this alternative, use of natural ignitions is not allowed, so restoration of species richness and diversity in nonforest vegetation would depend on prescribed fire and any improvement that occurs as an effect of wildfires managed under suppression strategies, similar to what occurred in the Klamathon Fire.

The focus of prescribed fire in nonforest vegetation would be oak woodlands and tree-encroached dry meadows. Juniper woodlands, shrub communities, grasslands, and riparian areas would not be a focus, although some treatment of grass understories in oak woodlands may occur. Treatment rates would be very slow, increasing the uncertainty that landscape heterogeneity and species richness and diversity would be enhanced or maintained.

Under Alternative D, passive management is unlikely to enhance species richness and diversity and more likely to harm it as oak woodlands become increasingly dominated by a single s-class, treatment of invasive plants becomes restricted to potentially less effective and more expensive methods, grazing is eliminated, and all unplanned fires are suppressed. In many respects, this

alternative is similar to the current actual management of the CSNM, where vegetation management is minimal, if conducted at all. Invasive plants are spreading largely unchecked. Oak woodlands and chaparral are increasingly homogenous. Historical conditions were likely more species-rich and diverse in part due to active management by Indigenous peoples (LaLande & Pullen, 1999; Devine et al., 2007; Hosten et al., 2007; Hickman & Christy, 2011; Crawford et al., 2015; Copes-Gerbiz et al., 2017; Metlen et al., 2018; Haugo et al., 2019). Excluding grazing from all riparian areas is the only place where improvements to species richness and diversity are likely under Alternative D.

Alternative E (Proposed RMP)

The Proposed RMP is substantially similar to Alternative C for vegetation treatment rates, but no treatment would be planned in chaparral or in marshes and swamps, sagebrush, juniper, and mountain shrub communities. A minimum of 16,130 nonforest acres would be treated per decade. Although the Proposed RMP treats at the same nominal rate as Alternative C (10 percent), removing chaparral from the potential treatment base increases potential treatment rates in the remaining communities to near that of Alternative B.

Woodlands

Under the Proposed RMP, open and closed s-classes eventually are nearly equal, although the open category is a mix of Mid-Development and Late Development Open, with about twice as much Mid-Development Open than Late Development Open (Figure 3-86). As with Alternatives A, B, and C, the Late Development Open s-class does not appear until year 100. Early disappears by year 50, but historically the Early s-class may not have been present to any great extent or difficult to detect, as it may have depended on the eventual death of a single, large open-grown oak. Having a greater mix of s-classes suggests a high level of species richness and diversity in the understory as well. Natural events or additional management beyond the minimum could increase the abundance of the open classes, although at the expense of Late Development Closed and may result in greater presence of Early and Mid-Development Closed.

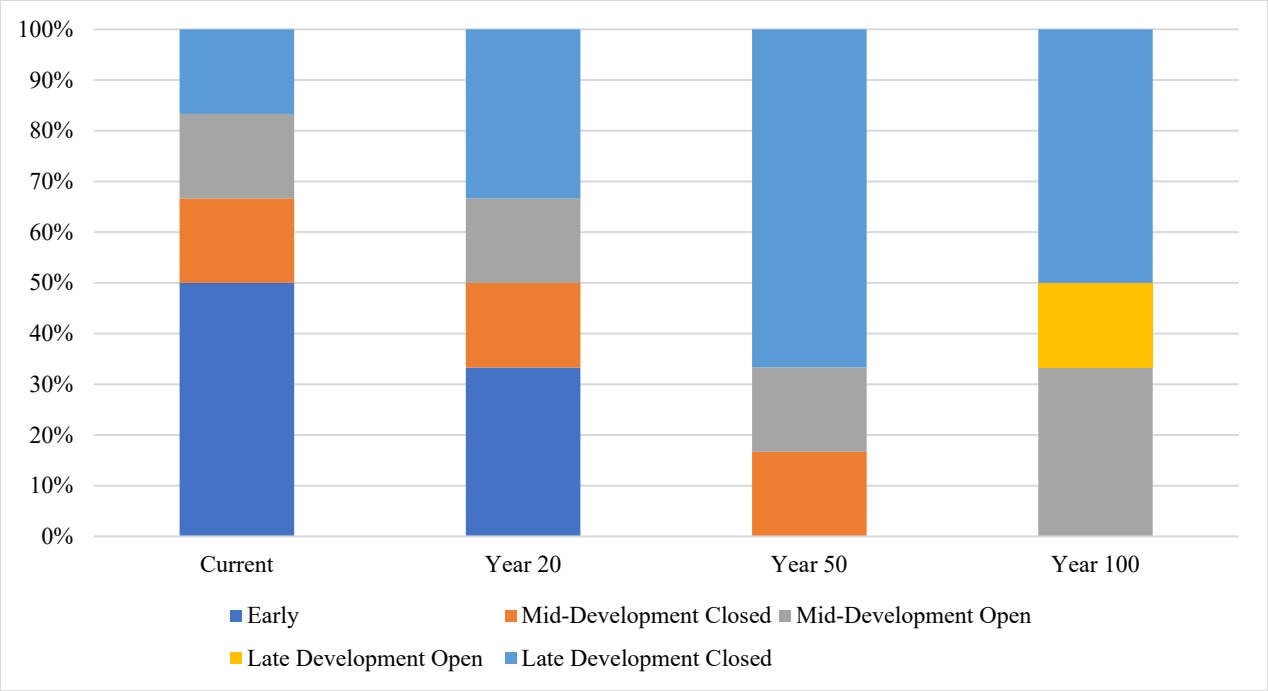


Figure 3-86. Structural stages in oak woodlands over time with management and without natural events under the Proposed RMP

Shrublands

As with Alterative D, chaparral would not be treated with the same effects expected over time.

Grasslands

The anticipated effect of the Proposed RMP is similar to Alternative C but allows for invasive plant management within the National Historical and Scenic Trail corridors. Management actions in ADMA-Lands with Wilderness Characteristics would protect wilderness characteristics, which would equate to treating them much like designated wilderness with invasive plant control, including chemical control, seen as essential for restoring wilderness character. The effects would also be similar to Alternatives A, B, and C but with a treatment rate closer to Alternative B. If the BLM were able to increase the treatment rate for invasive plants near that seen prior to 2008 and use targeted grazing of certain invasive species as a part of outcome-based grazing management, effects on species richness and diversity would be near those of Alternative B.

The Proposed RMP incorporates the same livestock management approach as Alternatives B and C, including the application of outcome-based grazing practices. The effects would be the same as described for Alternatives B and C.

Riparian Areas

The management of riparian areas is the same in Alternative E (Proposed RMP) as the other action alternatives, but it explicitly requires retention of deciduous riparian trees and shrubs when thinning conifers. With actual treatment rates closer to Alternative B, the BLM anticipates obtaining the same effects on riparian species richness and diversity.

Recreation Use

The Proposed RMP would result in similar effects from recreation use as described for Alternative C, with two exceptions. Under the Proposed RMP, the BLM would remove the Cottonwood Glades area from the Buck Prairie ERMA and close the area to public motorized access. Those actions would aid in reducing potential impacts from activities occurring in the Buck Prairie ERMA, including but not limited to the risk of trampling and spread or introduction of invasive plants in that area. The Proposed RMP also includes limits on group size, similar to the Alternative A, which would reduce the risks of creating large areas of trampled vegetation and soil compaction. As a result, the risks to nonforest vegetation ecological functioning are lower than under Alternative C.

Wildland Fire Management

Under the Proposed RMP, wildfire use is allowed outside of WUI. Although the configuration of WUI differs from Alternative C, the overall area available is similar. For example, no WUI would be designated within the Soda Mountain Wilderness while the width outside of the designated communities at risk is the same as Alternative D (120 feet from the public-private boundary for properties with a structure present). The overall potential to increase landscape heterogeneity and species richness and diversity is similar to Alternative C.

Prescribed fire as a restoration tool would be applied on the same basis as both Alternatives C and D with similar results expected. Treatment rates would close to Alternative B.

The Proposed RMP comes close to Alternative B in maintaining, restoring, and enhancing species richness and diversity. Oak woodland would have more diversity than under Alternative B, but chaparral would have less. The potential effects on species richness in grasslands and riparian areas would be similar to Alternative B.

Cumulative Effects

Whether any alternative would adequately restore or maintain species richness and diversity in accordance with the Presidential proclamations remains uncertain due to a variety of factors. Natural processes likely contribute to restoring and maintaining species richness and diversity, but the BLM cannot estimate the degree to which that may occur. Natural events other than fire that may affect nonforest vegetation have received little to no study and are not well described, or are not described, in the scientific literature. The two major cumulative effects that have been studied to some degree involve invasive plants and climate change.

Invasive plants readily move across the public-private boundary. Failure to control invasive plants allows for reinfestation of previously treated areas. Introductions of new invasive plants can occur on either public or private land and move across the boundary. Given the size of existing infestations and expected increases in potential vectors in the form of recreationists, movement from public to private land may be more likely than movement from private to public land. However, experience has shown that effective control of invasive plants in large areas and on landscapes has proven extremely difficult and expensive regardless of ownership.

Since treatment rates may be less than spread rates, invasive plants are a more or less permanent part of the CSNM. These species are a part of novel plant communities that would require a different approach to management goals and objectives that are relevant to these plant communities (Davies et al., 2021). Strategies could include:

- Focusing treatment on the leading edges, critical locations, such as in proximity to rare and sensitive plants, or where native communities are relatively intact;
- Altering grazing practices such as timing and duration, use of different species, or use of mixed species herds;
- Using acceptable nonnative species able to successfully compete with invasive species;
- Increase or improve native plant establishment rates through seed coats and source materials; and
- Reconsider when to resume livestock grazing after a disturbance or seeding.

Climate change increases the uncertainty that vegetation treatments would be effective at maintaining or restoring ecological functioning in nonforest vegetation. Precipitation variability and increasing temperatures favor invasive species over native species (Polley et al., 2013; Flores-Moreno et al., 2016; Archer et al., 2023). Grasslands and grassy understories could continue to shift towards a dominance of annual and biennial species that are more responsive to annual conditions (Flores-Moreno et al., 2016). Selection processes that favor dominance by one or only a few species would increase over complementarity processes, reducing species richness and trait diversity, and resistance to further change and disturbances (Wang et al., 2021). Continued species loss as invasive plants continue to spread and become more dominant would impair ecosystem functioning with impacts potentially unrealized until long after a given species or group of species was extirpated from the CSNM (Meyer et al., 2016). Maintaining multiple ecological functions requires maintaining a larger number of species and functional diversity (Zavaleta et al., 2010). Where management direction favors species richness and diversity, ecosystems would remain more stable even in the face of environmental change (Hong et al., 2022).

Climate change also is resulting in shifts in species ranges, although few herbaceous and shrub species have been studied. Species responses to climate change depend on more than just changes in temperature and precipitation regimes. Other important factors include seed or propagule dispersal distance, seed fecundity, time to maturity, interactions with other species, proximity of suitable habitat, and human land uses that fragment the landscape (Corlett & Wescott, 2023). Species with narrow ecological parameters are at greater risk of decline or loss unless the species can acclimate, adapt, or reach a climate refugium (Halofsky et al., 2022; Corlett & Wescott, 2023). Most plant species studied to date have only partly kept up with the rate of climate change or have failed to keep up (Corlett & Wescott, 2023). Since the CSNM is both naturally and anthropogenically fragmented, natural species migration is likely to be difficult or impossible for rare and endemic plants, and assisted migration may be needed in the future to preserve their presence.

Multiyear, severe droughts are likely to favor species that are deep rooted, have high water use efficiency, or growth patterns that better match precipitation seasonality (Polley et al., 2013). Projections of general vegetation change in southwest Oregon indicate that conifer forest would decrease and become more open, woodlands and shrublands would expand, and riparian areas would shrink under hotter and drier conditions. These changes would become more evident by 2050 due to increasing atmospheric CO_2 concentrations, altered precipitation regimes, warming temperatures, and more frequent disturbances such as drought, fire, insects, and disease (Halofsky et al., 2022).

Conclusions

Oak woodlands would see the greatest potential increase in species richness and diversity with four s-classes present over time under Alternative B and the next best with three s-classes present under the Proposed RMP. Alternative D would likely see declines in species richness and diversity with only a single s-class present. Alternatives A and C would result in less richness and diversity with only the two Late Development s-classes present and a dominance by Late Development Closed.

Shrublands would likely see similar improvements in Alternatives A, B, and C with the use of pilot studies to experiment with different restoration approaches. Although Alternatives B and C do not explicitly call for the use of pilot studies, there is nothing prohibiting the use of that approach. Shrublands would likely continue to see declines in the mix of age classes and potentially in species richness and diversity in the absence of restoration treatments. Natural events, primarily fire, may result in enhancement of species richness and diversity in chaparral, but that outcome is far less certain under Alternatives D and E (Proposed RMP) without some restoration treatments to potentially modify fire effects.

The outcomes in grasslands are less certain under all alternatives, although Alternative A has the greatest potential to see maintenance of the status quo or some improvements with respect to invasive plants due to the assumed treatment rate of 1,000 to 2,000 acres per year. Alternatives B and the Proposed RMP have similar potential to see at least some improvement, though possibly more localized than under Alternative A if targeted grazing of certain invasive plants is used as part of outcome-based grazing management. Even though the current minimum treatment rate under Alternative B and the Proposed RMP is less than under Alternative A, the BLM may increase the treatment rate if more funding becomes available. The outcome for grasslands is worst under Alternative D with the elimination of livestock grazing and severe limits on the use of chemical and biological control methods. Regardless of alternative, invasive plants are likely to remain a permanent part of the CSNM. The only question is how extensive they might be.

Enhancement of species richness and diversity in riparian areas would be similar under Alternatives A, B, C, and the Proposed RMP, although juggling the different types of management direction under Alternative A might be difficult, particularly for any riparian areas that span multiple RMPs. Enhancement of riparian area species richness and diversity would be greatest under Alternative D with the elimination of grazing in the Oregon expansion area. However, monitoring studies indicate that simply removing livestock grazing does not guarantee a return to pre-grazing conditions and functioning.

Collectively, Alternative B provides for the highest probability of improving ecological functioning, but the Proposed RMP comes close. The primary difference between the two outcomes is the potential for loss of ecological functioning in chaparral under the Proposed RMP. Alternative D would result in declining ecological functioning across the nonforest vegetation but improving functioning in riparian areas. Alternatives A and C would have similar outcomes in overall ecological functioning, although with its assumed greater treatment rates of invasive plants, Alternative A would have greater enhancement of ecological functioning in grasslands than Alternative C.

3.16. VISUAL RESOURCES

Key Points

- The No Action Alternative has the highest potential for degradation of visual resource values when compared with Alternative B, C, D, and E (Proposed RMP), all of which manage more acres in Visual Resource Management (VRM) Class I and II, and fewer acres in VRM Class III and IV.
- All action alternatives, including the Proposed RMP, are very similar in the degree of scenic quality protection, with the action alternatives being within 2.0 percent of managing lands under a more protective VRM class than the assigned Visual Resource Inventory (VRI) class. Every action alternative manages more lands, at a more protective VRM class, then the VRI class, with ranges of 3.2 to 5.3 percent of more protection than less protection. This means that every action alternative would see a beneficial change of scenic quality over time within the planning area, and the Proposed RMP (Alternative E) would provide the highest amount of scenic quality protections.

Analysis Issue

1. How would the alternatives affect visual resource values on BLM administered lands in the CSNM?

Visual Resources Analysis Issue 1

How would the alternatives affect visual resource values on BLM administered lands in the CSNM?

Summary of Analytical Methods

As part of the planning process the BLM performed an updated visual resource inventory within the decision area and established updated VRI Classes. The BLM evaluated the loss or protection of visual values (scenic quality, sensitivity levels, and distance zones) by each alternative from those identified during the VRI classification.

Under each alternative, the BLM evaluated acres proposed for management for each VRM class and analyzed how this management would affect existing visual resource values. Specifically, the BLM evaluated the effects on visual resource values by considering how management under the VRM class would likely change the existing character of the landscapes in a manner that could change the current acres in each VRI class over time. The identification of VRI classes is a calculation resulting from the combined rankings attributed to scenic quality, sensitivity levels, and distance zones. Of these three visual quality elements, land use planning decisions for this RMP would not influence decreasing sensitivity levels or changing distance zones. As such, the BLM focused this analysis on actions that could influence scenic quality only. Scenic quality is a measure of the visual appeal of a tract of land, which is graded based on these seven factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. The BLM assumed visual values to be negatively influenced on acres assigned to be managed under a less protective VRM class than the identified VRI class, since the less protective the VRM class, the higher the level of permissible visible change. For example, BLM-administered lands inventoried as VRI Class III are considered to have moderate visual values; management of these

lands under VRM Class IV, which allows for high levels of visible change, could adversely influence the inventoried characteristics of the natural landscape.

Analytical Assumptions

- Designating an area to a visual resource management class lower than the inventoried visual resource class would result in an adverse effect on visual resources. Conversely, designating an area to a visual resource management class higher than the inventoried visual resource class would result in a beneficial effect on visual resources over time.
- The more protection that is associated with the management of other resources and special designations, the greater the benefit to visual resources of the surrounding viewsheds.
- Management actions would not degrade lands identified as VRI Class I, because all acres identified as VRI Class I would be assigned to VRM Class I and thus managed for very low to no visual contrast.

Background

Public lands have a variety of visual values. These different values warrant different levels of management. Because it is neither desirable nor practical to provide the same level of management for all visual resources, it is necessary to systematically identify and evaluate these values to determine the appropriate level of management.

The Visual Resource Management (VRM) System is the inventory and planning actions taken by the BLM to identify visual values and establish objectives for managing those values. The BLM's VRM System consists of two distinct components:

- Visual resource inventory (VRI) classes (VRI Class I through VRI Class IV): identify the visual values.
- Visual resource management (VRM) classes (VRM Class I through VRM Class IV): establish the objectives for managing visual values.

The VRI process provides BLM managers with a means for determining visual values. The inventory consists of a scenic quality evaluation, sensitivity levels analysis, and a delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resources. Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of the least value. The inventory classes provide the basis for considering visual values in the RMP process. The BLM establishes VRM classes for BLM-administered lands through the RMP process. During the RMP process, the boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMPs. Visual management objectives are established for each class.

Inventory classes are informational in nature and provide the basis for considering visual values in the RMP process. Visual resource inventory data for the planning area are stored and maintained at the Oregon State Office's Geospatial Information Systems department. Inventory classes do not establish management direction and the BLM does not use them as a basis for constraining or limiting surface-disturbing activities, except for VRI Class I.

The BLM designates VRM classes through a resource management plan. Unlike VRI classes, which, except for VRI Class I, represent an area's existing visual value, VRM classes establish objectives, which prescribe the amount of change allowed through BLM management actions in the characteristic of the landscape. The allowance for noticeable change under VRM classes increases as the VRM class number increases:

- **VRM Class I:** The objective of this class is to preserve the existing character of the landscape. The level of change to the characteristic landscape would be very low and must not attract attention.
- **VRM Class II:** The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape would be low. Management activities may be seen but would not attract the attention of the casual observer.
- **VRM Class III:** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape would be moderate. Management activities would attract attention but would not dominate the view of the casual observer.
- **VRM Class IV:** The objective of this class is to provide for management activities, which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention.

Visual values identified through the visual resource inventory are considered with other resource values in the resource management planning process. The assignment of VRM classes can vary from the VRI class-placement except for VRI Class I areas, which is automatically assigned VRM Class I, but this does not exclude other lands from being assigned to a VRM Class I. For example, the BLM is not precluded from establishing a VRM Class IV on an area that inventoried as a VRI class of II or III. Outside of VRI Class I areas, the BLM is not required to generate land use allocations or other resource designations considered during planning based on the inventoried VRI class. For example, the BLM is not precluded from establishing the Wildland Urban Interface on an area that is inventoried as a VRI class of II. The BLM establishes visual management objectives through the allocations of VRM classes in conformance with the objectives of the designated land use allocations and other designations (e.g. Wild and Scenic Rivers, Special Recreation Management Areas, and Areas of Critical Environmental Concern) considered during planning. Appendix E, Objectives and Management Direction, contains details of the objectives and management direction for the assignment of VRM classes.

Affected Environment

Table 3-67 and Figure 3-87 displays the current distribution of VRI classes in the decision area.

Table 3-67. Visual Resource Inventory Class by acres

VRI Class I*	VRI Class II	VRI Class III	VRI Class IV
26,231	79,140	7,095	1,037

*The BLM assigns this class to areas where the management goal is to preserve a natural landscape. Unlike other VRI classes, VRI Class I is assigned for a preexisting preservation management objective rather than for the existing condition of visual resources.

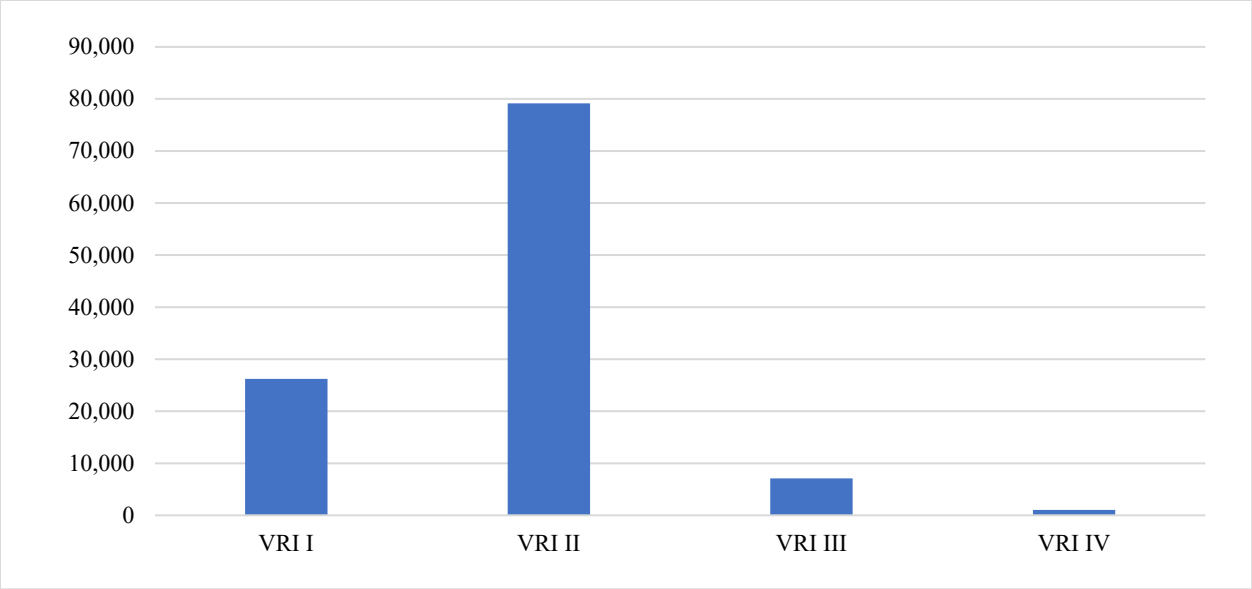


Figure 3-87. Visual Resource Inventory Class by acres

Environmental Consequences

All surface-disturbing activities, regardless of the alternative or management action, would be subject to the objectives of the underlying land use allocation and management areas. The visual resource contrast rating system analyzes the potential site-specific impacts of surface disturbance and facility design and placement on an area's visual components. The BLM would design surface-disturbing activities and facilities to mitigate visual effects and conform to the area's assigned VRM class objective.

Degradation of scenic qualities would potentially occur from surface-disturbing activities, such as those associated with timber harvest, vegetation management for human health and safety, or construction of roads and transmission lines. Effects on visual resource values would result from actions proposed to manage other resources and uses (e.g., reciprocal rights-of-way and transmission lines, wildland fire management). Programs not addressed in this section have no, or negligible, potential to impact visual resource values under any of the alternatives.

Effects from VRM Designation

Table 3-68 shows the acres assigned to each VRM class under each alternative. Areas designated as VRM Class III or IV would allow more surface- and vegetation-disturbing effects, which have the potential for greater adverse effects on the visual resource's scenic quality than those areas designated as VRM Class I or II. The current visual values have the potential to degrade to a moderate level if the BLM manages inventoried areas under a VRM Class III, and the visual values would be more severely affected if managed under a VRM Class IV. There are discrepancies in the data caused by GIS mapping errors related to how the acres are calculated and processed. Any GIS errors that are found during the implementation of the RMP would be corrected in the database (Table 3-69).

Table 3-68. VRM Class by Alternative (acres)

VRM Class	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Class I	24,700	26,231	26,231	26,231	26,784
Class II	53,606	82,780	83,439	82,717	84,637
Class III	14,081	2,771	2,113	2,836	378
Class IV	21,112	1,725	1,725	1,725	1,709
TOTAL	**113,500**	**113,508**	**113,508**	**113,509***	**113,508**

* Due to the algorithm of the GIS system, there are small anomalies that cause minor variances in the total GIS acreage.

Table 3-69. VRI Class designations by Management Class

Alternatives and VRM Class Designations		VRI Class I		VRI Class II		VRI Class III		VRI Class IV	
Alt. A	**Acres**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
VRM I	24,700	24,700	100%						
VRM II	53,606			53,606	66.5 %				
VRM III	14,081			6,899	8.5%	7,182	100%		
VRM IV	21,112			20,022	25%			1090	100%
Total	113,500	24,700		80,527	100%	7,182	100%	1,090	100%
		Total acres managed under a LESS protective VRM Class than Assigned VRI Class						26,921	23.5%
Alternatives and VRM Class Designations		**VRI Class I**		**VRI Class II**		**VRI Class III**		**VRI Class IV**	
Alt. B	**Acres**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
VRM I	26,231	26,231	100%						
VRM II	82,780			75,260	95%	6,564	93%	951	92%
VRM III	2,771			2,209	3%	476	7%	86	8%
VRM IV	1,726			1,671	2%	55	>1%		
Total	113,508	26,231	100%	79,140	100%	7,095	100%	1,037	100%
		Total acres managed under a MORE protective VRM Class than Assigned VRI Class						3,666	3.2%
Alternatives and VRM Class Designations		**VRI Class I**		**VRI Class II**		**VRI Class III**		**VRI Class IV**	
Alt. C	**Acres**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
VRM I	26,231	26,231	100%						

VRM II	83,439			75,894	96%	6,590	93%	951	92%
VRM III	2,113			1,577	2%	450	6%	86	8%
VRM IV	1,725			1,670	2%	55	1%		
Total	113,508	26,231	100%	79,140	100%	7,095	100%	1037	100%
		Total acres managed under a MORE protective VRM Class than Assigned VRI Class						4,325	3.8%

Alternatives and VRM Class Designations		**VRI Class I**		**VRI Class II**		**VRI Class III**		**VRI Class IV**	
Alt. D	**Acres**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
VRM I	26,231	26,231	100%						
VRM II	82,717			75,206	95%	6,556	92%	951	92%
VRM III	2,836			2,268	3%	482	7%	86	8%
VRM IV	1,725			1,670	2%	56	1%		
Total	113,509	26,231	100%	79,140	100%	7,095	100%	1,037	100%
		Total acres managed under a MORE protective VRM Class than Assigned VRI Class						3,599	3.2%

Alternatives and VRM Class Designations		**VRI Class I**		**VRI Class II**		**VRI Class III**		**VRI Class IV**	
Alt. E	**Acres**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
VRM I	26,784	26,784	100%						
VRM II	84,637			76,559	97%	7,040	99%	1037	100%
VRM III	378			378	1%				
VRM IV	1,709			1,654	2%	55	1%		
Total	113,508	26,231	100%	79,140	100%	7,095	100%	1,037	100%
		Total acres managed under a MORE protective VRM Class than Assigned VRI Class						5,990	5.3%

Alternative A (No Action)

The VRM classes set during the 2008 CSNM RMP would not change under the No Action alternative (Alternative A). This means there would be no change to the characteristics of the landscape designated as VRM I. There would be limited changes to the visual values of the landscape in VRM Class II, because these areas only allow for low levels of change. In these areas, management activities can only be seen, not attract the attention of the casual observer. Ongoing management activities in VRM Class III or IV areas would have the potential to degrade visual resources.

Table 3-70. VRI Classes compared to VRM Class for Alternative A by acres

Alternative A (No Action Alternative)	VRI	VRM
Class I	26,231	24,700
Class II	79,140	53,606
Class III	7,095	14,081
Class IV	1,037	21,112
TOTAL	**113,508**	**113,500**

Alternative A would result in a general decrease in visual values in the decision area, as management allowing for moderate or high levels of change (VRM Class III or IV) on inventoried lands of high and moderate values (VRI Class II and III) would likely occur (Table 3-70). The No Action alternative has the highest potential for degradation of visual resource values when compared with Alternative B, C, D, and E (Proposed RMP), all of which manage more acres in VRM Class I and II and fewer acres in VRM Class III and IV. All other alternatives offer higher levels of protection for the high and moderate inventoried lands when compared to the No Action alternative.

Common to Alternatives B, C, D, and E (Proposed RMP)

The BLM would manage visual resources on Congressionally designated lands (CDMAs) where decisions have been made to preserve a natural landscape. These lands include wilderness areas, designated and eligible Wild and Scenic Rivers for which suitability determinations have not been made that are classified as Wild or have a Wild ORV, and designated Areas of Critical Environmental Concern (ACECs)/Research Natural Areas (RNAs) with VRI Class I, as VRM Class I. VRM Class I areas would be managed in accordance with natural ecological changes, and activities would be prohibited that would lower the VRI Class of VRM Class I areas.

VRM Class II areas include National Scenic and Historic Trail management corridors, lands managed for their Wilderness Characteristics, Special Recreation Management Areas (SRMAs) that fall within the Primitive and Backcountry categories of the Recreation Opportunity Spectrum, ACECs/RNAs in VRI Class II, and designated and eligible Wild and Scenic rivers for which suitability determinations have not been made that are classified as Scenic or that have a Scenic ORV. The BLM would manage VRM Class II for low levels of change to the characteristic landscape. Management activities would be seen but would not attract attention of the casual observer.

VRM Class III areas include designated, and eligible Wild and Scenic Rivers that are classified as Recreational, and SRMAs and ERMAs that fall within the Middle Country and Front Country categories of the Recreation Opportunity Spectrum. Management activities would attract attention but would not dominate the view of the casual observer.

VRM Class IV includes all lands that are not designated as VRM Class I, II, or III. VRM Class IV would be in areas that need to be managed for high levels of change to the characteristic landscape. Management activities may dominate the view and would be the major focus of the causal observer’s attention.

All action alternatives are very similar in the degree of scenic quality protection, with the action alternatives being within 2.0 percent of managing lands under more protective VRM class than the assigned VRI class. Every action alternative manages more lands, at a more protective VRM class, then the VRI class, with ranges of 3.2 to 5.3 percent of more protection than less protection. This means that every action alternative would see a beneficial change of scenic quality over time within the planning area. The Proposed RMP (Alternative E) would provide the greatest amount of scenic quality protections. However, the difference between each action alternative in scenic quality protections is within 2.0 percent, indicating no significant difference between the action alternatives. This is due to the directives of the CSNM, the amount of acreage (23 percent of the lands) that has been assigned VRI I through Congressional designations and other administrative processes, and the focus on conservation in the monument's designating language (Proclamations 7318 and 9564).

Alternative B

Alternative B has 3.2 percent of more protective VRM class then VRI class, resulting in more protections overall for visual resources. The BLM would manage visual resources on Congressionally designated lands (CDMAs) where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) and on designated ACECs/RNAs according to their assigned VRI I class as VRM I.

Alternative B would result in a general increase in visual values in the planning area, because management allowing for low and moderate levels of change (VRM class II, and III) on inventoried lands of moderate and low values (VRI Class III, and IV) would occur. Under this alternative, 6,564 of VRI III and 951 acres of VRI IV would be managed as VRM II, and 86 acres of VRI IV would be managed as VRM III, resulting in 6.7 percent of the landscape being manage at a higher scenic quality than inventoried. This would increase the scenic quality of the landscape (Table 3-71) over time. This alternative has the highest level of discretionary uses allowed, resulting in the greatest amount visual change of the characteristic landscape compared to the other proposed alternatives, but it would still result in an increase of scenic quality over time when considering all visual impacts on the planning area. This alternative would have much less degradation compared to the scenic quality under the No Action alternative.

Table 3-71. VRI Classes compared to VRM class for Alternative B by acres

Alternative B	VRI	VRM
Class I	26,231	26,231
Class II	79,140	82,780
Class III	7,095	2,771
Class IV	1,037	1,725
TOTAL	**113,508**	**113,508**

Alternative C

Alternative C provides the second highest scenic quality protections, compared to the other alternatives. The BLM would manage visual resources on Congressionally designated lands (CDMAs) where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) and on designated ACECs/RNAs according to their assigned VRI I class as VRM I. Additionally, the BLM would manage more acres for VRM II and VRM III than under Alternatives A and B, putting a greater emphasis on protection for high and moderate values (VRI Class II and III), while also allowing for the management of other resources. This would provide for a balanced management approach that focuses on protection of visual values in the monument while allowing for the active management of other resources—most specifically, active management of the Wildland Urban Interface area.

Overall visual values would increase over time as the management would use a blend of active and passive management focusing on protecting and restoring the objects and values of the CSNM. The lands of high and moderate VRI rating, would be managed in VRM I, II, and III, resulting in the least amount of landscape characteristic change. This alternative protects 75,894 acres of VRI Class II out of 79,140 acres, or 96 percent (Table 3-72). The rest of the VRI Class II (1,577 acres as VRM III and 1,670 acres as VRM IV) acres would be managed to allow for active management of the Wildland Urban Interface area for fire suppression activities and other high-intensity management actions. Alternative C focuses on a balanced management approach. Alternative C has 7,627 acres of more protected scenic quality, or 6.7 percent of the total landscape acreage. This alternative would manage 3,302 acres at a less protective VRM class or 2.9 percent of the landscape.

Table 3-72. VRI Classes compared to VRM Class for Alternative C by acres

Alternative C	VRI	VRM
Class I	26,231	26,231
Class II	79,140	83,439
Class III	7,095	2,113
Class IV	1,037	1,725
TOTAL	**113,508**	**113,508**

Alternative D

Alternative D provides a similar degree of scenic quality protections, compared to the other alternatives. The BLM would manage visual resources on congressionally designated lands (CDMAs) where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) and on designated ACECs/RNAs according to their assigned VRI Class I as VRM Class I. The BLM would focus management on a passive, light-touch plan, except where it would adversely affect the CSNM objects and values. This would

reduce the long-term negative impacts to scenic quality of the characteristic landscape and improve the scenic quality of the landscape over time.

Overall visual values would increase over time as the management would use a primarily passive management approach to protecting and restoring the objects and values of the CSNM. The lands with high and moderate VRI ratings would be managed in VRM I, II, and III, resulting in an increase of scenic quality over time for the landscape. Alternative D would manage 6,556 acres of VRI Class III and 951 acres of VRI Class IV as VRM Class II, resulting in greater levels of protection for the VRI Class III and IV lands, which would improve the scenic quality of the VRI Class III and IV over time. This alternative protects 75,206, or 97 percent, of VRI Class II acres as VRM Class II and protects 6,556 acres, or 92 percent, of VRI Class III acres as VRM II. Additionally, this alternative protects 951 acres of VRI Class IV, or 92 percent, as VRI Class II, and 86 acres of VRI Class IV as VRM Class III (Table 3-73). In total, 7,593 acres would be assigned a more protective VRM Class, which results in a high level of protection for the scenic quality of the landscape and would improve scenic quality over time for the scenic quality of the landscape, which would improve the scenic quality over time. This alternative would provide a higher level of scenic quality protection for 6.7 percent of the landscape, with an overall increase of scenic quality protection of 3.2 percent, due to 3,994 acres being managed at a less protective VRM class, than the VRI class.

Table 3-73. VRI Classes compared to VRM Class for Alternative D by acres

Alternative D	VRI	VRM
Class I	26,231	26,231
Class II	79,140	82,717
Class III	7,095	2,836
Class IV	1,037	1,725
TOTAL	**113,508**	**113,509***

*This one-acre difference from VRI to VRM acreage is due to GIS issues caused from the way the data is processed.

Alternative E (Proposed RMP)

The Proposed RMP provides a similar degree of scenic quality protections, compared to the other alternatives. The BLM would manage visual resources on Congressionally designated lands (CDMAs) where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) according to their assigned VRI Class I as VRM Class I. The BLM would focus management on a passive or light-touch plan, except where it would adversely affect the CSNM objects and values. This would reduce the long-term negative impacts to scenic quality of the characteristic landscape and improve the scenic quality of the landscape over time.

The Proposed RMP would provide the highest level of scenic quality protection compared to the other alternatives. The visual values would increase over time as the management would use a blend of active and passive management focusing on protecting and restoring the objects and values of the CSNM. The lands with high and moderate VRI ratings would almost exclusively be

managed as VRM I and II, resulting in the improvement of the scenic quality of the landscape characteristic over time. The BLM would manage 7,040 acres (99 percent) of VRI Class III and 1,037 acres (100 percent) of VRI Class IV as VRM Class II, resulting in greater levels of protection for the VRI Class III, and IV lands, which would improve the scenic quality of the VRI Class III and IV over time. This alternative protects 76,559 acres, or 97 percent, of VRI Class II as VRM Class II and protects 7,040 acres, or 99 percent, of VRI Class III acres as VRM II. Additionally, this alternative protects 1,037 acres of VRI Class IV, or 100 percent as VRI Class II (Table 3-74). This alternative has the highest level of protection for the scenic quality of the landscape of all alternatives, which would improve the scenic quality over time.

Alternative E manages nearly all of the CSNM acreage as VRM I or VRM II, with the only exceptions of different VRM classes of management coming from highly developed recreation sites (VRM III), and transmission lines (VRM IV). The footprint of the communication site (roughly 2 acres), and the road leading to the communication site (roughly 13 acres) are being managed as VRM II under this alternative. With the surrounding lands of the communication site being a part of the Soda Mountain Wilderness, and being managed as VRM Class I, the vegetation would continue to grow and obscure the buildings of the communication site from the casual observer. Managing the communication site and the road leading to the site, as VRM Class II, would ensure that the communication site and road has minimal impact to the scenic quality, due to the VRM Class II requirements that changes repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features. Ensuring that the management activities would be seen but not attract the attention of the casual observer.

The communication site buildings would be of non-reflective colors or materials that blend in with the predominant natural features of the location such as vegetation, or geological features. The towers would also be non-reflective colors or materials that blend in with the predominant natural features of vegetation, geology, or even the sky, and the towers must be unlit, meeting these requirements and other design features as needed during implementation would allow building maintenance and tower height to conform to VRM Class II. Minimal vegetation removal would occur within the footprint of the communication site and the access road. Vegetation removal would be completed on an as needed basis, for the function of the site, and to maintain access to the site with the access road. The access road would utilize natural materials for maintenance. Implementing these requirements, and completing a VRM analysis before any site improvements, would ensure that the site would not draw the attention of a casual observer, and would just be seen. Conforming to these actions, and other as needed design features would allow the access road, and communication site to meet the VRM Class II requirements.

Table 3-74. VRI Classes Compared to VRM Class for Alternative E by acres

Class	VRI	VRM
Class I	26,784	26,784
Class II	79,140	81,459
Class III	7,095	378
Class IV	1,037	1,709
TOTAL	**113,508**	**113,508**

Analytical Conclusions

All action alternatives, including the Proposed RMP, would increase protections of visual resources when compared to the No Action alternative, resulting in an overall increase in visual resource values and scenic quality over time. The increase in scenic quality of the characteristic landscape is due to the management emphasis of protecting and restoring the CSNM objects and values that it was designated for. All action alternatives have a higher quantity of more protective VRM classes of VRI Classes, then lands that fall in a less protective VRM class than VRI class. This results in an increase of protections ranging from 3.2 to 5.3 percent, due to applying a more protective VRM Class to the VRI Class, which would increase the scenic quality of the CSNM over time. For each alternative, small portions (3 to 5 percent) of the landscape were placed in less protective VRM classes due to the type of associated management action needs for that portion of the landscape. Some primary examples include transmission line corridors, highly developed recreation sites, and other management actions that could either dominate the viewshed or attract the attention of the casual observer.

The scenic quality of the characteristic landscape would increase over time within the CSNM due to high and moderate scenic quality (VRI Class I, II and III) being managed in areas that allow for low and moderate levels of change (VRM Class I, II and III). In all of the action alternatives all of the VRI Class I lands would be managed as VRM Class I, and of the VRI Class II lands, only 3 to 5 percent of the lands would be managed at a less protective VRM Class, while 6.7 to 7.1 percent of the lands would be managed at a more protective VRM Class. This would result in an overall increase of scenic quality, with a high degree of protection for the characteristic landscape for all action alternatives. Over time the landscape would have an increase in scenic quality, with the Proposed RMP (Alternative E) having the greatest amount of an overall increase in scenic quality.

3.17. WILDLAND FIRE MANAGEMENT

Key Points

- Alternatives A and B would contribute the greatest amount toward wildfire risk reduction to the WUI and CSNM objects and values, followed by Alternative E (Proposed RMP), then Alternative C, and lastly Alternative D. Alternative D would not satisfy minimum thresholds for wildfire risk reduction; however, ecological restoration actions would occur in strategic locations.
- Common to all action alternatives, applying ecological restoration treatments that achieve reduced wildfire hazard only within strategic "Linear Features" optimally placed to disrupt large fire growth would fall short of the minimum 10 percent of the CSNM planning area needed for effective wildfire risk reduction.
- Alternatives A and B would provide the greatest localized wildfire risk reduction to important legacy tree CSNM objects that would take more than a century to replace, followed by Alternatives C and the Proposed RMP (Alternative E) and Alternative D.
- Low to moderate fire hazard conditions may provide opportunities for effective fire management, including the ability to manage wildfire to meet multiple land use and resource objectives. However, due to the complex intermixed ownership patterns of the planning area this may have limited application, and prescribed fire would likely represent most of the managed fire under any alternative.

Analysis Issue

1. How would management direction among the alternatives affect wildfire risk to the Wildland Urban Interface and CSNM objects and values?

Wildland Fire Management Analysis Issue 1

How would management direction among the alternatives affect wildfire risk to the Wildland Urban Interface and CSNM objects and values?

Background

Wildland fire risk describes the likelihood of wildfire, intensity of wildfire (i.e., hazard), and susceptibility of human values (e.g., communities, homes, infrastructure, resources, etc.). There are two general strategies for treatments intended to modify landscape-level fire growth and behavior, and thus reduce landscape wildfire risk: 1) linear fuel breaks intended to aid in fire containment and limit fire size or acres burned (Agee et al., 2000; Weatherspoon, 1996; Ager, Day, Aparício, Houtman, & Stinchfield, 2023); and 2) area-based treatments that modify fire behavior (Finney, 2001).

Fire hazard refers to the ease of ignition, potential fire behavior (surface, passive, or crown fire), and resistance to control of wildland fuels (i.e., surface, ladder, and canopy fuels), which directly influences suppression tactics. For example, stand-replacing crown fires create the greatest amount of ember production and spot fires among the potential fire behavior types and present the greatest resistance to control (USDI BLM, 2016a, pp. 254–255). The primary wildland fuel characteristics associated with potential fire behavior and crown fire potential are canopy base height, canopy bulk density (e.g., canopy cover), and surface fuel loading (Jain & Graham, 2007; Scott &

Reinhardt, 2001). Important stand attributes, such as reduced surface fuel loading, lower tree density, large diameter trees of fire-resistant species, increased height to live crown, and discontinuous horizontal and vertical fuels decrease the likelihood of atypical large-scale crown fires, thus reducing fire hazard (USDI BLM, 2016a; Jain, Fried, & Loreno, 2020).

There is no one specific quantifiable definition of the Wildland Urban Interface (WUI).[29] The BLM defines the WUI as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels (Glossary). For this analysis, the BLM uses a one-half mile buffer around People and Property data from the Pacific Northwest (PNW) 2023 Quantitative Wildfire Risk Assessment (McEvoy, Dunn, & Rickert, 2023). This represents a consistent geographic extent within the planning area to analyze wildfire risk to a focused "local area" where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels, i.e., the WUI (refer to assumptions below).

Summary of Analytical Methods

In this analysis, the BLM evaluated how management direction in the Ecosystem Management Areas and resource programs (i.e. wildland fire management, livestock grazing, invasive plants, and recreation and visitor services) would affect wildfire risk to the Wildland Urban Interface and CSNM objects and values within the planning area for the life of the plan (i.e., 20 years).

Specifically, the BLM evaluated how vegetation management and other management direction for resource programs, including wildfire response, livestock grazing, and recreation and visitor services, among the alternatives affect two general strategies intended to modify landscape-level fire growth and behavior, and thus reduce landscape wildfire risk. These two general strategies comprise 1) "linear features" (e.g., fuel breaks) intended to aid in fire containment and limit fire size or acres burned (Agee et al., 2000; Weatherspoon, 1996); and 2) "area" treatments that modify fire behavior (Finney, 2001).

To evaluate how vegetation management affects fire hazard, the BLM assigned forest structural stages derived in vegetation modeling to a relative ranking of stand-level fire hazard, as in the Western Oregon Final Environmental Impact Statement. This methodology and its assumptions are incorporated here, by reference (USDI BLM, 2016a, Table 3-34, pp. 254 -255, and Appendix H.). These categories range from high to moderate to low fire hazard (i.e., relatively easy to control), where surface fire represents low hazard; passive fire equates to moderate hazard; and crown fire equates to high hazard. The mixed fire hazard indicates the potential to exhibit the full range of hazard categories (high to low). The BLM summarized difference in relative stand-level fire hazard categories over time (see Appendix N, Vegetation Modeling and Assumptions, for more detail).

