OREGON GULCH FIRE SALVAGE RECOVERY PROJECT

BLM

Medford District Office

June 2015

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FINAL ENVIRONMENTAL ASSESSMENT

DOI-BLM-OR-M060-2015-0004-EA

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
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IN REPLY REFER TO:

JUN 16 2015

1792(ORM060)
# DOI-BLM-OR-M070-2015-0004-EA

Dear Interested Party:

The Final Environmental Assessment (EA), Decision Record (DR), and Finding of No Significant Impact (FONSI) for the Oregon Gulch Fire Salvage Recovery Project are available on the Medford District Bureau of Land Management (BLM) website at:

http://www.blm.gov/or/districts/medford/plans/index.php

Based on internal and external review of the environmental assessment (including public comments), I have decided to release a Final EA for this project as a part of the Decision Record to respond to comments received in response to the January 23, 2015 EA, to clarify portions of the analysis and to make corrections to the EA.

The Oregon Gulch Fire consumed about 35,302 acres with approximately 2,425 acres on public land managed by the Medford District BLM. The fire burned with high intensity consuming most of the vegetation in its path and leaving a charred landscape with few live trees remaining. The DR authorizes salvaging 683 acres of standing dead trees, fire-injured trees, and hazard trees that burned in the summer 2014 Oregon Gulch Fire. The project will also rehabilitate sites through planting trees, retaining coarse woody debris and snags, decommissioning 2.3 miles of roads, and closing 0.7 miles of roads in long-term closures on BLM-administered land.

The activities of the project are analyzed under the Oregon Gulch Fire Salvage Recovery Project Environmental Assessment (DOI-BLM-OR-M070-2015-0004-EA). The EA was made available for public comment from January 23, 2015 for a 30-day comment period. The BLM's responses to substantive public comments are included with the DR and FONSI, and are titled *Appendix A, Response to Comments*. These comments were considered in reaching a final decision for the project.

This decision is a forest management decision. Administrative remedies are available to persons who believe they will be adversely affected by this decision. In accordance with the BLM Forest Management Regulations (43 CFR § 5003.2(1)), the decision for this project will not become effective, or be open to formal protest, until the first Notice of Sale appears in the *Medford Mail Tribune* and *Grants Pass Daily Courier*.

43 CFR § 5003.3 subsection (b) states, "Protests shall be filed with the authorized officer and shall contain a written statement of reasons for protesting the decision." This precludes the

acceptance of electronic mail (email) or facsimile (fax) protests. Only written and signed hard copies of protests that are delivered to the Medford Interagency Office will be accepted. The protest must clearly and concisely state which portion or element of the decision is being protested and the reasons why the decision is believed to be in error.

For additional information contact me at 541-618-2438. Hardcopies of the DR and FONSI are also available at the Medford Interagency Office at 3040 Biddle Road, Medford, OR 97504. Office hours are Monday through Friday, 7:45am. to 4:30pm, closed on holidays.

Sincerely,

Kristi Mastrofini
Acting Field Manager
Ashland Resource Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE

FINAL EA COVER SHEET

RESOURCE AREA: Ashland

ACTION/TITLE: Oregon Gulch Fire Salvage Recovery Project

EA NUMBER: DOI-BLM-OR-M060-2015-0004-EA

LOCATION: T. 40 S., R. 04 E., Sec. 25 and 35; and T. 41 S., R. 04 E. in Sec. 1 Willamette Meridian, Jackson County, Oregon.

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CHAPTER 1 - PURPOSE AND NEED

A. INTRODUCTION

The Oregon Gulch Fire started on July 30, 2014 as a result of a lightning storm. The fire progressed to the south and east consuming about 35,302 acres. Approximately 8,767 acres were burned in Jackson County, Oregon with approximately 2,425 acres on public land managed by the Medford District BLM. Approximately 17,105 acres were burned in Klamath County, Oregon and 9,430 acres were burned in California. The fire burned across three BLM districts: the Medford and Lakeview Districts in Oregon and the Redding District in California. The Medford and Lakeview Districts are proposing fire salvage recovery projects. In California, approximately 496 acres of BLM-managed lands on the Redding District and 456 acres of public land managed by the Klamath National Forest burned. Neither the Redding BLM nor the Klamath National Forest is proposing post-fire salvage.