To assess the alternatives' anticipated performance related to these two strategies, the BLM quantified, by alternative, the proportion of estimated 20-year ecological restoration acres over the

[29] The Healthy Forest Restoration Act (HFR 2003) describes the WUI as "an area within or adjacent to an at-risk community." The act goes on to state that "in the case of any area for which a community wildfire protection plan is not in effect," this area can vary from one-half mile to one- and one-half miles around the at-risk community. As described in the AMS (USDI BLM, 2023a, p.198), the Rogue Valley Community Wildfire Protection Plan (2019), which covers Jackson Co., identified a community at risk. The 2008 RMP defined WUI as public lands around a Greensprings community at risk that pose a fire risk to landowners in the area (USDI BLM, 2008, p.28, 35, Map 12).

life of the plan relative to the optimal landscape treatment for reducing fire risk: 1) a "linear feature" fuel break footprint; and 2) two "area" footprints.

Through qualitative discussion, the BLM also evaluated how resource management direction for livestock grazing, recreation and visitor services, and travel and transportation would affect stand-level fire hazard and subsequent wildfire risk within Wildland Urban Interface and to CSNM objects and values within the decision area over the life of the plan.

Assumptions

Reducing loss of homes to wildfire is best achieved by reducing the susceptibility of homes to ignition and reducing the probability of home exposure to wildfire (Calkin, Cohen, Finney, & Thompson, 2014). The susceptibility of homes to ignitions is influenced by home construction material (i.e., whether it's fire resistant or not) and by the home ignition zone (100-200 feet circumference of vegetation around home) managed by the homeowner (Cohen, 2008). The BLM does not manage the susceptibility of private homes to wildfire. The probability of home (or community) exposure to wildfire is influenced by production of embers and large wildfire growth from the broader landscape beyond the home ignition zone, which includes all land ownerships.

Large-scale uncharacteristic high severity (i.e., stand-replacing) wildfire would negatively impact CSNM objects and values, including biodiversity, important closed old refugia forests, and legacy tree structures that would take more than a century to replace.

Strategically placed proactive treatments optimally arranged to disrupt the growth of large fires on at least 10 percent of the landscape, at an optimal rate of one to two percent of the landscape per year, would meet the minimum requirement to effectively reduce potential wildfire risk (Finney, Seli, McHugh, Ager, Bahro, & Agee, 2007) for the next two decades.

A 150-foot buffer around locally developed Potential (wildfire) Operational Delineation[30] boundaries (NWCG, 2022), as described by Thompson et al. (2016) and Stratton (2020), represent the extent of the strategic "linear feature" wildfire reduction strategy optimally arranged to limit large wildfire growth with fuel breaks (Map 3-3, Wildfire Risk Reduction Strategy Extents).

The optimal "area" treatment for reducing fire risk is approximately 20-40 percent (Tubbesing et al., 2019; Salis et al., 2016; Metlen et al., 2017; Finney, 2001; Finney et al., 2007). Additional treatments beyond 40 percent have been shown to have little added effect at reducing fire rate of spread or fire size at the landscape scale (Finney et al., 2007).

A one-half mile buffer around People and Property data from the Pacific Northwest (PNW) 2023 Quantitative Wildfire Risk Assessment (McEvoy, Dunn, & Rickert, 2023) represents a consistent geographic extent within the planning area to analyze wildfire risk to a focused "local area" where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels, i.e., the WUI. This one-half-mile buffer distance is consistent with the maximum

[30] Potential Operational Delineation boundaries, or PODs, represent geographic features that could aid in wildfire containment and limiting large fire growth. These features include major topographical breaks (ridgelines), road systems, rivers and waterbodies, barren areas, prior treatments, previous wildfires, etc. In this context, POD boundaries are used as an operationally relevant analytic extent. The POD boundaries do not dictate future actions and in no way establish a committal for fire management to use, nor do they account for specific circumstances (i.e., weather, wind, and fuel moisture, etc.) that may require deviation from a POD boundary in actual wildfire response.

spotting distance for Western Tree Species under 20 mile per hour 20-foot winds, these being common 90th percentile fire weather conditions (NWCG, 2021), and aligns with the HFR 2003 Wildland Urban Interface description.[31]

The landscape area within which to evaluate wildfire risk to CSNM objects and values, is represented by the CSNM planning area (Map 3-3, Wildfire Risk Reduction Strategy Extents).

To meet the above thresholds for linear and area wildfire risk reduction within the CSNM planning area, approximately 14,700 to 29,500 acres would need be treated or be at low wildfire risk within the People and Property Local Area, while approximately 18,400 to 37,000 acres would need treatment or to be in low wildfire risk within the Landscape Area (Table 3-75).

The Linear Feature only comprises 5 percent of the CSNM planning area landscape (8,060 acres All-Lands and 5,432 acres of BLM-administered lands), which falls short of the minimum 10 percent of the CSNM planning area (Table 3-75).

Table 3-75. Approximate acreage associated with desired wildfire risk reduction percent across the wildfire risk reduction strategies and the entire CSNM planning area

Risk Reduction Strategy Extent	Wildfire Risk Reduction Goal		
	10% of Area	20% of Area	40% of Area
	Acres		
Linear Feature (150-foot buffer along POD boundaries) 5,432 acres of BLM-administered lands (8,060 acres all lands)	16,200	32,400	65,000
Local Area (0.5 mi. around people and property) 38,152 acres BLM-administered lands (62,942 acres all lands)	N/A	14,000	28,000
Landscape Area (CSNM planning area outside Local Area) 69,922 acres BLM-administered lands (92,404 acres all-lands)	N/A	18,400	37,000
CSNM Planning Area (113,511 acres)	16,200	32,400	65,000

The magnitude of ecological restoration among the alternatives would follow management direction, including minimum decadal restoration treatment targets (Appendix E). The BLM applied common assumptions related to management direction in Appendix E and the alternative descriptions in Chapter 2 to derive estimated decadal treatment types and acreage (Appendix N, Table N-2). The minimum restoration target for two decades represents a reasonable comparison between alternatives for the life of the plan (i.e., 20 years).

The BLM acknowledges that in the action alternatives ecological restoration may occur within WUI/Fuels Emphasis-identified areas that overlap with Management Areas other than Ecosystem Management Areas and in Congressionally or Administratively Designated Management Areas consistent with the underlying management direction for the alternatives. However, to provide a

[31] The description characterizes WUI as an area within or adjacent to an at-risk community, which can vary from one-half mile to one and one-half miles around the at-risk community (HFR 2003 – Sec 16).

robust and consistent basis for comparing the effects of the alternatives, the BLM assumed that ecological restoration would only occur within Ecosystem Management Areas.

The application of management direction and BMPs as required for Botanical, Wildlife, or Cultural concerns would have minor, localized effect on implementation of ecological restoration.

Given the vegetation management direction for alternatives, proposed restoration actions would raise canopy base height and reduce surface fuel loading (including management-generated activity fuels), decreasing the likelihood of flames ascending into tree crowns and tree torching under 90th percentile fire weather conditions. Thinning of canopy fuels would reduce canopy bulk density (e.g., canopy cover) and decrease the likelihood of tree-to-tree crown fire spread (i.e. stand-replacing crown fire) under typical fire weather indices (Scott & Reinhardt, 2001) for the life of the plan. Additional context regarding vegetation management impacts to fire hazard is direct and indirect effects and Appendix N.

Activity fuels created from thinning would be treated according to EMA and Wildland fire management direction (Appendix E) through allowable treatment methods described in Appendix E within 1 to 2 years following thinning. If fuels are treated via prescribed fire, they would be and allowed to cure for 1 to 2 years and burned after they cure. While piles cure, surface fuel loading and potential flame length is temporarily increased. The BLM assumes that vegetation management would not extend "fire season length" (refer to Appendix N).

Most treated areas would require low to moderate intensity disturbance—e.g. to maintain low to moderate surface and ladder fuels every 10 to 30 years. Maintenance treatments would be needed every 10 to 20 years after initial entry treatments in long departed ecosystems, to maintain low fire hazard. Maintenance treatments would be needed every 20 to 30 years after initial entry treatments, to maintain moderate fire hazard. Maintenance would be needed more frequently in stands with canopy cover less than 40 percent, and less frequently in stands with canopy cover greater than 40 percent (Agee, 2000; USDI BLM, 2021b).

These maintenance timeframes are consistent with estimates of local historic fire-intervals, as Metlen et al. (2018) found 90 percent of historic fire return intervals to be between 3 and 30 years, with median return intervals of 8 years. The BLM incorporated these maintenance intervals into the Forest Vegetation Modeling (Appendix N). Approximately 6,000 acres of previously treated areas burned in a wildfire between 2008-2020 and treatments were found to be effective in some areas for up to 14 years (USDI BLM, 2021b). Between 2021 and 2022 an additional 3,000 acres interacted with treatments and were found to be effective up to 17 years in fuel treatments intersected by the Rum Creek wildfire (2022). Elsewhere, Lydersen, North, and Collins (2014) found that treatments were effective up to 22 years and other recent findings indicate treatment effectiveness can last up to two decades (Hood et al., 2024; Brodie et al., 2024).

Treatments on non-BLM-administered lands would continue at the same rate and types of treatments that have been used over the past decade (2012-2022) would continue to be applied. The BLM assumes natural wildfire ignitions would continue to occur at similar rates within the planning area.

Affected Environment

The Analysis of the Management Situation (USDI BLM, 2023a, pp. 194-206) provides a detailed description of the affected environment and is incorporated here by reference.

Fire Hazard

The variety of coniferous forest and non-conifer woodlands and shrublands within the planning area create a mosaic of fuel types within the planning area. The surface fuel loading across this mosaic of vegetation is distributed relatively evenly across the planning area, with approximately one-third of the planning area categorized as moderate loading grass-shrub fuels, moderate loading mixed conifer-hardwood, and very high load mixed conifer hardwood (USDI BLM, 2023a, p. 196, Table 6-18).

Wildland Urban Interface

Much of the planning area has a checkerboard pattern of ownership, with intermixed private, state, Bureau of Reclamation, and BLM-administered lands (USDI BLM, 2023a, p. 198). This same pattern is evident within the wildfire risk reduction strategies (refer to Table 3-76, Map 3-3, Wildfire Risk Reduction Strategy Extents). Nearly half (41 percent) of the planning area lies within the Local Area, which is distributed nearly evenly between BLM-administered lands (55 percent) and non-BLM-administered lands (45 percent). A relatively small proportion (5 percent) of the planning area is within the Linear Feature, and BLM-administered lands comprise 78 percent of the total Linear Feature. A little over half (54 percent) of the planning area is within the Landscape Area, represented by majority (76 percent) BLM-administered lands. Additionally, there are no POD polygons within the planning area comprised of entirely BLM-administered lands. All PODs have some percentage of mixed ownership.

Table 3-76. Ownership distribution within Area-Based and Linear Feature Wildfire Risk Reduction Extents in planning area (PA)

Wildfire Risk Reduction Extent	All Ownerships		Decision area		Non-BLM Administered Lands	
	Acres	Percent of PA	Acres	Percent of PA	Acres	Percent of PA
Local Area (People and Property half-mile buffer)*	69,942	41%	38,152	22%	31,790	19%
Linear Features (POD Boundaries)	8,060	5%	5,432	3%	2,628	2%
Landscape Area (Planning area outside of "Local Area")	92,404	54%	69,922	76%	22,483	24%

*Includes Linear Features within this extent.

Note: The distribution of wildfire ignitions varies by cause and location across the planning area. The majority (66 percent) of human-caused ignitions between 2022 to 2012 occurred within the Local Area, while the majority (63 percent) of lightning-caused ignitions occurred within the Landscape Area.

Wildfire Occurrence and Likelihood

Before fire exclusion and intensive management practices of the twentieth century, the planning area was characterized by high frequency, low to mixed severity fires (USDI BLM, 2023a, Table 6-16, p. 195) that would have reduced fuel loadings and maintained a mosaic of open and closed

stand conditions different from what is seen today. Even though frequent fire appreciably ended in 1850 in the region coincident with the cessation of cultural burning (Metlen et al., 2018), the decline of fire over the 20th century and the change in patterns of wildfire size distribution is evident in local fire spatial records (USDI BLM, 2023a, Table 6-23, p. 203, and Map 6-9).

Table 3-77. Wildfire acres and count by year and cause (2002 and 2021)*

Fire Count and Acres	Fire Cause	
	Human and Misc.	Lightning
Total number of fires	82	81
Average number fires/year	4	4
Acres burned	38,050	35,190

*Wildfires burning within the CSNM planning area

SOURCE: Oregon Department of Forestry (ODF). ODF data had two records for the Oregon Gulch Fire. That has been corrected here to show the lightning-caused Oregon Gulch fire and the human-caused Klamathon fire.

Recently (2000–2021), 163 fires burned within the planning area (Table 3-77). Half of fires were human caused and half lightning caused. While these fires burned over 70,000 acres across multiple jurisdictions, the majority (75 percent) of the fires were less than 0.25 acres. Two large wildfires accounted for 99 percent of acres burned. Table 6-19 in the AMS (USDI BLM 2023) erroneously included the 35,852-acre human-caused Klamathon fire in the lightning-fire cause column. The two recent large fires burned at different times during the fire season and in different landscape locations and resulted in variable burn-severity distribution across both Oregon Gulch and Klamathon fires, where approximately 13 percent of the Oregon Gulch wildfire burned at high severity, while approximately 9 percent of the Klamathon wildfire burned at high severity (USDI BLM 2023a, Table 6-24).

There is an evident pattern regarding the location of human and lightning caused ignitions relative to the wildfire risk reduction extents. The majority of human-caused ignitions have occurred within the local area and lightning-caused ignitions within the landscape area (Table 3-78).

Table 3-78. Wildfires burning within CSNM planning area between 2002 and 2021 by cause of ignition and location relative to the wildfire risk reduction strategy extents

Wildfire Risk Reduction Strategy Extent	Human-Caused Ignitions	Lightning-Caused Ignitions
Local Area (People and Property half mile buffer)	66%	20%
Linear Features (POD Boundaries)	2%	19%
Landscape Area (Planning area outside of Local Area)	32%	62%

Lightning typically occurs May through October. Multiple ignition lightning events can play a significant role in large-fire growth, particularly when exacerbated by fuels which have missed several fire cycles and extreme fire weather conditions, such as hot dry autumn east winds.

CSNM Objects and Values

As described in both Presidential Proclamation Nos. 7318 and 9564, the CSNM is an ecological wonder teeming with biodiversity and a rich mosaic of vegetation communities and habitats, hosting rare and endemic species and important legacy structure.

Wildfire Risk

The current condition of fuels and wildfire for lands within the planning area generally reflects a landscape that has not experienced the frequent to moderately frequent low-mixed severity that shaped it in previous times (USDI BLM, 2023a, p. 194). The majority of the planning area is classified as moderate risk but ranges from very high wildfire risk to low benefit from wildfire (Gilbertson-Day, Scott, Vogler, & Brough, 2018; USDI BLM, 2023a, p. 199). Additionally, a recent analysis indicates that much of the CSNM mature and old-growth forests have high and very high exposure to wildfire threats (USDA FS & USDI BLM 2024, figure 10, p.26). A more detailed fine-scale examination of the integrated hazard (or combination of fire hazard and likelihood) within the wildfire risk extents under 90th percentile weather conditions shows a little over half of the Local Area in moderate to high integrated hazard and nearly 30 percent of the Landscape Area in moderate to high integrated hazard, while the majority (60 percent) of the Linear Feature is a low risk (Table 3-79).

Table 3-79. Integrated hazard within the wildfire risk reduction strategy extents across the planning area

Wildfire Risk Reduction Strategy Extent	Low		Moderate		High	
	Acres	%	Acres	%	Acres	%
Linear Feature (150-foot buffer along POD boundary)	4,865	**60%**	1,349	**17%**	717	**1%**
Local Area (People and Property half mile buffer)	30,365	**43%**	18,776	**27%**	6,040	**27%**
Landscape Area (Planning area outside of Local Area)	63,820	**69%**	13,947	**15%**	12,038	**13%**

Data from Interagency Fuel Treatment Decision Support System model run (refer to Appendix N)

Wildland Fire Management and Proactive Management to Reduce Wildfire Risk

The altered landscape, including fuel build up combined with drought; expansion of development into wildland areas; checkerboard ownership patterns; and multi-jurisdictional wildland fire response organizations increase the inherent complexities of managing wildfire hazard (Prichard, Povak, Kennedy, & Peterson, 2021; Hessburg, Prichard, Hagmann, Pova, & Lake, 2021) or managing wildfires to meet resource and land use objectives (USDI BLM, 2023a, p. 200; USDI BLM, 2008).

Within the planning area, the BLM implemented approximately 3,500 acres of prescribed fire between 2000-2022, totaling 3 percent of the decision area. Approximately 2,500 acres of private lands within the planning area were treated to reduce fire hazard between 2018 and 2022 (USDI BLM, 2023a, p. 199).

Anticipated Wildfire and Climate Trends

Climate changes anticipated in the planning area expected to contribute toward future wildfire risk include increasing temperatures, increasing drought frequency and severity, reduced snowpack, and fewer but more extreme precipitation events (Halofsky, Peterson, & Gravenmier, 2022). These trends are already taking holding in meaningful ways across southwest OR, including increased conifer mortality as described in the AMS (USDI BLM, 2023a, p. 201). Excessive conifer mortality poses several potential implications of for fire management and firefighter safety.

Wildfire would continue to be a major change agent, interacting with other disturbance agents (e.g., drought and insect outbreaks) and affecting ecosystems and vegetation structure. Forecasts indicate that the number of fires escaping initial attack is likely to increase, along with area burned and the occurrence of very large fires (greater than 5000 ha or approximately 12,000 acres) (Halofsky et al., 2022).

Environmental Consequences

Vegetation and Wildland Fire Management Decisions

The alternatives differ in management direction related to Wildland Fire Management. For example, the Action Alternatives explore a range of zones associated with WUI/Fuels emphasis management direction (Chapter 2, Section 2.3, and Appendix E). The WUI/Fuels Emphasis zone overlaps other management areas, including Ecosystem Management Areas (EMAs), Congressionally Designated Management Areas (CDMAs), and Administratively Designated Management Areas (ADMAs).

Alternative B has the largest zone corresponding to WUI/Fuels Emphasis Management Direction, accounting for 23 percent of the decision area. In Alternative A, the WUI/Fuels Emphasis zone comprises 13 percent of the decision area, 10 percent in both Alternatives C and E (the Proposed RMP), and only 2 percent of the decision area in Alternative D (Table 3-80; refer also to Maps 2-34 to 2-37 and 3-3).

The alternatives also vary in the extent of area where natural wildfire ignitions may be managed to meet multiple objectives, when conditions are compatible (e.g., low-moderate fire danger or when expected fire behavior and potential effects are acceptable) to meet resource objectives (Table 3-80 and Appendix E, Section 4.Q). In Alternative B, wildfires may be managed to meet multiple objectives within the entire decision area, while in Alternatives C and E (Proposed RMP) this is only directed outside of the WUI/Fuels Emphasis zone, which represents 90 percent of the planning area. In Alternative A, wildfires managed to meet resource objectives are only an option within portions of the 2017 expansion area in 38 percent of the decision area. Management of wildfire for multiple objectives would not be allowed in Alternative D (Table 3-80).

Table 3-80. Acreage & proportion of decision area relative to Wildland Fire Management Direction*

Management Direction & Management Areas	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E (Proposed RMP)	
	Acres	**DA%**	**Acres**	**DA %**	**Acres**	**DA%**	**Acres**	**DA%**	**Acres**	**DA%**
Wildfire Response – Multiple Objectives	42,320	**38%**	113,506	**100%**	102,562	**90%**	0	**0%**	**102,140**	**90%**
WUI/Fuels Emphasis Direction	15,134	**13%**	26,482	**23%**	10,944	**10%**	2,081	**2%**	**11,371**	**10%**
Overlap with WUI/Fuels Emphasis Management Direction										
Wildfire Response – Multiple Objectives	13,492		26,482	100%	0	0%	0	0%	0	0%
EMA*	12,783	11%	16,756	15%	6,105	5%	1,290	1%	7,122	6%
ADMA	1,906	2%	211	<1%	322	<1%	59	<1%	296	<1%
CDMA	445	<1%	9,515	8%	4,516	4%	732	1%	3,953	3%

*WUI/Fuels Emphasis Management Direction and Wildfire Response – Multiple Objectives by alternative and corresponding overlap of Wildfire Response – Multiple Objectives and Management Areas with WUI/Fuels Emphasis Management Directions.

**For Alternative A the BLM includes all 2008 CSNM Undefined Management Area acres and 2016 SWO RMP Land Use Allocations other than Riparian Reserve in Alternative A EMA acres.

The WUI/Fuels Emphasis management direction does not vary considerably from general EMA management direction (refer to Appendix E and Appendix N), except for direction associated within 120 feet from private boundaries and the following bullets directed at reducing fire hazard:

- Thin to reduce canopy fuel connectivity while retaining sufficient canopy cover to limit understory growth.
- Reduce hazardous fuels adjacent to private properties to reinforce hazardous fuels reduction on residential properties.

In Alternative B, 15 percent of the WUI/Fuels Emphasis zone overlaps with EMAs, while Alternatives A, C, and E (the Proposed RMP) have less overlap (11 percent, 5 percent, and 6 percent, respectively) and Alternative D only has one percent. The area of WUI/Fuels Emphasis zone overlap with ADMA and CDMA designations is minimal across all alternatives. The overlap of WUI/Fuels Emphasis and ADMAs are less than 2 percent for all alternatives. Alternative B has 8 percent overlap with the WUI/Fuels Emphasis zone and CDMA and Alternative C has 4 percent overlap, and for all remaining alternatives this overlap is less 1 percent (Table 3-80). In Alternatives A and E (Proposed RMP), the WUI/Fuels Emphasis zone does not overlap with the CDMA-Wilderness.

The alternatives also differ in the directed and estimated minimum amount of target restoration acres associated with Ecosystem Management Areas (EMAs) (refer to Assumptions and Appendix N and Appendix E). Alternative A and B have similar estimated restoration acreage (Table 3-81) of approximately 27,000 acres. The estimated footprint for Alternative C and the Proposed RMP (Alternative E) is slightly less than half that amount, at an estimated 12,310 acres. For Alternative D, it is estimated to be 6,182 acres (Table 3-81).

Table 3-81. Comparison of the potential restoration acreage in Ecosystem Management Areas among alternatives

Management Area & Management Direction	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
	Acres				
Potential EMA Restoration Footprint	26,884	27,028	12,310	6,182	12,310

Direct and Indirect Effects Common to all Alternatives

Common to all alternatives ecologic restoration activities would directly reduce surface and ladder fuels, and reduce fuel continuity, and thus reduce the likelihood of crown fire initiation and wildfire hazard (refer to Assumptions and Appendix N).

As noted in the 2008 CSNM RMP, “thinning forest stands can be an effective tool for restoring forest structure, reducing stand density, decreasing fire hazard, promoting desired species, and can also serve as a precursor to the reintroduction of fire through prescribed burns. Common to

all alternatives is direction to "[i]mplement interim fuels treatments (e.g., thinning and hand pile and burn) in areas that are highly departed from natural conditions, prior to application of prescribed fire." Tree removal can be used to meet the overlapping goals of reducing fire hazard and restoring a more natural forest structure to currently overcrowded forests" (USDI BLM 2008, p. 31). The alternatives vary in the amount and intensity of canopy thinning proposed. Proposed actions that thin ladder fuels would increase vertical and horizontal separation or discontinuity in the fuel profile reduces the probability of surface fire flames ascending into and igniting tree crowns and subsequently decrease the likelihood of tree torching and crown fire initiation (Scott & Reinhard, 2001; Van Wagner, 1977). Prescribed fire, via underburning, can further raise canopy base heights and reduce ladder fuels. Thinning of canopy fuels would decrease the likelihood of tree-to-tree crown fire spread under typical fire weather indices (Scott & Reinhardt, 2001).

The alternatives vary in the proposed creation of openings and un-thinned skips. Proposed actions to create openings and leave untreated skips would introduce heterogeneity in uniform stands, disrupt horizontal fuel connectivity, and create variability in patterns of litter fall and surface fuel accumulation, and moderate potential fire behavior (Finney et al., 2001), and reduce competition and fuels around legacy trees. These actions are not akin to the "intensive plantation forestry" Zald and Dunn (2018) found to "have a greater impact on fire severity than decades of fire exclusion" in examination of variables that influenced fire severity in the 2013 Douglas Complex (Zald and Dunn, 2018, p. 10). Within the Ecosystem Management Area-Old-Growth Emphasis (EMA-OGE) area, the BLM provides a range of management direction indicating where allowable actions would occur, including stands with dense continuous canopy, ladder, and surface fuels, and young stands, often referred to as plantations.

The opening of forest canopy through thinning would directly alter microclimates, including wind, solar radiation (Weatherspoon, 1996, Wayman & North, 2007), and fuel moisture, an important factor contributing toward fire behavior (Rothermel, 1972). The sheltering effect that canopy has on surface winds and the moisture level of fine dead fuel (<0.25 inches in diameter) is well-established in predictive fire behavior modeling (Rothermel 1983; NWCG, 2021) and is described in detailed assumptions regarding wildfire risk (Appendix N). For example, openings of greater than 2 acres moderately increase surface winds (Bigelow & North, 2012) could contribute toward localized increased surface fire behavior. Alternatively, openings allow more precipitation to reach the forest—for example, during lightning events accompanied by rain (Estes, Knapp, Skinner, & Uzoh, 2012) or early fall rains, which can lead to higher fuel moisture following precipitation events, reducing ignition potential and fire spread. Prichard et al. (2021) suggest that thinning effects on surface winds and fuel moisture are complex and site specific and likely vary across ecoregions and seasons.

Un-thinned skips would contribute toward heterogeneity through retention of dense patches with connected canopy, ladder, and surface fuels, and be prone to group torching of trees during a wildland fire or a prescribed fire. Higher levels of overstory cover, canopy bulk density, and connected canopy fuels are associated with increased potential for crown fire. However, the additional cover may restrict or delay understory regeneration and allow more time between maintenance treatments (Agee et al., 2000). Conversely, in areas thinned to open canopy conditions—for example, areas with less than 40 percent canopy cover—regeneration of a diverse understory is expected (Wayman & North, 2007) and could contribute toward more rapid

live fuel loading accumulation in the moderate-term (10-30 years) (USDI BLM, 2021b; Agee et al., 2000) and increase rates of surface fire spread, without adequate maintenance disturbance (refer to Assumptions and Appendix N). However, these rates of spread would be approximately 5.75 times less than those presented by crown fires in untreated stands with greater than 50 percent cover under relatively low windspeeds (e.g., 10 mph 20-foot windspeeds, Appendix N). Also, the remaining trees would continue to grow with increased vigor and continue to increase canopy development, increasing canopy cover over time (as described in Section 3.15, Vegetation Analysis Issue 2). Additionally, common to all action alternatives, the WUI/Fuels Emphasis zone includes management direction to "[t]hin to reduce canopy fuel connectivity while retaining sufficient canopy cover to limit understory growth" (refer to Appendix E, Section 4.Q).

Surface fuels influence surface fire behavior flame lengths and rates of spread. Surface fire behavior has a direct effect on wildland fire suppression tactics and the initiation of crown fire. Rates of spread and flame lengths are key components affecting fire size and resistance to control. Proposed actions (i.e. prescribed burning) that reduce surface fuel loading would produce lower flame lengths and slower rates of wildfire spread. However, immediately following vegetation management, residual activity fuels left on the forest floor (e.g., treetops and limbs) would temporarily increase surface fuel loadings and have the potential to increase surface fire behavior and would pose a risk to the residual stand, until treated (Weatherspoon and Skinner 1995; Fule et al. 2001; Raymond and Peterson 2005). Common to all action alternatives, activity fuels would be treated, per management direction in Appendix E (Sections 2.C and 4.Q).

Della Sala et al. 2022 suggest that uncertainties in "fuels reduction" efficacy are often ignored in practice and point to unfavorable outcomes associated with commercially thinned stands. These negative outcomes are by and large associated with treatments that did not have follow up activity fuel treatments, such as in Raymond and Peterson (2005) who studied the effects of forest stands commercially thinned in 1996 and intersected by the Biscuit Fire in 2002. The treatments Raymond and Peterson (2005) investigated were: 1) untreated, 2) thinned, 3) thinned with 15 percent of the harvested logs scattered on site for additional coarse woody debris (CWD), and 4) thinned with tree crowns left on site and underburned in 2001. The thin and underburn treatment had significantly lower fire severity than any other treatment category, including untreated. The authors recommend that treatments would be most effective at minimizing residual tree mortality, if both ladder and surface fuels are treated.

In a review of science-based adaptation strategies for western North American forests, Prichard et al. (2021) examine 10 common questions and put it this way,

> "Thinning alone can sometimes mitigate fire severity, but through residual logging slash, desiccation of understory fuels, and increased surface wind flow without accompanying surface fuel reduction, thinning can contribute to high-intensity surface fires and abundant mortality" (p. 9).
>
> "In summary, although the efficacy of thinning alone as a fuel reduction treatment is questionable and site dependent, there exists widespread agreement that combined effects of thinning plus prescribed burning consistently reduces the potential for severe wildfire across a broad range of forest types and conditions. Given this broad consensus in the

> scientific literature, some authors suggest that forest thinning should be considered in the context of wildfire hazard abatement, ecological restoration and adaptation, and revitalization of cultural burning. Where restoring resilient forest composition and structure and reducing future wildfire hazard are goals of management, combined thinning and burning approaches will provide ecological and wildfire-risk reduction benefits." (p.10, *internal citations omitted*)

The reduced flame lengths, resulting from proposed actions, would indirectly improve safe and effective wildfire response and improve opportunities for direct attack of a wildfire, as indicated in Fuel Treatment Effectiveness Monitoring between 2008-2022 on the BLM Medford District. Forty percent of treatments intersected by wildfires aided in wildfire containment and 65 percent of treatments resulted in surface fire, which represents low fire hazard (USDI BLM, 2021b). Flame lengths less than 4 feet are considered safe for direct attack by firefighters (Andrews & Rothermel, 1982). Even at low fuel moistures and high wind speeds, fuel models with low to moderate fuel loading typically exhibit flame lengths less than 4 feet (Scott & Burgan, 2005).

Flame lengths greater than 4 feet require mechanical equipment and/or indirect attack methods such as burnout operations ahead of the fire. Local monitoring of fuel treatment wildfire intersections has demonstrated that 60 percent of units previously treated that interacted with wildfires contributed toward wildfire control. For example, surface fire was the predominant fire type in 68 percent of 219 previously treated units that were intersected by wildfire on the BLM Medford District (2008 to 2020), and nearly 70 percent of treatments were found to moderate fire behavior. In a subset of these treatments intersected by recent large wildfires (2013-2018), it took multiple days for fire to travel through 58 percent of treated units, averaging 35 acres in size (USDI BLM, 2021b).

This slowed rate of fire spread illustrates moderated fire behavior (i.e., no stand-replacement fire) which presents favorable conditions for wildfire containment (Finney, Grenfell, & McHugh, 2009). Treatments would improve efficiency and effectiveness of fire line production rates for responding wildfire resources because there would be less forest fuel (vegetation) to remove or burn during burn out operations and aerial resources would be more effective in thinned canopies, per the FTEM observations from the 2014 Twincheria Fire and 2018 Spencer Creek Fire (USDI BLM, 2021b; Moghaddas & Craggs, 2007).

During extreme fire weather events and plume-dominated fire behavior, even fuel profiles and vegetation structure representative of historic fire regimes may have a reduced likelihood of altering fire behavior (Lydersen, North, & Collins, 2014), and treated areas may become less effective at moderating fire behavior (Ewell et al. 2015; Prichard et al., 2020). Della Sala et al. 2022 present examples of treatments that failed to alter wildfire behavior during extreme weather events. However, there is empirical evidence that prior vegetation management has moderated fire behavior, even in extreme fire weather conditions (Povak, Kane, Collins, Lydersen, & Kane, 2020) on the 2024 Bootleg wildfire (Sanna, 2024) and the 2014 Carlton wildfire. Similarly, Povak et al. (2020) found that even during plume-dominated fire weather, "bottom-up controls from fuels and topography created local, fine-scale heterogeneity" (p. 293) and indicate that "restoration targeting both surface and ladder fuels can mediate future fire severity even under extreme weather conditions" (p. 294).

These findings are consistent with and add to a growing body of empirical evidence throughout Western states that demonstrates that vegetation management (mechanical thinning and prescribed fire) has successfully moderated fire behavior and fire effects and has contributed toward more resilient future forest structure and improved safe and effective fire management and response opportunities, even in some instances under extreme fire weather conditions (USDI BLM 2016a, p. 228) despite a presumed low probability that wildfires would intersect treatments (Rhodes & Baker, 2008). These moderated vegetation structures, and thus moderated fire behavior may provide opportunities to utilize wildfire (North et al., 2015) to meet land use and resource objectives, consistent with alternative management direction for wildfire response.

However, treating all fuels across an entire landscape is practically impossible, due to many limitations. The spatial arrangement and proportion of the landscape treated have been found to be important factors influencing effectiveness of treatments in modifying fire spread and reducing fire severity/intensity and area burned (Tubbesing et al., 2019; Salis et al., 2014; Metlen et al., 2017; Metlen et al., 2021; Schmidt, Taylor, & Skinner, 2008; Finney, 2001). Focusing treatments exclusively within the home ignition zone, which is critically important, ignores broader interconnected social and ecological issues, such as ecosystem service impacts (e.g., clean water and forests that provide wildlife habitat and bank carbon stores that can slow negative climate-fire feedback loops) (Prichard et al., 2021). Treatments that reduce the probability of torching and limit ember production or those that provide effective opportunities to limit large wildfire growth, limit wildfire hazard and likelihood (Calkin et al., 2014; Finney et al., 2007), limiting the probability of home (or community) exposure to wildfire.

Strategic actions, such as thinning and prescribed burning, taken to improve safe and effective wildfire response to limit large fire growth (Stratton, 2020), to reduce the risk of habitat loss to wildfire (Jones, Kramer, Berigan, Whitmore, Gutiérrez, & Peery, 2021), and to create vegetation conditions resilient to disturbance (Haugo et al., 2015; Hessburg et al., 2015; Hessburg et al., 2021; Prichard et al., 2021) can protect CSNM objects and values, such as large old trees (Johnson & Franklin, 2009) while reducing wildfire risk to communities. For example, a concluding statement in analysis of mature and old-growth forest threats "[s]uggests the Forest Service and BLM still have an opportunity to manage mature and old-growth forests on their respective lands to be adaptive and resilient to future threats," which include high and very high threats from wildfire (USDA FS & USDI BLM 2024, p. 64). Where implemented, vegetation management actions (e.g., thinning and prescribed fire) would indirectly improve opportunities for safe and effective wildfire response (Moghaddas & Craggs, 2007) and wildfire containment (Salis et al., 2016; USDI BLM, 2016a, p. 271). As Zald and Dunn (2018) put it, "thinning as well as the reintroduction of fire as an ecosystem process are critical to reducing fire severity and promoting ecosystem resilience and adaptive capacity" (p.10 *internal citations omitted*). Similarly, Johnson and Franklin (2009) indicate that restorative treatments, including thinning and prescribed fire, and increasing heterogeneity would reduce the potential for large, severe wildfires.

The Management Areas and Wildland Fire Management direction vary relative to the wildfire risk reduction strategy analytic extents. The acreage within the Linear Feature wildfire risk reduction strategy in the EMA designation ranges from approximately 5,400 acres in Alternative A to just over 3,400 acres in Alternatives C, D, and E (the Proposed RMP). Among alternatives, between approximately 20,000 to 27,000 acres of the Local Area wildfire risk reduction strategy includes the EMA designation. Alternative A has the greatest amount of EMA (7,415 acres) in

the Local Area, while Alternative D has the least (19,615 acres). The distribution of EMA acreage across the rest of the Landscape Area wildfire risk reduction strategy varies from approximately 39,000 acres to 44,000 acres among alternatives. Alternative D has the least and Alternative A has the most acreage (Table 3-82).

The alternatives also vary in the area where wildfires may be managed for multiple objectives when conditions are compatible to meet resource objectives relative to the wildfire risk reduction strategy extents. Alternative D does not allow management of wildfires to meet multiple objectives. Alternative B would allow management of wildfires to meet multiple objectives on 5,432 acres within the Linear Feature wildfire risk analytic extent. In Alternatives C and E (Proposed RMP), approximately 4,600 acres would have this management option and 2,625 acres would have the option in Alternative A. Under Alternative B, the largest portion (38,152 acres or 55 percent) of the Local Area would allow wildfires to be managed for multiple objectives. In both Alternative C and E (Proposed RMP), wildfires could be managed for multiple objectives across 40 percent (approximately 29,000 acres) of the Local Area, while this management option is allowed on 18 percent of the Local Area in Alternative A. Alternative A has the smallest portion (15 percent) of Landscape Area available for wildfires to be managed for multiple objectives (Table 3-82). Alternatives B, C, and E (Proposed RMP) would allow wildfires to be managed for multiple objectives on close to 75 percent of the Landscape Area (Table 3-82).

Table 3-82. Ecosystem Management Areas (EMAs) and Wildfire Response for multiple objectives acreage by alternative within wildfire risk analytic extents*

Management Area & Management Direction	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
	Acres				
"Linear Feature" (150 foot buffer along POD boundaries] (8,060 acres All-Lands)					
EMA	5,432	3,633	3,466	3,466	3,472
Wildfire Response – Multiple Obj.	2,625	5,432	4,601	0	4,601
"Local Area" [0.5 Miles Around People and Property] (69,942 acres All-Lands)					
EMA	27,415	20,816	19,116	19,375	19,615
Wildfire Response – Multiple Objectives	12,554	38,152	29,902	0	29,332
"Landscape Area" (Decision area not in Local Area] (92,404 acres All-Lands)					
EMA	44,032	43,122	38,967	38,982	39,739
Wildfire Response – Multiple Objectives	27,141	69,922	68,058	0	68,202

*Only 22,243 acres of EMA overlap with the Local Area half-mile buffer around People and Property

Common to all action alternatives, the Riparian Habitat EMA includes management direction to: "[c]onduct ecological restoration treatments to enhance and restore habitat that would allow for the presence of beaver, where their associated dams would improve fish and aquatic habitat" and [c]onduct ecological restoration activities to restore degraded channels" (Appendix E). Beaver activity and expansion of wet meadows, wetlands, riparian function, within the decision area

would contribute toward wildfire risk reduction by facilitating increased water storage (Section 3.2 Issue 1) creating areas of lower wildfire hazard and add positive net effects for wildfire risk reduction. For example, in a review of burn severity data across five wildfires in the Western US, Fairfax and White (2020) found that beaver-dammed riparian corridors were relatively unaffected by wildfire when compared to similar riparian corridors without beaver damming. Additionally, beaver impounded riparian areas have higher fuel moisture throughout the fire season, thus lower fire hazard and higher resistance to wildfire events, compared with non-beaver impounded riparian zones (Weirich, 2021).

Common to all action alternatives in Appendix E, the BLM includes management direction in the Old Growth Emphasis Management Area to" [p]rotect closed old refugia forests that occur in cooler, moister sites (e.g., drainage bottoms, lower slopes, and cool midslopes) that provide for refugia persistence. When located in topographic locations with low fire probability, such as drainage bottoms, lower slopes and cool midslopes, these older structurally complex forests these structural types can create influential microclimates and shelter surface winds, harboring conditions that are more likely to result in lowered fire severity (Odion et al. 2004), and thus lower fire hazard.

Alternative A (No Action)

The estimated 26,884 restoration acres under Alternative A (Table 3-81) would directly reduce or maintain low wildfire risk within 38 percent of the Local Area extent (69,942 acres) or 29 percent of the Landscape Area (92,404 acres) over the life of the plan if all restoration acres were focused within the EMA for either extent (Table 3-82). Proposed actions could contribute toward some combination of wildfire risk reduction or maintenance within the 20-40 percent threshold in either area extent and improve safe and effective areas for wildfire containment along all Linear Features in the decision area (Table 3-75).

Management of wildfires to meet multiple objectives including wildfire hazard reduction, when conditions are compatible (e.g., low-moderate fire danger or when expected fire behavior and potential effects are acceptable), would be available within 40 percent of the People and Property Local Area extent and 15 percent of the Landscape Area (Table 3-82).

WUI/Fuels Emphasis management direction would apply to 13 percent of the decision area (Table 3-80).

Direct and indirect effects to surface, ladder, and canopy fuels would apply, and large trees would be protected and promoted. The 2008 CSNM RMP does not include specific diameter limits, other than to say that:

"[t]hinning in the monument would generally involve removing small trees from densely stocked stands….. [and l]arge trees will not be cut, except for the purpose of creating openings, providing habitat structure, or eliminating hazard" (USDI BLM, 2008, p. 32).

Proposed actions to create variably sized openings of 4 acres or less (USDI BLM, 2016a) would have the effects as described above, and again the 2008 RMP provides no specificity around the size of openings to create. Unthinned skips would be retained in 10 percent of treated areas and have the effects described above under common to all.

As noted in the 2008 CSNM RMP, "reduction of shrubs through prescribed fire or manual means may allow the preservation of the large oak structure" and treatments to "[r]e-create a range of wedgeleaf ceanothus stand ages across the landscape" would reduce likelihood of continuous high-severity fire risks (USDI BLM, 2008, p. 49).

Alternative B

The estimated 27,028 restoration acres under Alternative B (Table 3-81) is similar to Alternative A. It would directly reduce or maintain low wildfire risk within about 38.5 percent of the Local Area extent or 29 percent of the Landscape Area over the life of the plan if all restoration acres were focused within the EMA for either extent (Table 3-82). Implementation of restoration actions on all 20,816 acres of the EMA within the People and Property Local Area would directly reduce or maintain low wildfire risk on 30 percent of the Local Area. Proposed actions could also contribute toward some combination of wildfire risk reduction or maintenance within the 20-40 percent threshold in either area extent, improving safe and effective areas for wildfire containment along all strategic Linear Features available for restoration activities (Table 3-75).

Management of wildfires to meet multiple objectives, including wildfire hazard reduction, would be available within 58 percent of the People and Property Local Area extent and 79 percent of the "Landscape Area" (Table 3-82). Per management direction on incidents managed to meet multiple objectives, strategies shall provide for cost containment and firefighter and public safety. WUI/Fuels Emphasis management direction would apply to 23 percent of the decision area (Table 3-80).

Proposed actions to create variably sized openings of 4 acres or less would have the effects as described above. The majority of openings created would be 2 acres or less, and larger openings would be in unique circumstances under Alternative B (refer to Appendix E, EMA-OGE management direction). Additionally, the WUI/Fuels Emphasis management direction to "[t]hin to reduce canopy fuel connectivity while retaining sufficient canopy cover to limit understory growth" (refer to Appendix E, Wildland Fire Management) would apply only to Alternative B WUI/Fuels Emphasis zone. Unthinned skips would be retained in 10 percent of treated areas and have the effects described above under common to all.

Treatments in chaparral communities would reduce competing shrubs from under the dripline of open grown oak and large pine trees (generally >20 inches DBH) (Appendix E. – EMA) and reduce wildfire risks to these important CSNM objects.

Alternative C

The estimated 12,310 restoration acres under Alternative C (Table 3-81) would directly reduce or maintain low wildfire risk within 18 percent of the People and Property Local Area extent or 13 percent of the Landscape Area over the life of the plan, if all restoration acres were focused within the EMA of either extent (Table 3-82). Placement of these acres within the Local Area nearly achieves the 20 percent threshold and strategic placement in the Landscape Area would exceed the 10 percent strategic threshold. Proposed actions would also contribute toward improving safe and effective areas for wildfire containment along all strategic Linear Features available for restoration activities (Table 3-75).

Management of wildfires to meet multiple objections, including wildfire hazard reduction, would be available within 42 percent of the People and Property Local Area extent and 79 percent of

the Landscape Area (Table 3-82). Per management direction on incidents managed to meet multiple objectives, strategies shall provide for cost containment and firefighter and public safety.

WUI/Fuels Emphasis management direction would apply to 10 percent of the decision area (Table 3-80). Alternative C would not allow wildfires to be managed for multiple objectives where WUI/Fuels Emphasis Management Direction applies.

Due to smaller diameter restrictions (refer to Appendix E, EMA-OGE management direction) Alternative C would have diminished effects related to thinning of canopy fuels described above. Proposed actions to create variably sized openings of 2 acres or less would have the effects as described above. Openings larger than 2 acres would not be created, so localized surface winds would not be moderately increased. The WUI/Fuels Emphasis management direction to "[t]hin to reduce canopy fuel connectivity while retaining sufficient canopy cover to limit understory growth" (Appendix E, Wildland Fire Management) would apply. Un-thinned skips would be retained in 10-30 percent of treated areas and have the effects described above under common to all.

Treatments in chaparral communities would reduce competing shrubs from under the dripline of open grown oak and large pine trees (generally >20 inches DBH) (Appendix E. – EMA) and reduce wildfire risks to these important CSNM objects.

Alternative D

The estimated 6,182 restoration acres under Alternative D (Table 3-81) would directly reduce or maintain low wildfire risk within only 9 percent of the People and Property Local Area extent or 7 percent of the Landscape Area over the life of the plan if all restoration acres were focused within the EMA of either extent (Table 3-82). Anticipated actions would fall short of the 20 percent area threshold and the 10 percent strategic threshold (Table 3-75). Proposed actions could contribute toward improving safe and effective areas for wildfire containment along all strategic Linear Features available for restoration activities.

WUI/Fuels Emphasis management direction would apply to 2 percent of the decision area (Table 3-80).

While Alternative D has a very limited management approach with no associated decadal restoration target and limits where vegetation management could occur (refer to Section 2.3), the focused footprint includes areas strategic for wildfire risk reduction. For example, young stands typically present relatively high fire hazard (Odion et al., 2004). Fuel breaks are also strategic and often good points to tie in prescribed fire lines; however, adhering to linear features only may introduce operational complexity in implementation of prescribed fire and wildfire response. And the inability to treat chaparral would diminish the ability to reduce wildfire risk within the limited WUI/Fuels Emphasis zone and along strategic linear features. Linear boundaries that do not follow operationally relevant landscape features (e.g., ridgelines) may present challenges for sustained maintenance of low-moderate fire hazard or for reducing the risk of wildfires spreading to residential properties from the decision area or to locations in the decision area from fires originating on adjacent private lands. Limited overstory canopy thinning would not contribute toward reducing the likelihood of tree-to-tree crown fire spread under typical fire weather indices or increasing aerial firefighting effectiveness as upper and mid-level canopies continue to close and reduce effective penetration of aerial applications of water.

Limited thinning around legacy trees may help reduce localized wildfire risk to those CSNM objects and values, however Hood, Cluck, Jones, & Pinnell (2018) suggest that legacy trees that receive radial thinning and within-stand thinning treatments have higher growth rates and higher resilience to drought compared to trees in unthinned stands or only those with radial thinning. No openings or skips would be created, such that horizontal fuels connectivity would not be disrupted, patterns of litter fall and surface fuel accumulation would not be altered, and potential fire behavior would not be moderated to the same extent.

Wildfires would not be allowed to meet multiple objectives, including wildfire hazard reduction and subsequent wildfire risk to the WUI or CSNM objects and values. Fire exclusion would continue, and disturbance regimes would continue to be altered; these aspects, coupled with other expected climatological changes, such as increased background tree mortality due to longer periods of hot drought (Halofsky et al., 2022), increase the likelihood for larger proportions of high-severity fire (Mote, Abatzoglou, Dello, Hegewisch, & Rupp, 2019) and would continue to elevate wildfire hazard.

Alternative E (Proposed RMP)

The estimated 12,310 restoration acres under the Proposed RMP (Table 3-81) would directly reduce or maintain low wildfire risk within 18 percent of the People and Property Local Area extent or 13 percent of the Landscape Area over the life of the plan, if all restoration acres were focused within the EMA of either extent. Placement of these acres within the "Local Area" nearly achieves the 20 percent threshold and strategic placement in the Landscape Area would exceed the 10 percent strategic threshold. Proposed actions would also contribute toward improving safe and effective areas for wildfire containment along all strategic Linear Features available for restoration activities.

Management of wildfires to meet multiple objections, including wildfire hazard reduction, would be available within 42 percent of the People and Property Local Area extent and 79 percent of the Landscape Area (Table 3-82). Per management direction on incidents managed to meet multiple objectives, strategies shall provide for cost containment, firefighter and public safety, and resource availability.

WUI/Fuels Emphasis management direction would apply to 10 percent of the decision area (Table 3-80). Under the Proposed RMP, the BLM would not allow wildfires to be managed for multiple objectives where WUI/Fuels Emphasis Management Direction applies.

The Proposed RMP includes management direction for nuanced diameter limits for fire- and drought- tolerant conifer species and fire- and drought- intolerant conifer species between Alternatives B and C diameter limits. Therefore, effects related to thinning of canopy fuels would be consistent with those described above. The Proposed RMP diameter limits were based on relevant literature review, including local studies (Metlen et al. 2021, Appendix 4), E. O. 14072, and anecdotal site-specific field evaluation, rather than arbitrary criteria. Proposed actions to create variably sized openings of 2 acres or less would have the effects as described above. Openings larger than 2 acres would not be created, so localized surface winds would not be moderately increased. The WUI/Fuels Emphasis management direction to [t]hin to reduce canopy fuel connectivity while retaining sufficient canopy cover to limit understory growth (refer to Appendix E, Wildland Fire Management) would apply. Unthinned skips would be retained in 10 percent of treated areas and have the effects described above under common to all.

Cumulative Effects

In historically low-to-moderate-severity fire regimes, such as the planning area, a combination of linear fuel breaks and area-wide fuel treatments, placed in adjacency on the landscape, can reduce the size and intensity of wildland fires (Agee et al., 2000). Ecological restoration occurring on additional lands within the decision area (e.g., beyond minimum restoration target or in ADMAs or CDMAs) or on private lands within the planning area would contribute toward cumulative wildfire risk reduction. Similar actions grouped in adjacency on BLM-administered lands or other ownerships would provide greater influence to modify fire behavior and slow fire spread (Finney, 2001) and create safer opportunities to limit large fire growth, thereby protecting resources such as timber, Threatened and Endangered species habitat, and communities (Ager, Finney, Kerns, & Maffei, 2007; Finney, 2009; Metlen et al., 2017; Metlen et al., 2021). These combined actions could also provide more opportunities to conduct prescribed underburning as a future maintenance action. The relatively large treatment acreage and active management aspect of Alternatives A and B would provide this opportunity and future opportunities to implement prescribed fire on previously treated acres and meet neighbors at the fence, contributing toward all-lands wildfire risk reduction. There would be less opportunity under Alternative C or Alternative E (Proposed RMP), as described in direct and indirect effects, unless minimum restoration targets were exceeded, and minimal opportunity in Alternative D due to the limited area where treatments may occur.

Without frequent low-to-moderate maintenance disturbance (e.g., prescribed fire or low-to-moderate severity wildfire), understory vegetation would continue to grow, vegetation would continue to die, and surface and ladder fuels would re-accumulate. This accumulation of fuel would contribute toward increasing surface fuels, ladder fuels and canopy fuels available to burn when intersected by a wildfire. Maintenance treatments, such as prescribed fire, are typically less expensive than initial entry treatments (per BLM Medford contracting prices). Low-to-moderate-intensity wildfires can provide maintenance of treated areas. In areas with low-to-moderate fire hazard, having the ability to manage fires for multiple objectives when conditions allow would contribute toward maintenance of low-to-moderate fuel loads in the Landscape Area or the People and Property Local Area. However, due to ownership patterns and values at risk within the planning area, opportunities may be limited. Additionally, in areas with high crown fire potential, or high hazard, it would frequently be necessary to reduce surface, ladder, and canopy fuels prior to managing wildfires to meet resource objectives. Ultimately, in the frequent-fire adapted dry forest, maintenance of low-to-moderate fire hazard hinges on frequent low-moderate intensity disturbance.

Per management direction common to all action alternatives, the BLM would explore opportunities to close areas to beaver trapping to improve riparian habitat conditions (refer to Appendix E – Section 2.C.3). Clearly closing areas to beaver trapping would facilitate future beaver activity, which would allow for persistence of direct and indirect effects described previously (refer to Section 3.2).

Climate changes anticipated in the planning area, including increasing temperatures, increasing drought frequency and severity, reduced snowpack, and fewer but more extreme precipitation events (Halofsky et al., 2022), would continue to affect future wildfire risk. Wildfire would continue to be a major change agent, interacting with other disturbance agents (e.g., drought and insect outbreaks) affecting ecosystems and vegetation structure. Forecasts indicate that the

number of fires escaping initial attack is likely to increase, along with area burned and the occurrence of very large fires (greater than 5000 ha or approximately 12,000 acres) (Halofsky et al., 2022). Larger proportions of high-severity fire are anticipated to increase in likelihood (Mote et al. 2019), as has been happening across the West in recent years (Francis et al., 2023). This is a reality which has been playing out recently where forests have been experiencing a deficit of fire, a deficit of low-severity fire, and a rise in high-severity fire compared with historic conditions, particularly in historically frequent-fire forests in Oregon and Washington (Haugo et al., 2019) and the Sierra Nevada California (Williams et al., 2022). However, as described in the AMS, "[t]he forecasted implications to future fire severity are mixed, given that a warmer temperature coupled with increased precipitation during the growing season could lead to an increase in vegetation biomass (i.e., fuel), promoting high severity fire. However, increased fire frequency is likely to result in repeat fire and reduce fuel load over time, however the implications of multiple overlapping fires and short-interval reburn periods can lead to compounding unknown effects on species regeneration, composition, vegetation type and structure (Halofsky et al. 2023) (refer to USDI BLM, 2023a, p. 206).

Climate change trends are already taking holding in meaningful ways within the planning area, including an increase in conifer mortality as described in the AMS (USDI BLM, 2023a, p. 201). Excessive conifer mortality poses several potential implications for fire management, firefighter safety (USDI BLM, 2023a, p. 201), and risk to communities. Abundant snag presence would require mitigation for firefighters to safely engage wildfires, thus increasing fire line construction time, or preventing firefighter engagement altogether. Hazard trees could fall onto roads and block prominent routes for the public and responding firefighters. The high quantities of dead and dying vegetation with low moisture content could lead to prolific spotting embers and extreme fire behavior, increasing home (or community) exposure to wildfire. This situation could decrease the ability to safely and effectively secure fire lines and may require larger safety zones for firefighters. The fuel impacts of large-scale forest mortality could lead to increased fuel loading for decades to come and a greater incidence of mass fire behavior, characterized by long-burning high fuel loads over extensive areas (Stephens et al., 2018) and resulting in adverse, landscape-scale effects (Stephens et al., 2022). While the alternatives have varied diameter limitation on removal of dead trees, all action alternatives allow for the removal of dead trees to reduce hazardous fuels (refer to Appendix E, EMA and Wildland Fire Management).

Conclusion

All alternatives would contribute toward creating conditions in which wildfire can occur without detrimental consequences (i.e. stand-replacing fire), thus reducing impacts to highly valued resources, including communities and wildlife habitat (Tubbesing et al., 2019; Jain et al., 2012; Ager et al., 2007, 2010; USDI BLM, 2016a, p. 254). All alternatives would contribute incrementally in varying amounts toward improving safe and effective wildfire response and reducing wildfire risk to the WUI and CSNM objects and values, such as biodiversity, legacy trees which may take centuries to replace if lost to wildfire and closed old refugia forests. The diameter restrictions and limited overstory canopy thinning in Alternatives D and C would have diminished effects on reducing the likelihood of tree-to-tree crown fire spread under typical fire weather indices or increasing aerial firefighting effectiveness, compared with Alternatives A, B, and Alternative E (Proposed RMP). Common to all action alternatives, through the protection of closed old refugia forests, facilitation of beaver activity, and expansion of wet meadows,

wetlands, and riparian function within riparian habitat (EMA-RH), the planning area would contribute toward wildfire risk reduction by creating areas of lower wildfire hazard.

Alternatives A and B would contribute the greatest amount toward wildfire risk reduction to the WUI and CSNM objects and values, followed by the Proposed RMP (Alternative E), then Alternative C and Alternative D. Alternatives A and B could achieve 20 percent wildfire risk reduction threshold within either the Local or Landscape wildfire risk reduction strategy extent and contribute toward additional risk reduction, given the estimated minimum ecological restoration acreage. Alternative C and the Proposed RMP would achieve nearly 20 percent wildfire risk reduction within either the Local Area and greater than 10 percent within the Landscape Area wildfire risk reduction strategy extent, given the estimated minimum ecological restoration acreage. Alternative D would not satisfy the 10 percent minimum threshold for wildfire risk reduction; however, actions would occur in strategic locations. Common to all action alternatives, applying ecological restoration treatments that achieve reduced wildfire hazard only within the Linear Feature area would fall short of the minimum 10 percent of the CSNM planning area needed for effective wildfire risk reduction in strategic areas optimally placed to disrupt large fire growth. This is because the Linear Feature area only comprises 5 percent of the CSNM planning area landscape. In the absence of natural fire as a disturbance agent, management activities, including prescribed fire and mechanical management of vegetation, can serve as a partial surrogate for natural disturbance, and promote and maintain wildland fuel profiles that would reduce wildfire hazard and support low-mixed severity fire.

Recreation and Visitor Services, Travel and Transportation Management

Between 2000 and 2021, human-caused wildfire ignitions within the CSNM planning area accounted for 50 percent of all wildfires (Table 3-77) and the majority of human caused ignitions occur within the Local Area wildfire risk reduction extent (Table 3-78).

The local data clearly illustrate that human actions have an influence on wildfire ignition patterns within the CSNM planning area. However, based on studies reviewed, there is mixed evidence on road density influence on human-caused ignitions, ranging from no detectable evidence to a positive correlation. Narayanaraj and Wimberly (2012) and Syphard et al. (2007) found road corridors to be correlated with human ignitions. Narayanaraj and Wimberly (2012) did not find a correlation between road proximity to population density and human caused ignitions, while Romero-Calcerrada et al. (2008) and Syphard et al. (2007) found positive relationships. Arienti et al. (2009) even found a positive relationship between road density and lightning-caused ignitions. Roads have been found to contribute toward wildfire containment and limiting fire spread (Price & Bradstock, 2010; Syphard et al., 2007).

Decommissioning roads and limiting road density would reduce the potential for human-caused ignitions associated with roads and trails. However, as fire season increases in severity, land management agencies impose restrictions pertaining to public and work-related activities to prevent fire ignitions. In extreme fire weather conditions, restrictions can include public land closures, which are intended to limit access and reduce potential human caused ignitions.

As stated above, roads and trails may also contribute toward wildfire containment and limiting fire spread, particularly if they coincide with identified Potential wildfire Operational Delineation (POD) boundaries as described by Thompson et al. (2016) and Stratton (2020),

which represent geographic features that could aid in wildfire containment and limit large fire growth. Additionally, long-term decommissioned roads could be easily opened for use in wildfire containment, particularly those located on ridgetops, landscape locations that would need little infrastructure (e.g., cross drains) to reduce erosion or sediment delivery to streams.

Travel Route Development – Alternatives A (No Action), B, C, and E (Proposed RMP)

These alternatives include management direction to develop public motorized and non-motorized on existing travel routes and trails. There are no other differences between action alternatives for Travel and Transportation. Alternatives would allow for the development of new recreation opportunities (refer to Appendix E, Recreation and Visitor Services management direction). This would provide opportunities to establish features that could aid in wildfire containment, evacuation routes, and responder ingress/egress; however, this would create additional potential sources of human-caused ignitions associated with use.

Travel Route Development - Alternative D

Alternative D prohibits the construction of new roads or trails and does not allow for the development of new recreation opportunities. This would limit potential human-caused ignitions associated with use and limit opportunities to establish features that could aid in wildfire containment, evacuation routes, and responder ingress/egress.

Reduction of Road Density - Common to all Action Alternatives

All action alternatives propose reduction of road density in riparian areas, special habitat, and fragile soils, and they would have similar effects as described above. Roads would cease to be a vector for invasive plant spread (Section 3.15, Vegetation Analysis Issue 4). Refer to effects discussed below regarding invasive plant management.

Reduction of Road Density - Alternatives A (No Action) and E (Proposed RMP)

These alternatives include management direction to allow for road decommissioning and establish direction for future route-by-route analysis to consider road decommissioning where decommissioning would reduce the potential for these roads to act as strategic locations for wildfire containment, evacuation routes, and responder ingress/egress. Eliminating roads would reduce the potential for human-caused ignitions associated with road and trail use. However, where and how much road decommissioning would occur is unknown at this time, so it is not possible to determine the effects of these potential actions beyond that they could adversely affect wildfire containment strategic operations or reduce potential ignitions. Roads would also cease to be a vector for invasive plan spread (Section 3.15, Vegetation Analysis Issue 4). See effects discussed below regarding invasive plants.

Cumulative Effects

Development of roads or removal of roads on private lands may have similar effects as described in direct and indirect effects above; however, the BLM is not aware of any reasonably foreseeable actions other than travel management planning. Future travel management planning would assess BLM-administered routes using the criteria outlined in 43 CFR 8342.1, A-D and the considerations outlined in Appendix E, Section 4.P, which primarily look at reducing road density and develop of trail opportunities where the BLM has public access and would be compatible with the protection of CSNM objects and values.

Conclusion

For the reasons above, the management direction for Travel and Transportation and Recreation and Visitor Services across all the alternatives does not present clear adverse or beneficial effects to fire occurrence and wildfire containment to make a reasoned choice among alternatives how wildfire risk would be affected. Alternative D may create fewer sources of human-caused ignitions.

Invasive Plant Management and Livestock Grazing Management

Invasive annual grasses have been observed in the CSNM, encompassing approximately 14,500 acres (Section 3.15, Vegetation Analysis Issue 4). Invasive annual grasses are known to create homogenous flammable fuel profiles, which can alter the timing, frequency, and intensity of fires (Kirkland & Kerns, 2023). These fine fuels often cure completely, leaving continuous extremely flammable horizontal fuel profiles. In many cases, these invasive plants cure weeks earlier than is typical for native plants, potentially altering the seasonality of fire occurrence. The thatch from invasive annual grasses builds up over time compounding the wildfire hazard potential. Invasive annual grass fuel beds have a longer flame length and a faster rate of spread compared to native vegetation (Kirkland & Kerns, 2023). Conversely, native vegetation would result in lower flame lengths under the same conditions.

Disturbance, including livestock grazing, vegetation management, roads, trails, and travel routes can contribute to the introduction and spread of invasive species (Section 3.15, Vegetation Analysis Issue 4). As described in Section 3.7, Livestock Grazing Analysis Issue 2, the CSNM allotments have varied representation of invasive plants in the most recent inventory from 2023 plots, ranging from zero percent cover on 57 percent of plots to 30 to 43 percent cover on all of the Dixie allotment plots.

Direct and Indirect Effects Common to All Action Alternatives

Invasive plant management direction and Ecosystem Management Area management direction to restore native species and treat invasive plants would provide opportunities to reduce hazardous fuel profiles associated with invasive non-native species among all alternatives after other restoration actions (e.g., thinning and prescribed fire) or as a stand-alone action. Additionally, consistent with management direction (Appendix E), the BLM would follow the Invasive Plant Management Strategy (Appendix O). However, as described in Section 3.15, Vegetation Analysis Issue 4, the success rate of invasive plant treatments in the CSNM is not known. Control of invasive plants frequently requires treating the same area multiple times using multiple methods (DiTomaso, 2006b; Mosley & Roselle, 2006; Olson & Launchbaugh, 2006; Firn, Price, & Whalley, 2013; Valliere, Balch, Bell, Contreras, & Hilbig, 2018).

Direct and Indirect Effects Common to Alternatives A (No Action), B, C, and E (Proposed RMP)

Livestock grazing would be available on 27,820 acres within the decision area and be consistent with current condition. Surface fuel beds composed of non-native annual grasses that exist on these acres would persist along with corresponding fire hazard. Generally, as grazing increases, species richness and diversity decrease and season-long grazing is more likely to increase risks of invasive plant spread (Section 3.15, Vegetation Analysis Issue 4), which would promote homogenous flammable fuel profiles. However, grazing has also been found to increase native species richness and diversity in rare cases and decrease the biomass or plant height (Whitridge,

Elvington, & Southworth, 2015), which can reduce flame lengths. However, these effects are dependent on timing of grazing and year-to-year annual grass production (Section 3.15, Vegetation Analysis Issue 4). Effectively managing livestock grazing to control invasive annual grasses requires intensive, hands-on management of the livestock spatially and seasonally and takes several years to achieve (Section 3.15, Vegetation Analysis Issue 4). See also the above discussion on travel routes related to wildfire occurrence and containment. The effect on invasive annual grasses would be aligned with sources of ignition described above.

Consistent with management direction (Appendix E, Section 4.G, Livestock Grazing), the BLM would "study the impacts of livestock grazing on the objects of biological interest in the monument with specific attention to sustaining the natural ecosystem dynamics" and would "[c]onduct Livestock grazing at flexible levels that allow for the protection of CSNM objects and values." The BLM would determine grazing levels by land health assessments and valid scientific studies of livestock grazing impacts on CSNM objects of biological interest, as outlined in Livestock Grazing Compatibility and Voluntary Permit Relinquishment (Appendix Q). Should grazing be found incompatible with protecting the objects of biological interest, the BLM would take necessary actions, such as adjusting seasonal timing of grazing or rotational grazing to protect CSNM objects and values or retire the grazing allotments pursuant to the processes of applicable law, as outlined in Appendix Q.

Consistent with management direction (Appendix E – G. Livestock Grazing), the BLM would "study the impacts of livestock grazing on the objects of biological interest in the monument with specific attention to sustaining the natural ecosystem dynamics" and "[c]onduct Livestock grazing at flexible levels that allow for the protection of CSNM objects and values." The BLM would determine grazing levels by land health assessments and valid scientific studies of livestock grazing impacts on CSNM objects, as outlined in Livestock Grazing Compatibility and Voluntary Permit Relinquishment (Appendix Q). Should grazing be found incompatible with protecting the objects of biological interest, the BLM may take necessary actions, such as adjusting seasonal timing of grazing or rotational grazing to protect CSNM objects and values or retire the grazing allotments pursuant to the processes of applicable law, as outlined in Appendix Q.

Alternative D

Livestock grazing would not be available on any acres within the decision area. Although there is management direction to restore native species and treat invasive plants, there is no estimated treatment rate or minimum target. However, some treatment is likely to occur. As stated in Section 3.15, Vegetation Analysis Issue 4, the effects of ending livestock grazing are complicated and discontinuing livestock grazing would have little or no effect on the abundance and spread of invasive plants given the level of roads, trails, recreation use, and the risks associated with vegetation management and wildfire in facilitating the spread of invasive plants, as well as introducing new invasive species (Section 3.15, Vegetation Analysis Issue 4 – Alternative D - Grasslands).

Cumulative Effects

Invasive annual grasses are present in the CSNM. Treatments to control invasion frequently requires treating the same area multiple times using multiple methods. All alternatives would incrementally contribute toward restoration actions, which would restore fuel beds associated

with native vegetation. However, invasive plants readily move across the public-private boundary, and the CSNM has mixed ownership as described in the affected environment. Invasion can initiate a cycle where a invasive grass colonizes an area and provides the fine fuel necessary for the initiation and propagation of wildfire. Fires then increase in frequency, area, and possibly severity. Per the discussion of cumulative effects on wildfire under Vegetation and Wildland Fire Management, following such grass-fueled fires, nonnative grasses recover more rapidly than native species and perpetuate the cycle, compromising the native component of the plant community.

Conclusion

For the reasons above, the management direction for Livestock grazing and Invasive Plant Management do not present clear adverse or beneficial effects on wildfire hazard to make a reasoned choice among alternatives how wildfire risk would be affected.

3.18. TERRESTRIAL WILDLIFE

Key Points

- Under Alternatives B, C, D, and E (Proposed RMP), the habitat restoration proposed under the Ecosystem Management Area objectives, combined with management direction for EMA–OGE, EMA–DE, and terrestrial wildlife, would have short-term adverse effects, but would have beneficial effects by improving wildlife habitat quality and resiliency in the long term.
- Overall, effects to Bureau Sensitive and ESA listed species from the objectives and management direction proposed in this plan are anticipated to be minimal. Management directions provide many protective guidelines that would limit impacts. Alternative B would target the largest number of acres for restoration, allowing more long-term habitat-altering actions to take place.
- Livestock grazing under all alternatives is not expected to affect connectivity for pollinators. Under Alternatives A, B, C, and E (Proposed RMP), grazing would only take place in current active allotments, which cover approximately twenty five percent of the CSNM and approximately 12 percent of the potential meadow habitat. Grazing would be managed and monitored to determine if livestock grazing is compatible with "protecting the objects of biological interest" and to evaluate the allotments for lease renewal, to ensure that livestock grazing is consistent with current laws and regulations. The Proposed RMP includes additional management direction to implement grazing management practices to provide interim protections of allotments with unprotected sensitive aquatic and riparian habitats prior to beginning of the next livestock season of use, until a long-term/permanent solution is implemented. Under Alternative D, livestock grazing would be phased out.
- Management direction under all alternatives would contribute to NSO Recovery Action 10 and Recovery Action 32 through a targeted treatment strategy that conserves high value northern spotted owl habitat, including nesting-roosting and closed old refugia forests, while also addressing risk of loss to habitat from severe wildfire.
- Common across all action alternatives is the preservation of closed old refugia forests. Assuring the persistence of these older, structurally complex stands would be accomplished through the exclusion of vegetation treatments. Further protection of closed old refugia forest habitat would be accomplished through fuel reduction treatments in areas surrounding the closed old refugia forest habitat.

Analysis Issues

1. How would the alternatives affect habitats used by special status wildlife species?
2. How would the alternatives affect nesting, roosting and foraging habitats used by northern spotted owls (NSO)?
3. How would the alternatives affect the availability of NSO dispersal-quality habitat?

Terrestrial Wildlife Analysis Issue 1: Special Status Wildlife Species

How would the alternatives affect habitats used by special status wildlife species?

Summary of Analytical Methods

The BLM evaluated at a programmatic level how the objectives and management direction may lessen or worsen threats to habitat. A resource management plan does not authorize site-specific projects or activities; therefore, there are no direct effects from adopting it. The BLM would analyze the direct and indirect site-specific effects as needed when future projects are proposed during RMP implementation. Although the BLM may describe the potential short-term effects of implementing the RMP alternatives where needed, this evaluation focuses on longer term indirect and cumulative effects that may occur over the 20-year life of the plan.

Where possible, the BLM quantified impacts on wildlife by determining the amount of Ecosystem Management Area (EMA) lands potentially altered based on the objectives and management direction. Where quantitative effects in terms of acres affected could not be determined, the BLM analyzed potential effects on wildlife and their habitats qualitatively, relying substantially on our professional judgment and on scientific literature about a species, its habitat, and effects of management. The BLM used this information to reach reasonable conclusions as to the context, intensity, duration, and type of a potential impact. The BLM then analyzed the effectiveness of management direction to protect, mitigate, and enhance key ecological conditions for special status species, such as canopy closure, large snags, dens, nest and roost sites, large trees, and protected activity centers.

It would be impractical and unnecessary to analyze the effects of each alternative on each species of wildlife known or suspected to occur in CSNM. Here the BLM has analyzed species that are rare or of special concern and whose populations or habitats could suffer imminent threat from ground-disturbing actions. For purposes of comparison between the alternatives, the special status species known or suspected to occur in the analysis area are the focus of the effects analysis for wildlife. The special status species (SSS) known to occur in the CSNM use a wide variety of habitats. In this analysis the species selected are a subset of the special status species known to occur in the CSNM and are meant to reflect effects to the larger suite of wildlife species that are present in the CSNM. Refer to Appendix J, Special Status Species in the CSNM, for a complete list of special status species known or suspected to occur within the CSNM.

A Biological Assessment has been prepared for the purpose of consulting with the USFWS through the Section 7 process regarding potential effects to ESA-listed species.

Affected Environment

The CSNM encompasses three geologically distinct mountain ranges with dramatic changes in elevation, aspect, and topography. This rare convergence of ecoregions results in a unique mosaic of habitat types including towering fir forests, sunlit oak groves, wildflower-strewn meadows, and steep canyons, all connected by a vast network of riparian systems (Presidential Proclamation No. 7318).

Endemic to these ecoregions is a variety of rare and special status species of plants and animals, who rely upon the ecological integrity (composition, structure, function, and processes) of intact habitats to maintain viable populations. Rare, endemic, and special status species often live in

habitats that contain elements such as particular soils, hollow trees, and unique microclimates that limit their distribution and prevent these species from being more widespread (Cartwright, 2019).

The Southern Cascades ecoregion, for example, includes an elevational range between 3,500 and 6,000 feet and is characterized by gentle to moderately sloping promontories and broad valleys with extensive meadows. This mixed-conifer forest habitat is interspersed with a network of streams, montane meadows, wetland, and perennial springs. The heterogeneous habitats distributed across this landscape are essential habitat for a broad range of wildlife including the northern spotted owl, northern goshawk, fisher, Johnson's hairstreak butterfly, northwestern pond turtle, and boreal toad, among others (Frost, Odion, Trail, & Williams, 2011). The mosaic of interconnected habitat throughout all ecoregions in the CSNM supports outstanding biodiversity.

This analysis focuses on impacts to habitat used by special status species. Special status species are plant and animal species that meet one of the following criteria:

1. Species officially listed, proposed for listing, or candidates for listing as threatened or endangered under the provisions of the Endangered Species Act (ESA);
2. Species listed or proposed for listing by the State of Oregon or California; and
3. Species designated by the BLM State Director as sensitive (Bureau Sensitive).

The special status wildlife species considered in this analysis are based on the updated State Director's Special Status Species List (USDI BLM, 2021a). A table of special status species either documented or suspected to occur in the CSNM and other information is provided in Appendix J, Section 1.2 – Special Status Wildlife Species.

Habitats used by special status species are briefly described below. Refer to the detailed analyses of impacts on these habitats in the appropriate sections of Chapter 3, including 3.2 Aquatic – Riparian, which includes riparian forest habitat and wet meadows and wetlands; 3.15 – Vegetation, which includes forests and upland nonforest plant communities (dry meadows, grasslands, shrub habitat, oak communities, juniper woodland, and mixed hardwood-conifer woodland); and 3.7 – Livestock Grazing which includes an analysis of rangeland health.

Riparian Habitats

Riparian habitats in the CSNM include mature conifer forests; hardwood stands that comprise aspen, maple, ash, and alder; and open meadow and wetland complexes where willow, riparian shrubs, grasses, and forbs comprise the riparian vegetation. The meadow/wetland habitats represent a small but critical component of the decision area that support native aquatic and terrestrial organisms. They are also usually less resistant to physical disturbances than forested riparian areas due to lack of hard substrates in their bed and banks, and hence are more prone to erosion and channel incision. Meadow/wetland habitats make up less than 4 percent of all riparian habitats identified in the decision area. As described in the Aquatic and Riparian analysis (section 3.2), current conditions of riparian areas vary widely across the decision area and are reflective of past and ongoing land and water use practices that include construction and operation of reservoirs, diversion of water between watersheds and basins, forest and range-land management practices, and geologic and topographic considerations (e.g., soil types and their water holding capacities, elevation, aspect, precipitation regime, plant communities). Changes in climate and fire return intervals have also altered riparian habitat conditions, as described in the

AMS (USDI BLM, 2023a). In general, water is more prevalent at higher elevations and in northern and western portions of the decision area, though all areas have been negatively impacted by a prolonged and ongoing drought that has affected the entire region. Across all watersheds, notable ongoing and/or historic uses with impacts to meadow resources include cattle grazing, water capture and transfer (reservoir operations and water withdrawals), and timber harvest and associated road construction and maintenance. Refer to Affected Environment in Section 3.2, Aquatic and Riparian Habitat, for more details about riparian plant communities.

Meadows and wetlands and riparian forest habitats within the CSNM support a high diversity of species, including the Oregon spotted frog (*Rana pretiosa*) (ESA listed as Threatened), Franklin's bumble bee (*Bombus franklini*) (ESA listed as Endangered), northwestern pond turtle (*Actinemys marmorata*) (ESA listing status Proposed Threatened), and several Bureau Sensitive Species, including American white pelican (*Pelecanus erythrorhynchos*), bald eagle (*Haliaeetus leucocephalus*), purple martin (*Progne subis*), tricolored blackbird (*Agelaius tricolor*), pallid bat (*Antrozous pallidus*), foothill yellow-legged frog (*Rana boylii*), western bumble bee (*Bombus occidentalis*) (ESA listing status Under Review), Suckley's cuckoo bumble bee (Bombus suckleyi) (ESA listing status Under Review), monarch butterfly (*Danaus plexippus*) (ESA listing status Candidate), gray-blue butterfly (*Plebejus podarce klamathensis*), mardon skipper (*Polites mardon*), and Coronis fritillary (*Argynnis coronis coronis*).

Franklin's bumble bee (*Bombus franklini*) was last sighted in 2006 near the westernmost extent of the CSNM. There are two historic observations of Franklin's bumble bee within the CSNM planning area boundary, located in the northern expansion area. The observations are from preserved specimens with the American Museum of Natural History (GBIF, 2024). Although annual surveys for this and other species of bumble bees occur in the best-known habitat in southwestern Oregon, there have not been any detections of *B. franklini* since 2006. In 2014, the Medford District conducted a survey for special status meadow invertebrates between July and September, with survey locations based on (1) historical occurrence records for Franklin's bumble bee on private, BLM, and USFS lands, and (2) water and floral resources. *B. occidentalis* was observed at three locations but B. franklini was not found (Pool, 2014, entire, as cited in USDI FWS, 2018, p. 15). Additional information on bumble bee habitat is presented in the grass and forb habitat section below.

Both the mardon skipper and gray-blue butterfly require constant access to sources of water within their habitat during the reproductive flight period of their lifecycle, making them highly drought sensitive. The mardon skipper is a rare northwestern butterfly with a remarkably disjunct range, with the Cascade Mountains of southern Oregon and coastal hills in northwestern California and southwestern Oregon being two of the four locales where it is found (USDI FWS, 2012a). Mardon skipper food resources for adults are flower nectar, and larval host plants are grasses and sedges. The mardon skipper is known from approximately ten distinct sites on the CSNM (Fallon, 2018), with the population at Hobart Peak as the descriptive type locality of the subspecies (Mattoon et al., 1998).

The gray-blue butterfly is found in high elevation wet montane meadows, 5,100 ft. to over 6,500 ft. elevation. As of 2018, this subspecies was recorded from only one site on the CSNM, in a small meadow below Little Hyatt Reservoir (Fallon, 2018). Although larval host plants in Oregon have not been documented, the larvae of the nominate species (*P. p. podarce*) is known

to rely on several species of shooting stars (*Dodecatheon* spp.). Adults have been observed on multiple nectar floral resources outside the CSNM (Warren et al., 2024).

Oregon spotted frog, foothill yellow-legged frog, and the northwestern pond turtle are strongly tied to water for all or most of their life cycles. Of these, only the pond turtle leaves the water to lay eggs in suitable upland locations with adequate sun exposure and soil suitable for excavation. Watson, McAllister, & Pierce (2003, p. 298) summarized the conditions required for completion of the Oregon spotted frog's life cycle as shallow water areas for egg and tadpole survival; perennially deep, moderately vegetated pools for adult and juvenile survival in the dry season; and perennial water for protecting all age classes during cold wet weather. Foothill yellow-legged frog is associated with slow-moving streams, especially those with large shallow pools. Both frogs are highly aquatic and rarely leave the streams or ponds where they forage and reproduce.

Grass and Forb Habitats

Mesic to dry meadow habitat and dry meadow/grassland habitat is scattered throughout the CSNM. Mesic to dry meadows are scattered across the northern part of CSNM, primarily in mixed-conifer, white fir, and red fir forest habitats, while dry meadow/grasslands are largely restricted to shallower soils not capable of supporting woody vegetation (USDI BLM, 2023a, p. 184). Historical grazing, fire exclusion, and other past land management practices have greatly altered most of these plant communities. Native perennial bunchgrass grasslands and grass understories have been supplanted by annual grasslands and poison oak thickets. Nonnative grasslands comprise 45 percent of the grassland communities. Invasive forbs are also widespread.

Wildlife species diversity in grass and forb habitats is typically lower than in riparian habitats, but these habitats provide important nesting habitat for grassland and scrub special status species. In particular, the mesic to dry meadow habitat can produce substantial floral resources in the spring that support pollinators and small mammals. Special status species in this group include the ESA listed as Endangered Franklin's bumble bee (*B. franklini*), ESA Candidate monarch butterfly (*Danaus plexippus*), and the Bureau Sensitive species, grasshopper sparrow (*Ammodramus savannarum*), Oregon vesper sparrow (*Pooecetes gramineus affinis*), western bumble bee (*B. occidentalis*), Suckley's cuckoo bumble bee (B. suckleyi), Siskiyou short-horned grasshopper (*Chloealtis aspasma*), Oregon branded skipper (*Hesperia colorado oregonia*), mardon skipper (*Polites mardon*), and Coronis fritillary (*Argynnis coronis coronis*). Oregon vesper sparrow, western bumble bee, and Suckley's cuckoo bumble bee are currently under review for ESA listing. Grass and forb habitats also provide an open hunting ground for raptors and other predatory species.

All three bumble bees (Franklin's bumble bee, western bumble bee, and Suckley's cuckoo bumble bee) require substantial floral resources: a constant and diverse supply of flowers that bloom throughout the colony's life cycle, from spring to autumn (Xerces Society and Thorp, 2010, p. 11). These resources are typically found in open (nonforested) meadows in proximity to seeps and other wet meadow environments. Nectar from flowers provides carbohydrates, and pollen provides protein. The typical dispersal distance of Bombus species is 3 km (1.86 mi) or less (USDI FWS, 2018; Goulson, 2010, p. 96), and they have a foraging distance of up to 10 km (6.2 mi) (USDI FWS, 2018). Franklin's bumble bee has been observed collecting pollen from lupine (Lupinus spp.) and California poppy (Eschscholzia californica) and collecting nectar from

horsemint (Agastache urticifolia) and coyote mint (Monardella odoratissima) (Xerces Society and Thorp, 2010, p. 11). Bumble bees in the Bombus genus may also collect both pollen and nectar from vetch (Vicia spp.) (Xerces Society and Thorp, 2010, p. 11).

Franklin's bumble bee high priority zones (HPZs) have been identified by the US Fish & Wildlife Service and are based on all known historical observation locations of Franklin's bumble bee, supplemented by additional modeling of areas with substantial floral resources (SFRs) and other habitat characteristics most likely to support the species within its historical range. HPZs also include a 1.86-mile (3 km) buffer for dispersal distance around each Franklin's bumble bee historical occurrence (see USDI FWSb, 2024, pp. 12, 28). There are three delineated Franklin's bumble bee HPZs that overlap approximately 34,000 acres of the CSNM planning area, which are dispersed across approximately 17,000 acres of the CSNM decision area. Approximately 3,000 acres overlap the Soda Mountain Wilderness and approximately 5,200 acres overlap the active grazing allotments.

Other potential meadow habitat for pollinators was identified using nonforested vegetation layers developed with LANDFIRE remote sensing data and supported by ESRI World Imagery. The layer uses the "Terrestrial Ecological Systems" classification to identify mid- to local-scale ecological units useful for standardized mapping and conservation assessments of habitat diversity and landscape conditions. Wet, mesic to dry, and dry meadow habitats were identified. There are approximately 14,650 acres of total meadow habitat dispersed throughout the decision area. There are approximately 2,135 acres of wet meadow habitat and 7,045 acres of mesic to dry meadow habitat, approximately 9,180 acres in all that have greater potential to provide substantial floral resources for pollinators. There are approximately 5,470 acres that are considered dry meadow/grassland habitat types.

The Oregon vesper sparrow is among the most imperiled bird species in the region and has been found throughout the monument (Altman, 2015), including but not limited to the meadows of the upper Jenny Creek Watershed. This sparrow is found in areas with grass dominated understories with elevated perches for singing. An inventory of Oregon vesper sparrows was completed from May through June of 2024, on nearly all suitable habitat on public land (plus a few private properties) in the CSNM (Stephens pers comm 2024). In all, 55 meadows or meadow complexes were surveyed, and Oregon vesper sparrow was found to occupy 28, about 51 percent of the meadows. Additional suitable habitat was identified on private property that surveyors were unable to access.

The monarch butterfly has been documented in many locations throughout the CSNM (GBIF, 2024; WMMM, 2018), including on 19 of the 20 butterfly monitoring sites in the CSNM (Fallon, 2018, Monroe, 2021). Milkweed host plant species for monarch larvae occur in dry meadow/grassland areas and other sunny spots in or near the CSNM; these include narrow-leaf milkweed, (Asclepias fascicularis), heart-leaf milkweed (A. cordifolia), and showy milkweed as documented on OregonFlora (https://oregonflora.org/). Occurrences of milkweed in the CSNM are not systematically surveyed or documented. The Global Biodiversity Information Facility database (GBIF, 2024) has about 20 documented occurrences of milkweed in the CSNM planning area, and the Western Monarch and Milkweed Mapper has about 10 additional occurrences within the boundary of the CSNM (WMMM, 2018).

The Coronis fritillary has been documented from four sites on the CSNM: Baldy Creek Road, Keno Access, Shale Divide, and O'Brien Creek (Pool, 2014). This species is associated with a variety of habitats including conifer woodlands, lower elevation canyons, meadows, chaparral, and sage steppe (Fallon, 2018). Speyeria larvae depend on various species of violets (Viola spp.), and adults migrate to higher elevations in the summer and can be found north of the Monument in meadows surrounded by fairly dense forests, potentially away from areas with host plants (Fallon, 2018).

Oak Woodland Habitat

Oak woodland communities represent a minor component of the CSNM, occurring in soils too dry to support conifers. Oregon white oak is associated with soils that have a high clay content. Oak communities are commonly closed woodlands, but there are areas of open oak savannahs. Fire exclusion has allowed conifers to establish and move downward in elevation. Oak savannah communities have been reduced over time due to fire exclusion that created denser grown.

The Klamath black salamander (*Aneides klamathensis*), a Bureau sensitive species, is a lungless terrestrial salamander that is associated with open oak woodland, rocky areas, and streamside habitats. Black salamanders retreat underground, deep into large decaying logs, or to moist streamside areas during prolonged dry periods.

Other Bureau sensitive species associated with woodland habitat include the mollusks, Dalles Hesperian (*Vespericola depressus*) and Siskiyou Hesperian (*Vespericola sierranus*); a number of bird species nest and forage within oak woodland habitat, including Lewis's woodpecker (*Melanerpes lewis*), and roosting sites for bats, including pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and fringed myotis (*Myotis thysanodes*).

Mixed Hardwood – Conifer Woodland Habitat

Mixed hardwood – conifer woodlands occur in the ecotone between nonforest and forest and are classified based on which species are dominant and the stand density. Oak species include Oregon white oak or California black oak, and conifer species include ponderosa pine, Douglas-fir, and incense cedar. This habitat type is highly variable in the mix of species and represents about 8 percent of the decision area, Conifers have encroached on oak woodlands and shifted some mixed oak-conifer communities to conifer. Large open-grown oaks are increasingly rare, and California black oak is decreasing.

There are several special status carnivore species that are either known or suspected to occur within the CSNM or have potential habitat within its boundaries. The wolverine (*Gulo gulo luscos*), coastal marten (*Martes caurina*), and gray wolf (*Canis lupus*) are all ESA listed species. Wolverine and coastal marten, both ESA listed as Threatened, have potential habitat, and the gray wolf, listed as Endangered, has been observed in the CSNM. Fisher (*Pekania pennanti*) is currently the only Bureau Sensitive carnivore documented in the CSNM.

Gray wolves use a wide variety of habitats as they move across the landscape while hunting. Any habitat favored by deer and elk upon which they prey is considered gray wolf foraging habitat. Gray wolves choose isolated locations for construction of their den sites. These may be within forested stands or in more open areas of meadow or rock outcrops.

Fisher inhabits upland and lowland forests, including coniferous, mixed, and deciduous forests. They den in forest stands with dense canopies and abundant large trees, snags, and logs. Fisher

forage in a variety of habitats as they seek out small and medium-sized mammals upon which to prey, including gray squirrels and porcupines.

Other Bureau Sensitive species found in mixed hardwood – conifer woodland include Lewis's woodpecker (*Melanerpes lewis*), which inhabitat lower elevation oak, ponderosa pine, and riparian cottonwood; fringed myotis (*Myotis thysanodes*), which is a generalist with a broad dietary range that roosts in crevices in trees, buildings, and mines; Dalles hesperian (*Vespericola depressus*), a mollusk associated with areas of high humidity and constant temperature, including cracks in mud, talus, under coarse woody debris, or under permanently moist vegetation; and Siskiyou Hesperian (*Vespericola sierranus*), a mollusk associated with perennially moist habitat, including spring seeps and deep leaf litter along streambanks and under debris and rocks.

Mixed Conifer / White Fir / Red Fir Forest Habitats

Forested habitat covers about 68 percent of the landscape in the CSNM. The major forest types include mixed conifer, white fir, and red fir. Each forest type is composed of a mix of associated tree species, as described in the Affected Environment of Section 3.15 – Vegetation. Forested areas within the CSNM are currently dominated by late-successional forest species, estimated at over 85 percent. Historically, the landscape of the CSNM was comprised of much more open canopied forest habitat.

Forested habitats of the CSNM provide for many special status wildlife species, including North American wolverine (*Gulo gulo*), coastal marten (*Martes caurina*) and gray wolf (*Canis lupus*), fisher (*Pekania pennanti*), northern spotted owl (Strix occidentalis caurina), white-headed woodpecker (*Picoides albolarvatus*), Johnson's Hairstreak (*Callophrys johnsoni*) and tree-roosting bats (e.g. Fringed myotis {*Myotis thysonodes*}). For some of these species forested areas are only one of many habitat types they use. Other species are more specialized in their selection of habitat. For example, the Johnson's hairstreak is a small butterfly that relies on various species of dwarf mistletoes to complete its life cycle. Johnson's Hairstreak is associated with old-growth coniferous forests that are host to parasitic and species-specific dwarf mistletoes. Johnson's Hairstreak larva is believed to feed generally on all dwarf mistletoe species throughout its range and may specialize on locally available dwarf mistletoes in specific localities. Miller and Hammond (2007) describe suitable habitat as being almost identical to that of the northern spotted owl. Adult Johnson's hairstreak find nectar on low growing plants such as Oregon grape, ceanothus, and pussypaws. While relatively widespread across the Pacific Northwest, this species has a patchy distribution and is known from only three records on the CSNM: at Moon Prairie, Hyatt Reservoir, and Randcore Pass (Fallon, 2018).