The Bureau of Land Management (BLM), Ashland Resource Area, proposes to implement the Oregon Gulch Fire Salvage Recovery Project, a post-fire forest management recovery project. Of the 2,425 acres consumed by the fire on the Medford District, 465 acres were in the Cascade-Siskiyou National Monument and the remaining 1,960 acres were on land allocated as Matrix. The Matrix land use allocation (LUA) is identified in the Medford District Resource Management Plan (RMP) as the area in which most timber harvest and other silvicultural activities will be conducted with the objective to produce a sustainable supply of timber and other forest commodities (USDI 1995, p. 73). The fire burned with high intensity, consuming most of the vegetation in its path and leaving a charred landscape with few trees with any green needles.

The existing condition of the burned landscape has resulted in trees that are dead and dying and are no longer on a trajectory for sustained yield. There is a need to remove the dead and dying trees and provide for a site that can support sustainable forest management in addition to conserving habitat elements as defined by the RMP. Timely salvage is critical to capture remaining merchantable timber values before further deterioration occurs. Salvaging dead or dying trees would allow the BLM to retrieve some economic value from these trees while retaining levels of coarse wood and standing snags needed to meet RMP standards and guidelines. Additionally, the effects of the fire to BLM-managed land have resulted in varying types of hazards such as danger (hazard) trees and increased future fuel loading, as well as potential for re-burn in some areas.

The Lakeview District is also proposing a fire salvage recovery project. The Medford and Lakeview Districts coordinated throughout the planning process, but developed separate proposals because the two districts are distinct administrative units with separate resource management plans. The effects from both fire salvage recovery projects are accounted for in the cumulative effects analysis in each environmental assessment document.

Summary of changes made to finalize the Oregon Gulch Fire Salvage Recovery Project Environmental Assessment

In response to internal and external review of the environmental assessment (including public comments), the Ashland Resource Area Field Manager decided to release a final environmental assessment (EA) for the Oregon Gulch Fire Salvage Recovery Project. The Final EA includes minor modifications and clarifications based on public comment.

Black-Backed Woodpecker
The EA was updated to disclose the potential number of nesting black-backed woodpecker pairs that could be affected by salvage based on the available habitat as well as the results of surveys conducted to detect black-backed woodpecker nest sites.

Northern Spotted Owl
A further explanation of how the BLM determined that post-fire conditions do not currently provide dispersal, nesting, roosting, or foraging habitat opportunities to support northern spotted owls in the Oregon Gulch Fire area on the Medford District has been added to p. 3-58 and 3-60 of the Final EA. This explanation does not change the assumptions of the affected environment from the EA released in January 2015 (p. 3-57 and 3-61).

The Final EA (p. 3-58) notes the northern spotted owl has been petitioned for listing as Endangered under the Endangered Species Act (ESA). The USFWS recently initiated a 12 month-finding to determine if a change in listing status is warranted. Until the 12-month finding is released, the species will remain listed as Threatened and will receive protection as required under the ESA.

Gray Wolf
The details of the known gray wolf activity area that overlaps the Project Area provided by the Oregon Department of Fish and Wildlife on January 27, 2015 is described in the Chapter 3 (p. 3-63).

Redband Trout
The Final EA notes (p. 3-48) that the Klamath redband trout is no longer listed as a Bureau Special Status species since the species description was redefined and delineated and broken into separate geographic areas. Redband trout are not listed or proposed to be listed for protection under the ESA. The updated information does not change the anticipated effects to fish species, as there is no anticipated offsite erosion or causal mechanism for sediment to transfer into streams (January 2015 EA, p. 3-48).

Water Resources, Aquatic Habitat, and Fish
Clarification for the primary Analysis Areas for the water resources, aquatic habitat, and fish sections has been made in Chapter 3 of the Final EA (p. 3-35 and 3-48). The Oregon Gulch Fire Salvage Recovery Project is proposed primarily in the Upper Fall Creek seven-field drainage of the Iron Gate-Klamath fifth-field watershed. One 50-acre unit and 0.6 miles of temporary road construction are proposed near the ridge of the adjoining Beaver Creek seventh-field drainage of the Copco Reservoir-Klamath River fifth-field watershed. There is no causal mechanism to transfer sediment and affect aquatic resources due to their location near the ridge of the watershed boundary and these project activities are not hydrologically connected to the rest of the Copco watershed. Therefore, there is no effect to water resources from the BLM project activities in the Beaver Creek seventh-field drainage. This clarification does not change the anticipated effects to these resources as described in the EA released in January 2015 (p. 3-35 and 3-48).

Grazing
On March 16, 2015, the KFRA Field Manager and the Dixie Allotment lessee signed a Grazing Management Agreement (per 43 CFR 4110.3-2 and 4110.3-3) to temporarily suspend livestock grazing on BLM lands within the Oregon Gulch fire perimeter for a minimum of two growing seasons. On June 10, 2015, as part of a protest resolution, the agreement was modified to include one full year's rest (2015) for the entire Dixie Allotment. In 2016, if monitoring indicates that the vegetation has recovered, the lessee would be allowed to graze outside the fire area. The amount of grazing would be reduced proportionally based on acres within the allotment that were not burned in the Oregon Gulch fire (24 percent of the allotment).