Fisher have been documented in a variety of forested habitats across the CSNM, but they typically select late-successional forest stands for denning and resting sites. They may forage in a broader array of habitats including early to mid-seral conifer forest and oak woodland. While northern spotted owl (NSO) habitat (discussed in the two analyses below) is specifically classified as to suitability for spotted owls, NSO nesting, roosting, and foraging habitat has been determined to be a reasonable proxy for fisher denning and resting habitat (*KS Wild v. US BLM*, Case No. 06-3076-PA, Order and Judgment, 9/10/2007). Guidelines and activities in NSO nesting-roosting habitat would retain habitat function across the entire CSNM and would by proxy protect habitat for other species, like fisher denning and resting habitat. See NSO issue 1 and rate of increase in NSO NRF habitat which serves as a proxy for fisher denning and resting habitat.

White-headed woodpecker is found in higher elevation conifer forests, associated with old-growth ponderosa pine or fir, and prefers large-diameter snags or live trees with decay for cavity nesting.

Special Habitats: Talus, Mines

Several habitat types occur across the CSNM that are referred to as "special habitats." They include rock outcrops and talus as well as caves and mines. Vegetation communities associated with these abiotic features (e.g., juniper woodland) are also considered special habitats.

The southern end of the CSNM includes a portion of the Soda Mountain Wilderness and Horseshoe Ranch Wildlife Area. This area is home to several special habitats including juniper woodland in rocky areas.

Special status species in special habitats include Townsend's big-eared bat (*Corynorhinus townsendii*), which forages along edges of coniferous and deciduous forests and riparian areas, with a mosaic of woodland, grassland, and/or shrubland, and with maternity and hibernation colonies typically in relatively cold places, such as caves and mines. There are two special status mollusks that use special habitats, Oregon shoulderband (*Helminthoglypta hertleini*) and Dalles Hesperian (*Vespericola depressus*). Dalles Hesperian inhabits conifer or oak woodland refugia with high humidity and constant temperature, including cracks in mud, talus, under coarse woody debris, or areas of permanently moist vegetation.

North American wolverines are known to use a wide variety of habitats during foraging and movement across the landscape. The most important habitat type for wolverines across their range and within the CSNM is open, often rocky habitat at high elevations (at least 5500 feet) that provides sufficient snowpack and features (e.g. boulders, fallen trees, upturned roots of trees, etc.) for use as denning structures by females. Preliminary analysis reveals approximately 12,000 acres within the CSNM that are both above 5500 feet in elevation and in the "persistent snow zone." The suitability of these areas for use by wolverine would be evaluated further prior to project implementation that would affect these areas. Very little of this habitat would be expected to provide denning locations for wolverines due to lack of suitable den structures, and proximity to areas of year-round human activity (such as roads and trails). During project implementation planning, habitat would be evaluated as to its suitability for use by wolverines in any of their life stages. Habitat identified as potential wolverine denning habitat would be protected through seasonal restrictions or other project design features. Recreational activities would also be seasonally restricted near any potential wolverine denning locations to avoid disturbance.

Migratory Birds

In addition to the migratory birds included in this analysis, the effects of management direction on migratory birds are included in Appendix F – Issues Not Analyzed in Detail, which includes the executive order, MOU with the USFWS, and BLM management direction that support the conservation of migratory birds. The purpose of the MOU is to strengthen bird conservation beyond current compliance with the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA), by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the USFWS.

The Proclamations that established the CSNM include descriptions of the importance of the landscape to a variety of birds, including over 30 bird species protected by the Migratory Bird Treaty Act. The BLM considers the USFWS list of Birds of Conservation Concern (BCC) (USDI FWS, 2021b) when determining the Bureau Sensitive species list. The current State Director's special status species list was finalized in 2021 (USDI BLM, 2021a). All Bureau Sensitive bird species are protected by the Migratory Bird Treaty Act. Appendix J includes the special status bird species that are documented or suspected to occur in the CSNM decision area and their habitat associations. The Bureau Sensitive bird species documented in the CSNM decision area include tricolored blackbird (Agelaius tricolor), Grasshopper sparrow (*Ammodramus savannarum*), bald eagle (*Haliaeetus leucocephalus*), Lewis's woodpecker (*Melanerpes lewis*), American white pelican (*Pelecanus erythrorhynchos*), white-headed woodpecker (*Picoides albolarvatus*), Oregon vesper sparrow (*Pooecetes gramineus affinis*), and purple martin (*Progne subis*).

Game Species

Big game species present in the CSNM, for which ODFW maintains population trend data, include black-tailed deer and elk. The analysis of how management direction affects game species habitats is analyzed in in the Wildlife section of Appendix F.

Environmental Consequences

The following management decisions would not affect habitat used by special status wildlife species and are not discussed further in this analysis.

- **Congressionally and Administratively Designated Management Areas**
  Designated areas represent approximately 40 to 46 percent of the decision area, depending on alternative. The objectives and management direction developed for wilderness and wild and scenic rivers would contribute overall to the protection of habitat for special status species and do not vary across alternative; therefore, these are not analyzed further. Some current ACEC or RNA designations overlap eligible wild and scenic rivers segments. If some segments overlaying an ACEC or RNA were later found ineligible, management direction for EMA–RH is expected to provide the same degree of protection. Management direction for all EMAs is expected to protect the values identified for all ACECs and RNAs given conformance with the proclamations and the overall purpose of the CSNM. Reducing fire risks in the wildland urban interface (WUI) is expected to benefit ACEC/RNA values by reducing the probability of unacceptable fire effects.
- **Ecosystem Management Area - Riparian Habitat**
  Riparian areas provide valuable corridors for habitat used by special status species. Management direction in EMA-RH does not vary across alternatives and is not analyzed below. Objectives and management direction for the EMA-RH are specifically designed to protect hydrologic systems, maintain high quality water, and contribute to restoration of degraded water quality. Refer to the Aquatic and Riparian Habitat section (Section 3.2) for detailed impacts to riparian plant communities.
- **Recreation and Travel and Transportation Management**
  Across alternatives, management direction was developed to be consistent with the protection of CSNM objects and values, which includes habitats used by special status

species. The use of BMPs (Appendix I) would further provide protection to wildlife and their habitats.

Ecosystem Management Areas

As displayed in Table 2-3 of Chapter 2, the Ecosystem Management Area represents approximately 56 to 60 percent of the decision area, depending on the alternative. The vegetation analyses in Section 3.15 (issues 1 through 4) provide a comparison of the differences in acres of targeted ecological restoration treatments within the EMA by alternative, and the potential effect on the habitat used by special status species that are known or suspected to occur within EMA-OGE and EMA-DE, respectively. Effects would occur from thinning of forest stands, prescribed fire treatments, and livestock grazing, since these activities would alter habitat structure and species composition and in turn influence the use of affected habitats by wildlife species. The analysis of the effectiveness of management direction to protect and restore ecological conditions for special status species, such as canopy cover, snags, dens, nest and roost sites, trees with large limbs and deformities, and protected activity centers is described under each alternative.

Alternative A (No Action Alternative)

Alternative A (No Action) would continue current management under the 2008 CSNM RMP (USDI BLM, 2008), the 2016 Southwestern Oregon RMP (USDI BLM, 2016a), and the 1993 Redding RMP (USDI BLM, 1993). Current management direction would largely limit vegetation treatments to thinning to improve habitat conditions and fuels treatments to reduce the risk of uncharacteristic wildfire and would generally preclude stand treatments that would remove or degrade mature and structurally complex habitat. Under this alternative, within the original CSNM boundary approximately 5,600 acres of thinning and 3,700 acres of prescribed fire would be targeted for restoration treatments in the Old-Growth Emphasis Area (OGEA) per decade and 308 acres of small diameter thinning minimum targeted treatment in the Diversity Emphasis Area per decade (see Table 3-83 and 3-84 below and Appendix N, Table N-2). Within the expansion area under the 2016 Southwestern Oregon RMP, about 7,500 acres minimum of thinning and prescribed fire would be targeted for treatment per decade in the OGEA, with no additional target in the diversity emphasis area (Tables 3-83 and 3-84).

The 2008 CSNM RMP includes primary management objectives for the OGEA, including to identify areas where past disturbances have reduced canopy closure to a point that no longer provides connectivity for late-successional species and accelerate the development of late-successional where feasible; and to reduce the risk of stand-replacing fires by the removal of understory trees, which would reduce competition and increase resiliency of larger, established trees.

The 2016 Southwestern Oregon RMP, which preceded Proclamation No. 9564, covers much of the acres in the 2017 CSNM expansion area. This RMP authorized timber harvest but included direction that would manage forested lands on a sustainable basis for multiple uses including wildlife and riparian habitats and promote development of fire-resilient forests. There is also management direction to retain snags and down woody material; manage habitat for species that are ESA listed, or are candidates for listing, consistent with recovery plans, conservation agreements, and designated critical habitat; and implement conservation measures to mitigate specific threats to Bureau Sensitive species during the planning of activities and projects. There is also other management direction specific to habitats used by bats, deer and elk, fisher, gray

wolf, raptors, Oregon spotted frog, and northern spotted owl. The wildlife analyses in Chapter 3 of the 2016 Final EIS (USDI BLM, 2016b, pp. 825–1009) describes the likely effects of the RMP on special status species. For many species, no change in habitat availability would be expected, especially for those in specialized habitats like oak woodlands. An increase in habitat overtime is expected for those special status species which use mature and structurally complex habitat.

The 1993 Redding RMP management direction includes enhancement and protection of wildlife habitat resources, including fawning areas, raptor nesting areas, and salmonid rearing areas. This RMP incorporates several existing California, BLM, and USFWS habitat management plans.

Table 3-83. Comparison of the differences of targeted ecological restoration treatments in OGEA/EMA-OGE (conifer forests), by alternative, and the potential effect on habitat used by special status species

Species (Habitat Features)	Alternative A OGEA (2008) RMP & Forested Lands (2016 RMP)	Alternative B EMA - OGE	Alternative C EMA - OGE	Alternative D EMA - OGE	Alternative E (Proposed RMP) EMA - OGE
Common to all species (Mixed conifer, white fir, and red fir plant communities)	13,134 acres of vegetation treatment per decade: • 5,565 acres minimum targeted treatment in original monument area under the 2008 RMP • 7,469 acres minimum thinning and prescribed fire in expansion area under 2016 RMP	8,136 acres minimum targeted restoration treatment per decade. Late-successional habitat development and protection from fire through thinning and prescribed burning would increase or maintain suitable habitat for late-successional species.	3,736 acres minimum targeted restoration treatment per decade Effects to treatment units would be similar to Alternative B. Alternative C would treat half as many acres per decade as Alternative B. More of the large trees would be retained within treatment units, leaving more remaining habitat for late-successional species though lessening protection from wildfire.	1,874 acres minimum targeted restoration treatment per decade	3,736 acres minimum targeted restoration treatment per decade Effects to treatment units would be similar to Alternative B. More of the large trees would be retained within treatment units, leaving more remaining habitat for late-successional species though lessening protection from wildfire.
Fisher (Dense mid-elevation forests; cavities in trees, hollow logs, large limbs and platforms for resting; log piles as hiding cover)	Thinning could remove trees used by fisher for resting.	Thinning may remove trees used by fisher for resting.	Similar to Alternative B, but with fewer acres of treatment.	Treatments would occur only in young stands and around legacy trees. Young stands do not provide habitat for fisher. Treatments of young stands would improve future habitat for fisher by allowing for larger trees to develop into usable resting trees and through improving habitat for fisher's prey species.	Similar to Alternative B, but with fewer acres of treatment.

Species (Habitat Features)	Alternative A OGEA (2008) RMP & Forested Lands (2016 RMP)	Alternative B EMA - OGE	Alternative C EMA - OGE	Alternative D EMA - OGE	Alternative E (Proposed RMP) EMA - OGE
Fringed Myotis (Mid-elevation forests; roost in rock crevices, hollow trees, and snags)	Thinning may reduce snag availability for roost sites. Thinning may make stands more accessible for foraging.	Thinning may reduce snag availability for roost sites. Thinning may make stands more accessible for foraging.	Same effects as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Young stand treatments may improve habitat for foraging. Over time large trees may become suitable for roost sites.	Same effects as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.
Johnson's Hairstreak Butterfly (Older coniferous forests, notably in ponderosa pine or true firs infested with dwarf mistletoe)	Thinning may reduce dwarf mistletoe available for egg-laying/larval feeding.	Thinning may reduce dwarf mistletoe available for egg-laying/larval feeding.	Same effects as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Same effects as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Same effects as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.
White-headed woodpecker (Large diameter Ponderosa pine or fir snags and live trees)	Thinning could remove trees used by white-headed woodpecker for nesting or foraging.	Thinning and prescribed fire may increase habitat quantity and improve habitat quality for this species, because they prefer open conifer stands and areas with recent fire activity. Some snag removal may reduce nest cavity availability.	Same as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Young stand treatments may improve habitat for nesting and foraging.	Same as Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.

Table 3-84. Comparison of the differences of targeted ecological restoration treatments in diversity emphasis areas (non-conifer plant communities), by alternative, and the potential effect on habitat used by special status species

Species	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Common to all species	308 acres of small diameter thinning minimum targeted treatment per decade	3,341 acres minimum targeted restoration treatment per decade Increase in meadow habitat due to thinning and burning to address conifer encroachment.	1,538 acres minimum targeted restoration treatment per decade Similar to Alternative B, but with fewer acres of treatment.	771 acres minimum targeted restoration treatment per decade Similar to Alternative C, but with fewer acres of treatment	1,538 acres minimum targeted restoration treatment per decade Similar to Alternative B, but with fewer acres of treatment and no treatment of chaparral.
Franklin's bumble bee and Bureau sensitive pollinators Meadows with floral resources and nesting habitat	Short-term loss of floral forage habitat due to burning.	Short-term loss of floral forage habitat due to burning.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Loss of meadow habitat due to conifer encroachment. Prescribed fire may still address conifer encroachment to a small degree.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.
Monarch butterfly Breeding areas are patches of native milkweed spp.	Short-term loss of floral forage habitat due to burning.	Short-term loss of floral forage habitat due to burning.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Loss of meadow habitat due to conifer encroachment. Prescribed fire may still address conifer encroachment to a small degree.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.
Oregon vesper sparrow Grass dominated understory with elevated perches for singing	Short-term loss of nesting and foraging habitat due to burning. Potential loss of nests, including from burning, if conducted during the breeding season from May 1st to July 28.	Short-term loss of nesting and foraging habitat due to burning. Potential loss of nests, including from burning, if conducted during the breeding season from May 1st to July 28.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Loss of meadow habitat due to conifer encroachment. Prescribed fire may still address conifer encroachment to a small degree. Potential loss of nests, including from burning, if conducted during the breeding season from May 1st to July 28.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.

Species	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Pallid bat Dry, semi-arid habitats. Rock crevices, hollow trees, and snags	Thinning would provide more open foraging habitat.	Thinning would provide more open foraging habitat.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.	Less habitat improvement than Alternatives B and C. Prescribed fire may open some areas for improved foraging.	Similar to Alternative B, but with fewer acres of treatment, thus scale of effects would be reduced.
Lewis's woodpecker Oak savanna, oak chaparral, oak woodland, Ponderosa pine, and riparian cottonwood	Short-term loss of aerial insect resources due to burning of floral resources. Long-term increase in foraging and nesting habitat from fire-maintained features, including low stem densities; large oak, ponderosa pine or Douglas-firs; abundant wildlife trees; and rich herb and shrub layers.	Similar to Alternative A.	Similar to Alternative A.	Continued loss of grassland and oak woodland habitat due to conifer encroachment.	Similar to Alternative A.
Klamath black salamander Talus, oak / Douglas fir open habitat, rocky ravines	HFR may remove cover objects.	HFR may remove cover objects.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Common to All Action Alternatives

For the action alternatives, Alternatives B, C, D, and E (the Proposed RMP), there are objectives and management direction for the Ecosystem Management Areas that are common to all, including direction specific to each sub-management area—namely, the EMA-Old-Growth Emphasis area, EMA-Diversity Emphasis area, and EMA-Riparian Habitat area (refer to Appendix E, Section 2.C). These include objectives and management direction to conduct ecological restoration treatments to promote a diverse understory, the development of structural heterogeneity and growing space for pines and hardwoods; to reduce stand susceptibility to fire, windstorm, disease, and insect infestation; to conduct understory burning, where feasible; and to protect large pieces of down woody material from full consumption. Differences in the decadal targets between the action alternatives are discussed under each alternative below.

There are also objectives and management direction for terrestrial wildlife management, including objectives to avoid disturbance of wildlife species and to protect special habitats from modification or seasonal disturbance, as well as direction that would minimize specific threats to Bureau Sensitive species and migratory birds by designing projects to alter the type, timing, location, and intensity of management actions, along with other projects specific to certain species and groups of species, as described below (refer also to Appendix E, Terrestrial Wildlife).

A difference between all the action alternatives and Alternative A is that vegetation treatments under the action alternatives are focused on restoration and reducing wildfire risk to the WUI and CSNM objects and values, which would improve habitats used by special status species in the CSNM. Also, Alternative A proposes over 13,000 acres per decade of thinning and prescribed fire treatments while Alternative E (the Proposed RMP) would treat 3,736 acres per decade.

Grassland/Meadow Habitats

There are two historic records of Franklin's bumble bee within the CSNM, and Franklin's bumble bee high priority zones (HPZs) overlap several portions of the CSNM, including portions of the active grazing allotments (refer to Section 3.7, Livestock Grazing). However, presence of Franklin's bumble bee, western bumble bee, and Suckley's cuckoo bumble bee is assumed to be possible anywhere in the CSNM.

Franklin's bumble bee and other pollinators may be affected by disturbance or removal of vegetation through thinning, burning, mechanical or manual treatment, or application of herbicide. Burning may cause short-term loss of floral forage habitat while also providing an increase of habitat in the longer term. Bumble bee nests may be disturbed or destroyed through ground disturbance or soil compaction from heavy equipment. Increase in available floral habitat may result from thinning, removal of encroaching conifers in meadows (Celis, Halpern, & Muldoon, 2019), or invasive vegetation, and also through other restoration actions such as planting and seeding. Management direction to protect species habitat and mitigate impacts of disturbance include prohibiting treatment activities in meadows with substantial floral resources (SFRs) or lower quality floral forage habitat (FFH) and avoiding soil compaction activities within 100 meters of areas with SFRs to minimize loss and disturbance of bumble bee nesting and overwintering sites (Appendix E, Terrestrial Wildlife).

Though there may be a long-term net benefit for habitat for many migratory birds, potential adverse impacts to avian species from vegetation treatments (including prescribed burning)

conducted in the spring include short-term loss of habitat with active nest destruction of viable eggs and/or unfledged chicks. Terrestrial wildlife management direction that includes designs to minimize impacts during project planning would limit short-term adverse impact on special status species (Appendix E, Terrestrial Wildlife).

For the mardon skipper, there must be food resources for adults (flower nectar), larval host plants (grasses and sedges), and site-specific environmental and structural conditions that support successful reproduction and survival. This includes patches of early-seral open grassland habitat that are dominated by short-statured grasses or sedges and forbs that are generally free of overstory trees and shrubs. Mardon skippers generally avoid areas with tall grasses, shrubs, or trees (Henry, 2010, p. 44). Grassland patches that are as small as 0.5 ac (0.2 ha) can support small populations of mardon skippers. However, most areas that support populations of mardon skippers consist of mixed forest-grassland complexes that support multiple occupied ‘‘sites’’ with some connectivity between habitat patches for successful dispersal and movement of individuals among sites.

Oak Woodland & Mixed Hardwood – Conifer Woodland Habitats

Management direction that is common to all action alternatives for EMA–DE (Appendix E, Ecosystem Management Areas) would support improving habitat for the special status species that use these areas. Ecological restoration activities would maintain and enhance oak persistence and structure or restore oak dominance where conifer encroachment has reduced it, while preventing the loss of large, old trees within oak woodlands.

Mixed Conifer / White Fir / Red Fir Forest Habitats

Vegetation treatments including Hazardous Fuels Reduction (HFR) and forest thinning may remove habitat elements used by special status species in EMA–OGE areas. The following are examples of potential effects of vegetation treatments on special status species:

- Hazardous fuels reduction and forest thinning harvests may remove habitat elements used by wolverines, including large hollow logs and large standing hollow trees.
- Effects to gray wolf may occur during vegetation treatments (Dellinger, 2018). These activities could disturb gray wolf denning and rendezvous activities through noise and/or habitat structure modification.
- Thinning and hazardous fuel reduction actions could reduce the canopy cover below the 80 percent canopy cover that fishers choose for den and rest sites (Lofroth et al., 2011).
- Johnson’s Hairstreak requires dwarf mistletoe which occurs as a parasitic plant on its host, i.e., mature and old-growth conifers at middle to low elevations (Miller & Hammond, 2007).
- Hazardous fuels reduction and forest thinning harvests may remove habitat elements used by bats such as large standing hollow trees.

In addition to the old-growth development emphasis in these special status species habitats (Appendix E, Ecosystem Management Areas), all alternatives call for the retention of at least 60 percent canopy cover in forest stands rated as NSO nesting-roosting habitat (Appendix E, Terrestrial Wildlife), and management direction under all action alternatives requires the retention of most snags (Appendix E, Ecosystem Management Areas). The spatially and

temporally dispersed nature of vegetation treatments proposed under the alternatives would retain the majority of denning and resting habitat present in the CSNM at any given time. These treatments would also reduce stress from overcrowding of trees and, in the case of hazardous fuels reduction, would reduce the likelihood of large-scale catastrophic fires.

Effects to reptiles and amphibians from proposed ecological treatments would be through alteration of existing habitat used by these species. Thinning and fuel reduction may remove structure used by black salamander in woodland settings. Three aquatic species in this group include Oregon spotted frog, foothill yellow-legged frog, and northwestern pond turtle, which are likely to see little effect from these upland activities. Nesting habitat for northwestern pond turtle may be affected through these actions. In-stream restoration work has the potential to cause effects to all three aquatic species through disturbance and, less likely, through direct mortality during structurally altering activities. All action alternatives have management direction that would limit impacts on these special status species, such as avoiding ground-disturbing activities within 100 meters of water bodies with potential turtle nesting habitat or within 150 meters of turtle habitat during the overwintering period.

Special Habitats

Effects to special status birds within the CSNM could come from modification of existing habitats used by these birds through ecological treatments. Objectives and management direction would limit modification of the cliffs used by peregrine falcons for their nests. Disturbance at these cliffs is possible due to thinning or fuel reduction treatments immediately adjacent to such locations. Effects to bald eagles from these same treatments are also possible if they take place in proximity to active nest trees or modify or damage these nest trees. Management direction for all action alternatives would prohibit activities near active eagle nests that would disrupt nesting during the breeding season (Appendix E, Terrestrial Wildlife). Similarly, such treatments in or near oak woodland, conifer forest, meadows, or brushy areas could cause disturbance or destruction of nests of the species using those respective habitats.

Connectivity

Overall, the majority of the CSNM footprint serves effectively as a connectivity corridor for the species present. As described in the Affected Environment, past land management practices have greatly altered many plant communities in the CSNM, resulting in habitat loss at large spatial scales for some special status species. Existing obstacles to wildlife movement include existing clearcuts, roadways, and old burn scars.

Thinning and hazardous fuels reductions in the EMA-OGE and EMA–DEA may have beneficial or adverse effects on connectivity. The removal of trees, shrubs, and down woody debris; the building of temporary roads; and the consumption of vegetation by prescribed fire may remove important habitat components for some special status species. These habitat changes may affect the ability of some wildlife species to move across the landscape in the short term, some positively and some negatively, while improving it over the long term. Retaining sufficient complex habitat elements, treating blocks over several phases of implementation, or limiting overlap between treatments and critical areas used by sensitive species can help to limit the effects of restoration on wildlife. For example, hazardous fuel reduction treatments are expected to affect individual fishers in the short term through the removal of some large, downed logs that may provide denning, resting, and hiding cover. These treatments may also reduce prey

availability due to direct mortality to individuals of prey species and removal of herbaceous forage and hiding cover. However, management direction calls for the retention of large, downed logs, and the proportion of the landscape subject to these treatments is small and would be spatially and temporally dispersed. Hazardous fuel reduction treatments are thus not anticipated to have a measurable effect on either individual fishers or the species. Fisher benefit from the retention and recruitment of forest conditions left as a legacy of historical selective management practices under contemporary forest management practices and conservation measures (Green et al., 2022). Due to the patchy distribution of treatments, and their dispersion over time, effects on fishers are anticipated to be minimal, because large quantities of fisher habitat would remain present surrounding treatment areas.

Similarly, thinning in plantations is expected to have little to no effect on fishers because these animals are unlikely to use young, dense conifer stands due to lack of structure for denning or resting as well as lack of prey: these stands are poor-quality habitat for prey species due to an absence of herbaceous understory and a lack of cover/hiding habitat (Smith, 2021). Thinning is likely to improve the suitability of these sites for both fishers and the species upon which they prey. In 5 to 10 years post-treatment, the more open forest conditions would increase accessibility for fishers and increase forage for prey species as herbaceous plants increase in abundance with increased solar penetration to the forest floor.

As quantified in Wildlife Analysis Issue 2, in Table 3-87 "Modeled change to NRF in the decision area by alternative" and Figure 3-88 "Distribution of northern spotted owl nesting, roosting, and foraging habitat in the CSNM" and in Issue 3 in Tables 3-98 and 3-100 "Alternative E - Modeled change to dispersal-quality habitat in decision area by decade" and "Summary of modeled change to dispersal-quality habitat in the decision area over 50 years by alternative" and Figure 3-90 "Mean (%) dispersal-quality habitat across 5-km2 within 15.5 miles of CSNM." NSO NRF and dispersal-only habitats cover a large proportion of the CSNM. These habitats provide connectivity habitat for a broad range of wildlife species. Quantities of both NRF and dispersal-only habitats are projected to increase over the long term. Some short-term reductions in habitat may occur because of vegetation treatments, but these reductions in acres of habitat would be short-lived.

Alternative B

Alternative B would have the greatest effect on habitat used by special status species because it would allow for the largest number of acres treated, allowing more habitat-altering actions to take place. In EMA–OGE, pines, Douglas-firs, and incense cedar >36 inches and hardwoods >24 inches DBH would be retained. In young stands, all trees >20 inches DBH would be retained. There is also management direction to leave at least 10 percent of treatment area as untreated skips and create variably sized and spaced openings to promote a diverse understory. These created openings must be < 4 acres in size. Effects may be adverse in the short term as some habitats are rendered less usable. Long-term effects are anticipated to be beneficial as treated stands develop into habitat more conducive to use by wildlife species.

In EMA–DE, there is management direction to protect large oaks, including to fell and remove or girdle conifers that have grown into or through large-crowned oaks; and to reduce competing shrubs from under the dripline of open grown oak and large pine trees.

Alternative C

Alternative C has a lower target of restoration treatments than Alternative B, but greater than Alternative D. In EMA–OGE, management direction is to retain pines, Douglas-firs, and incense cedars >20 inches DBH and hardwoods >13 inches DBH; in young stands retain all trees >12 inches DBH; leave at least 10 to 30 percent of treatment area as untreated skips and create variably sized and spaced openings to promote a diverse understory; and do not create openings > 2 acres in size. Effects may be adverse in the short term as some habitats are rendered less usable. Long-term effects are anticipated to be beneficial as treated stands develop into habitat more conducive to use by wildlife species.

In EMA-DE, management direction is to protect large oaks, including to fell and remove or girdle conifers that have grown into or through large-crowned oaks, and to reduce competing shrubs from under the dripline of open grown oak and large pine trees.

Alternative D

Alternative D would be the yield the least effects with the smallest acres footprint proposed and the most restrictive management directions in terms of habitat modification. In EMA–OGE, ecological restoration is limited to young stands and thinning around legacy trees, as well as along evacuation routes and in the WUI. It would also retain all trees >8 inches DBH except around legacy trees. In EMA–DE, conifer trees would be girdled and retained if they have grown into or through large-crowned oaks.

Alternative E (Proposed RMP)

For the Proposed RMP, the BLM more specifically identifies tree size (DBH) thresholds for retention based on the species tolerance to drought, fire, and shade. When conducting ecological restoration treatments, management direction under the Proposed RMP would favor retention of fire- and drought-tolerant conifer species greater than 24 inches DBH. For fire- and drought-intolerant and shade-tolerant conifer species (e.g. Douglas-fir and white fir), trees greater than 29 inches DBH would be retained. Hardwood species >13 inches would be retained. Retention of drought, fire, and shade tolerant trees based on size thresholds would result in more habitat continuing to be available for species that depend on forest habitat. Species dependent on early successional habitats would not benefit as much due to less creation of this type of habitat. Restoration treatments for Alternative E (Proposed RMP) are the same as in Alternative C.

When conducting ecological restoration in the EMA-OGE, the Proposed RMP would leave at least 10 percent of treatment area as untreated skips and would not create openings greater than 2 acres in size. In areas conductive to NRF development, retained habitat components in skips would contribute to future development of NRF at the treatment scale by providing the necessary habitat diversity such as multi-layered canopy, large trees, and snags. Effects may be adverse in the short term as some habitats are rendered less usable. Long-term effects are anticipated to be beneficial as treated stands develop into habitat more conducive to use by wildlife species.

Livestock Grazing

A comparison of the overall effects of grazing on the special status species under each alternative is displayed in Table 3-85. This is specific to special status species that occur in active grazing allotments and does not include the effects on the species as a whole across the species range.

The table summarizes the overall effect each alternative is expected to have on a particular species considering all the provisions of each alternative.

Table 3-85. Effects of grazing on special status wildlife species

Species	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Common to all species	Consumption of grasses may reduce cover and forage	Consumption of grasses may reduce cover and forage	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Western bumble bee	Trampling may damage or destroy nests	Trampling may damage or destroy nests	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Siskiyou short-horned grasshopper	Consumption or damage to grasses and black elderberry reduces forage and egg laying habitat.	Consumption or damage to grasses and black elderberry reduces forage and egg laying habitat.	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Mardon skipper	Consumption and/or trampling of plants may reduce nectar sources and damage or destroy eggs or larvae.	Consumption and/or trampling of plants may reduce nectar sources and damage or destroy eggs or larvae.	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Grasshopper sparrow	Trampling may damage or destroy nests	Trampling may damage or destroy nests	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Lewis' woodpecker	Consumption of grasses and forbs may reduce presence of aerial insect forage	Consumption of grasses and forbs may reduce presence of aerial insect forage	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Oregon vesper sparrow	Trampling may damage or destroy nests	Trampling may damage or destroy nests	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B
Northwestern pond turtle	Trampling of areas around riparian areas with turtles may	Trampling of areas around riparian areas with turtles may	Same as Alternative B	Same as Alternative B	Same as Alternative B

Species	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
	damage or destroy turtle nests	damage or destroy turtle nests		until leases expire	
Bats	Consumption of grasses and forbs may reduce presence of aerial insect forage. Livestock trampling may impact water sources (e.g. pump chances, small streams)	Consumption of grasses and forbs may reduce presence of aerial insect forage. Livestock trampling may impact water sources (e.g. pump chances, small streams)	Same as Alternative B	Same as Alternative B until leases expire	Same as Alternative B

Common to All Alternatives

The history of authorized livestock grazing in the planning area is described in the livestock grazing analysis (Section 3.7). Approximately 25 percent (27,800 acres) of BLM-administered lands in the CSNM (the decision area) are now actively grazed by livestock. Nearly all livestock grazing within the original 2008 boundary of the CSNM has been retired and most active grazing allotments are located along the northern boundary of the CSNM. Although the BLM policy is to not allow grazing to exceed moderate use (40 to 60 percent forage utilized) in the CSNM, livestock grazing utilization records within the CSNM planning area have not been consistently reported. Six grazing allotments were evaluated between 2022 and 2023 and reported slight use to light use, while one grazing allotment has no record since 2015 and four grazing allotments have no records since 2005 or 2008.

Of the approximately 14,650 acres of total potential meadow habitat in the CSNM decision area, about 12 percent overlaps with active grazing allotments and 88 percent does not overlap with active grazing allotments. There are approximately 1,260 acres of wet and mesic to dry meadow habitat and approximately 450 acres of dry meadow/grassland habitat within the active grazing allotments. Approximately 5,000 acres of the Franklin's bumble bee HPZs overlap with parts of five active grazing allotments: Conde Creek, Cove Creek, Cove Ranch, Deadwood, and Grizzly Allotments. Impacts from grazing in riparian areas are expected to be similar to that described in the aquatic and riparian analysis (Section 3.2) for the qualitative assessment of riparian areas in the Deadwood allotment that was completed in the fall of 2023 by BLM fisheries and hydrology staff. As is commonly reported, cattle use is not evenly distributed throughout riparian areas in the Deadwood allotment. Disturbances are primarily associated with meadow/wetland habitats and impacts to riparian habitat were most numerous in the western portion of the allotment with greater availability of perennial water sources. Grazing impacts were noted within 70 percent of all meadow/wetland habitats but not every acre was degraded. Observed impacts included post-holing of soft ground, hoof shear of banks into stream channels, incised channels, cow manure in channel, and browsed riparian grasses.

All alternatives include management direction for livestock grazing (refer to Appendix E) to retire grazing allotments, pursuant to the processes of applicable law, should grazing be found incompatible with protecting the objects of biological interest. Management direction for livestock grazing supports the objects and values for which the CSNM was established, including direction from the presidential proclamations that established the monument. That direction reads as follows:

> "The Secretary of the Interior shall study the impacts of livestock grazing on the objects of biological interest in the monument with specific attention to sustaining the natural ecosystem dynamics. Existing authorized permits or leases may continue with appropriate terms and conditions under existing laws and regulations. Should grazing be found incompatible with protecting the objects of biological interest, the Secretary shall retire the grazing allotments pursuant to the processes of applicable law. Should grazing permits or leases be relinquished by existing holders, the Secretary shall not reallocate the forage available under such permits or for livestock grazing purposes unless the Secretary specifically finds, pending the outcome of the study, that such reallocation will advance the purposes of the proclamation."

As described in the livestock grazing analysis (Section 3.7), under all alternatives the BLM proposes to carry forward from the 2008 CSNM RMP the process described in Appendix Q to determine if livestock grazing is compatible with "protecting the objects of biological interest," and to evaluate the allotments for lease renewal, to ensure that livestock grazing is consistent with current laws and regulations. To ensure management decisions regarding livestock grazing comply with with protecting the objects of biological interest of the CSNM, monitoring studies such as forage utilization, compliance checks, and actual use reports would be completed annually and rangeland health assessments, vegetative analysis, and trend studies would be completed every 5 – 10 years. Rangeland health assessments are required on each allotment prior to consideration of grazing lease renewal. As described in Appendix Q, these assessments are conducted by an interdisciplinary team of resource specialists who assess ecological processes, watershed functioning condition, water quality conditions, special status species, and wildlife habitat conditions on an allotment. Assessments include field visits to the allotments and evaluation of all available data. All available data, including the results of the livestock impacts study, would be used to make an overall assessment of rangeland health as described in the OR/WA Standards for Rangeland Health and Guidelines for Livestock Grazing Management Considering the Fundamentals of Rangeland Health at 43 CFR 4180.1. Following the evaluation and determination of rangeland health and compatibility with protecting the objects of biological interest, lease renewals would be subject to the appropriate level of environmental analysis as prescribed under the National Environmental Policy Act (NEPA). The NEPA analysis would develop a full range of management alternatives for livestock grazing consistent with all applicable legal authorities, including the presidential proclamations. Alternatives would include current grazing management, a no-grazing alternative, and other alternatives developed to respond to the findings of the rangeland health assessment. Evaluation of the consequences of implementing each alternative would include consideration of the social impacts, as well as the economic and logistical feasibility.

Common to Alternatives A (No Action), B, C, and E (Proposed RMP)

Under Alternatives A (No Action), B, C, and E (Proposed RMP), all active grazing allotments (27,820 acres) would be available for livestock grazing, while the remaining 85,692 acres of the planning area would be unavailable (Section 3.7). This equates to approximately 25 percent of the CSNM available for livestock grazing, and 75 percent unavailable to livestock grazing. As discussed for all alternatives above, monitoring studies and rangeland health assessments would be used to determine rangeland health and compatibility with protecting the objects of biological interest in the CSNM, and grazing lease renewals would be subject to the appropriate level of environmental analysis as prescribed under the National Environmental Policy Act (NEPA).

As shown in Appendix J, and described above in Affected Environment, there are several special status pollinator species in the CSNM. Pollinators make use of a wide variety of meadow and grassland habitats. Grazing that occurs within meadow and grassland habitats reduces the floral forage availability to pollinators, like Franklin's bumble bee, and may impact nesting sites via soil compaction through trampling (Thapa-Magar et al., 2020, p. 2). High intensity and long duration grazing can result in significant ecological damage to vegetation (Freitas et al., 2014; Lindenmeyer et al., 2018; Vernon et al., 2022). It may alter plant community composition by favoring short plants over tall, prostrate over erect plants, stoloniferous over rosette or tussock architecture, and annual over perennial plants (Díaz et al., 2007). Livestock grazing may reduce litter, cover, seedling survival, and total vegetation biomass, although impacts may differ based on grazing intensity, timing, and stocking rates, which can affect plant responses (Jones, 2000). Intensity of effects would vary across the active allotment areas, depending on proximity to water sources and accessibility to livestock. Grazing that occurs within mesic or wet meadows may also cause damage or destruction to habitat by trampling, which could damage bumble bee nests and/or overwintering sites or ground nesting bird and small mammal species habitats. Although bumble bee nests may be disturbed or destroyed through ground disturbance or soil compaction, nest sites are not considered a limiting resource for bumble bees (USDI FWS, 2021c, p. 47227). However, extent of nesting habitat subject to ground disturbance during the active flight season would be considered.

Livestock grazing effects on special status species like the Oregon vesper sparrow, which nests on the ground, and Lewis' woodpecker and bats, which are aerial insectivores, are particularly associated with open ponderosa pine, pine-oak, and oak woodlands and grassland habitats in the CSNM (Alexander et al., 2008). Livestock grazing is known to affect bird reproductive success (Walsberg, 2005) and may lead to changes in vegetation that affect bird community composition (Knopf et al., 1988; Schulz & Leininger, 1991). Disturbance or destruction of habitat and/or nests may result from cattle's consumption of vegetation that attracts insects and provides shelter or nest structure, or from direct damage due to trampling by livestock (Altman, Stinson, & Hayes, 2021). Alexander and others (2008) examined the effects of grazing in the original footprint of the CSNM and found grazing influences bird community composition in both riparian and upland areas of oak woodland vegetation. Bird communities associated with high grazing utilization in oak woodland had significantly fewer shrub-nesting, foliage-gleaning, and long-distance migrant species than those associated with low grazing utilization. In mixed-conifer forest, bird community composition differed only between upland and riparian areas and not between areas of low- and high-grazing utilization.

Bats may also be impacted by damage, modification, or destruction of water sources (e.g. pump chances, small streams) through trampling by livestock.

Oregon spotted frog, foothill yellow-legged frog, and northwestern pond turtle may experience effects from grazing. Effects on these species from grazing are likely to be limited to damage brought about by livestock entering riparian and aquatic habitat and causing direct damage through trampling and post-holing. This damage has the potential to alter habitats in such a way as to render them unsuitable for use by these species. Turtle nests may also be damaged or destroyed if livestock step directly on them. An Oregon spotted frog site found in Buck Lake Allotment is protected by a fence exclosure.

Alternative A (No Action)

Under this alternative, the BLM would continue current management under the 2008 CSNM RMP, the 2016 Southwestern Oregon RMP, and the 1993 Redding RMP. The availability of floral resources in meadow and grassland habitats would not be expected to change unless there is a severe event such as a catastrophic fire. Maintenance of existing protective exclosures would continue to protect the CSNM objects and values, since BLM policy requires it, and monitoring results would show if the BLM's protective actions are effective.

Common to Alternatives B and C

Livestock management objectives and direction under Alternatives B and C would integrate adaptive, flexible, and outcome-based grazing management. For example, the BLM would incorporate rest/rotational grazing, season-of-use change, duration, and intensity/stocking levels. These changes could alter annual livestock use but would not exceed current authorized AUMs. Management directions for livestock grazing would maintain, restore, and enhance the overall condition of rangeland ecosystems based on rangeland health standards not being met, or being met along with restoration needs identified. For example, this would include restoration needs identified to improve floral resources and nest site availability for bumble bee colony development. Adaptive management techniques of livestock grazing would be incorporated into the lease terms and conditions (see Appendix Q - Livestock Grazing Compatibility and Voluntary Permit Relinquishment and Appendix R – Monitoring Plan). This could include changes to season of use, duration of use, forage allocations, and the promotion of rangeland health (USDI BLM, 1997). Over the short term, changes to lease terms and conditions could limit the forage available for livestock grazing operations while making resources more available to pollinators. Improving the overall rangeland condition through actions such as maintenance or restoration of nonstructural (native seeding, prescribed fire, invasive species treatment) and structural range improvements would lead to improved/stabilized rangeland health and AUMs could be adjusted over the long term. Maintenance of the existing protective exclosures (Section 3.7) would continue to protect the streams, springs, and fish, rare plant, and wildlife habitats they were designed to protect, like the exclosures to protect mardon skipper habitat. Management direction in the action alternatives would manage livestock grazing to maintain or increase available special status species habitat, including floral forage and nesting habitat to support bumble bee colony development. Other management direction for pollinator species under Alternatives B and C include to apply herbicides outside of flowering periods and use targeted application methods, which would also protect floral forage resources for pollinator species.

As described in Affected Environment above, there are three delineated Franklin's bumble bee HPZs that overlap approximately 34,000 acres of the CSNM planning area, which are dispersed across approximately 17,000 acres of the CSNM decision area. Approximately 5,000 acres overlap the active grazing allotments, which includes approximately 700 acres with potential substantial floral resources. Alternatives A, B, and C include management direction that would limit impact on habitat the HPZs with substantial floral resources and unsubstantial floral resources. This includes management direction to conduct land health assessments and valid scientific studies of livestock grazing impacts on CSNM objects and values, and also to take actions to protect CSNM objects and values, such as adjusting seasonal timing of grazing, use of rotational grazing, and adjusting use levels to improve conditions. This management direction would make more floral forage resources available and limit impacts on nesting habitat for pollinators and ground nesting bird species, like Oregon vesper sparrow.

Alternative D

Under Alternative D, all lands would be allocated as unavailable for livestock grazing and active grazing allotments (27,820 acres) would be phased out through non-renewal of leases. No acres of EMA-RH meadows or EMA-DE dry meadows/grasslands would continue to be available for grazing. Grazing in the 12 percent of the potential meadow habitat of the CSNM decision area that is currently in active grazing allotments would cease. Disturbed areas would have the opportunity to begin to recover as cattle are removed with recovery rates expected to vary. Vegetation would begin to recover immediately in some areas with full recovery of vegetation possible over the long term (Nussle, Mathews, & Carlson, 2017), and invasive plant species may remain present. Meadow habitat would provide more resources for special status species. For example, seven years after grazing was removed from oak woodlands in the original CSNM boundary area, Alexander and others (in preparation per Klamath Bird Observatory, 2024) measure changes to migratory bird populations. Preliminary analysis of the new surveys suggests that after grazing was removed, the formerly high-grazed sites supported a higher abundance of long-distance migratory birds, including Nashville warbler, Wilson's warbler, chipping sparrow, and black-headed grosbeak.

Alternative E (Proposed RMP)

Livestock management objectives and management direction under the Proposed RMP are similar to Alternatives B and C in that the BLM would integrate adaptive, flexible, and out-come based grazing management. The BLM would incorporate rest/rotational grazing, season-of-use change, duration, and intensity/stocking levels. The Proposed RMP includes additional livestock grazing management direction (Appendix E, Section 4.G) for allotments with unprotected sensitive aquatic and riparian habitats: prior to beginning the next livestock season of use, implement grazing management practices to provide interim protections of these areas until a long-term/permanent solution is implemented. These interim protections would reduce both the spatial extent and/or degree of impacts to sensitive aquatic habitats. Areas excluded from grazing by fences would be protected from all grazing related impacts. Areas where changes to livestock management are implemented would be subjected to less disturbance, through reduction of stocking levels or changes to season/duration of use. Because both water and grass and floral resources are at a minimum during the late season (i.e. late summer – early fall), excessive cattle use in these sensitive aquatic habitats (where both water and suitable browse are still available) is most likely to occur during this period. Reducing/eliminating late season grazing would provide

site level protections to these sensitive aquatic habitats, as cattle would not be able to congregate in these areas, increasing the availability of late season floral resources for pollinator species.

Management direction under the Proposed RMP includes avoidance of ground-disturbing activities within 500 meters from the edge of water bodies where suitable turtle estivating or nesting habitat is identified.

The Proposed RMP also includes more comprehensive management direction that would support, protect, and restore pollinator through altering the type, timing, and intensity of actions; and implementing other strategies designed to improve habitat to recover populations of pollinator species. The Proposed RMP also includes more thorough management direction to restore native flowering vegetation to disturbed sites through seeding or planting. Alternatives B, C, and D would include similar direction in the EMA only; under the Proposed RMP this management direction would apply to all BLM-administered lands in the. When re-vegetating degraded or disturbed areas, the BLM would use locally adapted seeds and native plant materials appropriate to the location and site-specific conditions, and it would also use seeds and plant materials that are genetically appropriate and native to the plant community or region. The Proposed RMP also includes more comprehensive direction for applying herbicides compared to Alternatives B, C, and D. To minimize impacts to pollinator habitat, the BLM would use an integrated management approach in the planning and implementation of all projects and activities related to management of invasive species. This approach would entail using treatment methods that are more selective, provide better control, and have fewer adverse environmental effects. These measures include proper procedures when applying herbicides, which would safeguard sensitive resources, including wetlands, riparian zones, and rare plant habitats. The measures would also allow only herbicides approved for such communities. These measures support the development of floral resources that would be available for Franklin's bumble bee and other special status species that use meadow/grassland habitats.

Conclusion

Management direction in the action alternatives with potential to affect habitat for special status wildlife species includes direction for the Ecosystem Management Areas (EMAs), for livestock grazing, and for invasive species management. The direction in the Proposed RMP has the potential to affect habitat, due to habitat restoration treatments, habitat alteration, temporary removal of floral resources, potential soil compaction, effects on ground-nesting rodents that in turn may affect the number of nest sites for bumble bees, and damage or loss of floral forage from herbicide use. Although treatment activities may have short-term adverse impacts, habitat improvement projects would provide long-term beneficial effects for special status species. The management direction would largely negate or avoid harmful impacts to special status species by minimizing impacts to habitat, including to identify habitat, alter timing, limit the extent of treatment, and use an integrated management approach in the planning and implementation of all projects and activities related to management of special status species habitat.

Overall, the effects on Bureau Sensitive and ESA listed species from all action alternatives would be minimal. Management direction provides many protective guidelines mentioned above that would limit impacts to habitat used by these species. Alternative B would target the largest number of acres for restoration treatment, which would create short-term habitat impacts. Alternative D would yield the least effects with the smallest acres of targeted restoration treatments and would have the most restrictive management directions in terms of habitat

modification. Alternatives C and E (Proposed RMP) represent a middle ground between the other action alternatives.

Grazing is not expected to impact connectivity for pollinators. Grazing would only take place on current active allotments, which cover approximately twenty five percent of the CSNM decision area and 12 percent of the potential meadow habitat. To ensure that management decisions regarding livestock grazing comply with protection of the objects of biological interest of the CSNM, monitoring studies such as forage utilization, compliance checks, and actual use reports need to be completed annually. Rangeland health assessments, vegetative analysis, and trend studies would be completed every 5 – 10 years. Under all alternatives, rangeland health assessments are required on each allotment prior to consideration of grazing lease renewal. As described in Appendix Q, these assessments are conducted by an interdisciplinary team of resource specialists who assess ecological processes, watershed functioning condition, water quality conditions, special status species, and wildlife habitat conditions on an allotment. Assessments include field visits to the allotments and evaluation of all available data, and the results are used to make an overall assessment of rangeland health as described in the OR/WA Standards for Rangeland Health and Guidelines for Livestock Grazing Management Considering the Fundamentals of Rangeland Health at 43 CFR 4180.1. Following the evaluation and determination of rangeland health and compatibility with protecting the objects of biological interest, lease renewals would be subject to the appropriate level of environmental analysis as prescribed under the National Environmental Policy Act (NEPA). The NEPA analysis would develop a full range of management alternatives for livestock grazing consistent with all applicable legal authorities, including the presidential proclamations. Alternatives would include current grazing management, a no-grazing alternative, and other alternatives developed to respond to the findings of the rangeland health assessment.

The Proposed RMP management direction for pollinator habitat and additional livestock grazing direction would avoid adverse impacts to floral resources that may affect special status bumble bee species colony development during the critical colony period. This Proposed RMP direction would alter livestock grazing practices to favor the recovery in riparian areas and wetlands/wet meadows, maintain or improves upland species richness and diversity, and reduce the spread of invasive plants. These include adjusting the timing of grazing and spatial distribution of livestock, limiting the duration, and allowing for rest in different seasons (Freitas et al. 2014, Vernon et al. 2022). Changes to lease terms and conditions could limit the forage available for livestock grazing operations while making resources more available to bumble bees and other pollinators.

Cumulative Effects

Past actions and reasonably foreseeable actions that would add to the effects analyzed under each of the alternatives include timber harvest, road construction, etc. on private property, alteration of habitat by wildfire on both private and public land. Grazing on both public and private land outside the CSNM boundary would continue to have effects on a variety of wildlife species. These effects would include reduction of forage and floral resources available to ungulates and pollinators due to consumption by livestock. Some trampling of vegetation and soil by livestock would also occur on these lands and may have direct impacts, such as hooves destroying northwestern pond turtle nests or Oregon spotted frog egg masses, or indirect impacts, such as livestock consuming resources otherwise available for wildlife. Similarly, timber harvest on both

public and private lands outside the CSNM would remove habitat that would otherwise be used by a variety of wildlife species including birds and mammals. The effects of these actions would add to similar effects from actions taken within the CSNM. Effects on wildlife species associated with these habitats would be greater across this broader landscape than the effects analyzed for actions taken within the CSNM on their own.

A wildlife crossing structure over Interstate 5 has been proposed and may be constructed in the coming years. This structure would be a net benefit to many wildlife species, especially those not able to fly over the interstate. Large and small mammals such as coastal marten, fisher, and gray wolf would be among those species most benefited by this project. It would also provide habitat appropriate for the facilitation of crossing by many smaller wildlife species such butterflies, bumble bees, and bats. All of these benefits would be a long-term net gain, but there would be short-term negative effects during construction of such a structure. Alteration of the physical environment would likely disrupt the lifecycle of all wildlife in the immediate area of the work. This would be a result of removal or alteration of trees, shrubs, and smaller plant species. Additional short-term negative effects would result from moving soil on site and the addition of soil and construction materials from off site. The short-term effects of a project such as this would be greatly offset by the long-term gains in ecosystem resiliency brought about by the improved connectivity such an overpass structure would provide.

Terrestrial Wildlife Analysis Issue 2: Northern Spotted Owl

How would the management direction affect nesting, roosting and foraging habitats used by northern spotted owls (NSO)?

Affected Environment

The CSNM is located within the range of the northern spotted owl (NSO), which is listed as threatened under the Endangered Species Act (ESA). NSOs prefer coniferous forest with multiple layers of vegetation; a variety of tree species and age classes; and the presence of large down, woody material (to serve as habitat for prey species) and large diameter live and dead trees (snags) for nesting-roosting habitat.

Despite consistent patterns of habitat selection by NSO, structural conditions of forest habitats occupied by spotted owls are highly variable. This is particularly evident in the diverse conifer-hardwood forests of southern Oregon, including the Oregon Klamath and Oregon West Cascades Provinces, relative to the more northerly moist Douglas-fir-hemlock forests/Provinces, where spotted owl home ranges are larger (Zabel, McKelvey, & Ward, 1995) and habitat preferences are narrower. Based on studies of owl habitat selection, including habitat structure and use, and prey preference throughout the range of the owl, NSO habitat consists of three components: nesting-roosting, foraging (NRF), and dispersal-only (Thomas et al., 1990). NSO NRF habitat in southwest Oregon is mixed-conifer habitats with recurrent fire history, and patchy habitat components. NSOs also utilize younger stands with closed canopies for foraging and dispersing. A detailed account of the habitat, ecology, and reproductive characteristics of the spotted owl can be found in the 2011 Revised Recovery Plan for the Northern Spotted Owl (USDI FWS, 2011).

Conservation Needs of the Northern Spotted Owl

The U.S. Fish and Wildlife Service identifies four conservations needs for NSO recovery:

1. Large blocks of nesting, roosting, and foraging habitat that support clusters of reproducing owls, are distributed across a variety of ecological conditions, and are spaced to facilitate owl movement between the blocks;
2. Habitat conditions within and surrounding large blocks of nesting, roosting, and foraging habitat that facilitate owl movement between the blocks and ensure the survival of dispersing owls;
3. A coordinated, adaptive management effort to reduce the loss of habitat due to catastrophic wildfire throughout the northern spotted owl's range, and a monitoring program to clarify whether these risk reduction methods are effective and to determine how owls use habitat treated to reduce fuels; and,
4. In areas of significant population decline, sustain the full range of survival and recovery options for this species in light of significant uncertainty.

Threats

Populations of the northern spotted owl are rapidly declining due to habitat loss and competition with non-native and invasive barred owls. Historically, the range of the barred owl was believed to be limited to eastern North America. Since the early 1900s, the range of the barred owl gradually expanded westward across wooded regions of Canada and the Western United States (refer to summary in Kelly, Forsman, & Anthony, 2003). After the first record of a barred owl

sighting in Oregon in the northeast corner of the state in June 1974, they were quickly observed in other parts of the state, with detection in the southern Cascades by 1981. Existing evidence suggests that barred owls compete with northern spotted owls for habitat and prey with near total niche overlap and that interference competition (Dugger, Anthony, & Andrews, 2011; Van Lanen et al., 2011; Wiens, Anthony, & Forsman, 2014) is resulting in increased northern spotted owl site abandonment, reduced colonization rates, and likely reduction in reproduction (Olson et al., 2005; Dugger et al., 2011; Forsman et al., 2011; Wiens et al., 2014).

There are eleven NSO research study areas across Washington, Oregon, and northern California, one of which is near the CSNM. In all study areas, data from range-wide meta-analyses illustrate that NSO populations declined and are concurrent with increasing presence of barred owls (Franklin et al., 2021; Dugger et al., 2023). There are strong declines in NSO territory occupancy (Franklin et al., 2021) and increased rates of NSO breeding dispersal (Jenkins et al., 2021). While the BLM does not conduct barred owl surveys across the CSNM, the BLM assumes the trend of barred owl occupancy is consistent with the trends in the adjacent demography study areas (see Dugger et al. 2020, p. 6; Lesmeister et al., 2020, p. 24).

Although habitat remains a key consideration for spotted owl recovery, the 2011 Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011, pp. III-62–68) identifies competition from the barred owl as an important threat to the spotted owl, and the USFWS now recognizes such competition to be the most pressing threat to the northern spotted owl's recovery (USDI FWS, 2021d, p. 81146). Competition with barred owls has diminished the ability for spotted owls to occupy a site and reproduce, however, regardless of habitat availability (Dugger et al., 2011; Franklin et al., 2021).

Spotted owls still perceive conditions associated with older forest as important when selecting new territories, but the findings reported by Jenkins et al. (2021) are consistent with Franklin et al. (2021) findings that barred owl presence has a strong effect on site abandonment many times greater than any positive effect of the amount of habitat, and that the negative effect of barred owl presence on colonization is somewhat smaller and the influence of nesting-roosting forest is more variable in magnitude.

Habitat is clearly important for spotted owls (e.g., Wiens et al., 2014; Yackulic et al., 2019), but the effects of barred owls on spotted owl demography are so large all spotted owl demographic trends in all demography study areas analyzed by Franklin et al. (2021) were negative, regardless of habitat quantity or the relative suitability of habitat. For example, barred owls have now largely displaced northern spotted owls in Olympic National Park and Mount Rainer National Park, which contain large areas of older forest and do not allow commercial timber harvest (Lesmeister et al., 2018; Mangan et al., 2019). Davis et al. (2022) estimated that the range-wide carrying capacity for northern spotted owls (maximum number of owl sites that could be contained in a given landscape based on biological and physical features) on federal lands has increased by 3.5 percent from 1993 to 2017, but territory occupancy had declined by approximately 62 percent.

NSO Recovery Actions

The U.S. Fish and Wildlife Service issued its Revised Recovery Plan in 2011. Recovery plans are not regulatory documents; rather, they provide guidance to bring about recovery and establish criteria to be used in evaluating when recovery has been achieved. The BLM continues to work

with the USFWS to incorporate Recovery Goals and Actions consistent with BLM laws and regulations. The BLM is a participant in the inter-organizational spotted owl working group (Recovery Action 1) and would continue demographic monitoring to address Recovery Actions 2 and 3. Designations and management direction contained in this planning effort also contribute to and follow recommendations in Recovery Action 6, 10, and 32.

- **Recovery Action 6:** Recovery Action 6 is designed to implement silvicultural treatments in younger stands for development of structural complexity to benefit spotted owls (III-19).
- **Recovery Action 10:** Conserve spotted owl sites and high-value spotted owl habitat to provide additional demographic support to the spotted owl population (p. III-43).
- **Recovery Action 32:** Because spotted owl recovery requires well-distributed, older and more structurally complex multilayered conifer forests on Federal and non-Federal lands across its range, land managers should work with the USFWS as described below to maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees (p. III-67).

NSO Prey Species

The composition of the NSO's diet varies geographically and by forest type. In southwest Oregon, flying squirrels and dusky-footed woodrats are a primary prey species for spotted owls (Forsman, Anthony, Meslow, & Zabel, 2004). They are typically found in high densities in early seral or edge habitat (Sakai & Noon, 1993; Bingham & Noon, 1997) but are also abundant in old-growth and complex forests (Carey, Wilson, Maguire, & Biswell, 1997). In general, two forest conditions support high numbers of flying squirrels, high-stem-density closed-canopy forest (old or young), and classic multi-layered late-successional forest, with the latter providing the highest abundances (Wilson, 2010). In general, small mammals such as red tree voles, deer mice and red-backed voles along with birds and insects comprise a small proportion of the overall diet (biomass and composition) for spotted owls across southwest Oregon (Forsman et al., 2004).

NSO Habitat in the CSNM

There are approximately 28,400 acres of NRF habitat in the CSNM (Figure 3-88; Table 3-86) and 30,000 acres of dispersal-only habitat (refer to Terrestrial Wildlife Analysis Issue 3). The decision area also contains portions of the December 2021 designated NSO critical habitat (USDI FWS, 2021a). Most (85 percent) of it occurrs in the EMA-OGE Of the NRF in the decision area; approximately 6,600 acres are within East Cascades Critical Habitat Unit 8, sub-units 1 and 2, and 2,600 acres are within Klamath East Critical Habitat Unit 10, sub-units 5 and 6. These sub-units are intended to function for demographic support to the overall population and for the north-south and east-west connectivity between sub-units and critical habitat units. Special management considerations or protection are required in these subunits to address threats to the essential physical or biological features from current and past timber harvest, losses due to wildfire and the effects on vegetation from fire exclusion, and competition with barred owls.

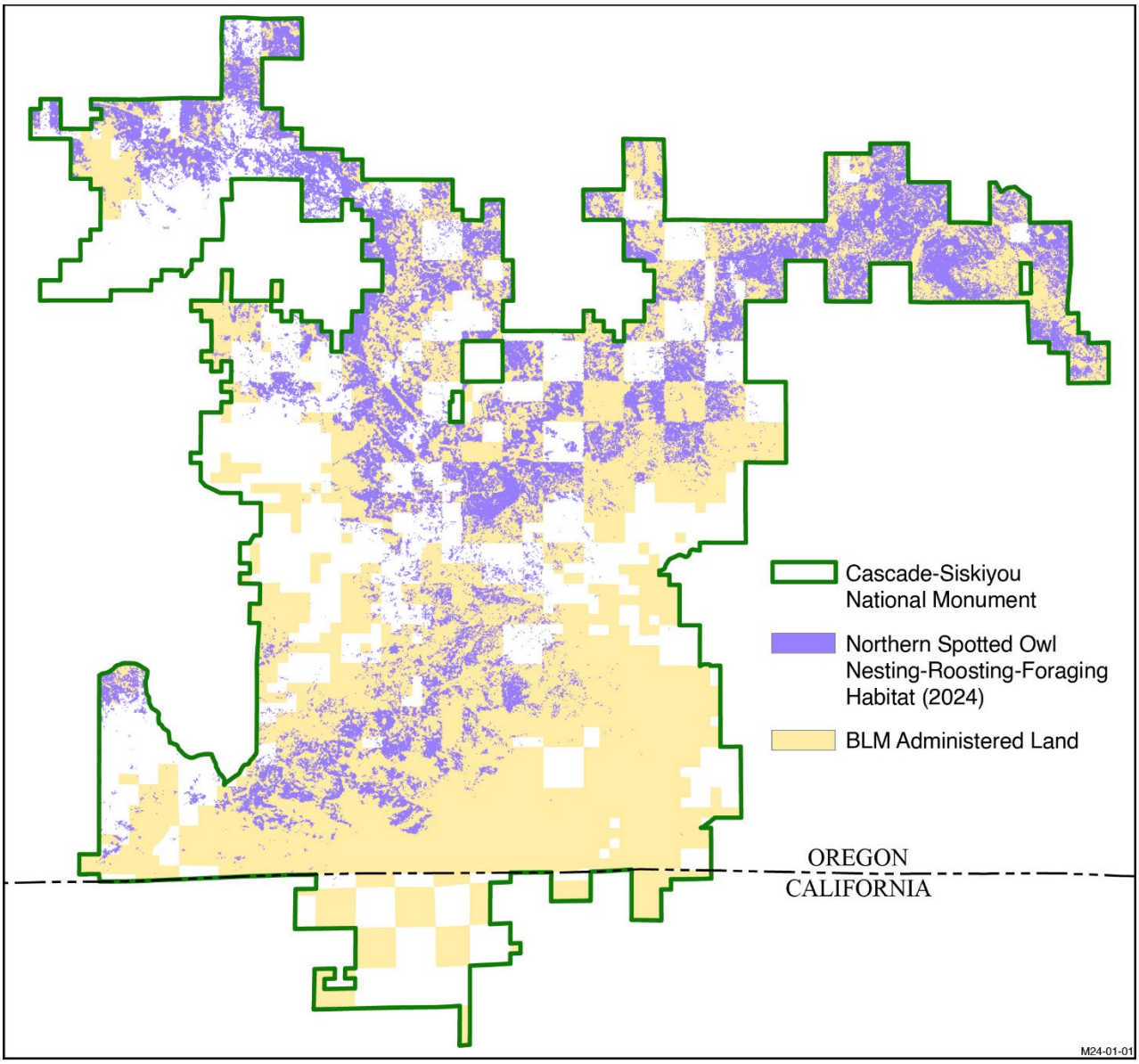


Figure 3-88. Distribution of northern spotted owl nesting-roosting and foraging habitat in the CSNM

Table 3-86. Distribution of NRF habitat in the CSNM by alternative

Proposed Management Area	Acres of NRF (BLM-only) by alternative (Alt.)					Percent of NRF in Decision Area by alternative (Alt.)				
	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E (Proposed RMP)	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E (Proposed RMP)
Wilderness	2,488	2,488	2,488	2,488	2,488	9%	9%	9%	9%	9%
Designated Wild & Scenic River	33	217	217	217	217	<1%	<1%	<1%	<1%	<1%
Eligible Wild & Scenic River	N/A	2,502	2,502	2,502	2,197	N/A	9%	9%	9%	9%
National Scenic & Historic Trail Corridor	-	2,380	2,380	2,380	2,406	-	8%	8%	8%	8%
Herd Management Area	0	0	0	0	0	0%	0%	0%	0%	0%
Lands Managed for Their Wilderness Characteristics	N/A	N/A	776	776	782	N/A	N/A	3%	3%	3%
Area of Critical Environmental Concern	31	8	8	N/A	N/A	<1%	<1%	<1%	N/A	N/A
Research Natural Area	584	280	N/A	N/A	N/A	2%	1%	N/A	N/A	N/A
Special Recreation Management Area	N/A	16	16	16	16	N/A	<1%	<1%	<1%	<1%
Riparian Habitat	1,464	2,692	2,452	2,455	2,551	5%	9%	9%	9%	9%
Old-Growth Emphasis	5,352	17,534	17,291	17,295	17,462	19%	62%	61%	61%	61%
Diversity Emphasis	185	284	272	272	282	<1%	1%	1%	1%	1%
2016 SWO RMP Other	17,295	N/A	N/A	N/A	N/A	61%	N/A	N/A	N/A	N/A
2008 CSNM RMP Undefined	929	N/A	N/A	N/A	N/A	3%	N/A	N/A	N/A	N/A
TOTAL	**28,400**					**100%**				

Summary of Analytical Methods

The BLM evaluated at a programmatic level the objectives and management direction that may lessen or worsen threats to nesting-roosting and foraging habitat. A resource management plan does not authorize site-specific projects or activities; therefore, there are no direct effects from adopting it. During RMP implementation, the direct and indirect site-specific effects are analyzed as needed when future projects are proposed. Although the BLM describes the potential short-term consequences of implementing the programmatic approach where needed, this evaluation focuses on longer term indirect and cumulative effects that may occur with the implementation of the RMP.

For this analysis, the BLM derived current NSO habitat across the CSNM using cover type suitability models derived from the NWFP Interagency Regional Monitoring Program Spotted Owl habitat GIS layers (Davis et al., 2022) and compared proposed vegetation management direction across alternatives in the Ecosystem Management Areas (EMAs).

It is impossible to identify for this analysis the exact locations and scope of proposed ecological restoration treatments within the EMAs that would affect NRF habitat function. Additionally, effects to NSO habitat are dependent on many factors, including current stand condition (and how closely it approximates old, complex-forest characteristics considered important to spotted owls), how many trees are removed, the residual overstory, the aerial extent of the treatment, the residual decadence of standing and down wood, the canopy complexity, the time of year the treatment occurs, and the type of tree removal.

Since the exact locations of future ecological restoration treatments that would affect NRF habitat cannot be identified for this analysis, the BLM used the ecological restoration target for each alternative to represent the lands that would be treated each decade. This approach results in an overestimation of acres to be treated, as not all lands in the EMA would require restoration. This analysis also considers the application of management direction that would further restrict where, when, and how treatments would occur. To further demonstrate the potential effects on NRF habitat from the proposed management direction, the BLM used FVS modeling and analytical assumptions to demonstrate the variance across alternatives based on EMA decadal restoration target assumptions (refer to Appendix N).

The BLM assumes the magnitude of ecological restoration among the alternatives would follow management direction, including minimum decadal restoration treatment targets (Appendix E, Section 2.C). The BLM applied common assumptions related to management direction in Appendix E and the alternative descriptions in Chapter 2 to derive estimated decadal treatment types and acreage (Appendix N – Table N-2).

Approximate acres of treatment described below, by alternative, represent the high end of NSO habitat treatment that would occur over a decade. Actual treatment acres of NRF would be much lower through the application of management direction. For example, management direction for NSO (refer to Appendix E, Terrestrial Wildlife management direction) would prohibit treatment within the nest-patch of occupied or unsurveyed NSO sites, as well as habitat that is currently functioning as nesting-roosting or foraging in occupied (or unsurveyed) core-use areas, except for fuels reduction treatments (prescribed fire and thinning of trees <8 inches) that retain NSO habitat function post-treatment. For this analysis, the BLM assumed all historic NSO sites are unoccupied to demonstrate the higher extent of treatment per alternative.

Additionally, management direction for ecological restoration in the EMA-OGE would prohibit treatment of nesting-roosting habitat in areas of low fire hazard and burn probability. In areas of medium to high fire hazard and burn severity where ecological restoration treatments could occur in nesting-roosting habitat, Terrestrial Wildlife management direction directs the retention of nesting-roosting habitat function post-treatment across the decision area, regardless of NSO occupancy status. As such, treatments that occur within nesting-roosting habitat would not downgrade or remove the habitat function and are not anticipated to directly affect the availability of nesting-roosting habitat within the decision area. Therefore, the only ecological restoration that has potential to affect the availability of NRF habitat would include treatments that occur in foraging habitat that downgrade or remove the habitat function, or treatments in dispersal-only habitat and NSO non-habitat which could promote the development of future NRF and/or reduce fire risk to adjacent stands of NRF habitat. Thinning treatments in simple, densely stocked stands (such as some foraging or dispersal-only habitat stands) can accelerate development of nesting-roosting habitat over the long term by retaining large trees, encouraging tree growth, increasing heterogeneity and diversity, enhancing and creating horizontal and vertical structure, and reducing risk of habitat loss due to severe fire, disease, and insects. Bailey and Tappeiner (1998, p. 111) found that treatments designed to purposely favor legacy structures (large remnant trees, snags, and downed wood) and/or overstory hardwoods would further hasten development of old-growth forest characteristics. Without treatment, competition between trees slows their growth (Bennett & Main, 2018, p. 4), delaying the development of nesting-roosting habitat characteristics.

Environmental Consequences

The following management decisions would not affect the availability of NSO NRF habitat in the decision area and are not discussed further in this analysis.

- **Congressionally Designated Management Area (CDMA)**
  There are approximately 7,600 acres of NRF habitat within the CDMA. The objectives and management direction developed for wilderness and WSRs would contribute overall to the protection of NSO habitat and do not vary across alternatives; therefore, they are not analyzed further. The proposed management direction for NHST does not include actions that are anticipated to affect the availability of NRF habitat in the CDMAs and are not included further in this analysis.
- **Administratively Designated Management Area (ADMA)**
  In the ADMAs, there are approximately 3,500 acres of NSO habitat (6 percent of NSO habitat in the decision area). Within the ADMA, most of the NSO habitat (96 percent; 3,369 acres) occurs in the ADMA-Lands Managed for their Wilderness Characteristics (LWC). Under the Proposed RMP and other action alternatives, ecological restoration activities in the LWC would be limited to fuels reduction treatments (such as prescribed fire or thinning of trees less than 8 inches) in the WUI/Fuels Emphasis Areas, consistent with underlying management direction. The WUI overlaps with approximately 300 acres of the ADMA, of which approximately 141 acres are NSO habitat. These treatment types typically modify but maintain habitat function and are not expected to reduce NRF habitat availability in the ADMAs. The remaining 4 percent (<100 acres) of NSO habitat in the ADMAs fall within ADMA-Special Recreation Management Area (SRMA) and ADMA-Herd Management Area. Management direction in the SRMA may minimally

modify NSO habitat through maintenance of recreation sites such as trails, but are not expected to reduce NRF habitat availability in the ADMAs.

- **Ecosystem Management Area-Riparian Habitat (EMA-RH)**
  Riparian areas provide valuable corridors for NSO habitat connectivity. Within the EMA-RH, the proposed management direction focuses on ecological restoration and could include small-diameter thinning (<8 inches) and prescribed fire. These treatment types can simplify the understory but typically retain NSO habitat function and are not anticipated to result in the removal or downgrade of NRF habitat, therefore, management direction for EMA-RH is not further analyzed below.
- **Ecosystem Management Area -Diversity Emphasis (EMA-DE)**
  The objective for the diversity emphasis area is to manage habitats that contribute to the unique diversity of the CSNM to maintain their ecological function, such as natural meadows, oak communities, cliffs, talus slopes, and mineral licks. As such, the EMA-DE contains relatively little NSO habitat (approximately 961 acres; one percent of NSO habitat in the decision area) and effects on NSO habitat are assumed to be minimal and localized because the predominant treatment types that are expected to occur in the EMA-DE that would affect NSO habitat (prescribed fire and thinning of trees <8 inches DBH) are expected to maintain habitat function. Management direction in the EMA-DE is not analyzed further below because only one percent of NRF habitat in the decision area is contained in the EMA-DE and management direction in the EMA-DE is not likely to have an impact on the availability of NRF habitat at the landscape scale.
- **Recreation and Transportation Management**
  NRF habitat is not expected to change significantly because of recreation or transportation management direction. Across alternatives, management direction was developed to be consistent with the protection of CSNM objects and values, which includes NSO and their habitats. Objectives include providing and managing recreational experiences that do not conflict with the protections of CSNM objects and values. Management direction includes using tools such as applying group size limits to limit resource damage from recreation activities. Disturbance to individual owls could occur from human presence but is not anticipated to affect the availability of NRF habitat in the decision area. The use of BMPs would further provide protection to wildlife and their habitats.

Vegetation Management in Ecosystem Management Area

There is an intersection between high fire risk and NSO habitat in the CSNM. To address the purpose and need of this RMP, and thereby both protect and restore the ecosystems that provide habitat for special status wildlife species while also reducing wildfire risk to CSNM objects and values, a strategy is needed to prioritize restoration treatments on the landscape. Given wildfire threats to complex old forest, fuel treatments can serve as a tool and may be necessary to protect late-successional habitat from the effects of uncharacteristically severe fire (Spies et al., 2006; Kennedy & Wimberly, 2009; Ager et al., 2010; Gaines et al., 2010; Roloff, Mealey, & Bailey, 2012; Jones et al., 2016; Lesmeister et al., 2019), though short-term costs need to be weighed against long-term benefits (Tempel et al., 2015; Lesmeister et al., 2018).

Management direction in the EMA-OGE for the Alternative E (Proposed RMP), as well as Alternatives B and C, addresses this challenge by providing a framework for prioritization of

treatments in the EMA-OGE by looking at habitat across a spectrum of fire hazard and burn probability and its proximity to CSNM objects and values (such as NSO nesting-roosting habitat). In areas of low fire hazard and burn probability, treatments would not occur in NRF habitat, except where conditions are favorable for NR habitat development and treatments in foraging could be used to accelerate the development of NR habitat function. In areas of medium-to-high fire hazard and burn probability, treatments could occur within foraging or dispersal-only as appropriate to reduce fire hazard and contribute to the long-term protection of NRF.

Common to All Alternatives

Effects on Northern Spotted Owl Prey Availability

Some changes in prey availability may occur in all alternatives as cover is disturbed and animals move around in the understory. Reductions in habitat components such as canopy connectivity and cover such as shrubs, down wood, and snags, may subsequently affect small mammal abundance and diversity (Chambers, 2002; Manning, Hagar, & McComb, 2012); however, positive response of some components of prey habitat such as herb-grass cover, understory vegetation, shrub cover, and understory species richness have been observed after treatments designed to restore historic vegetation conditions (Suzuki & Hayes, 2003, p. 357; Manning & Edge, 2008, p. 628; Dodson, Peterson, & Harrod, 2008, pp. 3134, 3137; Dodson & Peterson, 2010, p. 1704). Other findings indicate thinning can have short-term negative effects on understory plants (mechanical destruction) and below-ground fungi (death of host trees and mechanical destruction) (Courtney et al., 2004). In turn these effects may affect the food sources used by small mammals. The effects on small mammal species' diets and small mammal biomass have been shown to be insignificant or of short duration (Suzuki & Hayes, 2003, pp. 358–359; Converse, White, Farris, & Zack, 2006, pp. 268–269; Amacher et al., 2008, pp. 3198-3199; Manning & Edge, 2008, p. 628). Although small mammals seem to recolonize areas soon after disturbance, diversity and species dominance differ as succession progresses. Verschuyl et al. 2011 (p. 227) reported positive medium- and long-term response to forest thinning by mammals across all forest types and thinning intensities but noted that the effects of forest thinning on species of conservation concern may warrant further review.

Humboldt's flying squirrel, dusky-footed woodrat, and bushy-tailed woodrat are important prey of the northern spotted owl in the CSNM area (Forsman et al., 2004). Spotted owl prey relationships are complex, and prey-switching may be important (Courtney et al., 2004). Vegetation treatment projects may impact spotted owl foraging by changing habitat conditions for different prey species.

Dusky-footed woodrats occur in a variety of conditions, including old, structurally complex forests, younger seral stages, and shrubby openings, and are often associated with streams (Carey et al., 1999; Sakai & Noon, 1993; Hamm & Diller, 2009). Oaks (Quercus spp.), other mast producing hardwoods, and shrubs provide a key food resource for dusky-footed woodrats, and shrubs may be important sources of cover from predators. Research has suggested that some types of harvest activities such thinning or associated practices (e.g., burning slash piles) could be detrimental to dusky-footed woodrats if it reduces hardwoods, shrubs, or downed wood. Thinning treatments that create substantial canopy openings could reduce habitat suitability for woodrats in the short term; however, those treatments would create benefits if increases in growth of shrubs or hardwoods follow thinning (Innes et al., 2007, pp. 1528–1529) or the

creation of new ecological edges (Sakai & Noon, 1993). A study of dusky-footed woodrats in the redwood region of California found positive relationships in the abundance of woodrats with amount of shrub cover and found lower abundances in thinned mature stands (Hamm & Diller 2009, pp. 100-101).

Gaps and areas of reduced canopy from thinning would reduce the continuity of cover but are expected to enhance the fine-scale diversity of vegetation and should maintain overall populations of dusky-footed woodrats in the long term through the development of earlier seral patches and retention of cover in untreated areas. Short-term effects are largely dependent on the large-and-fine-scale spatial distribution of existing habitats and the proportion of the habitat affected.

Sakai and Noon (1993) stated that dusky-footed woodrats might benefit from some fuels management and thinning that would increase shrub and pole stands. Bushy-tailed woodrat presence is more dependent on cover and food availability than on seral stage. They often use areas previously disturbed by fire (Carey, 1991). Bushy-tailed woodrats are most abundant along streams, and riparian areas may serve as the principal avenue for woodrat recolonization (Carey et al., 1992). Lehmkuhl et al. (2006) found that fuels projects in eastern Washington could have impacts on bushy-tailed woodrats, but confirmed the importance of maintaining snags, down wood, and mistletoe. These components would be retained to the extent practicable under the management direction. Thinning treatments may have rapid, positive effects for many forest-floor prey species (e.g., mice, voles, chipmunks) especially due to increased understory development (Carey, 2001; Carey & Wilson, 2001; Haveri & Carey, 2000). This would indirectly benefit spotted owls by providing more prey available for capture (e.g., mice, voles, chipmunks).

Studies of the effects of vegetation management on flying squirrels have found mixed results similar to those for other species described above, likely due to variability in stand conditions, spatial distribution of treatments, and treatment intensity and of study areas. Effects to flying squirrels at the stand-scale appears to vary depending on the prescription and pretreatment conditions. Thinning and other forms of partial harvesting can alter forest structure and/or reduce canopy continuity; therefore, these treatments can affect a squirrel's ability to glide or avoid predation (Wilson & Forsman, 2013, p. 82). In one study in the Sierra Nevada of California, abundances of flying squirrels in thinned stands appeared related to the amount of canopy cover retained during harvesting, though the authors noted that the study was limited in scope and sampling effort (Meyer, Kelt, & North, 2007, pp. 206–207). In a literature review, Holloway and Smith (2011) found flying squirrel abundance lower in partially harvested areas compared to uncut stands (p. 670). Holloway and others (2012, p. 191) found thinning treatments that retained less than 40 percent of the stands represented poor quality habitat for flying squirrels. Similar results have been described by others (Manning, Hagar, & McComb, 2012, p. 120; Sollmann et al., 2016, p. 104–106).

In addition to ecological restoration activities, livestock grazing can also affect NSO prey availability. Livestock trample vegetation and compact soil, which can cause erosion and reduced understory vegetation. Additionally, grazing can contribute to the proliferation of invasive plant species that outcompete native vegetation (Belsky, Matzke, & Uselman, 1999; Hayes & Holl, 2003; Foster, Barton, & Lindenmayer, 2014; Beschta & Ripple, 2019). Livestock grazing can alter vegetation structure and composition in a way which can negatively affect

habitat and food sources associated with small mammal species such as woodrats and flying squirrels (Carey et al., 1992; Forsman et al., 1984).

Under all alternatives, including the Proposed RMP, acreage available (27,820 acres) and unavailable (85,680) for livestock use would not change from the current use (refer to Appendix Q, Livestock Grazing Management). There are approximately 11,720 acres of NRF within active livestock grazing allotments. Refer to Terrestrial Wildlife Analysis Issue 1 for additional information about grazing effects on special status wildlife species.

In summary, vegetation treatments that reduce overstory canopy (such as thinning of large-diameter trees), as well as activities that alter vegetation species compositions or reduce understory components (i.e. snags, down woody debris, and understory shrubs) can have variably adverse effects to key NSO prey species, such as woodrats and flying squirrels. Some of these adverse effects, such as temporary changes in understory from thinning activities, are anticipated to be short-term and would have long-term benefits for some species. Ecological restoration activities, such as thinning (all diameters) and prescribed fire, as well as livestock grazing, are attributed to these effects and would occur to varying degrees under all alternatives. Management direction that requires the retention of down woody material and higher snag densities, and that limits canopy openings (canopy cover as well as gap size), would lessen the immediate effects of vegetation treatments on NSO prey. Additional direction common across all alternatives that is anticipated to support NSO prey and their habitats is the requirement to retain NR habitat function (post-treatment habitat would retain habitat components important for prey species), as well as direction which limits the location, timing, and intensity of NSO foraging habitat treatments (Appendix E, Terrestrial Wildlife direction, common to all alternatives).

Effects on Barred Owls

Interspecific competition between barred owls and northern spotted owls is the current primary driver of northern spotted owl population decline seen throughout the northern spotted owl's range (Franklin et al., 2021). Barred owls exert pressure on northern spotted owls through interference competition, where barred owls deny northern spotted owls access to resources (e.g., older forest stands for breeding); through territorial interaction; and through exploitation competition, where barred owls use some or all the resources necessary for spotted owl fitness (e.g., prey species), thereby reducing their availability (Wiens et al., 2014; Yackulic et al., 2014, p. 275).

Recent studies of the impacts of barred owl do not present new information that would create new effects on NSO populations since the 2016 Western Oregon Proposed RMPs/Final EIS (USDI BLM, 2016b). Recent analyses indicate a decline in the NSO population and an increase in barred owl detections (Franklin et al., 2021; Dugger et al., 2023), including in the southern Cascades study area, which is near the CSNM. Additionally, Franklin et al. (2021) found that barred owl occupancy had a dominant negative effect on colonization and a positive effect on extinction of NSO territories (Franklin et al., 2021). These reports support the overall NSO population decline predicted in the 2016 Western Oregon Proposed RMP/Final EIS (USDI BLM, 2016b). The 2016 RMP/Final EIS analysis of the effects of management actions on NSO populations include simulation of barred owl encounters. The population simulations acknowledged that the NSO population would continue to decline, and the 2016 Western Oregon Proposed RMP/Final EIS did not show discernible differences among the alternatives when compared to the No Timber Harvest reference analysis (USDI BLM, 2016b). Additionally, there

has been no new information to counteract the 2016 Western Oregon Proposed RMP/Final EIS's conclusion that the BLM cannot manage individual forest stands to provide NSOs with a competitive advantage over barred owls (USDI BLM, 2016b; Dugger et al., 2011; Wiens et al., 2014).

Treatments that reduce the understory could negatively impact spotted owls because they have been found to select forests with greater understory densities. Jenkins et. al. (2019, p. 4) found barred owls might select for forests with more open understories, so, hypothetically, the selection of forests with more dense understories by spotted owls could be to avoid competitive interactions with barred owls. The authors encouraged future research exploring this potential divergence in habitat use. Long-term beneficial effects are anticipated because fuels treatments are likely to contribute to reducing the rate of spread and intensity of wildland fires common to the action area. However, the reduction of the understory in occupied sites could result in measurable effects to spotted owls through reduced habitat quality and potentially increased competition with barred owls. Management direction in Terrestrial Wildlife provides spatial restrictions in occupied sites that would limit the extent of these effects.

Disturbance-Related Effects on Northern Spotted Owls

Although information specific to behavioral responses of NSO to disturbance is limited, research indicates that recreational activity can cause Mexican spotted owls (*S. o. lucida*) to vacate otherwise suitable habitat (Swarthout & Steidl, 2001, p. 314) and helicopter overflights can reduce prey delivery rates to nests (Delaney et al., 1999, p. 70). Additional effects from disturbance, including altered foraging behavior and decreases in nest attendance and reproductive success, have been reported for other raptors (White & Thurow, 1985, p. 14; Andersen, Rongstad, & Mytton, 1989, p. 296; McGarigal, Anthony, & Isaacs, 1991, p. 5)

Northern spotted owls also respond physiologically to a disturbance without exhibiting a significant behavioral response. In response to environmental stressors, vertebrates secrete stress hormones called corticosteroids (Campbell, 1990, p. 925). Although these hormones are essential for survival, extended periods with elevated stress hormone levels may have negative effects on reproductive function, disease resistance, or physical condition (Carsia & Harvey, 2000, pp. 517–518; Saplosky, Romero, & Munck, 2000, p. 1). In avian species, the secretion of corticosterone is the primary non-specific stress response (Carsia & Harvey, 2000, p. 517).

The effects of noise on NSO are largely unknown. The effect of noise on birds is extremely difficult to determine due to the inability of most studies to quantify one or more of the following variables: 1) timing of the disturbance in relation to nesting chronology; 2) type, frequency, and proximity of human disturbance; 3) clutch size; 4) health of individual birds; 5) food supply; and 6) outcome of previous interactions between birds and humans (Knight & Skagan, 1988, pp. 355–358). Additional factors that confound the issue of disturbance include the individual bird's tolerance level, ambient sound levels, physical parameters of sound, how it reacts with topographic characteristics and vegetation, and differences in how species perceive noise.

Although it has not been conclusively demonstrated, it is anticipated that nesting spotted owls may be disturbed by heat and smoke from burning activities during the breeding season.

All alternatives have the potential to cause disturbance to NSO in the CSNM. Management direction for Terrestrial Wildlife, the application of BMPs, and ESA-species consultation with

the USFWS would alleviate the extent and timing of these effects to NSO through spatial and temporal restrictions.

Alternative A (No Action)

Alternative A (No Action) would continue current management under the 2008 CSNM RMP and the 2016 Southwestern Oregon (SWO) RMP. The 1993 Redding RMP is not applicable to NSO issues since there is no NSO habitat in this section of the CSNM. The 2008 CSNM RMP includes primary management objectives for the Old-Growth Emphasis Area (OGEA), including to identify areas where past disturbances have reduced canopy closure to a point that no longer provides connectivity for late-successional species and accelerate the development of late-successional where feasible; and to reduce the risk of stand-replacing fires by the removal of understory trees, which would reduce competition and increase resiliency of larger, established trees. The 2016 SWO RMP precedes the 2017 Proclamation No. 9564. This RMP includes much of the acreage in the CSNM expansion area and had authorized timber harvest. However, management direction would not authorize timber sales that would cause the incidental take of northern spotted owl territorial pairs or resident singles from timber harvest until implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion on the RMP had begun.

Under Alternative A, approximately 13,134 acres of thinning, and 3,700 acres of prescribed fire would be allowed in the OGEA per decade. This includes forested habitats that are not in designated OGEA under the 2016 SWO RMP. Vegetation modeling for Alternative A resulted in a 3-10 percent increase in NRF in the decision area over 50 years.

Common to All Action Alternatives (B, C, D, and E [Proposed RMP])

The action alternatives include the same Terrestrial Wildlife management direction for project planning (Appendix E, Terrestrial Wildlife). Management direction includes that restoration treatments would be designed to be consistent with recovery plans, conservation agreements, and designated critical habitat. Additionally, Terrestrial Wildlife and EMA management direction places temporal and spatial restrictions on vegetation treatments in nesting-roosting habitat and within nest patches and core-use areas of NSO sites.

Management direction common across action alternatives includes thinning in young stands (<60 years). Thinning in stands that provide foraging and dispersal-only habitat would accelerate tree growth and promote the development of structurally complex forest conditions, which are important to northern spotted owls (Wimberly, Spies, & Nonaka, 2004; Andrews et al., 2005, as cited in USDI FWS, 2011). Other management direction common across action alternatives that is anticipated to contribute toward protection and development of NRF habitat function includes direction in that EMA that retains legacy structures and down woody debris, reduces hazardous fuels, restores native species, and mitigates for invasive species.

Alternative B

Ecosystem Management Areas

Alternative B would have the greatest overall effect (both adverse and beneficial) on habitat used by NSO because it would allow for the greatest number of acres treated, allowing more habitat-altering actions to take place. Vegetation modeling for Alternative B resulted in a 5-10 percent increase in NRF habitat in the decision area over 50 years.

Under Alternative B, management direction would retain the largest size-class of snags when conducting ecological restoration in the EMA. An abundance of snag and downed wood in NRF provide habitat features for important prey species. In areas where thinning occurs within foraging habitat, the availability of snags of smaller size classes would be lower compared to the other action alternatives which could affect prey availability for NSO. The reduction of smaller-diameter snags would reduce hazardous fuels and could prevent the future loss of spotted owl habitat from wildfire and provide protection to adjacent NSO habitat (refer to Section 3.17, Wildland Fire Management).

Ecosystem Management Area – Old-Growth Emphasis

Under Alternative B, approximately 8,100 acres within the EMA-OGE would be targeted for ecological restoration per decade. These treatment acres are not necessarily analogous with acres of NSO habitat that would be treated, as they could include a range of NSO habitat or non-habitat acres depending on the vegetative conditions and treatment objective, which would be determined at the project level.

Ecological restoration in the EMA-OGE would be strategically targeted to reduce fire risk to CSNM objects and values, including NSO NRF habitat. Treatments could occur in nesting-roosting, foraging, dispersal-only, or NSO non-habitat. In areas of low fire hazard and burn probability, treatments would not occur in NRF habitat, except where conditions are favorable for NR development and treatments in foraging could be used to accelerate the development of NR. In areas of medium-to-high fire hazard and burn probability, treatments could occur within nesting-roosting, foraging, dispersal-only, or NSO non-habitat as appropriate to reduce fire hazard and contribute to the long-term protection of NRF habitat function.