The suspension of livestock grazing on the entire Dixie Creek Allotment in 2015 and 2016 on the burned portion of the Dixie Allotment will allow vegetation to recover and for resource management objectives to be met as described in the EA (p. 3-3, 3-10, 3-14, 3-24, 3-27, 3-30, 3-34, 3-41, 3-43, 3-47, 3-50, 3-83). Administrative actions to remove cattle in accordance with 43 CFR 4150 will take place if cattle graze on the Dixie Allotment in 2015 or on BLM burned lands within the allotment in 2016. Therefore, this modification does not change the anticipated effects to resources as described in the EA released in January 2015.

Project Design Features
In Chapter 2 of the Final EA the following Project Design Features (PDF) have been corrected:

- The road numbers have been corrected to state "Dust abatement may be accomplished by applying water or lignin to the road surface, except for BLM Roads 40-4E-26.1, 40-4E-35.3, 40-5E-19.0 near Fall Creek which would be limited to water application only (Final EA, p. 2-21)."
- The percent soil moisture has been corrected from 30% to 25%, to state "Tractor yarding on designated skid trails would be allowed when soil moisture content is 25% or less to ensure that soil rutting or displacement beyond the trail does not occur (Final EA, p. 2-18)."
- Since there are no slide areas or high landslide hazard locations in the Project Area, the notation of these features in the PDF has been removed and now states "During rehabilitation of landings, runoff water would be diverted away from headwalls or steep erodible fill slopes (Final EA, p. 2-19)."

Silviculture: Insects
The EA (p. 3-5 and 3-8) incorrectly stated "Douglas-fir engravers were found in pole-sized ponderosa pine approximately a mile to the east of the Project Area but within the Oregon Gulch Fire boundary in 2012 and at several locations within the Project Area in 2014." Since the Douglas-fir engraver, also known as bark beetles, only infest Douglas-fir, not pole sized ponderosa pine, they were only detected in Douglas-fir in the described area. Additionally, the USDA Forest Service entomologist that assisted the BLM silviculturalist on the EA would like to note, "The fir engraver can cause patch, branch or top kill of Douglas-firs, as well as mortality, especially in root disease pockets or during periods of drought. It is possible that the very dry spring through fall last year may have stressed those Doulas-firs sufficiently to induce fir engraver attack (SWOFIDSC 2014)." These corrections have been made to p. 3-5 and 3-8 of the Final EA for this project.

Fire Hazard
The fire hazard section in the Final EA (pp. 3-17 to 3-20) has been clarified to include discussion related to the modeling that was used to evaluate the difficulty of controlling a potential wildfire (fire hazard). This minor modification does not change the anticipated effects of implementing each alternative as described in the EA released in January 2015 (pp. 3-17 and 3-20).

Temporary Roads and Streams
The Final EA (p. 3-31, 3-45, and 3-55) corrected the following statement….. "the temporary spur roads would not cross streams and are located in Riparian Reserves with short-duration intermittent streams that flow less than 30 days of the year." The words "Riparian Reserves with" were missing in the EA released in January 2015. No additional analysis was required for this correction.

References
There are references used for the EA analysis that were inadvertently omitted from Appendix B of the EA (References). Those references have been added in the Final EA Appendix B.

This Final Environmental Assessment (EA) documents the environmental analysis conducted to estimate the site-specific effects on the human environment that may result from the implementation of the Oregon Gulch Fire Salvage Recovery Project on BLM-administered lands. The analysis documented in this Final EA will provide the BLM responsible official, the Ashland Resource Area Field Manager, with current information to aid in the decision-making process. This Final EA complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's regulations on Implementation of the National Environmental Policy Act of 1969 (43 CFR part 46).

B. WHAT IS BLM PROPOSING AND WHERE IS THE PROJECT LOCATED?

This section provides a brief summary of BLM's proposal for post-fire recovery. A more detailed description of BLM's Proposed Action is included in Chapter 2, Alternatives. The proposed 683-acre Oregon Gulch Fire Salvage Recovery Project would salvage standing dead trees, fire-injured trees, and hazard trees and rehabilitate sites through planting trees, retaining structure (coarse woody material and snags), and repairing/maintaining/decommissioning road facilities on BLM-administered land. A limited amount of temporary road construction would occur to access salvage areas and would be decommissioned after harvest. All proposed activities for this project would occur within the Upper Fall Creek and Beaver Creek drainages of the Iron Gate Reservoir-Klamath River and Copco Reservoir-Klamath River fifth-field watersheds.