Where treatments occur, management direction under Alternative B would retain pines, Douglas-firs, and incense cedar >36 inches DBH and hardwoods >24 inches DBH. When thinning in young stands (<60 years old), trees greater than 20 inches DBH would be retained.

When conducting thinning in the EMA-OGE, Alternative B would leave at least 10 percent of the treatment area as skips (no treatment), which would create retention aggregates interspersed with varying levels of thinning and retention. In areas conducive to NRF habitat development, retained habitat components in skips would contribute to future development of NRF habitat function at the treatment scale by providing the necessary habitat diversity such as multi-layered canopy, large trees, and snags. These skips benefit small scale diversity and create conditions for more vulnerable and accessible prey to spotted owls due to the micro edge creation within the stand.

Alternative C

Ecosystem Management Areas

Alternative C has a lower target of restoration acres of 10 percent compared to Alternative B (20 percent), but greater than Alternative D, which does not include a restoration target. Vegetation modeling for Alternative C resulted in a 5 to 17 percent increase in NRF habitat in the decision area over 50 years.

When conducting ecological restoration within an EMA, snags over 12 inches would be retained under Alternative C, leading to an increased availability of smaller diameter snags post-treatment

for prey species. However, this would also contribute to a higher wildfire risk, compared to Alternative B (refer to Section 3.17, Wildland Fire Management).

Ecosystem Management Area – Old-Growth Emphasis

Under Alternative C, approximately 3,700 acres in the EMA-OGE would be targeted for ecological restoration (thinning and prescribed fire) per decade. As stated above, these treatment acres are not necessarily analogous with acres of NSO habitat. Like Alternative B, ecological restoration in Alternative C would be strategically targeted to reduce fire risk to CSNM objects and values, including NSO NRF habitat. Treatments could occur in nesting-roosting, foraging, dispersal-only, or NSO non-habitat. In areas of low fire hazard and burn probability, treatments would not occur in NRF habitat, except where conditions are favorable for NR habitat development and treatments in foraging could be used to accelerate the development of NR habitat function. In areas of medium to high fire hazard and burn probability, treatments could occur within nesting-roosting, foraging, dispersal-only or NSO non-habitat as appropriate to reduce fire hazard and contribute to the long-term protection of NRF habitat function.

Where treatments occur, management direction under Alternative C would retain pines, Shasta red fir, Douglas-firs, and incense cedar >20 inches DBH and hardwoods >13 inches DBH. When thinning in young stands (<60 years old), trees greater than 12 inches DBH would be retained. When conducting ecological restoration in the EMA-OGE, Alternative C would leave at least 10–30 percent of the treatment area as untreated skips. In areas conducive to NRF habitat development, retained habitat components in skips would contribute to future development of NRF habitat function at the treatment scale by providing the necessary habitat diversity such as multi-layered canopy, large trees, and snags.

Alternative D

Alternative D promotes the least active management for protection and restoration of CSNM objects and values. Under this alternative, the BLM would rely primarily on natural ecosystem processes that would allow plant community dynamics to unfold without intervention. Alternative D would yield the least effects with the smallest acres footprint proposed and the most restrictive management directions in terms of habitat modification. Vegetation modeling for Alternative D resulted in an 8-21 percent increase in NRF habitat in the decision area over five decades.

When conducting ecological restoration within any EMA, snags over 6 inches DBH would be retained under Alternative D. This level of retention would provide the highest level of small diameter snag availability (post-treatment) for prey species in NRF habitat, as well as potentially a higher wildfire risk (refer to Section 3.17 Wildland Fire Management analysis).

While Alternative D does not define an EMA decadal restoration target, for analysis and modeling purposes an estimated 1,900 acres of thinning and prescribed fire would be targeted in the EMA–OGE per decade. Ecological restoration under this alternative is limited to young conifer stands (plantations) that are a product of past timber harvest and thinning around legacy trees, as well as along evacuation routes and in the WUI. Direct effects to NRF habitat would be lower compared to the other action alternatives. Treated areas would retain all trees greater than 8 inches DBH, except where thinning around legacy trees. Thinning around legacy trees could aid in the development of late-successional stand characteristics. Treatment skips are not included in the management direction for Alternative D.

Young stands can be used by NSO for dispersal or foraging if they contain adequate canopy cover and some roosting structures for temporary resting and feeding. Alternative D could affect NRF habitat function through thinning in young stands that do not currently provide NRF habitat. In landscape positions conducive to NRF habitat development, young stand treatments could accelerate the development of NSO habitat. Bailey and Tappeiner (1997, p. 111) found that thinning in young stands provides a trajectory toward achieving overstory and understory attributes similar to those in old-growth stands. Management direction that favors retention of legacy structures (large remnant trees, snags, and downed wood) and/or overstory hardwoods would further hasten development of old-growth forest characteristics (Bailey & Tappeiner, 1997, p. 111). Additionally, thinning treatments in dense stands are likely to contribute to reducing the rate of spread and intensity of wildfire which would benefit adjacent stands of NRF habitat.

Alternative E (Proposed RMP)

The Proposed RMP (Alternative E) includes the same EMA decadal restoration target as Alternative C (10 percent of restoration acres), which is lower than Alternative B but greater than Alternative D. Vegetation modeling for the Proposed RMP predicted an 8 to16 percent increase in NRF in the decision area over five decades.

When conducting ecological restoration within any EMA, snags over 6 inches DBH would be retained, except those removed for operational or safety reasons, including hazardous fuels reduction (refer to Appendix E, Wildland Fire Management). This level of retention is the same as Alternative D and would provide the highest level of small diameter snag availability (post-treatment) for prey species in NRF habitat, as well as potentially a higher wildfire risk (refer to Section 3.17, Wildland Fire Management).

Approximately 3,700 acres in the EMA-OGE would be targeted for ecological restoration per decade. This is the same level of restoration as analyzed in Alternative C. As stated above for Alternative B and C, these restoration acres are not necessarily analogous with NSO habitat. Under the Proposed RMP, as with Alternative B and C, ecological restoration would be targeted to reduce fire risk in strategic landscape positions that would be anticipated to protect CSNM objects and values, including NSO NRF habitat. Treatments could occur in nesting-roosting, foraging, dispersal-only, or NSO non-habitat. In areas of low fire hazard and burn probability, treatments would not occur in NRF, except where conditions are favorable for NR development and treatments in foraging could be used to accelerate the development of NR. In areas of medium-to-high fire hazard and burn probability, treatments could occur within nesting-roosting, foraging, dispersal-only, or NSO non-habitat to reduce fire hazard and contribute to the long-term protection of NRF habitat function.

In contrast to the other action alternatives, in the Proposed RMP, the BLM specifically identifies tree size (DBH) thresholds for retention based on the species tolerance to drought, fire, and shade. For example, the Proposed RMP includes management direction to require the retention of fire- and drought-tolerant conifer species greater than 24 inches DBH. For fire- and drought-intolerant and shade-tolerant conifer species (e.g. Douglas-fir and white fir), trees greater than 29 inches DBH would be retained. Hardwood species >13 inches would be retained. Favoring retention of fire-resistant species is anticipated to have long-term benefits for stand resiliency which is anticipated to further protect adjacent NRF habitat function.

When conducting ecological restoration in the EMA-OGE, Alternative E (Proposed RMP) would leave at least 10 percent of treatment area as untreated skips and would not create openings greater than 2 acres in size. In areas conducive to NRF habitat development, retained habitat components in skips would contribute to future development of NRF habitat function at the treatment scale by providing the necessary habitat diversity such as multi-layered canopy, large trees, and snags.

Conclusion

All action alternatives propose management direction that would have both adverse and beneficial effects on NSO habitat. In Alternatives B, C, and E (Proposed RMP), treatment areas in NSO habitat would be strategically targeted in the EMA-OGE to reduce wildfire risk to high-quality habitat, develop future habitat in appropriate landscape positions, and restore functional landscape patterning consistent with the recovery plan and recovery actions. Alternative D would only focus on treatment of young stands, around legacy trees, along wildfire evacuation routes, and in the WUI. Alternative D would also not treat stands for the development of NRF habitat function and overall would treat the least amount of NSO habitat acres. Alternative B would have the most direct, adverse effects to NRF habitat function in the short term through vegetation treatments and Alternative D would have the least direct, adverse effects in the short term among the action alternatives.

Management direction common across action alternatives includes thinning in young stands (<60 years). Thinning in simple stands of foraging and dispersal-only habitat would accelerate tree growth and promote the development of structurally complex forest conditions, which are important to spotted owls (Wimberly et al. 2004; Andrews et al., 2005, as cited in USDI FWS, 2011).

Management direction in the EMA-OGE in Alternatives B, C, and E would further contribute toward the protection and development of NRF habitat function by excluding treatments in NR habitat in low-fire hazard and low burn probability, and strategically targeting treatments in foraging or dispersal stands for NR development or fuels reduction. Additionally, common to all action alternatives, nesting-roosting habitat function would be maintained post-treatment across the decision area (i.e. not downgraded or removed) and vegetation treatments would be prohibited in closed old refugia forests that occur in cooler, moister sites in the EMA-OGE.

Fuel reduction treatments (such as thinning of small diameter trees and prescribed fire) are anticipated to provide additional protection to adjacent untreated NRF stands from uncharacteristically severe wildfire by making more fire resilient stands through stand density and ladder fuel reduction (Spies et al., 2006; Kennedy & Wimberly, 2009; Calkin et al., 2010; Gaines et al., 2010; Roloff et al., 2012; Jones et al., 2016; Lesmeister et al., 2019). Management direction in Alternatives A and B would contribute the greatest amount toward wildfire risk reduction to CSNM objects and values (including NSO NRF habitat), followed by Alternative E (Proposed RMP), and then Alternative C, and Alternative D (refer to Section 3.17, Wildland Fire Issue 1).

Vegetation modeling over 50 years was variable by decade but resulted in an increase in NRF across all alternatives. (Table 3-87).

Table 3-87. Modeled change to NRF in the decision area by alternative

Percent Change from Baseline NRF by Decade					
Alternative	**2034**	**2044**	**2054**	**2064**	**2074**
No Treatment[1]	+8%	+12%	+14%	+18%	+19%
Alternative A	+5%	+3%	+4%	+10%	+7%
Alternative B	+2%	+2%	+4%	+8%	+6%
Alternative C	+5%	+9%	+10%	+15%	+17%
Alternative D	+8%	+11%	+10%	+21%	+20%
Alternative E (Proposed RMP)	+8%	+10%	+10+	+15%	+16%

[1] No Treatment represents a modeling scenario of no treatment for reference analysis purposes.

Alternative D would result in the highest overall increase in NRF habitat within the decision area over five decades, followed by Alternative C, E (Proposed RMP), A, and B. Refer to Appendix N, Vegetation Modeling and Assumptions, for detailed modeling assumptions and methods.

Management direction in the Proposed RMP that would affect NSO critical habitat (CHU) is predominantly in the Ecosystem Management Areas (EMAs). Outside the EMAs, ecological restoration or fuels reduction activities have the potential to occur in the CDMAs and ADMAs where they overlap with Wildland Urban Interface (WUI)/Fuels Emphasis areas, or for restoration of CSNM objects and values, consistent with the underlying management direction. The effect on NSO CHU is expected to be minimal in the ADMAs and CDMAs because the allowable vegetation treatments within those designations are expected to retain habitat function post-treatment and Terrestrial Wildlife management direction would also help to minimize effects by limiting the timing, intensity, and location of vegetation treatments that occur in NSO sites and habitat. Some short-term effects for ecological restoration and fuels reduction objectives could occur, such as reduction in understory vegetation that would affect prey availability. However, these treatments are anticipated to have long-term beneficial effects through reduced fire risk to NSO sites and NSO habitat adjacent to treatment areas.

Recovery Action 6

Even though this Recovery Action targets moist forests, thinning treatments in dispersal-only and capable non-habitat would also meet Recovery Action 6 objectives. Thinning treatments in these stands has the potential to develop into nesting habitat, especially stands located where their plant association and site potential would be expected to accelerate the development of structural complexity and biological diversity. All alternatives contribute toward this recovery action. Alternatives B, C, and E (Proposed RMP) are anticipated to contribute the most toward this recovery action because they provide EMA management direction with the highest restoration targets and footprint. Alternative D would also contribute toward this recovery action through management direction in the EMA that targets thinning treatments in young stands.

Recovery Action 10

Management direction under all alternatives would contribute to Recovery Action 10 through a targeted treatment strategy that conserves high-value spotted owl habitat, including nesting-roosting and closed old refugia, while also addressing risk of loss to habitat from severe wildfire. Common across all action alternatives, management direction in Terrestrial Wildlife contains temporal and spatial restrictions that would minimize adverse effects to NSO sites. At implementation level, ESA Section 7 consultation would further provide recommendations and project design criteria to contribute to the protection of NSO sites. Additionally, Congressionally Designated Wilderness, Wild and Scenic River (including Eligible), and National Scenic and Historic Trail Corridors within the CSNM contain approximately 7,500 acres of NRF habitat. The restrictions in these designations limit anthropogenic disturbance and contribute overall to the protection of large blocks of NSO habitat.

Recovery Action 32

The BLM is also a collaborator in Recovery Actions that address barred owl issues, such as the implementation of Recovery Action 32 recommendation. Many studies suggest that barred owl and spotted owls compete for resources and that maintaining older, high quality forest habitat may help NSO persist, at least in the short term. The intent of Recovery Action 32 is to maintain the older and more structurally complex multilayered conifer forests on federal lands in order not to further exacerbate the competitive interactions between spotted owls and barred owls. Common across all action alternatives, management direction in EMA aligns with this recommendation by excluding treatment in nesting-roosting stands and closed old refugia forests that contribute to the persistence of older, structurally complex stands that occur on cooler, moister sites. Management direction in Terrestrial Wildlife, common across all action alternatives, directs the retention of habitat function in stands of nesting roosting habitat, regardless of NSO occupancy. As part of ESA Section 7 consultation, habitat evaluations would be conducted prior to proposed treatments that would aid in the identification of closed old refugia forests that contribute toward Recovery Action 32. Additionally, as stated above, CDMAs contribute toward the preservation of large blocks of NSO habitat including structurally complex forests.

NSO Prey

Ecological restoration activities such as thinning would reduce prey habitat but are expected to variably retain important habitat components (snags, woody debris, shrubs) while promoting productivity of shrubs and herbaceous vegetation. EMA management direction supports the preservation of these habitat components by directing the retention of snags and down woody material greater >6 inches in diameter, except for safety, operational, or fuels reduction reasons. Alternatives D and E (Proposed RMP) include the highest snag retention compared to the other action alternatives, which would have the greatest positive benefit to NSO prey species.

In a study comparing flying squirrel densities in thinned and unthinned areas, flying squirrel densities were found to be lowest in thinned units. Flying squirrels shifted into unthinned patches toward unharvested areas that retained higher percent canopy cover, but overall flying squirrel densities at larger spatial scales did not decline (Sollmann et al. 2016, pp. 104–106). In Alternative B, the direction limits treatment openings to less than 4 acres in size which is greater than Alternatives C and E (2 acres). By contrast, treatment openings remain undefined in

Alternative D. In terms of potential acres of thinning treatments, Alternative D proposes the least acres of ecological restoration as compared to the other action alternatives and would be anticipated to have the least direct affects to flying squirrels from thinning. Alternative B would be anticipated to have the greatest direct effects on flying squirrels from thinning because it proposes a greater decadal ecological restoration acreage target. Alternatives C and E (Proposed RMP) represent a middle ground in terms of proposed restoration acreage targets that would affect NSO prey from thinning treatments.

Ecological restoration activities described in the action alternatives would affect or displace flying squirrels and other prey species at the treatment-scale where thinning and prescribed fire remove or reduce habitat structures, tree densities, and canopy cover. Management recommendations for flying squirrel conservation include the retention of the existing environmental heterogeneity—specifically, avoidance of large openings, the retention of large logs, snags and escape cover, and connectivity within the canopy to facilitate gliding. Management direction in the Proposed RMP is expected to contribute to the protection of flying squirrel habitat, especially in the EMA and EMA-OGE where the objectives include development of structural heterogeneity, protection of intact habitat for late-successional species, and providing for the conservation of endemic species and the ecosystems on which they depend. Management direction in the Ecosystem Management Area that restricts treatments in closed old refugia forests, limits treatments in riparian corridors, directs the retention of snags and woody material, excludes treatments in occupied nest patches, and directs the retention of habitat function in nesting-roosting habitat, is anticipated to provide refugia areas as well as some connectivity for dispersing small mammals.

Common across all action alternatives, direction to maintain nesting-roosting habitat function (which are stands of typically greater than 60 percent canopy cover) would be expected to retain habitat quality for flying squirrels and other NSO prey species during thinning treatments. In occupied NSO sites or unsurveyed, foraging habitat would also maintain habitat function post-treatment and contribute toward prey habitat preservation and development.

Cumulative Effects

Past actions and reasonably foreseeable actions that would add to the effects analyzed under each of the alternatives include vegetation-altering activities on adjacent, private lands such as timber harvest, road construction, and livestock grazing. Additionally, alteration of habitat by wildfire, introduced species, insect and disease, and other climate-induced stressors such as an increase in more frequent, severe storms and prolonged drought would have additive effects. Climate change trends are already apparent within the planning area, including an increase in conifer mortality as described in the AMS (USDI BLM, 2023a, p. 201). These additive effects on vegetative composition in the planning area could further reduce NSO habitat resources and prey availability to unknown degrees.

The planning area has a checkerboard pattern of ownership of private land interspersed with BLM. Management practices occurring on private lands range from residential home site development to industrial timber management. The Medford BLM assumes past management practices on private lands would continue based on historic trends. The BLM anticipates some loss of owl habitat on private lands, but cannot predict the rate of loss, types of spotted owl habitat affected, or the specific location of harvest. Harvest activities on state and private lands can be expected to adversely impact spotted owls located within adjacent federal lands by

removing and fragmenting habitat and through disturbance activities adjacent to occupied sites during sensitive periods. Non-federal lands are not expected to provide demographic support for spotted owls across and between physiographic provinces (Thomas et al., 1990; USDA FS & USDI BLM, 1994).

Glenn, Anthony, and Forsman (2010, p. 2551) noted that the potential consequences of global climate change on Pacific Northwest forests remain somewhat unclear, though there is potential for changes in forest composition and disturbance patterns that could affect northern spotted owl populations. Most models predict warmer and wetter winters, and hotter and drier summers for the Pacific Northwest in the first half of the 21st century (Mote & Salathé, 2010, Figure 7, pp. 39–41). More recently, Mote et al. (2014, p. 489) found similar temperature trends but varying precipitation trends depending on scenarios. These changes would likely exacerbate some existing threats such as the effects of past habitat loss as a result of tree mortality caused by drought-related fires, insects, and disease, along with increases in extreme flooding, landslides and wind-throw events in the short term (10 to 30 years) (Mote et al., 2014, p. 494). While a change in forest composition or extent is likely a result of climate change, the rate of that change is uncertain. Large-scale high-severity fires were found to initiate rapid ecological state changes at local and stand-level spatial scales (Crausbay et al., 2017) suggesting forest transformation could likely occur over the long term. Others have noted that in forests with long-lived dominant tree species some forest components can survive these stresses, so direct effects of climate on forest composition and structure would most likely occur over a longer time scale (100 to 500 years) in some areas than the times scale for disturbances such as wildfire or insect outbreaks (25 to 100 years) (McKenzie, Peterson, & Littell, 2009, pp. 319–338).

Additionally, the proliferation of barred owls on the landscape and the resulting tendency for spotted owls to move around due to barred owl presence are likely compounding the challenges facing spotted owls. Barred owls likely out-compete spotted owls for resources (Van Lanen et al., 2011, p. 2199) and could influence major changes in the trophic structure of local resources (Holm et al., 2016) at the territory scale. Even though barred owls may be taking northern spotted owls' primary prey only as a generalist, northern spotted owls may be affected by a sufficient reduction in the density of these prey items due to barred owls, leading to a depletion of prey to the extent that the northern spotted owl cannot find an adequate amount of food to sustain maintenance or reproduction (Gutiérrez & Courtney, 2007, p. 187; Livezey & Fleming, 2007, p. 319).

Widespread implementation of barred owl management is considered necessary for the conservation of spotted owls. Experimental removal of barred owls in a few of the NSO study areas has shown a strong, positive effect on survival of NSO (Wiens et al., 2021). The USFWS has released a Final Environmental Impact Statement and Proposed Barred Owl Management Strategy that addresses the threat of the non-native and invasive barred owls to native NSO and California spotted owls (USDI FWS, 2024a; USDI FWS, 2024b). The strategy recommends actions to reduce barred owl populations in certain areas of the northern spotted owl's range.

Terrestrial Wildlife Analysis Issue 3: Northern Spotted Owl

*How would the management direction affect the availability of NSO dispersa*l-quality habitat?

Affected Environment

Dispersal-quality habitat for the NSO consists of an assemblage of conifer-dominated forest stands that the owls can use for dispersal movements across the landscape. Dispersal-quality habitat for spotted owls includes nesting-roosting, foraging, and dispersal-only habitat. Dispersal-quality habitat and dispersal-only habitat are not synonymous. The term "dispersal-quality habitat" is used when describing and discussing the opportunities (e.g., acres of nesting, roosting, and dispersal-only habitat) for spotted owls to move across the landscape.

Dispersal-only habitat at a minimum consists of stands with adequate tree size and canopy cover to provide protection from avian predators and at least minimal foraging opportunities. Dispersal-only habitat as described here generally consists of forest stands with an average stand canopy cover of 40 percent or greater and an average DBH of 11 inches or greater. It provides temporary shelter for owls moving through the area between NRF habitats and some opportunity for owls to find prey; but it does not provide all of the requirements to support an owl throughout its life. Dispersal-only habitat may include younger and less diverse forest stands than foraging habitat, such as even-aged, pole-sized stands, but such stands should contain some roosting structures and foraging habitat to allow for temporary resting and feeding for dispersing juveniles (USDI FWS, 2012b).

Dispersal function consists of landscapes with sufficient habitat that provide for forest connectivity, enabling successful dispersal (Thomas et al., 1990; Lint et al., 2005; Davis et al., 2011; Davis et al., 2016). The US Fish & Wildlife Service has generally recommended using a fifth field watershed or larger landscapes for assessing dispersal-quality habitat conditions because watersheds or provinces offer a more biologically meaningful way to evaluate dispersal function. More recent information (Davis et al., 2016), suggests that landscapes having at least 40 percent of dispersal-quality habitat conditions (including both older and younger forests) would be sufficient to support spotted owl dispersal across the landscape.

Checkerboard ownership patterns where private lands are interspersed with BLM-administered lands together with past timber harvest and roadbuilding within the CSNM boundary and surrounding areas contribute to habitat fragmentation that can affect NSO dispersal capability. Among the reasons the CSNM landscape is ecologically significant is that it provides a habitat link between the southern Oregon Cascades and southern Oregon Klamath region to the west which contributes to habitat connectivity and dispersal function for NSO and other wildlife species.

Summary of Analytical Methods

The analysis for this issue evaluates the effects on dispersal-quality habitat baseline (current estimated amount) from the alternatives. For this analysis, the term "dispersal-quality" habitat refers to the sum of NSO nesting-roosting, foraging and dispersal-only (NRF + D) habitat.

The BLM modeled dispersal-quality habitat across the planning area and at the fifth field watershed-scale for all watersheds that overlap the planning area to demonstrate the approximate distribution of dispersal-quality habitat at a landscape scale (Figure 3-89). Habitat baseline acres

were derived from the 2022 NWFP Interagency Regional Monitoring Program Spotted Owl habitat GIS layer, with 2023 habitat updates (Davis et al., 2022).

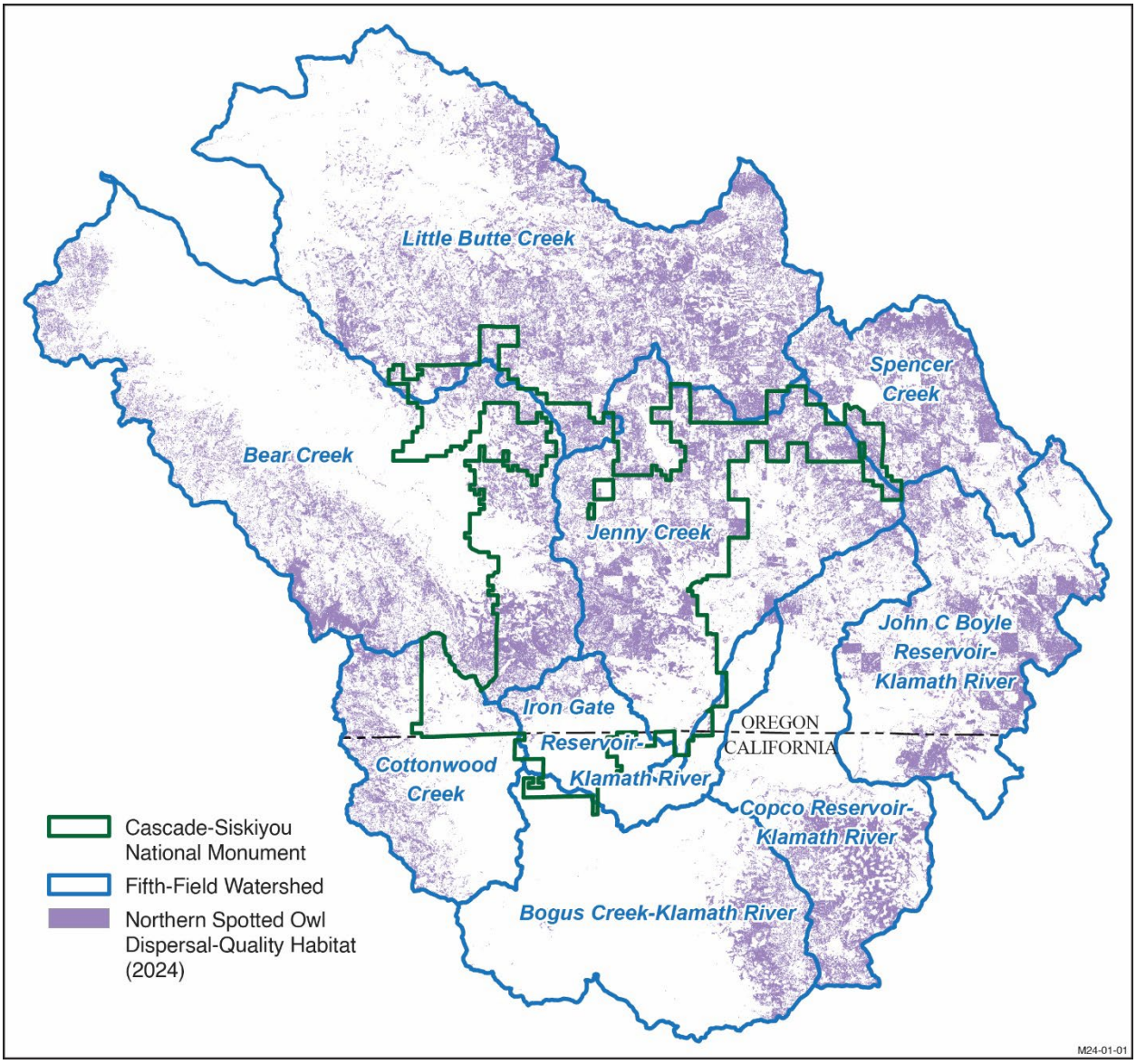


Figure 3-89. Distribution of NSO dispersal-quality habitat in watersheds associated with the CSNM

A total of nine fifth-field watersheds overlaps with the planning area; these watersheds are summarized below (Table 3-88). Several of these watersheds minimally overlap within the planning area and do not contain NSO dispersal-quality habitat within the CSNM. However, they are useful in demonstrating the landscape-scale dispersal capability around the planning area. There are approximately 58,500 acres of dispersal-quality habitat within the CSNM distributed across six fifth-field watersheds.

Table 3-88. Distribution of NSO dispersal (NRF + dispersal-only) habitat in watersheds associated with CSNM

Fifth Field Watershed	Total Watershed (acres)	Total Forest-Capable (acres/% of watershed)	Total Dispersal (acres/% of watershed)	Total Dispersal Percent of forest-capable watershed	Dispersal Habitat within CSNM (acres)
Bear Creek	231,067	152,914 (66%)	68,628 (30%)	45%	11,429
Bogus Creek-Klamath River	111,410	57,550 (52%)	12,008 (11%)	21%	n/a
Copco Reservoir-Klamath River	86,348	75,908 (88%)	19,868 (23%)	26%	n/a
Cottonwood Creek	63,515	50,852 (80%)	16,501 (26%)	32%	909
Iron Gate Reservoir-Klamath River	42,241	29,932 (71%)	3,797 (9%)	13%	3,468
Jenny Creek	134,361	126,547 (94%)	53,256 (40%)	57%	35,362
John C Boyle Reservoir-Klamath River	100,304	93,414 (93%)	20,533 (20%)	22%	n/a
Little Butte Creek	238,700	206,331 (86%)	93,686 (39%)	45%	5,239
Spencer Creek	54,208	52,726 (97%)	27,860 (51%)	53%	2,081
Total			**316,137**		**58,489**

Table 3-88 summarizes current dispersal-quality habitat conditions at the watershed scale. Two of the nine watersheds currently contain 40 percent or more of dispersal-quality habitat across the whole watershed. Some of the dispersal-deficit watersheds are habitat limited due to factors such as human development, as well as presence of habitat types that are not capable of developing into forest such as rock outcrops and barrens, cliffs, chaparral, and waterbodies.

To evaluate the percentage of dispersal-quality habitat relative to the forest-capable areas within the watershed, the BLM used habitat modeling to estimate how many acres within each watershed are forest-capable, as demonstrated in Table 3-88. However, the above acres of forest-capable habitat include non-federal land where forest development is limited. Management practices occurring on private lands range from residential homesite development to intensive industrial timber management. Non-federal lands are not expected to provide demographic support for spotted owls across and between physiographic provinces (Thomas et al., 1990; USDA FS & USDI BLM, 1994).

Additionally, the BLM used a hexagonal dispersal analysis to demonstrate dispersal capability at a finer scale than the fifth-field watershed analysis. The hexagonal dispersal analysis displays a mean of dispersal-quality habitat (NRF + dispersal-only) within a grid of 5-km^2 hexagons across the analysis area (Figure 3-90). The 5-km^2 hexagons represent an ecologically relevant space approximately the size of the core-use area in an NSO territory as well as the home range of a barred owl (Davis et al., 2022; Lesmeister & Jenkins, 2022). This analysis outlines the stepping-

stones for NSO movement on the landscape and provides an additional tool for assessing NSO habitat connectivity at a finer scale to inform management decisions at the project implementation level.

Figure 3-90 demonstrates mean dispersal-quality habitat, as a percentage, within 5-km^2 hexagons within 15.5 miles of the CSNM. This distance was chosen based on dispersal condition recommendations in Davis et al. (2011, p. 40). Cells of green and yellow color (range 50-100 percent) are above minimum thresholds suitable for facilitating NSO movement and identify core areas of dispersal. Cells of purple and blue color (range 0-39 percent) identify dispersal-deficit areas on the landscape. Cells of orange color (range 40-49 percent) identify areas at or slightly above minimum dispersal threshold. Cells with no color represent data gaps. Habitat data used in this analysis were derived from the NWFP 25-year monitoring report (Davis et al., 2022) with updates in 2023 to reflect habitat losses from wildfire and harvest.

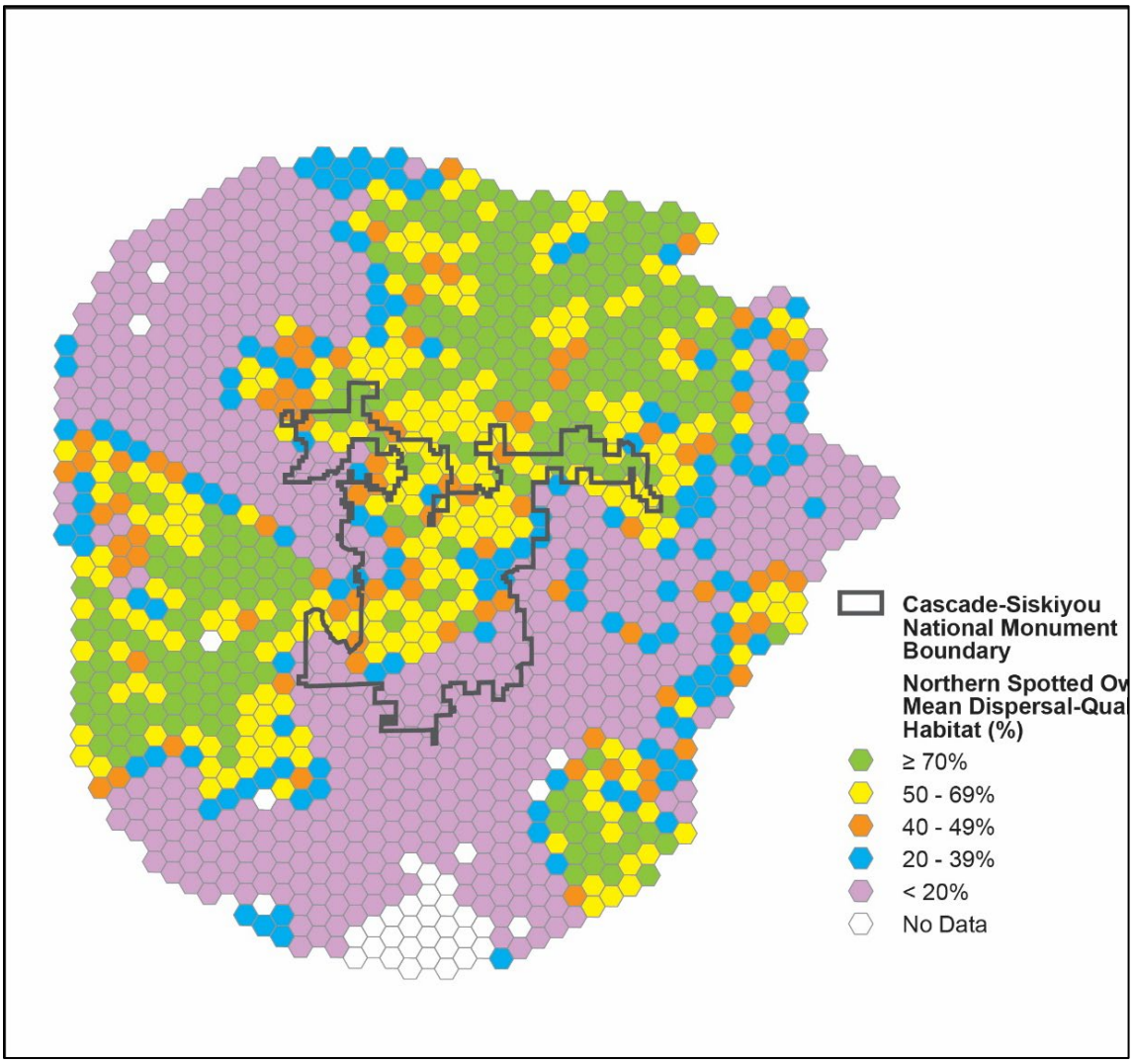


Figure 3-90. Mean (%) dispersal-quality habitat across 5-km^2 within 15.5 miles of CSNM

Analytical Assumptions

It is impossible to identify specifically where and how many acres of restoration treatments proposed in the action alternatives would take place within these watersheds over a specific timeframe. However, to demonstrate potential impacts on availability of dispersal habitat at the watershed scale, the BLM used analytical assumptions to demonstrate the variance across alternatives based on EMA decadal thinning restoration target assumptions (refer to Appendix N).

For analytical purposes at the watershed scale, Tables 3-88, 3-89, and 3-91 demonstrate the percentage of dispersal habitat within each watershed potentially affected by restoration targets in the EMA. The values for each watershed were based on the current dispersal-quality habitat (NRF + D) within those EMAs and the full extent of the decadal EMA target for analysis purposes. To demonstrate the high extent of effect, the values for each watershed represent the acres that could be treated if all restoration acres were to occur within that watershed.

Actual treatment acres within each watershed would be much lower if they were spread out across multiple watersheds at the project level and over the life of the RMP. Additionally, acres of NSO habitat treatment would be somewhat lower than those demonstrated for this analysis because management objectives in the EMA across all action alternatives would exclude treatments in nest patches of occupied or unsurveyed NSO sites, as well as in habitat that is currently functioning as nesting-roosting or foraging in occupied (or unsurveyed) core-use areas, except fuels reduction treatments that retain NSO habitat function post-treatment. Management direction in Terrestrial Wildlife also restricts any project from reducing the landscapelevel connectivity function of NSO habitat across the project areas and the CSNM. Additionally, for demonstration purposes this analysis assumes that restoration thinning proposed in the EMA occurs in NSO habitat. At the project level, restoration acres would also occur in other NSO non-habitat types (e.g., oak woodlands or meadows), in which case the total footprint of NSO habitat affected would be lower than in this analysis.

Environmental Consequences

The following management decisions would not affect NSO dispersal habitat and are not discussed further in this analysis.

- **Congressionally Designated Management Areas (CDMAs)**
  The objectives and management direction developed for wilderness and WSRs would contribute overall to the preservation of NSO dispersal and habitat connectivity. Vegetation treatments that would occur in the CDMAs are not included in this analysis because the management direction does not contain vegetation treatments that would be expected to downgrade or remove dispersal-quality habitat. Rather, the overall effect from these treatments (such as thinning of trees <8 inches and prescribed fire) would be expected to retain habitat function.
- **Administratively Designated Management Area (ADMA)**
  Vegetation treatments that would occur in the ADMA are not included in this analysis because the management direction does not contain vegetation treatments that would be expected to downgrade or remove dispersal-quality habitat. While some minor habitat modification would occur that could affect prey availability and nesting/roosting structures, the overall effect from these treatments (such as thinning of trees <8 inches

and prescribed fire) would be expected to retain habitat function, and therefore not change the availability of dispersal-quality habitat.

- **Recreation Management and Transportation Management**
  Dispersal-quality habitat is not expected to change significantly as a result of recreation management direction. Across alternatives, management direction was developed to be consistent the protection of CSNM objects and values, which includes NSO and their habitats. The use of BMPs would, further, provide protection to wildlife and their habitats.
- **Livestock Grazing Management**
  Habitat effects from grazing could include some loss or alteration of understory vegetation species. Grazing is not included in the analysis below because the anticipated effects to understory vegetation are not expected to result in a change to overstory canopy cover and dispersal capability at the landscape scale. Refer to Terrestrial Wildlife Analysis Issue 1 and 2 for additional discussion on grazing effects to wildlife species, including NSO prey species.
- **EMA-Riparian Habitat**
  Riparian areas provide valuable corridors for NSO dispersal and habitat connectivity. Management Direction in EMA-RH is not analyzed below because management direction does not vary across action alternatives and does not contain vegetation treatments that would be expected to downgrade or remove dispersal-quality habitat.

Ecosystem Management Areas

The total NSO dispersal-quality habitat in the EMAs is approximately 38,000 acres (65 percent of dispersal-quality habitat in the decision area). Within the EMAs, the acres of dispersal-quality habitat are distributed primarily in the EMA–OGE (85 percent) and EMA-RH (13 percent) with minimal overlap in the EMA–DEA (2 percent) (Table 3-89).

Table 3-89. Acres of NSO dispersal-quality habitat (NRF + D) in EMAs by watershed

Fifth Field Watershed	Dispersal-quality Acres within EMA-DE	Dispersal-quality Acres within EMA-OGE	Dispersal-quality Acres within EMA-RH	Total Dispersal-quality Acres within All EMAs
Bear Creek	468	4,353	1,443	6,264
Cottonwood Creek	52	120	32	204
Iron Gate Reservoir-Klamath River	15	48	15	78
Jenny Creek	183	22,125	2,416	24,724
Little Butte Creek	145	3,817	810	4,772
Spencer Creek	5	1,791	172	1,968
TOTAL	**868**	**32,254**	**4,888**	**38,010**

Ecological restoration, predominantly thinning activities, proposed in the EMA management direction would affect the composition of forests used by NSO (refer to relevant forested vegetation analysis, Section 3.15). Fuels reduction treatments such as small diameter thinning (<8 inches DBH) and prescribed fire simplify the understory but typically retain NSO habitat function. Therefore, assumed restoration acres of small diameter thinning, and prescribed fire are excluded from this analysis.

EMA management direction that would directly affect the dispersal capability of NSO in the planning area includes restoration treatments that would either improve and increase NSO habitat and connectivity over time (beneficial effects), or treatments which would reduce habitat quality below the thresholds suitable to support dispersing owls (adverse effects). Some habitat effects would reduce habitat function in the short term (such as through reduced canopy cover) but lead to an increase in habitat quality in the long term through treatments that accelerate the development of late successional characteristics such as multilayered canopies, large-diameter trees, and structural legacies.

Following project planning and implementation, the response to treatments on NSO habitat can vary depending on the current stand condition (and how closely it approximates old, complex-forest characteristics considered important to owls), how many trees are removed, the residual overstory, the aerial extent of the treatment, the residual decadence of standing and down wood, the canopy complexity, the time of year the treatment occurs, and the type of tree removal.

Tables 3-91 to 3-98 in the following sections display the approximate percentage of change to dispersal-quality habitat at the watershed scale based on the assumed restoration targets by alternative. As stated above, the response to treatments on habitat function can vary based on many factors. At the implementation level, no treatments would reduce landscape dispersal function in watersheds that are dispersal-deficit. Some short-term adverse effects (including temporarily reducing canopy cover below 40 percent) are expected to occur to accomplish other objectives to meet the purpose and need of the RMP but are expected to provide long-term benefits to dispersal-quality habitat.

As detailed in the Revised NSO Recovery Plan (USDI FWS, 2011), there is a longstanding debate regarding the effects of active management in dry forest landscapes and the potential positive and negative impacts to spotted owls. The recommendation is for land managers to implement a program of landscape-scale, science-based adaptive restoration treatments in disturbance-prone forests that would allow forests to recover from past management measures and respond positively to climate change with resilience. The intent is to provide more high-quality spotted owl habitat sooner and for longer into the future that would benefit spotted owl recovery in the long term. Vegetation management occurs through mechanical removal such as thinning, prescribed burning, or using naturally ignited fires burning within a specified prescription to meet ecological objectives. There are risks associated with these treatments in their potential to disturb soils, affect long-term productivity, and increase the risk of exotic plant invasions. This includes from temporary road construction. Management direction in the RMP would minimize these risks as restoration treatments projects are planned and implemented.

Common to All Alternatives

Disturbance-Related Effects on Northern Spotted Owls

Refer to Terrestrial Wildlife Analysis Issue 2 for analysis of disturbance effects to NSO.

Management direction has the potential to cause disturbance to dispersing owls in the CSNM. Management direction contained in Terrestrial Wildlife together with ESA Section 7 consultation and the use of BMPs would help alleviate the extent and timing of these effects on NSO through spatial and temporal restrictions as required by management direction.

Alternative A (No Action)

Alternative A, the No Action alternative, would continue current management under the 2008 CSNM RMP, the 2016 Southwestern Oregon RMP, and the 1993 Redding RMP.

Under this alternative, approximately 13,134 acres of thinning would be targeted in the EMA-OGE per decade. This includes forested habitats that are not in designated old growth emphasis areas under the 2016 SW RMP. When modeled over 50 years, change to dispersal-quality habitat in the decision area ranged ± 2 percent under Alternative A (Table 3-90).

Table 3-90. Alternative A - Modeled change to dispersal-quality habitat in the decision area by decade

Alternative A – Dispersal (NRF + D) Habitat in Decision Area by Decade						
Temporal Scale	**2024 (Baseline)**	**2034**	**2044**	**2054**	**2064**	**2074**
Dispersal-quality habitat (acres)	58,381	58,614	57,347	58,098	59,703	59,431
Percent change from decision area baseline	N/A	<1%	-2%	<1%	+2%	+2%

Common to All Action Alternatives (B, C, D, and E [Proposed RMP])

The action alternatives have the same Terrestrial Wildlife management direction for project planning (refer to Appendix E, Section on Terrestrial Wildlife). Restoration treatments would be designed to be consistent with recovery plans, conservation agreements, and designated critical habitat. Terrestrial Wildlife and EMA management direction places temporal and spatial restrictions in nesting roosting habitat and within nest patches and core-use areas of NSO sites, which would limit the extent of adverse effects on NSO habitat and contribute to the protection of habitat in the decision area.

Other management direction common across action alternatives that is anticipated to contribute toward the protection and development of NSO habitat includes direction in the EMA that retains legacy structures and down woody debris, reduces hazardous fuels, restores native species, and mitigates for invasive species.

Alternative B

Under Alternative B, approximately 8,800 restoration acres per decade (8,136 acres in EMA-OGE and 676 acres in EMA-DE) include thinning treatments that could affect NSO dispersal function through modifications such as reduced canopy cover. Management direction for the EMA and Terrestrial Wildlife would restrict treatments that have the potential to downgrade or remove habitat to areas of dispersal-only or foraging, although the alternative directs the retention of foraging habitat function in some circumstances (refer to Appendix E). Adverse effects to habitat are expected to be short term and would provide long-term benefits to the habitat through improved habitat structure (such as canopy layering) which could contribute toward the development of NRF and reduced fire risk to adjacent NSO habitats.

Alternative B would have the most short-term adverse effects on dispersal-quality habitat in the CSNM compared to the other action alternatives because it proposes the most active management and the largest footprint of restoration per decade, allowing more habitat-altering actions to take place. For these reasons, disturbance effects to NSO would be greater in Alternative B compared to the other action alternatives.

Table 3-91 demonstrates the percentage of dispersal-quality habitat within each watershed affected by restoration targets in the EMA. The values for each watershed were based on the current NSO habitat (NRF + D) within those EMAs and the full extent of the decadal EMA restoration acres for analysis purposes. To demonstrate the high extent of the effects, the values for each watershed represent the acres that could be treated if all restoration acres were to occur within that watershed.

Table 3-91. Alternative B –Watershed NSO dispersal-quality (NRF + D) acres affected by proposed EMA restoration targets (per decade)

Fifth Field Watershed	Dispersal Thinning in EMA-OGE (acres)	Dispersal Thinning in EMA-DE (acres)	Percent of Watershed Affected
Bear Creek	4,353	468	2%
Cottonwood Creek	120	52	<1%
Iron Gate Reservoir-Klamath River	48	15	<1%
Jenny Creek	8,136	183	6%
Little Butte Creek	3,817	145	2%
Spencer Creek	1,791	5	3%
Total	**18,265**	**868**	

When modeled over 50 years, the abundance of dispersal-quality habitat in the decision area declined 0-6 percent under Alternative B (Table 3-92). The vegetation model does not capture all of the nuances of the proposed management direction that would limit habitat effects through spatial restrictions and prescriptive limitations, such as management direction in Terrestrial Wildlife that prohibits treatments in occupied or unsurveyed nest patches and requires the retention of habitat function (i.e., no downgrading or removal) of specific NSO habitat types and

locations. Site-specific analysis and project planning would incorporate these more specific management directions that aren't captured in the vegetation model.

Table 3-92. Alternative B - Modeled change to dispersal-quality habitat in decision area by decade

Alternative B – Dispersal (NRF + D) Habitat in Decision Area by Decade						
Temporal Scale	**2024 (Baseline)**	**2034**	**2044**	**2054**	**2064**	**2074**
Dispersal habitat (acres)	58,381	56,423	55,900	54,725	56,893	58,355
Percent change from decision area baseline	N/A	-3%	-4%	-6%	-3%	<1%

Alternative C

Under Alternative C, approximately 4,000 restoration acres per decade (3,736 acres in EMA-OGE and 308 acres in EMA-DE) include thinning treatments that could affect NSO dispersal-quality habitat through modifications such as reduced canopy cover and species composition (refer to Section 3.15 for relevant vegetation analysis for effects on forest structure). Like Alternative B, management direction for the EMA and Terrestrial Wildlife would restrict treatments that have the potential to downgrade or remove habitat to areas of dispersal-only or foraging, although alternative directs the retention of foraging habitat function in some circumstances (refer to Appendix E). Adverse effects to habitat are expected to be short term and provide long-term benefits to the habitat through improved habitat structure which could contribute toward the development of NRF and reduced fire risk to adjacent NSO habitats.

Table 3-93 demonstrates the percentage of dispersal-quality habitat within each watershed affected by restoration targets in the EMA. When modeled over 50 years, change to dispersal-quality habitat in the decision area ranged from a decrease of 1 percent to an increase of 5 percent in Alternative C (Table 3-94).

Table 3-93. Alternative C –Watershed NSO dispersal-quality acres affected by proposed EMA restoration targets (per decade)

Fifth Field Watershed	Dispersal Thinning in EMA-OGE (acres)	Dispersal Thinning in EMA-DE (acres)	Percent of Watershed Affected
Bear Creek	3,736	308	2%
Cottonwood Creek	120	52	<1%
Iron Gate Reservoir-Klamath River	48	15	<1%
Jenny Creek	3,736	183	3%
Little Butte Creek	3,736	145	2%

Fifth Field Watershed	Dispersal Thinning in EMA-OGE (acres)	Dispersal Thinning in EMA-DE (acres)	Percent of Watershed Affected
Spencer Creek	1,791	5	3%
Total	**13,167**	**708**	

Table 3-94. Alternative C - Modeled change to dispersal-quality habitat in the decision area by decade

Alternative C – Dispersal-quality (NRF + D) Habitat in Decision Area by Decade						
Temporal Scale	**2024 (baseline)**	**2034**	**2044**	**2054**	**2064**	**2074**
Dispersal-quality habitat (acres)	58,381	58,252	57,797	59,246	60,194	61,287
Percent Change from decision area baseline	N/A	<1%	-1%	+1%	+3%	+5%

Alternative D

Under Alternative D, approximately 2,030 restoration acres per decade (1,874 acres in EMA-OGE and 155 acres in EMA-DE) include thinning treatments that could adversely affect NSO dispersal-quality habitat through modifications such as reduced canopy cover (refer to Section 3.15 for relevant vegetation analysis for affects to forest structure).

Alternative D would have the least short-term adverse effects to dispersal-quality habitat within the decision area compared to the other action alternatives because Alternative D promotes the least active management for protection and restoration of CSNM objects and values. Table 3-95 demonstrates the percentage of dispersal-quality habitat within each watershed affected by restoration targets in the EMA. When modeled over 50 years, change to dispersal-quality habitat in the decision area increased 0-4 percent in Alternative D (Table 3-96).

Table 3-95. Alternative D –Watershed NSO dispersal-quality acres affected by proposed EMA restoration targets (per decade)

Fifth Field Watershed	Dispersal Thinning in EMA-OGE (acres)	Dispersal Thinning in EMA-DE (acres)	Percent of Watershed Affected
Bear Creek	1,874	15	1%
Cottonwood Creek	120	5	<1%
Iron Gate Reservoir-Klamath River	48	15	<1%
Jenny Creek	1,874	155	2%

Fifth Field Watershed	Dispersal Thinning in EMA-OGE (acres)	Dispersal Thinning in EMA-DE (acres)	Percent of Watershed Affected
Little Butte Creek	1,874	145	1%
Spencer Creek	1,791	5	3%
Total	**7,581**	**527**	

Table 3-96. Alternative D - Modeled change to dispersal-quality habitat in decision area by decade

Alternative D – Dispersal-quality (NRF + D) Habitat in Decision Area by Decade						
Temporal Scale	**2024 (Baseline)**	**2034**	**2044**	**2054**	**2064**	**2074**
Dispersal-quality habitat (acres)	58,381	58,253	58,213	58,736	60,764	60,581
Percent change from decision area baseline	N/A	<1%	<1%	+1%	+4%	+4%

Alternative E (Proposed RMP)

This alternative includes the same restoration targets at Alternative C, and therefore the acres of vegetation treatments that could affect NSO dispersal-quality habitat would be the same (approximately 4,000 restoration acres per decade). These vegetation treatments could affect NSO dispersal-quality habitat through modifications such as reduced canopy cover and species composition. Like Alternative B and C, management direction for the EMA and Terrestrial Wildlife would restrict treatments that have the potential to downgrade or remove habitat to areas of dispersal-only, foraging, although the Proposed RMP directs the retention of foraging habitat function in some circumstances (refer to Appendix E). Adverse effects to habitat are expected to be short term and provide long-term benefits to the habitat through improved habitat structure that could contribute toward the development of NRF and reduced fire risk to adjacent NSO habitats.

Table 3-97 demonstrates the percentage of dispersal-quality habitat within each watershed affected by restoration targets in the EMA. When modeled over 50 years, change to dispersal-quality habitat in the decision area ranged from a decrease of less than 1 percent (-0.7) to an increase of 4 percent in Alternative E (Table 3-98).

Table 3-97. Alternative E –Watershed NSO dispersal-quality acres affected by proposed EMA restoration targets (per decade)

Fifth Field Watershed	Dispersal Thinning in EMA-OGE (acres)	Dispersal Thinning in EMA-DE (acres)	Percent of Watershed Affected
Bear Creek	3,736	308	2%
Cottonwood Creek	120	52	<1%
Iron Gate Reservoir-Klamath River	48	15	<1%
Jenny Creek	3,736	183	3%
Little Butte Creek	3,736	145	2%
Spencer Creek	1,791	5	3%
Total	**13,167**	**708**	

Table 3-98. Alternative E – Modeled change to dispersal-quality habitat in decision area by decade

Alternative D – Dispersal (NRF + D) Habitat in Decision Area by Decade						
Temporal Scale	**2024 (Baseline)**	**2034**	**2044**	**2054**	**2064**	**2074**
Dispersal-quality habitat (acres)	58,381	58,622	57,985	58,848	59,919	60,674
Percent change from decision area baseline	N/A	<1%	<1%	<1%	+3%	+4%

Conclusion

As stated above, it is not possible to determine in this analysis specifically where and when vegetation treatments in the proposed management direction would take place. As described in the EMA–OGE management direction, for Alternatives B, C, and E (Proposed RMP) restoration sites would be strategically identified for treatment based on stands with dense continuous canopy, ladder, and surface fuels; presence of suppressed fire-tolerant species; risk of large-scale high-intensity/high-severity fire; operationally strategic locations; or proximity to highly valued resources and assets (e.g., NSO NRF habitat and closed old refugia forests). Strategically placed restoration treatments are anticipated to have short-term adverse effects on vegetation (such as reduced canopy cover) but long-term positive benefits in terms of protection and development of forests used by NSOs (increased resiliency and structural heterogeneity).

A summary of watershed dispersal-quality habitat affected by decadal EMA restoration thinning targets proposed in the action alternatives is shown in Table 3-99 below.

Table 3-99. Summary of watershed dispersal-quality acres affected by proposed EMA restoration targets

Fifth-Field Watershed	Alternative B	Alternative C	Alternative D	Alternative E (Proposed RMP)
Bear Creek	2%	2%	1%	2%
Cottonwood Creek	<1%	<1%	<1%	<1%
Iron Gate Reservoir-Klamath River	<1%	<1%	<1%	<1%
Jenny Creek	6%	3%	2%	3%
Little Butte Creek	2%	2%	1%	2%
Spencer Creek	3%	3%	3%	3%

When modeled over 50 years, dispersal-quality habitat in the decision area increased overall in Alternatives A, C, D, and E (Proposed RMP). The increase was highest in Alternative C (up to 5 percent), followed by the Proposed RMP and Alternative D (up to 4 percent), and the least in Alternative A (up to 2 percent). Unlike the other alternatives, the vegetation modeling showed a negative trend in dispersal-quality habitat for Alternative B, with the exception of the first decade (results ranged from a decline of 6 percent to an increase of 3 percent) (Table 3-100). These results are in line with trends of modeled NRF (refer to Terrestrial Wildlife Analysis Issue 2), where Alternative D, C, and E (Proposed RMP) resulted in the greatest NSO NRF habitat increase in the decision area over 50 years compared to the other alternatives.

Table 3-100. Summary of modeled change to dispersal-quality habitat in the decision area over 50 years by alternative

Percent Change to Dispersal-quality (NRF + D) Habitat in Decision Area by Decade					
Temporal Scale	**2034**	**2044**	**2054**	**2064**	**2074**
No Treatment	<1%	<1%	+1%	+5%	+6%
Alternative A	<1%	-2%	<1%	+2%	+2%
Alternative B	-3%	-4%	-6%	-3%	<1%
Alternative C	<1%	-1%	+1%	+3%	+5%
Alternative D	<1%	<1%	+1%	+4%	+4%
Alternative E	<1%	<1%	<1%	+3%	+4%

Additionally, the results of the vegetation modeling do not include the potential effects of climate change or natural disturbances such as wildfire, disease, and insect-induced mortality. Alternative D has the least active management and contributes less to fuels reduction in the decision area compared to the other alternatives (refer to Section 3.17, Wildland Fire

Management analysis). Management direction that contributes to reduced fire hazard and fire severity across the decision area is expected to also contribute toward long-term preservation and resiliency of adjacent NSO habitat.

Additional hexagonal dispersal analysis conducted at project-level implementation would inform where proposed treatments could impact dispersal capability on the landscape. As described above in Affected Environment, the hexagonal dispersal analysis quantifies the proportion of dispersal-quality habitat (NRF + dispersal-only) within a grid of 5-km2 hexagons across the analysis area (Figure 3-90). This analysis outlines the stepping-stones for NSO movement on the landscape and provides an additional tool for assessing NSO habitat connectivity at a finer scale to inform management decisions at the project-implementation level. Management direction in the EMAs that directs ecological restoration treatments, specifically thinning of large-diameter trees (>8 inches DBH) would reduce dispersal capability in areas where overstory canopy retention is left below suitable thresholds (at least 40 percent), depending on scale and scope of treatment.

Hexagonal cells in the range of 0-39 percent (purple and blue color in Figure 3-90 above) identify dispersal-deficit areas on the landscape (less than 40 percent dispersal-quality, per Davis et al., 2016). Some of these areas are nonforest, private lands, or vegetation types not conducive for NSO habitat (such as rocky outcrops or oak chaparral) and are not expected to contribute toward dispersal capability in the future. However, some of these areas may contain forest-capable stands (which are not currently functioning as NSO habitat) that have the potential to develop into NSO habitat and could lead to long-term increases in dispersal capability in these areas. Management direction contained in the EMAs that directs ecological restoration treatments (such as thinning in young stands) would contribute toward this, depending on site specific conditions such as landscape position and vegetation type. Hazardous fuels reduction treatments in these stands could further protect dispersal connectivity by reducing fire hazard to adjacent stands.

Hexagonal cells in the range of 40-50 percent dispersal-quality habitat (orange color in Figure 3-90) identify areas at or near the minimum dispersal threshold (at least 40 percent dispersal-quality habitat, per Davis et al. 2016). These areas indicate where lighter-touch management (e.g., thinning treatments should retain >40 percent canopy cover and preserve roosting structures) is warranted at implementation level to protect dispersal connectivity.

Hexagonal cells in the range of 50-100 percent dispersal-quality habitat (green and yellow color in Figure 3-90) are above minimum thresholds suitable for facilitating NSO movement and identify core areas of dispersal. Proposed treatments in these areas, depending on scale and site-specific conditions, would not be expected to reduce dispersal capability as long as they retain sufficient canopy cover (>40 percent), roosting structures and foraging opportunities, and the overall treatment acres wouldn't reduce the watershed dispersal-quality acreage below the minimum 40 percent threshold suitable for dispersing owls.

As stated above, the result of treatments on habitat function depends on many factors. At the implementation level, no treatments would reduce landscape dispersal function in watersheds that are dispersal-deficit (refer to Appendix E, Terrestrial Wildlife). Some short-term adverse effects (including temporarily reducing canopy cover below 40 percent) are expected to occur to accomplish other objectives to meet the purpose and need of the Proposed RMP. However, these treatments are expected to provide long-term benefits to the habitat.

Cumulative Effects

Refer also to cumulative effects in Terrestrial Wildlife Analysis Issues 1 and 2.

Most state and private forests in Washington, Oregon, and Northern California are managed for timber production. Non-federal lands are not expected to provide demographic support for spotted owls across and between physiographic provinces (Thomas, et al. 1990; USDA FS & USDI BLM, 1994). Generally, non-federal landowners practice even-aged management (clear-cutting) of timber over extensive acreages. Private industrial forestlands are managed for timber production and would typically be harvested between 40 and 60 years of age, in accordance with State Forest Practices Act Standards.

The BLM assumes past management practices on private lands would continue. The BLM anticipates some loss of owl habitat on private lands, but cannot predict the rate of loss, types of spotted owl habitat affected, or the specific location of harvest. The BLM does not track private land harvest activity. Harvest activities on state and private lands are expected to impact NSOs located on adjacent federal lands by removing and fragmenting habitat and through disturbance activities adjacent to occupied sites during sensitive periods. Timber harvest activities on adjacent private lands could exacerbate the short-term effects of ecological restoration activities on BLM lands by reducing dispersal connectivity in proximity to the planning area. These cumulative affects magnify the importance of improving habitat conditions for NSO over the long term on BLM-administered lands.

Chapter 4. Consultation and Coordination

4.1. Introduction

Partnerships are essential for the successful management of the CSNM. The BLM has sought to establish and maintain partnerships through public outreach and involvement, in the form of in-person and virtual public scoping meetings. It has also built partnerships through coordination and consultation with other government bodies and the nine federally recognized and two non-federally recognized Tribes with ancestral or ceded lands in or adjacent to the CSNM.

The NEPA and associated regulations and policies require the BLM to seek public involvement throughout the planning process to develop a reasonable range of alternatives and to prepare environmental documents that disclose potential significant impacts. The RMP team has also engaged officials and staff of other agencies and other government entities to share critical skills and resources, shaping the BLM's land use plans and environmental analyses so that they better reflect the policies, needs, and conditions of their jurisdictions and the citizens they represent. At the same time, active participation by Tribal partners in CSNM management honors their long-standing relationship with the landscape and helps the BLM more effectively manage sensitive values while relating the Tribes' history and culture to the wider public.

This chapter describes the kinds of public involvement, consultation with other agencies, and government-to-government coordination that were undertaken for the purposes of this Proposed RMP/Final EIS. The chapter also describes how the BLM consulted with other agencies about ecologically and culturally sensitive aspects of the Proposed RMP/Final EIS, to ensure the plan's compliance with Section 7 of the Endangered Species Act as well as Section 106 of the National Historic Preservation Act. Finally, the chapter includes a list of the preparers of this Proposed RMP/Final EIS.

4.2. Public Involvement

This section provides a description of BLM's public outreach strategy and objectives for this planning process, as well as a summary of the public involvement efforts that occurred during scoping and for the Draft RMP/EIS.

The BLM's objectives for public involvement included:

- Building awareness of the CSNM unique ecosystems and biodiversity for which the monument
- Providing timely and accurate information on the planning and NEPA process.
- Establishing communications and coordination with area Tribes interested in the project including Government-to-Government consultation and Cooperating Agencies.
- Engage the public and interested parties in the planning process and provide opportunities to gather meaningful feedback throughout the planning and NEPA process.
- Meet public involvement requirements per NEPA requirements.

The BLM conducted outreach to the public during public scoping (i.e., publication of the Notice of Intent to prepare a RMP for the CSNM starting a 30-day public scoping period), and for the Draft RMP/EIS (i.e., publication of the Notice of Availability of the Draft RMP/EIS starting the 90-day comment period.)

The BLM's conducted outreach by doing the following:

- publishing news releases
- publishing meeting notices in local newspapers
- posting documents and public meeting information on the BLM's CSNM RMP ePlanning page
- holding public meetings during comment periods (in-person and virtually)
- posting public meeting notices at trailheads, campgrounds, and informational kiosks;
- sending email notices to interested parties on the RMP mailing list
- sending individual information mailings to landowners within the planning area
- posting on the BLM's social media channels to inform the public of public meetings and comment period
- creating informational fliers including public meeting dates and planning team contact email and phone number.

Public Involvement during Scoping

As noted in the CSNM RMP Revision Scoping Report, the BLM contracted with The Langdon Group through the Department of Interior's Office of Collaborative Action Dispute Resolution to conduct a prescoping assessment with key interested and potentially affected parties of the Revision. The Situation Assessment identified areas of interest and generated a list of interested parties and identified issues for consideration in scoping, and input received helped inform the BLM's public involvement process. Ninety-one confidential interviews were conducted between December 2022 and February 2023 with BLM employees, Tribal Nations, and interested or potentially affected parties/individuals. The Situation Assessment report is available on the CSNM RMP ePlanning page.

The BLM held a series of public scoping meetings in-person and virtually to provide information on the RMP process, preliminary issues, and the Analysis of the Management Situation and Planning Criteria; these meetings also afforded the opportunity for the public to submit written comments. Scoping is "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). Its purpose is to give the public an opportunity to help with the resource management planning process, by providing early input in identifying critical management concerns to determine the scope of the environmental analysis, including issues for analysis and alternatives development. In all, four public scoping meetings were held between June 26 and July 10, 2023. Three in-person meetings took place in Klamath Falls, Greensprings, and Medford, OR, with 17, 45, and 28 participants, respectively, followed by a fourth, virtual meeting with 38 participants.

These meetings were conducted in an open-house format where attendees walked around to view planning information and resource display boards, ask questions of the BLM staff and management, and submit written comments. Information on the background of the CSNM, the

timeline for the RMP process, summaries of preliminary issues, and instructions on how to submit a comment were displayed. Large reference maps of lands within the planning area and maps from the Analysis of the Management Situation were available as references. Seven stations for preliminary issues were staffed with resource specialists from the BLM. BLM staff were available to provide background information on preliminary issues and answer questions. Official comments were accepted in written form as a comment card. The public was also directed to submit comments through the ePlanning page or in letters sent to the CSNM RMP mailing address.

Public Involvement for the Draft RMP/EIS

The BLM released the Draft RMP/EIS on April 5, 2024, for a 90-day public comment period that ran through July 5, 2024. Four public meetings were held between May 8, 2024, and May 18, 2024. Three in-person meetings took place in Klamath Falls, Greensprings, and Medford, Oregon. The BLM also hosted a virtual meeting and presented an overview of the Draft RMP/EIS as well as information on how to comment. A total of 103 people attended the public meetings.

The BLM conducted the in-person public meetings in an open-house format, similar to the public scoping meetings, where attendees walked around to view the draft alternatives, asked questions of the BLM staff and management, and submitted written comments.

Information on the Draft RMP/EIS was summarized including background on the planning effort, an alternatives overview, and comparisons of alternatives for key topics. The BLM also provided considerations for providing substantive comments and fact sheets on key topics where there was a range of alternatives. An online story map was available throughout the comment period and during the public meetings that presented a user-friendly visual overview of the Draft RMP/EIS.

4.3. CONSULTATION AND COORDINATION

The planning process included both formal consultation with agencies (e.g. regulatory agencies and federally recognized Tribal Nations) and coordination with others (e.g. non-federally recognized Tribal governments). Consultation involves a formal effort to obtain the advice or opinion of another agency regarding an aspect of land use management for which that agency has particular expertise or responsibility, as required by statute or regulation. Such consultation is called for by Council on Environmental Quality (CEQ) regulations, which address the mandate that federal agencies responsible for preparing NEPA analyses and documentation do so "in cooperation with state and local governments" and other agencies with jurisdiction by law or special expertise (42 U.S.C. §§ 433 l(a), 4332(2)). Coordination, as required by FLPMA (Section 202(c)(9)), involves ongoing communication between BLM managers and state, local, and Tribal governments to ensure that the BLM considers pertinent provisions of non-BLM plans in managing public lands; seeks to resolve inconsistencies between such plans; and provides ample opportunities for state, local, and Tribal government representatives to comment in the development of BLM’s RMPs (43 CFR 1610.3-1).

Government-to-Government Consultation with Tribal Nations

The BLM honors its legally affirmed Nation-to-Nation relationship with American Indian and Alaska Native Tribal Nations, protects and supports Tribal sovereignty and self-governance, and strives to uphold this unique trust responsibility with Tribes.

Nine (9) federally recognized Tribal Nations and two (2) non-federally recognized Tribes (*) have ancestral or ceded lands in or adjacent to the CSNM:

- Confederated Tribes of the Grand Ronde Community of Oregon
- Confederated Tribes of the Siletz Indians of Oregon
- Cow Creek Band of Umpqua Tribe of Indians
- Hoopa Valley Tribe
- Karuk Tribe
- The Klamath Tribes
- Modoc Nation
- The Modoc Nation*
- Quartz Valley Indian Reservation
- Yurok Tribe
- Shasta Indian Nation*

The BLM OR/WA and the CA State Directors initiated government-to-government consultation with the Tribes regarding the future management of the CSNM on September 14, 2022. The State Directors sent certified letters to federally recognized Tribal Nations making them aware that the BLM was in the initial stages of revising the CSNM RMP. Reaching out to Tribal governments and communities in Oregon and California with long-standing interests in the CSNM, they conveyed the BLM's commitment to providing meaningful opportunities to participate in the land use planning process. The BLM also completed, in 2022, a pre-scoping Situation Assessment for the CSNM RMP. The goal of the situation assessment was to capture an accurate cross-section of interests and representative members of the community. Representatives from two Tribes participated in the situation assessment interviews.

In January 2023, the BLM developed a Tribal Outreach Strategy for the CSNM RMP. The strategy goals called for ensuring that Tribal Nations are included in fundamental steps of the RMP process; seeking input from Tribal Nations through individual outreach, public comment, and Tribal consultation, as requested or necessary; incorporating Tribal input, including Indigenous Knowledge, into the plan; and prioritizing opportunities for collaboration with Tribes. On April 20, 2023, the BLM OR/WA and the CA State Directors sent signed letters to each Tribal government inviting them to participate as a cooperating agency. As of September 2023, three Tribes had signed cooperating agency MOUs.

The BLM has been conducting traditional Nation-to-Nation consultation and integrating staff-to-staff outreach methods such as emails, virtual meetings, and phone calls since the planning effort was initiated. Formal Nation-to-Nation Consultation with all federally recognized Tribal Nations would resume as certain project milestones are reached, such as anticipated publication of the draft RMP/EIS.

Coordination with Other Government Entities

Beginning in April 2023, the BLM began to identify federal, state, Tribal, and local government agencies that have jurisdiction by law and special expertise with respect to significant environmental, social, or economic impacts associated with the plan revision. Following the Desk Guide to Cooperating Agency Relationships and Coordination with Intergovernmental Partners, the BLM began to engage officials and staff of these other agencies to share critical skills and resources, shaping the BLM's land use plans and environmental analyses to better reflect the policies, needs, and conditions of their jurisdictions and the citizens they represent.

Cooperating Agencies

A cooperating agency is an eligible governmental entity (local, state, Tribal, or federal agency with related expertise or legal jurisdiction) that has entered into a written agreement with the BLM to provide input and expertise for the planning and environmental analysis processes. As shown in Table 4-1, 15 federal agencies, 9 state agencies (4 in the State of Oregon and 5 in the State of California), 5 local governments (4 in the State of Oregon and 1 in the State of California) and the 11 Tribes mentioned previously were invited to participate as cooperating agencies for the RMP.

Table 4-1. Invited Cooperating Agencies

Agency/Entity	Type
National Park Service	Gov – Federal
U.S. Forest Service	Gov – Federal
Environmental Protection Agency**	Gov – Federal
United States Geological Survey	Gov – Federal
Bureau of Reclamation*	Gov – Federal
U.S. Fish and Wildlife Service*	Gov – Federal
NOAA Fisheries**	Gov – Federal
Bureau of Indian Affairs*	Gov – Federal
National Historic Trails Council (NHTC)	Gov – Federal
Oregon Department of Environmental Quality	Gov – State
California Department of Forestry and Fire Protection (CalFire)	Gov – State
California Department of Fish and Wildlife	Gov – State
Oregon Department of Forestry	Gov – State
Oregon Department of Transportation	Gov – State
Oregon State Parks and Recreation Department*	Gov – State
California Department of Parks and Recreation	Gov – State

Agency/Entity	Type
California Department of Transportation	Gov – State
Klamath County Commissioners	Gov – Local
Jackson County Board of Commissioners	Gov – Local
Siskiyou County Board of Supervisors*	Gov – Local
City of Ashland	Gov – Local
City of Klamath Falls	Gov – Local
Confederated Tribes of the Grand Ronde Community of Oregon	Tribal Nation
Confederated Tribes of the Siletz Indians of Oregon*	Tribal Nation
Cow Creek Band of Umpqua Tribe of Indians	Tribal Nation
Karuk Tribe	Tribal Nation
The Klamath Tribes	Tribal Nation
Quartz Valley Indian Reservation*	Tribal Nation
Yurok Tribe	Tribal Nation
Modoc Nation*	Tribal Nation
Hoopa Valley Tribe	Tribal Nation
Oregon State Historic Preservation Office (SHPO)**	Gov – State
California State Historic Preservation Office (SHPO)	Gov – State
Advisory Council on Historic Preservation (ACHP)	Gov – Federal

*Signed MOUs. **Signed letter.

In June 2023, the RMP team held a virtual meeting for government bodies that were invited to participate as cooperating agencies. The meeting reviewed the RMP process and schedule, provided an overview of issues being considering in the planning process, and reviewed the process of establishing a MOU that defines and explains expectations and time commitments for cooperating agencies.

Subsequent virtual meetings between the RMP and cooperating agencies were held throughout the planning process. In the first two meetings in September and November 2023, the team provided a summary of the scoping comments received during the public scoping period. In second two meetings in February and April 2024, the team provided RMP updates as well as an opportunity to review and discuss the Draft Alternatives. In September 2024 a virtual meeting between the RMP and cooperating agencies to provide a summary of the public comments and responses and the Proposed RMP/Final EIS.

Non-Federally Recognized Tribal Nations

The BLM OR/WA and the CA State Directors sent certified letters on September 14, 2022, to both federally recognized and non-federally recognized Tribal Nations making them aware that the BLM was in the initial stages of revising the CSNM RMP. Reaching out to Tribal governments with long-standing interests in the CSNM, conveyed the BLM's commitment to providing meaningful opportunities to participate in the land use planning process.

The BLM has been conducting staff-to-staff outreach methods such as emails, virtual meetings, and phone calls since the planning effort was initiated. Likewise, members of non-federally recognized Tribal Nations have had an opportunity to review and comment on the draft RMP/EIS.

Regulatory Agency Consultation

The BLM followed applicable regulations for consulting with other agencies about ecologically and culturally sensitive aspects of the Proposed RMP/Final EIS. Specifically, consultations were undertaken to ensure the plan's compliance with Section 7 of the Endangered Species Act as well as Section 106 of the National Historic Preservation Act.

Consultation with the USFWS per Section 7 of the Endangered Species Act

Gentner's fritillary (*Fritillaria gentneri*), a federally endangered plant species, has been documented in the decision area. The species was listed by the U.S. Fish & Wildlife Service (FWS) as endangered under the Endangered Species Act (ESA) in January 2000, and a Recovery Plan was published in 2003 (USDI FWS 1999, USDI FWS 2003). As such, consultation with the FWS on any federal action that may affect this species, or its habitat, is required.

The BLM submitted a Biological Assessment to the FWS about wildlife species falling within the scope of Section 7 of the ESA, which include:

- Northern spotted owl (spotted owl) (*Strix occidentalis caurina*) and its critical habitat, listed as Threatened June 1990 (USDI FWS, 1990), and a Revised Recovery Plan was published in 2011 (USDI FWS, 2011).
- Gray wolf (*Canis lupus*) listed as Endangered January 1974.
- Oregon spotted frog (*Rana pretiosa*) and its critical habitat, listed Threatened August 2013 (USDI FWS, 2013).
- Franklin's bumble bee (*Bombus franklini*) listed Endangered September 2021 (USDI FWS, 2018, 2021c).
- Coastal marten (*Martes caurina*) and its critical habitat, listed Threatened October 2020 (USDI FWS, 2020a).
- Wolverine (*Gulo gulo*) listed Threatened November 2023 (USDI FWS, 2023a).

Also assessed, are the following species under consideration for ESA listing by USFWS:

- Western bumble bee (*Bombus occidentalis*) ESA listed status is Under Review.
- Suckley cuckoo bumble bee (*Bombus suckleyi*) ESA listed status is Under Review.
- Northwestern pond turtle (*Actinemys marmorata*) ESA listed status Proposed Threatened, October 2023 (USDI FWS, 2023b).

- Monarch butterfly (*Danaus plexippus*) ESA listed status Candidate, December 2020 (USDI FWS, 2020b).
- Fisher (*Pekania pennanti*) May 15, 2020, the Southern Sierra Nevada DPS was listed as an endangered species and the NCSO DPS was found not warranted for listing (85 FR 29532-29589). In September 2022, a complaint was filed in Northern District of California, and, per the stipulated settlement agreement, the Service is currently completing a new 12-month finding as to whether listing the NCSO DPS is warranted, with a court mandated deadline of August 21, 2025.

Consultation with OR and CA State Historic Preservation Officers per Section 106 of the National Historic Preservation Act

The BLM complies with the National Historic Preservation Act (54 U.S.C. 300101 et seq.) through the State Protocol with the Oregon State Historic Preservation Office (USDI BLM 2015) as directed by the National Programmatic Agreement (USDI BLM, ACHP, NCSHPO 2012). Upon implementation of actions consistent with the Proposed RMP/Final EIS, the BLM consulted with the Oregon State Historic Preservation Office on Federal undertakings with the potential to effect historic properties (a prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places) in accordance with the 2015 State Protocol to comply with the National Historic Preservation Act. Per the National Historic Preservation Act (NHPA), BLM initiated consultation with both the Oregon and California State Historic Preservation Offices for the Proposed RMP/Final EIS. The Oregon State Historic Preservation Office signed on as a cooperating agency in October 2023; consultation is ongoing with both agencies.

4.4. LIST OF PREPARERS

NEPA regulations require that all persons responsible for a particular analysis, including analyses given in background papers, be listed by name, title, and qualifications. Tables 4-2 and 4-3 list both current and former team members, as well as other contributors and support staff.

Table 4-2. List of Proposed RMP/Final EIS preparers

Name	Title/Responsibilities	Qualifications
RMP/EIS Preparers		
Allen, Stewart	Social Scientist; Socioeconomic analysis	B.A. Mass Communications, B.A. Psychology, University of Utah; M.A. Environmental Psychology, Claremont Graduate School; Ph.D. Forestry (minor Psychology), University of Montana. 30 years Federal social science experience.
Bowen, Andrea	Geologist	M.S. Geology, University of Mississippi; BLM 9 years.
Campbell, Madeline	Forester	M.S. Forestry, Michigan Technological University; BLM 19 years
Canham, Sarah	Botanist; Special Status & Invasive Plants	M.S. Forest Science, Yale University School of Forestry & Environmental Studies; BLM 14 years

Name	Title/Responsibilities	Qualifications
RMP/EIS Preparers		
Davis, Dan	Outdoor Recreation Planner	M.B.A. Southern New Hampshire University, B.S. Sociology Linfield University, BLM 9 years.
Evers, Louisa	Forest/Fuels Ecologist	B.S. Forest Management, University of Tennessee; M.S. Forest Resource Management, University of Idaho; PhD Environmental Studies (Ecology), Oregon State University. Forest Service 13 years; BLM 18 years; BLM ESP
Fairweather, MaryLou	Ecologist	B.S. Biology, Fort Lewis College, Durango, CO; M.S. Forest Pathology, University of Arizona; Forest Service 34 years, BLM ESP.
Godwin, Steve	Wildlife Biologist	B.S. Biology, Dana College, M.S. Interdisciplinary Studies, Southern Oregon University. BLM 30 years
Goodwine, Nate	Forester (Silviculture)	B.S., Natural Resources (Forest Ecosystems) Oregon State University, BLM 22 years.
Haskett, Nikki	Project Manager	B.S. Oregon State University. Fisheries Science. Forest Service 1 year, BLM 27 years.
Holt, Michael	Tribal Liaison/Archaeologist	M.A. Landscape Archaeology, University of Leicester, United Kingdom, Register of Professional Archaeologists. DOI 20 years.
Kelleher, Stephanie	NEPA/Planning, IDT Lead	B.S. Environmental Studies, Southern Oregon University; BLM 15 years.
Kiene, Jesse	Fire Management Specialist	Wildland Fire Management 24 years (10 Years BLM)
Knauf, Chris	Travel Management & National Trails Program Lead	B.S. Environmental Studies, The Evergreen State College, BLM 24 years.
Long, Brian	Outdoor Recreation Planner	B.S. Recreation Resource Management, University of Montana; M.EnvDev. Protected Areas Management, University of KwaZulu Natal; NPS, USDA FS, BLM 20 years.
McClintock, Matt	Soil Scientist	M.S. Soil Science. Oregon State University; NRCS 4 years, BLM 5 years.
Montfort, Tim	Hydrologist	B.S. Environmental Science/Geology, St. Lawrence University, BLM 26 years.
Parry, Diane	Geologist	B.S. Geology, Humboldt State University, BLM 37 years.
Rice, Lisa	Archaeologist	B.S. Anthropology, minor Native American Studies, Southern Oregon University. BLM 23 years.
Robeson, Josh	Road Engineer	BLM 22 years.
Struck, Kristine	Realty Specialist	B.S. Recreation Management, University of Montana; FWS, NPS, BLM 23 years.

Name	Title/Responsibilities	Qualifications
RMP/EIS Preparers		
Tarrant, Jason	Rangeland Management Specialist	B.S. Rangeland Resources. Oregon State University. BLM 26 years. FS 5 years.
Volpe, Chris	Fish Biologist	B.S. Fisheries Science. Oregon State University. BLM 22 years.
Volpe, Jena	Fire Ecologist	M.S. Biology (Fire Ecology), Southern Oregon University. NPS 4 years. BLM 20 years.
Willard, Melanie	Wildlife Biologist	B.S. Fisheries and Wildlife Science, Oregon State University. DOI 4 years

Table 4-3. List of former team members and other contributors/support

Former RMP/EIS Team Members	
Kuykendall, Keli	Ecologist
Schelz, Charles	CSNM Ecologist
Linton, Fletcher	Botanist
Heatley, Kevin	Field Manager, Klamath Falls Field Office
Sikes, Brandon	Realty Specialist
Other Contributors / Support	
Fyfield, Paul	GIS-Cartographer
Benevides, Alex	GIS Specialist
Ducey, Craig	GIS Specialist
Duwe, John	CSNM Interpretive Specialist
Snider, Ryan	GIS Specialist
Fulmer, Kathleen	GIS Data Manager/Analyst
Herman, David	Writer-Editor
Humphrey, Cathy	Writer-Editor
Naughton, Marie	Writer-Editor
Carter, Rebecca	Rangeland Management Specialist
Lowery, Heidi	Grants Pass Field Manager
Sullivan, Kyle	Public Affairs Specialist, Medford District
Brown, Lauren	Field Manager, Ashland

Former RMP/EIS Team Members	
Brumm, Joel	Assistant Monument Manager
Burghard, Elizabeth	District Manager, Medford
Klein, Jeanne	Outdoor Recreation Planner; Wild & Scenic River Eligibility Report
Forbes, Todd	District Manager, Lakeview
Limb, Michael	Acting Field Manager, Klamath Falls Field Office
Mata, Jennifer	Field Manager, California Redding Office
Wilson, Dereck	District Manager, Northern California District Office
Boeder, Anne	NEPA Planner, BLM ESP
Morgan, Tye	Planning & Environmental Coordinator, BLM OR/WA

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Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS	Full Phrase
A	
ACEC	area of critical environmental concern
ACS	Aquatic Conservation Strategy
AIM	Assessment, Inventory, and Monitoring
ALOT	allotment
AML	abandoned mine lands
AMS	analysis of the management situation
AUM	animal unit month
B	
BAR	burned area rehabilitation
BLM	Bureau of Land Management
C	
C	carbon
°C	degrees Celsius
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	cubic feet per second
CO_2e	carbon dioxide equivalent
CSNM	Cascade-Siskiyou National Monument
D	
DEQ	Department of Environmental Quality
DOI	Department of the Interior
DM	Departmental manual
E	
EA	environmental assessment
EIS	environmental impact statement
EJ	environmental justice
EPA	US Environmental Protection Agency
ERMA	extensive recreation management area
ESA	Endangered Species Act of 1973

F

°F	degrees Fahrenheit
FEIS	final environmental impact statement
FLPMA	Federal Land Policy and Management Act of 1976
FMP	fire management plan
FR	Federal Register
FT3	cubic feet

G

GeoBOB	Geographic Biotic Observations app
GHG	greenhouse gas
GIS	Geographic Information System
GNN	Gradient Nearest Neighbor

H

HIZ	home ignition zone
HMA	herd management area
HUC	hydrologic unit code
HVRA	Highly Valued Resource or Asset

I

IM	instruction memorandum
IPCC	Intergovernmental Panel on Climate Change

L

LB	pound
LiDAR	Light Detection and Ranging
LWC	lands with wilderness characteristics
LWCF	Land and Water Conservation Funds

M

M	meter
MG	milligrams
MIST	minimum impact suppression tactics

N

NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NLCS	National Landscape Conservation System
NOAA	National Oceanic and Atmospheric Administration
NOI	notice of intent
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRV	natural range of variability
NSHT	National Scenic Historic Trails
NWCG	National Wildfire Coordination Group
NWFP	Northwest Forest Plan

O

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
OPLMA	Omnibus Public Land Management Act
OR/WA	Oregon/Washington
ORV	outstandingly remarkable value
OSU	Oregon State University

P

PAG	Plant Association Groups
PCT	Pacific Crest National Scenic Trail
PIM	permanent instruction memorandum
PL	public law
PRMP	proposed resource management plan

Q

QMD	quadratic mean diameter

R

RD	relative density
RHA	rangeland health assessment
RMA	recreation management area
RMP	resource management plan
RMIS	recreation management information system

RMZ	recreation management zone
RNA	research natural area
ROD	record of decision
ROW	right-of-way
RSC	recreation setting characteristics
R&VS	recreation and visitor services

S

SDI	stand density index
SHPO	State Historic Preservation Office
SMW	Soda Mountain Wilderness
SRMA	special recreation management area
SRP	special recreation permit
SWO	Southwestern Oregon (RMP)

T

Tg	teragram
TID	Talent Irrigation District
TMA	travel management area
TMP	travel management plan

U

UO	University of Oregon
US	United States
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDA FS	United States Department of Agriculture Forest Service
USDI BLM	United States Department of the Interior Bureau of Land Management
USDI FWS	United States Department of the Interior Fish and Wildlife Service
USGS	United States Geological Survey

V

VER	valid existing right
VRI	visual resources inventory
VRM	visual resource management

W

WSA	wilderness study area
WSR	wild and scenic river
WSRA	Wild and Scenic Rivers Act
WUI	wildland urban interface

Glossary

A

Aboriginal homelands: Lands referenced in treaties and or legislation, although not officially ceded by a ratified treaty. It can also describe an area where people originated from prior to being relocated to reservations.

Acquired lands: Public lands that the Federal government has obtained by purchase, condemnation, gift, or exchange, as distinguished in the decision area from Coos Bay Wagon Road lands, O&C lands, and public domain lands.

Acquisition: The BLM acquires land, easements, and other real property rights when it is in the public interest and consistent with approved land use plans. The BLM's land acquisition program is designed to (1) improve management of natural resources through consolidation of federal, state, and private lands; (2) increase recreational opportunities, preserve open space, and/or ensure accessibility of public lands; (3) secure key property necessary to protect habitat for threatened and endangered species, promote high-quality riparian areas, and promote biological diversity; (4) preserve archaeological and historical resources; and (5) implement specific acquisitions authorized by Acts of Congress.

Active crown fire: A solid flame consistently maintained in the canopy of the stand of trees or shrubs.

Administratively Designated Management Area: comprises areas designated by the BLM through a land use plan, including lands to manage for their wilderness characteristics, Areas of Critical Environmental Concern, Research Natural Areas, and Special Recreation Management Areas.

Administrative use: Official use related to management and resources of the public lands by Federal, State, or local governments or non-official use sanctioned by an appropriate authorization instrument, such as right-of-way, permit, lease, or maintenance agreement.

Age class: A system that categorizes forest stands by interval of years. For this analysis, the interval is 10-year increments. For example, a stand of ten-year age class of 60 includes ages 56-65.

Air pollution: The addition of any material to the atmosphere that may have a deleterious effect on life on earth.

Air quality: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Air Quality Class I And II Areas: Regions in attainment areas where maintenance of existing good air quality is of high priority. Class I areas are those that have the most stringent degree of protection from future degradation of air quality. Class II areas permit moderate deterioration of existing air quality.

Air quality attainment area: A geographic area with air quality as good as or better than the National Ambient Air Quality Standards as defined in the Clean Air Act. An area may be in attainment for one or more criteria pollutants but also be in nonattainment for one or more other criteria pollutants.

Air quality maintenance area: A geographic area that had a history of nonattainment but are now consistently meeting the National Ambient Air Quality Standards. Maintenance areas have been re-designated by the U.S. Environmental Protection Agency (EPA) from "nonattainment" to "attainment with a maintenance plan," or designated by the Environmental Quality Commission.

Air quality nonattainment area: A geographic area that has not consistently met the clean air levels set by the U.S. Environmental Protection Agency in the National Ambient Air Quality Standards.

Air Quality-Related Values: Resources such as visibility, water, soils, flora, fauna, cultural resources, or odor that have the potential to be changed by air pollution.

Air Quality Standard: Level of air pollutants prescribed by regulations that may not be exceeded during a specified time in a defined area.

All-terrain vehicle (ATV): A wheeled or tracked vehicle, other than a snowmobile or work vehicle, designed primarily for recreational use or for the transportation of property or equipment exclusively on undeveloped roads, trails, marshland, open country, or other unprepared surfaces (from BLM National Management Strategy for OHV Use on Public Lands).

Allocation: Process to specifically assign use between and ration among competing users for a particular area of BLM-managed land or related waters.

Allotment: An area of land in which one or more livestock operators graze their livestock. Allotments generally consists of BLM-administered lands but may include other federally managed, state-owned, and private lands. An area of land designated and managed for grazing of livestock (43 CFR 4100.0-5).

Alternative: One of at least two proposed means of accomplishing planning objectives.

Ambient (air): The surrounding atmospheric conditions to which the general public has access.

Ambient air quality: The state of the atmosphere at ground level as defined by the range of measured or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

Anadromous fish: Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce.

Analysis area: Any lands, regardless of jurisdiction, that the BLM uses to analyze impacts on a particular resource.

Analysis of the Management Situation (AMS): Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

Ancestral Territory: Homelands and traditional territory of ancestral Tribes. Lands that may or may not have been formally ceded by a Tribe. May reference lands from which Tribes were forcibly removed and may or may not have been compensated for later. May also reference reservation lands that were taken back later.

Aquatic habitat: Habitat that occurs in free water.

Aquifer: Stratum or zone below the surface of the Earth capable of producing water, as from a well. A saturated bed, formation, or group of formations that yield water in sufficient quantity to be of consequence as a source of supply. An aquifer acts as a transmission conduit and storage reservoir.

Archaeological site: A location that contains material remains of human life or activities that are at least 100 years old.

Area of Critical Environmental Concern (ACEC): Lands where special management attention is needed 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 provide safety from natural hazards. Area within the BLM-managed lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards (from the Federal Land Policy and Management Act of 1976, Title 43 Chapter 35 Subchapter I 1702(a)).

Artifact: A human-modified object, often appearing on an archaeological site, that typically dates to over 50 years in age.

Authorized Officer: The federal employee who has the delegated authority to make a specific decision.

Avoidance Area (Right-of-Way): Areas where rights-of-way are granted only if the BLM determines that the right-of-way proposals are compatible with the protection of the values for which the land use was designated, or when no feasible alternative route or designated right-of-way corridor is available as applicable with BLM laws and policy.

B

Basal Area: The cross-sectional area of a single plant stem, of all stems of a species in a stand, or of all plants in a stand (including the bark) that is measured at breast height (about 4.5 feet up from the ground) for larger plants (like trees) or measured at ground level for smaller plants.

Best Management Practices (BMPs): Methods, measures, or practices designed to prevent or reduce water pollution. Usually, BMPs are applied as a system of practices rather than a single practice.

Biological Assessment (BA): The document prepared by or under the direction of BLM concerning listed and proposed species and designated and proposed critical habitat that may be present in the action area and contains the BLM's determination of potential effects of the action on such species and habitat. Biological assessments are required for formal consultations and conferences on "major construction projects." They are recommended for all formal consultations and formal conferences and many informal consultations where a written evaluation of the effects of an action on listed or proposed species and on designated or proposed critical habitat is needed. (from M-6840, Special Status Species Manual).

Biological Opinion (BO): The document resulting from formal consultation that states the opinion of the Fish and Wildlife Service or National Marine Fisheries Service as to whether or not a Federal action is likely to jeopardize the continued existence of ESA-listed species or results in destruction or adverse modification of critical habitat.

Biomass: Plant materials used as a source of renewable combustible fuel. Also includes woody material ground up into fiber and used in secondary wood products.

Board foot (bf): A lumber or timber measurement term. The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

Bureau Sensitive species: Plant or animal species eligible for ESA-listed or candidate, state listed, or state candidate (plant) status, are on list in the Oregon Natural Heritage Data Base or are approved for this category by the BLM State Director.

C

Campground/Designated Recreation Area/Developed Site/Recreation Management Area: Sites and areas that contain structures or capital improvements primarily used by the public for recreation purposes.

Candidate species: Taxa for which the U.S. Fish and Wildlife Service has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the Endangered Species Act, but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register. Checkerboard pattern of ownership: A land ownership pattern in which every other section (square mile) is in federal ownership as a result of federal land grants to early western railroad companies.

Canopy cover: A measure of the percentage of ground covered by a vertical projection of the tree crowns.

Checkerboard Ownership: A land ownership pattern in which every other section (square mile) is in federal ownership as a result of federal land grants to early western railroad companies.

Community at Risk: A key component of the wildland urban interface (WUI) defined as a geographic area within and surrounding permanent dwellings (at least 1 home per 40 acres) with basic infrastructure and services, under a common fire protection jurisdiction, government, or tribal trust or allotment, for which there is a significant threat due to wildfire.

Community science: public participation in scientific research.

Climatype: A population defined primarily by the temperature and precipitation ranges to which it is presumably adapted genetically.

Climax stage: See seral stages.

Closed canopy: The degree to which the canopy (forest layers above one's head) blocks sunlight or obscures the sky. It can only be accurately determined from measurements taken under the canopy to account for openings in the branches and crowns.

Coarse woody debris/material: See **Down woody material**.

Conditional crown fire: A crown fire that will not initiate within the stand under given conditions, but canopy fuels are sufficiently dense to support an active crown fire entering from an adjacent stand.

Commercial forest land base: Forestlands declared suitable for producing timber and having a minimum level of productivity of 20 cubic feet/acre/year. Contrast with Harvest Land Base.

Commercial thinning: Stand thinning in which some or all of the cut trees are removed from the stand for timber. 'Commercial thinning' in this context does not include individual tree falling or stand thinning in which all the cut trees are left in the stand or some of the cut trees are moved for restoration purposes, or fuels reduction treatments in which cut trees are burned, chipped, or otherwise disposed of without removal from the stand for timber. 'Commercial thinning' may be implemented through a variety of mechanisms, including timber sale contracts and stewardship agreements or contracts.

Commercial use (of roads): Commercial use of BLM's road systems are authorizations related to profit-making purposes. In the decision area, it typically includes log hauling and mineral hauling and is authorized by either 1) perpetual O&C reciprocal right-of-way agreements and termed O&C Logging Road Right-of-Way permits between the United States and private timberland owners, 2) BLM timber sale contracts, or 3) Authorizations for rights-of-way where the holder attempts to produce a profit by allowing the use of its facilities by others.

Condition class (fire regimes): Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key

ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plan species, introduced insects or disease, or other management activities.

Congressionally Designated Management Area: comprises areas designated by Congress, including Wilderness Areas, designated and eligible Wild and Scenic River corridors, and National Scenic and Historic Trail corridors.

Conservation strategy: A management plan for a species, group of species, or ecosystem that prescribes standards and guidelines that if implemented provide a high likelihood that the species, groups of species, or ecosystem, with its full complement of species and processes, will continue to exist well distributed throughout a planning area.

Consultation: A formal interaction between the U.S. Fish and Wildlife Service and another Federal agency when it is determined that the agency's action may affect a species that has been ESA-listed as threatened or endangered or its critical habitat

Cooperating Agency: A Tribe or Federal, State, or local government agency that assists a lead Federal agency in developing an environmental assessment or environmental impact statement. These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6).

Coos Bay Wagon Road (CBWR) Lands: Public lands that were granted to the Southern Oregon Company for construction of a military road but were subsequently reconveyed to the United States.

Council on Environmental Quality (CEQ): An advisory council to the President of the U.S.A. that was established by the National Environmental Policy Act of 1969. It reviews Federal programs to analyze and interpret environmental trends and information.

Criteria pollutants: Six principle pollutants considered most harmful to public health and the environment and that can be monitored effectively. They include carbon monoxide (CO), lead (Pb), nitrogen oxides (NOx), sulfur dioxide (SO2), ozone (O3), and particulate matter of two different aerodynamic diameters (PM10 and PM2.5).

Critical habitat: Under the Endangered Species Act, critical habitat is defined as: (1) the specific areas within the geographic area occupied by an ESA-listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by an ESA-listed species, when it is determined that such areas are essential for the conservation of the species.

Crown fire: A fire in the upper tree or shrub canopy. Crown fires are sometimes classified as independent (conditional) or dependent (active or passive) to distinguish the degree of independence from the surface fire.

Cultural resources: Locations of human activity, occupation, or use. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social or cultural groups.

Cumulative effect: 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 regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Current Vegetation Survey (CVS): BLM's regional permanent plot inventory. Each sampling point has a series of nested concentric sub-plots, in which trees of different diameter classes are measured. Live and dead trees, down woody debris, and understory vegetation are measured. The plots are located on a 1.7-mile grid, on BLM land, if at least one subplot is forested.

D

Debris flow: A rapid moving mass of rock fragments, soil, and mud, with more than half of the particles being larger than sand size.

Decision area: The lands within the planning area of this RMP revisions for which the BLM has authority to make land use and management decisions. In general, the BLM has jurisdiction over all BLM-administered lands (surface and subsurface) and over mineral estate in areas of split estate (i.e., areas where the BLM administers Federal mineral estate, but the surface is not owned by the BLM).

Decommissioning (of roads): See **Road Closure**.

Desired future condition: For rangeland vegetation, the condition of rangeland resources on a landscape scale that meet management objectives. It is based on ecological, social, and economic considerations during the land planning process. It is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, and age and size class of species) and desired soil qualities (soil cover, erosion, and compaction). In a general context, desired future condition is a portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

Detrimental disturbance: The limit where the naturally occurring soil properties change to a reduced state and the inherent soil capacity to sustain growth of desired vegetation is reduced. Detrimental soil disturbance generally represents any one or all of the following; unacceptable levels of erosion (i.e., formation of rills, gullies, pedestals, or soil deposition), loss of organic matter (removal of more than half the organically enriched upper horizon), soil compaction (increase in natural bulk density that restricts root growth or wheel (or track) ruts > 2" deep), soil heating (physical and biological changes to the soil resulting from elevated temperatures of long duration), or soil displacement (removal of ≥ 1" of any surface horizon from a contiguous area greater than 100 sq. ft.).

Diameter breast height (DBH): The diameter of the stem of a tree measured at 4.5 feet above the ground level on the uphill side of the stem. See quadratic mean diameter.

Discretionary Action: Actions or activities in which the BLM Authorized Officer must determine whether or how to approve, authorize, or implement the action or activity.

Disposal: Conveyance of public lands and minerals out of Federal ownership to another party through sale or exchange that meets the requirements of Secs. 203 (sales), 206 (exchanges), and 209 (conveyance of mineral interest) of the Federal Land Policy and Management Act of 1976 or as authorized by the Recreation and Public Purposes Act of 1926 or other land law statutes.

Distinct population segment (DPS): a discrete population of a species and the smallest portion of a vertebrate species that can be protected under the Endangered Species Act.

Disruption (ESA-listed wildlife): A type of disturbance that that creates the likelihood of injury to ESA-listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (see 50 CFR 17.3). Disruption is a subset of disturbance. An action that would disrupt the normal behavior of an ESA-listed species may affect, and would be likely to adversely affect, the species and would cause the taking of affected individual(s).

Disturbance (ESA-listed wildlife): A human action that may affect an ESA-listed animal species by the addition, above ambient condition, of noise or human intrusion, or the mechanical movement of habitat (e.g., the shaking of the forest canopy from helicopter rotor wash). Disturbance is temporary/short term (minutes to days) and does not modify habitat structure, or water/air flow or quality. Disturbance should not be confused with "surface disturbance," which refers to an action that modifies soil, water, or vegetation. Disturbance requires the presence of an ESA-listed animal.

Disturbance (natural): A force that causes significant change in structure or composition through natural events such as fire, flood, wind, or earthquake, mortality caused by insect or disease outbreaks, or by human-caused events such as the harvest of forest products.

Down woody material/coarse woody debris: Portion of a tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

Durable rock surfacing: Durability is an indicator of the relative quality or competence of an aggregate to resist abrasion, impact or grinding to produce clay like fines when subjected to commercial hauling. Durable rock surfacing will support commercial timber or rock haul in the winter with a minimal level of fines produced due to wear.

E

Early seral: Early seral habitat typically occurs from the time of disturbance at a site until approximately 10 years of age. This stage may be dominated by grasses and forbs or by sprouting shrubs or hardwoods. Conifers develop slowly at first and gradually replace grasses, forbs, or shrubs as the dominant vegetation.

Ecological restoration: the process of repairing, renewing, or restoring ecosystems that have been degraded, damaged, or destroyed. The goal is to return these ecosystems to a more natural, healthy, and functional state. Ecological restoration involves both the physical reconstruction of the environment and the reintroduction of native plant and animal species.

Ecosystem Management Area: The CSNM has been divided into three management areas that are used when describing potential management activities that may be related to ecosystem management. The Ecosystem Management Area (EMA) is comprised of three sub-management areas: Old-Growth Emphasis (EMA – OGE), Diversity Emphasis (EMA - DE), and Riparian Habitat (EMA – RH).

Eligible river: A river or river segment found to meet criteria found in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of being free flowing and possessing one or more outstandingly remarkable value.

Endangered species: Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, as published in the Federal Register.

Environmental Impact Statement (EIS): A detailed statement prepared by the responsible official in which a major Federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed.

Extensive Recreation Management Area (ERMA): An administrative unit that requires specific management consideration in order to address recreation use, demand, or recreation and visitor services program investments. Management of ERMAs is commensurate with the management of other resources and resource uses.

F

Federal Lands: As used in this document, lands owned by the United States, without reference to how the lands were acquired or what Federal agency administers the lands. The term includes mineral estates and coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos. (See also Public Land.)

Federal Land Policy and Management Act (FLPMA) (OF 1976): Public law 94-579. An Act to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development, and enhancement of the public lands; and for other purposes.

Federal Register: A daily publication that reports Presidential and Federal agency documents.

Fifth-field watershed: Individual watershed within a Hydrologic Unit as defined by the U.S. Geological Survey, typically averages 87,000 acres in size.

Fire frequency: The number of times that fires occur within a defined area and time period.

Fire hazard: A fuel complex, defined by volume, type condition, arrangement, and location, that determines the degree of ease of ignition and of resistance to control.

Fire Management Plan: Strategic implementation-level plans that define a program to manage wildland fires, fuel reduction, and fire rehabilitation based on an area's approved resource management plan. Fire management plans must address a full range of fire management activities that support ecosystem sustainability, values to be protected, protection of firefighter and public safety, and public health and environmental issues and must be consistent with resource management objectives and activities of the area.

Fire regime: Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites.

Fire resilient forest: A forest having characteristics that limit fire severity and increase the resistance of the forest to mortality.

Fire return interval: The time between fires in a defined area, usually at the scale of a point, stand or relatively small landscape area. This is called Mean Fire Interval (MFI) in the LANDFIRE system, where it refers to the average number of years between fires in representative stands.

Fire suppression: Fire management actions taken to extinguish a fire or confine fire spread.

First foods: Traditional and culturally significant foods that hold special importance for Indigenous communities. These foods are considered foundational to the identity, well-being, and cultural practices of Indigenous peoples; concept goes beyond mere sustenance and often involves a deep spiritual, social, and ecological connection. For many Indigenous cultures, First Foods are seen as gifts from the land and are central to traditional ceremonies, rituals, and ways of life. These foods include a variety of plants, animals, and fish that are often harvested or gathered from the natural environment.

Forage: All browse and herbaceous foods available to grazing animals, including wildlife and domestic livestock.

Fragile soil: Soils that can be easily degraded through ground-disturbing actions (e.g. thinning, tree removal, broadcast burning) and/or have a low capacity to recover after disturbance has occurred. Fragile soils are characterized by a low content of organic matter, extreme soil textures, low aggregate stability, and weak soil structure. Site characteristics that contribute to the classification of fragile soils include steep slopes, sparse vegetative cover, and semi-arid microclimates.

Full Decommissioning (of roads): refer to *road closure*.

G

Geographic Information System (GIS): A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Grazing System: A prescribed method of grazing a range allotment having two or more pastures or management units to provide periodic rest for each unit.

H

Habitat corridor: Environmental spaces, either natural, maintained or restored, between species, ecosystems, and ecological processes at various scales. Examples of habitat corridors include river systems, restored habitat pathways (at a variety of scales), and even tunnels, underpasses, and overpasses.

Hazard Tree: Tree with failure potential where the likelihood that the tree, or its parts, would fail within a certain time period, is either imminent or likely.

Herd Management Area: Public land under the jurisdiction of the BLM that has been designated for special management emphasizing the maintenance of an established wild horse or burro herd.

High-severity fire: Greater than 75 percent of the total canopy cover, or basal area, is killed by the sum of all fire effects.

Home ignition zone (HIZ): Concept designed to help homeowners in the Wildland-Urban Interface (WUI) reduce the risk of their homes catching fire during wildfires. It involves creating defensible space around the home to mitigate the impact of embers and flames. The HIZ can extend up to 200 feet from the foundation, depending on local fuels and fire behavior.

Horses, wild: Unbranded, unclaimed, free-roaming horses or burros found on public lands in the United States. Unbranded and unclaimed horses and burros that use public lands as all or part of their habitat or that have been removed from these lands by the authorized officer but have not lost their status under Section 3 of the Act. (H-4750-2, BLM Wild Horse and Burro Adoption Handbook).

I

Impact: Synonymous with effects; Includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Impacts may also include those resulting from actions which may have both beneficial and detrimental (adverse) effects. Impacts may be considered as direct, indirect, or cumulative.

Indigenous Knowledge: – also referred to as Traditional Knowledge or Traditional Ecological Knowledge – is a body of observations, oral and written knowledge, innovations, practices, and beliefs that promote sustainability and the responsible stewardship of cultural and natural

resources through relationships between humans and their landscapes. Indigenous Knowledge cannot be separated from the people inextricably connected to that knowledge. It applies to phenomena across biological, physical, social, cultural, and spiritual systems. Indigenous Peoples have developed their knowledge systems over millennia and continue to do so based on evidence acquired through direct contact with the environment, long-term experiences, extensive observations, lessons, and skills. (USDI Department Manual 301 DM 7.4)

Intact habitat: refers to an ecosystem or natural environment that remains largely undisturbed and unaltered by human activities. In an intact habitat, ecological processes, biodiversity, and natural functions are preserved in a state that closely resembles the original, pre-disturbance condition. These habitats have not experienced significant degradation, fragmentation, or loss of key components, such as native species, vegetation, or ecosystem structure.

Intermittent Stream: Seasonal stream that flows only at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

Invasive plants (or weeds): Non-native aggressive plants with the potential to cause significant damage to native ecosystems and / or cause significant economic losses. For the purposes of this DEIS, the term "invasive plants" includes noxious weeds.

Invasive species: Non-native organisms that, when introduced to a new environment, can cause harm to the native ecosystems, economy, or human health. These species often outcompete or negatively impact native species, disrupt ecological balance, and can lead to the decline of native biodiversity. Invasive species can include plants, animals, fungi, and microorganisms.

J

Jurisdiction: The legal right to control or regulate use. Jurisdiction requires authority, but not necessarily ownership.

K

Key Watershed: A watershed containing 1) habitat for potentially threatened species of stocks of anadromous salmonids or other potentially threatened fish; or 2) greater than six square miles with high quality water and fish habitat.

L

Ladder fuel: Fuel that provides vertical continuity between forest strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

Landscape: A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout.

Land Use Allocation: The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

Late-Successional Forest: Forest seral stages which include mature and old-growth age class.

Late-Seral Open: Late seral open stage occurs as conifers continue to die from competition and stand growth slows, approximately 61 to 100 years. Forest stands are dominated by conifers or hardwoods; canopy closure often approaches 100 percent. Stand diversity is minimal.

Late-Seral Closed: Structurally complex stands are defined as forests that are more than 50 years old, ≥ 12 trees per acre that are ≥ 20 inches diameter at breast height, and ≥ 2.1 trees per acre ≥ 40 inches diameter at breast height. This structural stage is associated with the Late-Closed successional class.

Lead-off ditch: A formed channel that diverts ditch water away from the road, usually angled in the direction of water flow and placed at locations to empty into vegetative filtering areas.

Leasable minerals: Minerals generally found in bedded deposits and include oil, gas, coal, chlorides, sulfates, carbonates, borates, silicates, and nitrates of potassium (potash) or sodium and related products; sulfur; phosphate and its associated and related minerals; asphalt; and gilsonite.

Lease (Land Use Authorization)**:** An authorization to possess and use public lands for a fixed period of time (43 CFR 2920.0-5(j).

Legacy trees: Old trees that have been spared during harvest or have survived stand-replacing natural disturbances. These trees as have achieved near-maximum size and age, which is significantly larger and older than the average trees on the landscape.

Lessee: (Livestock Operator) A person or organization legally permitted to graze a specific number and class of livestock on designated areas of public land during specified seasons each year.

Locatable minerals: Metallic minerals (e.g., gold, silver, lead, copper, zinc, and nickel) and nonmetallic minerals (fluorspar, mica, certain limestone and gypsum, tantalum, heavy minerals in placer form and gemstones) in land belonging to the United States that are open to citizens of the United States for exploration, discovery, and location which conveys the possessory right to extract the locatable minerals upon receiving all required authorizations in accordance with regulations at 43 CFR 3802 for lands in wilderness review and 43 CFR 3809 for other public lands.

Lop and scatter: The cutting of branches, tops, and unwanted boles into lengths that will lie close to the ground and spreading debris more or less evenly.

Low-severity fire: Less than 25 percent of the total canopy cover or basal area is killed by the sum of all fire effects.

Low-tech Process-based Restoration: Process-based approaches for restoring streams and their associated riparian areas (riverscapes) with simple, hand-built tools, including Beaver Dam Analogues (BDAs) and Post-Assisted Log Structures (PALS), intended to mimic and promote specific ecosystem processes that benefit fish, wildlife, working lands, and other resource values.

M

Management direction: Rules in an RMP that identify where future actions may or may not be allowed and what restrictions or requirements may be placed on those future actions to achieve the objectives set for the BLM-administered lands and resources.

Meadows: Open areas dominated by grasses and forbs with occasional small shrubs and trees. Typically limited by soil type, aspect, elevation, or precipitation regimes, meadow habitats occur at a variety of locations across the landscape.

Mid-Seral Closed: The mid-seral closed stage occurs with crown closure to the time when conifers would begin to die from competition, approximately age 11 to 30 years.

Mid-Seral Open: The mid-seral stage occurs from crown closure to the time when conifers begin to die from competition, approximately age 30 to 60 years. Stands are dense and dominated by conifers, hardwoods, or thick brush. Grass, forbs, and herbaceous vegetation decrease with increasing age.

Mineral estate – The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Minimum Impact Suppression Tactics (MIST): The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural, and social impacts.

Mining claim – A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Mitigation – The act of reducing or eliminating an adverse environmental impact.

Mixed-severity fire – The severity of fires varies between nonlethal understory and lethal stand-replacement fire with the variation occurring in space or time. The result may be a mosaic of young, older, and multiple-aged vegetation patches as a function of landscape complexity or vegetation patterning. Typically, more than 25 percent and less than 75 percent of the total canopy cover or basal area is killed by the sum of all effects. Fires may also vary over time between low-intensity surface fires and longer-interval stand replacement fires.

Modeling: A scientific method that operates by a structured set of rules and procedures to simulate current conditions and predict future conditions.

Monitoring: The review on a sample basis, of management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

Multi-layered canopy: Forest areas with two or more distinct canopy layers.

Multi-aged stand: Two-aged and uneven-aged stands.

N

National Environmental Policy Act (NEPA) of 1969, as Amended: An Act which encourages productive and enjoyable harmony between man and his environment; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality. (BLM National Management Strategy for OHV Use on Public Lands)

National Landscape Conservation System: Special Congressional or Presidential land use designations such as National Monuments, Wild and Scenic Rivers, and Wilderness Areas.

National Register: The National Register of Historic Places, expanded and maintained by the Secretary of the Interior, as authorized by Section 2(b) of the Historic Sites Act and Section 101(a)(1)(A) of the National Historic Preservation Act. The National Register lists cultural properties found to qualify for inclusion because of their local, state, or national significance. Eligibility criteria and nomination procedures are found in 36 CFR Part 60. The Secretary's administrative responsibility for the National Register is delegated to the National Park Service. (M-8100-1, BLM Cultural Resources Management)

National Wild and Scenic Rivers System: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of rivers: (1) recreational—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Native plant communities: Native plant communities create habitat which is necessary for wildlife and essential to sustaining biodiversity and resilient landscapes. As the foundation of healthy functioning ecosystems, native plant communities buffer the impacts of extreme weather events such as severe flooding and prolonged drought.

Natural communities: Recurring assemblages of plants and animals found in particular physical environments.

Non-commercial thinning (management): Cutting merchantable trees but not removing them from the *stand.*

Non-discretionary designations: designations that can only be established by the President, Congress, or the Secretary of the Interior pursuant to specific legal authority.

Non-discretionary uses: Uses that are not under discretion.

Non-Functioning Condition: (1) Condition in which vegetation and ground cover are not maintaining soil conditions that can sustain natural biotic communities. (2) Riparian-wetland areas are in nonfunctioning condition when they do not provide adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, or other normal characteristics of riparian areas. The absence of a floodplain may be an indicator of nonfunctioning condition. (H-4180-1, BLM Rangeland Health Standards Manual).

Noxious weeds: Subset of invasive plants that are county-, State-, or federally listed as injurious to public health, agriculture, recreation, wildlife, or any public or private property. Also refer to "invasive plants" definition.

O

O&C lands: Lands administered by the BLM which are in Oregon and in and west of Range 8 E., Willamette Meridian, Oregon, including the Revested Oregon and California Railroad, Reconveyed Coos Bay Wagon Road Grant Lands, and other public lands administered by the U.S. under the provisions of the Act of August 28, 1937 (43 U.S.C. §1181a and §1181b). Refer also to 43 CFR §2812.0-5(e).

Oak woodlands: Oak woodlands are dominated by drought tolerant oak species. Usually occurring on sites not hospitable to conifer species due to aspect, soil type, elevation, and annual precipitation regime.

Objective: A description of a desired outcome for BLM-administered lands and resources in an RMP; the resource conditions that the BLM envisions, or desires would eventually result from implementation of the RMP. Objectives can be quantified and measured and, where possible, have established timeframes for achievement. (H-1601-1, BLM Land Use Planning Handbook)

Obliteration (of roads): refer to *road closure*.

Occupancy: Full or part-time residence on public lands. It also means activities that involve residence; the construction, presence, or maintenance of temporary or permanent structures that may be used for such purposes; or the use of a watchman or caretaker for the purpose of monitoring activities. Residence or structures include, but are not limited to, barriers to access, fences, tents, motor homes, trailers, cabins, houses, buildings, and storage of equipment or supplies.

Official use: Use by an employee, agent, or designated representative of the federal government or one of its contractors, in the course of their employment, agency, or representation.

Off-Road Vehicle: Means any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) Any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used in times of national defense emergencies.

OHV (Off-Highway Vehicle): Any motorized track or wheeled vehicle designed for cross-country travel over any type of natural terrain.

Old-Growth Forest: A conifer forest stand usually at least 180-220 years old with moderate to high canopy closure; a multi-layered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

Outstandingly Remarkable Values: Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act of 1968: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values..." Other similar values that may be considered include ecological, biological, or botanical.

Overstory: That portion of trees forming the uppermost canopy layer in a forest stand and that consists of more than one distinct layer.

P

Decommission (long-term closure of road): refer to *road closure*.

Perennial Stream: A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

Permit: A short-term, revocable authorization to use public lands for specified purposes.

Permittee (reciprocal agreements): (a) The cooperating party to a reciprocal agreement (some early agreements refer to such a party as "applicant"); (b) A third party using a road controlled by the United States and constructed over lands belonging to the permittee in a reciprocal agreement; and (c) A party authorized to use roads controlled by the United States under the terms of a Unilateral O&C Rights-of-Way, mining, or grazing permit, etc.

Planning Area: All of the lands within the BLM management boundary addressed in a BLM resource management plan, however planning decisions apply only to BLM-administered lands and mineral estate.

Plant Community: An association of plants of various species found growing together in different areas with similar site characteristics.

Preferred Alternative: Term used in the Council on Environmental Quality's implementing regulations of the National Environmental Policy Act (NEPA) and BLM planning regulations. Guidance from the Council on Environmental Quality explains that the preferred alternative is the alternative that the agency believes would fulfill its statutory mission and responsibilities, considering economic, environmental, technical, and other factors.

Prescribed Fire: Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that will allow confinement of the fire to a predetermined area and at the same time, will produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives for wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.

Prey Species: An animal taken by a predator as food.

Properly Functioning Condition (PFC): Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion, and improving water quality. Properly functioning condition also acts to filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse pond and channel characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supports greater biodiversity.

Public Land: Land or interest in land owned by the U.S. and administered by the Secretary of the Interior through the BLM without regard to how the U.S. acquired ownership, except lands located on the Outer Continental Shelf and land held for the benefit of Indians, Aleuts, and Eskimos.

Public motorized access designation – Designation of lands made in a land use plan for public motorized travel activities:

- *Limited*—Public motorized travel activities are restricted at certain times, in certain areas, to certain routes, or to certain types of motorized vehicular use.
- *Closed*—Public motorized travel activities are prohibited anywhere in the area.

Q

Quadratic mean diameter: The diameter of the tree of average basal area in a stand at breast height. See **diameter breast height**.

R

Range Improvement: An authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect, and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The

term includes structures, treatment projects and use of mechanical devices or modifications achieved through mechanical means. (43 CFR § 4100.0-5) (H-4180-1, BLM Rangeland Health Standards Manual).

Rangeland: A kind of land on which the native vegetation, climax or natural potential consists predominantly of grasses, grass like plants, forbs, or shrubs. Rangeland includes lands revegetated naturally or artificially to provide a non-crop plant cover that is managed like native vegetation. Rangeland may consist of natural grasslands, savannahs, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows. (H-4180-1, BLM Rangeland Health Standards Manual)

Raptor: A group of predatory avian species (hawks, eagles, falcons, and owls) also referred to as birds of prey, which share a variety of physical characteristics (e.g., sharp talons, strongly curved bill).

Record of Decision (ROD): A document signed by a responsible official recording a decision that was preceded by the preparing of an environmental impact statement.

Recovery plan: A plan for the conservation and survival of an endangered species or a threatened species listed under the Endangered Species Act, for the purpose of improving the status of the species to the point where listing is no longer required.

Regeneration: Tree seedlings or saplings existing in a stand. (v.) The process of re-establishing trees on a tract of forestland where harvest or some natural event has removed existing trees.

Recreation Management Area (RMA): To help effectively manage recreation and visitor services, the BLM designates recreation management areas (RMAs), and the areas are classified as either a special recreation management area (SRMA) or an extensive recreation management area (ERMA). The RMA designation is based on recreation demands and issues, Recreation Setting Characteristics, resolving use/user conflicts, compatibility with other resource uses, and resource protection needs.

Recreation Setting Characteristics (RSC): Derived from the recreation opportunity spectrum, these characteristics are categorized as physical, social, and operational components and are further subdivided into specific characteristics (attributes). These characteristics are categorized across a spectrum of classes that describe a range of qualities and conditions of a recreation setting, for example primitive to urban.

Reference conditions: In the context of the Bureau of Land Management (BLM) and Areas of Critical Environmental Concern (ACEC), "reference conditions" typically refer to the baseline or original ecological and environmental conditions used as a standard against which changes, or potential impacts are assessed. ACECs are areas that have been identified as having significant natural values, and the concept of reference conditions is important in managing and conserving these areas.

Relative density (RD) – A means of describing the level of competition among trees or site occupancy in a stand, relative to some theoretical maximum based on tree density, size, and species composition. Relative density percent is calculated by expressing *Stand Density Index*

(SDI) (Reineke 1933) as a percentage of the theoretical maximum SDI, which varies by tree species and range. Curtis's relative density (Curtis 1982) is determined mathematically by dividing the stand basal area by the square root of the *quadratic mean diameter*. See also *Stand Density Index*.

Resource Management Plan (RMP): A land use plan as described the Federal Land Policy and Management Act. The RMP generally establishes in a written document: (1) Land uses for limited, restricted or exclusive use; designations, including ACEC designation; and transfer from BLM administration; (2) Allowable resource uses (either singly or in combination) and related levels of production or use to be maintained; (3) Resource condition goals and objectives to be attained; (4) Program constraints and general management practices needed to achieve the above items; (5) Need for an area to be covered by more detailed and specific plans; (6) Support action, including such measures as resource protection, access, development, realty action, cadastral survey, etc., as necessary to meet the above; (7) General implementation sequences where carrying out a planned action is dependent upon prior accomplishment of another planned action; and (8) Intervals and standards for monitoring and evaluating the plan to determine the effectiveness of the plan and the need for amendment or revision. (43 CFR 1601.0-5(k)).

Right-of-way: The public lands that the BLM authorizes a holder to use or occupy under a particular grant or lease. (43 CFR 2801.5(b)).

Right-of-Way Corridor: A parcel of land that has been identified by law, Secretarial order, through a land use plan or by other management decision as being the preferred location for existing and future right-of-way grants and suitable to accommodate one type of right-of-way or one or more rights-of-way which are similar, identical, or compatible.

Riparian: Habitats proximal to water bodies (streams, rivers, lakes, ponds, etc.). Species composition in riparian habitat favors deciduous and coniferous species tolerant of or dependent upon the moisture provided by this location on the landscape.

Road closure: Closing roads to use in any of the following categories:

- Temporary/Seasonal/Limited Access – These are typically resource roads, closed with a gate or barrier. The road will be closed to public vehicular traffic but may be open for BLM/Permittee commercial activities. The road may or may not be closed to BLM administrative uses on a seasonal basis depending upon impacts to the resources. Drainage structures will be left in place.
- Decommission (long-term) –The road segment will be closed to vehicles on a long-term basis but may be used again in the future. Prior to closure the road will be left in an erosion-resistant condition by establishing cross drains, eliminating diversion potential at stream channels, and stabilizing or removing fills on unstable areas. Exposed soils will be treated to reduce sediment delivery to streams. The road will be closed with an earthen barrier or its equivalent. This category can include roads that have been or will be closed due to a natural process (abandonment) and may be opened and maintained for future use.
- Full Decommission (permanent) – Roads determined to have no future need may be subsoiled (or tilled), seeded, mulched, and planted to reestablish vegetation. Cross drains,

fills in stream channels, and unstable areas will be removed, if necessary, to restore natural hydrologic flow. The road will be closed with an earthen barrier or its equivalent. The road will not require future maintenance. This category includes roads that have been closed due to a natural process (abandonment) and where hydrologic flow has been naturally restored.

- Obliteration (full site restoration/permanent) – Roads receiving this level of treatment have no future need. All drainage structures will be removed. Fill material used in the original road construction will be excavated and placed on the subgrade in an attempt to reestablish the original ground line. Exposed soil will be vegetated with native trees or other native vegetation. Road closure by obliteration is rarely used.

Route: A path, way, trail, road, or other established travel corridor

S

Salable minerals: Minerals including but not limited to petrified wood and common varieties of sand, stone, gravel, pumice, pumicite, cinder, clay, and rock.

Season-Of-Use: The timing of livestock grazing on a rangeland area.

Sediment: Fine particles of inorganic or organic matter carried by water.

Sensitive species (Bureau Sensitive): those designated by a State Director, usually in cooperation with the state agency responsible for managing the species and State Natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a state, or within a significant portion of its distribution; (2) are under status review by the FWS and/or NMFS; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listed, proposed, candidate, or State Listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State Listed but which may be better conserved through application of BLM sensitive species status.

Seral stages: The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage.

Shrub steppe: Shrub steppe habitats are dominated by shrub species. These sites are generally not hospitable to most tree species although some oaks and juniper may be present.

Silvicultural practices (or treatments or system): The set of field techniques and general methods used to modify and manage a forest stand over time to meet desires conditions and objectives. Examples include reforestation, pre-commercial thinning, and commercial thinning.

Site class: A classification of an area's relative productive capacity for tree growth commonly expressed in terms of the heights of the largest trees in a stand at a common 'index' age, usually 50 or 100 years old. Site classes are numbered from 1 (most productive) to 5 (least productive).

Site-potential tree height: The average maximum height of the tallest dominant trees (200 years or older) for a given site class. Site-potential tree heights range from 155 feet to 170 feet across the decision area, depending on site productivity.

Skips: Portions of a stand generally left untreated after a commercial thinning or selection harvest. Skips are used to increase variability of forest conditions in the post-harvest stand, and to create desirable habitats and ecological conditions.

Slash – The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging has been completed.

Snag: A standing dead tree.

Soil productivity: Capacity or suitability of a soil, for establishment and growth of a specified crop or plant species.

Soil quality: The capacity of a soil to function for specific land uses or within ecosystem boundaries. This capacity is an inherent characteristic of a soil and varies from soil to soil. Indicators such as organic-matter content, salinity, tilth, compaction, available nutrients, and rooting depth help measure the health or condition of the soil-its quality-in any given place.

Special Forest Products: Monument resources such as rocks and minerals, petrified wood, fossils, archaeological and cultural items, plants and parts of plants, Christmas trees, fish and animals not regulated by ODFW, insects or other invertebrate animals, bones, waste, and other products from animals.

Special Recreation Management Area (SRMA): An administrative unit where existing or proposed recreation opportunities and Recreation Setting Characteristics (RSCs) are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation. Within an SRMA, recreation and visitor services management are recognized as the predominant land use plan focus, where specific recreation opportunities and RSCs are managed and protected on a long-term basis.

Special status species: Special status species are plant and animal species that meet one of the following criteria: 1) Species proposed for listing, officially listed, or candidates for listing as threatened or endangered under the provisions of the Endangered Species Act (ESA); 2)Species listed or proposed for listing by Oregon; and 3)Species designated by the BLM State Director as sensitive (Bureau Sensitive), assessment, or tracking species.

Stabilization: A process to reduce risk of erosion and landslides by constructing drainage structures such as dips and water bars. This also includes seeding, planting other vegetation, or mulching on slopes. Unstable fill embankments that exceed the required road/trail width may be partially or fully removed.

Stand – An aggregation of trees occupying a specific area managed as a discrete operational or management unit. A stand may be composed of trees and groups of trees of a variety of ages, species, and conditions, or it may be relatively uniform.

Stand Density Index (SDI) – Reineke's (1933) stand density index is a function of quadratic mean diameter and number of trees per unit area. SDI can be interpreted as the number of 10-inch trees that would experience approximately the same level of inter-tree competition as the observed number of trees with the observed mean diameter. Refer also to *Relative Density*.

Stock animals: Animals that are ridden or used as pack animals.

Stream reach: An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of 0.5 mile to 1.5 miles in length unless channel character, confluence distribution, or management considerations dictate variance. Refer also to *Turbidity*.

Substantial floral resources: A diverse and abundant group of insecticide-free native flowering plants that provide both pollen and nectar throughout a colony's active flight period (May – September). A varied assortment of plant species with staggered floral senescence must be abundantly present (i.e., no monocultures), as floral forage must be available throughout the active flight season. Exemplified by meadow systems.

Subwatershed: The sixth level in the hydrologic unit hierarchy. A subwatershed is a subdivision within a fifth level watershed.

Succession: A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax.

Successional class (s-class): In describing forest structure, a structural/successional (s-class) layer is used to characterize current vegetation conditions with respect to vegetation species composition, cover, and height ranges of successional states that occur within each biophysical setting (Haugo et al., 2015). The five s-classes based on these factors are the following:

- Early development (early)
- Mid-development closed canopy (mid closed)
- Mid-development open canopy (mid open)
- Late development open canopy (late open)
- Late development closed canopy (late closed)

Suitable River: An eligible river segment found through administrative study to meet the criteria for designation as a component of the National System, as specified in Section 4(a) of the Wild and Scenic Rivers Act.

Surface fire: A fire that burns on the surface of the ground and consumes surface fuels.

Surface fuel: Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.

T

Technically and economically feasible: Under NEPA, alternatives that are technically and economically feasible would satisfy the primary objectives of the project defined in the Purpose and Need statement and include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable.

Temporary Road: A short-term use road authorized for the development of a project that has a finite lifespan (e.g., a timber sale spur road). Temporary roads are not part of the permanent designated transportation network and must be reclaimed when their intended purpose has been fulfilled.

Thinning: A silvicultural treatment made to reduce the density of trees primarily to improve tree/stand growth and vigor, or recover potential mortality of trees, generally for commodity use.

Total Maximum Daily Loads (TMDLs): Pollution load limits calculated by DEQ for each pollutant entering a water body. TMDLs describe the amount of each pollutant a waterway can receive and still not violate water quality standards. Both point and non-point source pollution are accounted for in TMDLs as well as a safety margin for uncertainty and growth that allows for future discharges to a water body without exceeding water quality standards.

Trail: A created or evolved transportation facility administratively designated for certain nonmechanized types of use. Examples of use on the trails in the monument include hiking, running, equestrian riding, and snowmobiling and cross-country skiing.

Trail corridor: A designated corridor established of sufficient width to encompass the resources, qualities, values and associated settings and the primary use or uses that are present or to be restored.

Trailhead: A designated point of access to a recreation route or trail. It may include a parking area, kiosk, or toilet and can be reached by vehicular or pedestrian access.

Travel and Transportation Management Program planning: The formal decision-making process the BLM uses to identify and classify all roads and trails, including well-maintained Federal Lands Transportation Program eligible roads, temporary access routes for commercial uses, high clearance primitive roads, and various types of recreational trails.

Travel Management Area: Delineated areas where travel management requires particular focus. These areas may be designated as open, closed, or limited to motorized use. See *public motorized access designation*.

Tribal Interests: Native American or Native Alaskan economic rights such as Indian trust assets, resource uses and access guaranteed by treaty rights, and subsistence uses.

Tribal Nations: Federally recognized Native American entities that are legally entitled to specific treaty rights and other legally enshrined rights as sovereign nations.

Turbidity: The cloudiness exhibited by water carrying sediment; the degree to which suspended sediment interferes with light passage through water.

U

Uncharacteristic wildfire – fire processes occurring outside of their biophysical baseline conditions (i.e., outside of historical natural fire regimes) and often at such high intensity and severity that important ecosystem components or processes are altered or destroyed over substantial portions of the burned area.

Underburn: A fire that consumes surface fuels but not the overstory canopy.

Underburning: Prescribed burning under a forest canopy.

Understory: That portion of trees or other woody vegetation, which form the lower layer in a forest stand, which consists of more than one distinct layer.

Uneven-aged stand: A stand composed of at least three (3) distinct age classes intimately mixed or in aggregated groups producing a multi-layered canopy structure managed as a discrete operational unit.

Upland: Lands that exist above the riparian/ wetland area, or active flood plains of rivers and streams; those lands not influenced by the water table or by free or unbound water; commonly represented by the toe slopes, alluvial fans, side slopes, shoulders and ridges of mountain and hills.

Utility: A service provided by a public utility, such as electricity, telephone, or water

V

Valid Existing Rights (VER): Existing rights are defined in Section 701 of FLPMA as any "valid lease, permit, patent, right-of-way, or other land use right or authorization" and must be in existence at the time of designation.

Visual Resource Management (VRM): The inventory and planning actions to identify values and establish objectives for managing those values and the management actions to achieve those objectives.

Visual Resource Management classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape.

W

Water quality: The chemical, physical, and biological characteristics of water with respect to its suitability for a particular use.

Waters of the State: Includes lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial,

inland, or coastal, fresh or salt, public or private which are wholly or partially within or bordering the State or within its jurisdiction. ORS 468B.005(10).

Watershed: An area in which all surface waters flow to a common point.

Watershed Analysis: A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis provides a basis for ecosystem management planning.

Watershed Function: The principle functions of a watershed include the capture of moisture contributed by precipitation; the storage of moisture within the soil profile, and the release of moisture through subsurface flow, deep percolation to groundwater, evaporation from the soil, and transpiration by live vegetation.

Weeds: Refer to "Invasive plants" definition.

Wet season (for roads): An annually variable period of time, starting after precipitation amounts of enough to saturate soils. This occurs after the onset of fairly continuous fall rains, generally November through May, which result in seasonal runoff in ephemeral and intermittent stream channels and from the road surface and ditches. It could start or end earlier depending on seasonal precipitation influences.

Wetland: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined by the 1972 Federal Clean Water Act. These wetlands generally meet the jurisdictional wetland criteria.

Wild and Scenic Rivers System: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values and are preserved in a free-flowing condition.

Wilderness: An area defined in Section 2(c) of the Wilderness Act, and formally designated by Congress as part of the National Wilderness Preservation System.

Wilderness Characteristics: These attributes include the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values. Lands with wilderness characteristics are those lands that have been inventoried and determined by the BLM to contain wilderness characteristics as defined in section 2(c) of the Wilderness Act.

Wilderness Study Area: Areas with wilderness characteristics identified and designated through the inventory and study processes authorized by Section 603 of the FLPMA, and, prior to 2003, through the planning process authorized by Section 202 of the FLPMA.

Wildfire: Unplanned ignition of a wildland fire (such as a fire caused by lightning or unauthorized and accidental human-caused fires) and escaped prescribed fires.

Wildfire response, multiple objectives: Fire, as a critical natural process, would be integrated into Land and Resource Management Plans and activities on a landscape scale, and across agency boundaries. Response to wildland fires is based on ecological, social, and legal consequences of the fire. The circumstances under which a fire occurs, and the likely consequences on firefighter and public safety and welfare, natural and cultural resources, and values to be protected dictate the appropriate management response to the fire. Wildland fire would be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role. Use of fire would be based on approved Fire Management Plans and would follow specific prescriptions contained in operational plans.

Wildfire response, suppression: All the work to extinguish or limit wildland fire spread.

Wild horses: Refer to **Horses, wild.**

Wildland Developed Areas: A delineation of where people live in the wildland, classifying a minimum of one structure per 40 acres as a developed area.

Wildland fire: A general term describing a non-structure fire that occurs in the wildland.

Wildland Urban Interface (WUI): The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.

Windthrow: A tree or trees uprooted or felled by the wind.

Withdrawal: Removal or "withholding" of public lands from operation of some or all of the public land laws (settlement, sale, mining, and/or mineral leasing). An action which restricts the use or disposal of public lands, segregating the land from the operation of some or all of the public land and/or mineral laws and holding it for a specific public purpose. Withdrawals may also be used to transfer jurisdiction of management to other federal agencies.

X

Y

Yarding: The process of moving cut logs to a landing, particularly by cable, ground-based or helicopter yarding systems.

Z