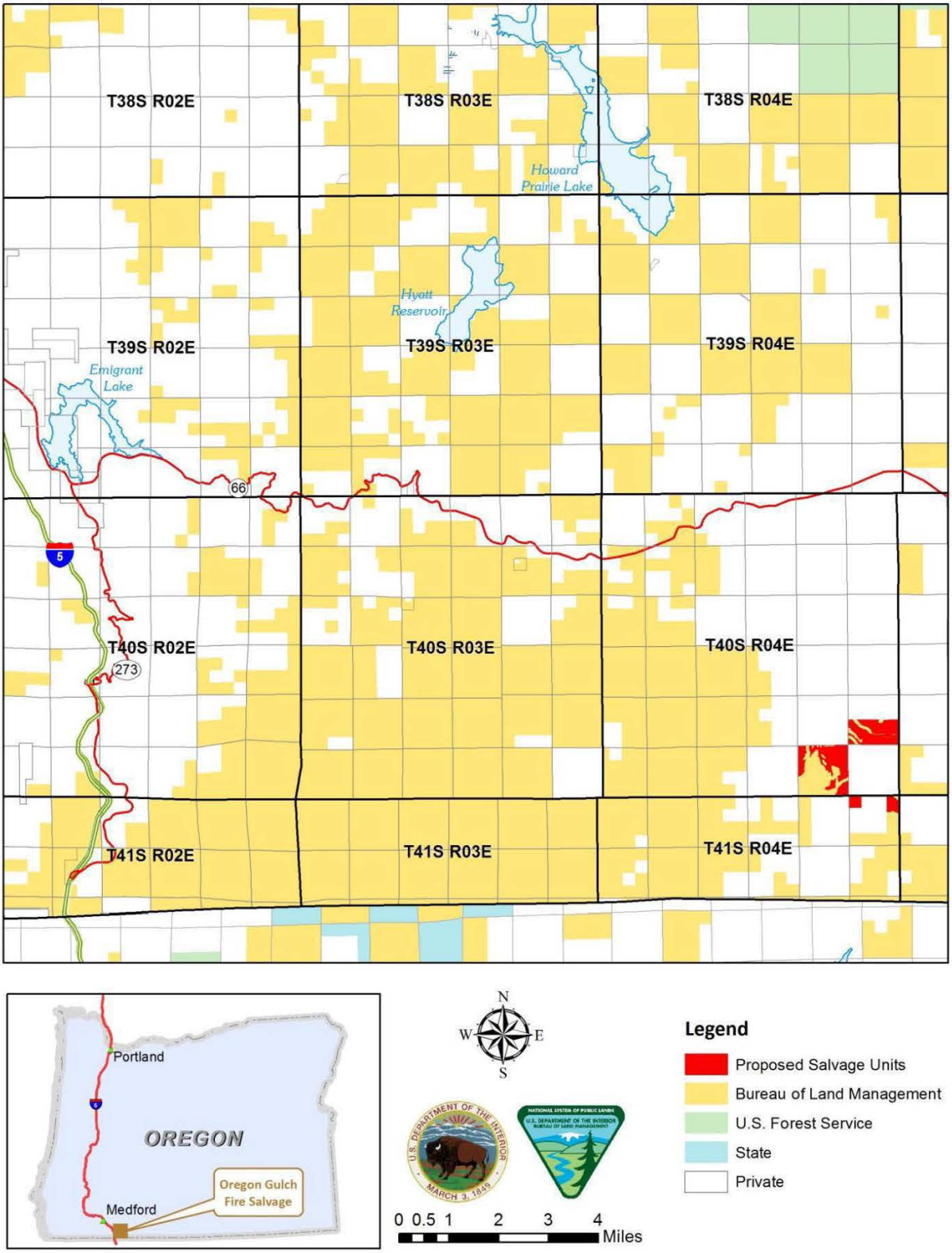
Recovery projects include the implementation of stabilization efforts identified in the Emergency Stabilization Rehabilitation Plan to minimize the effects of the wildfire on the landscape. These efforts include seeding and mulching of bare soil areas, repair of existing fences, and construction of temporary fences (Medford District Emergency Stabilization and Rehabilitation FY 2013-2016 Categorical Exclusion and Decision Record, and Medford District Road Maintenance Categorical Exclusion and Decision Record 2012-2016).

Forest management would be accomplished using a combination of timber sale and service contracts. Silvicultural treatments are tailored to forest and site conditions to meet the desired long-term objectives for each forest stand type.

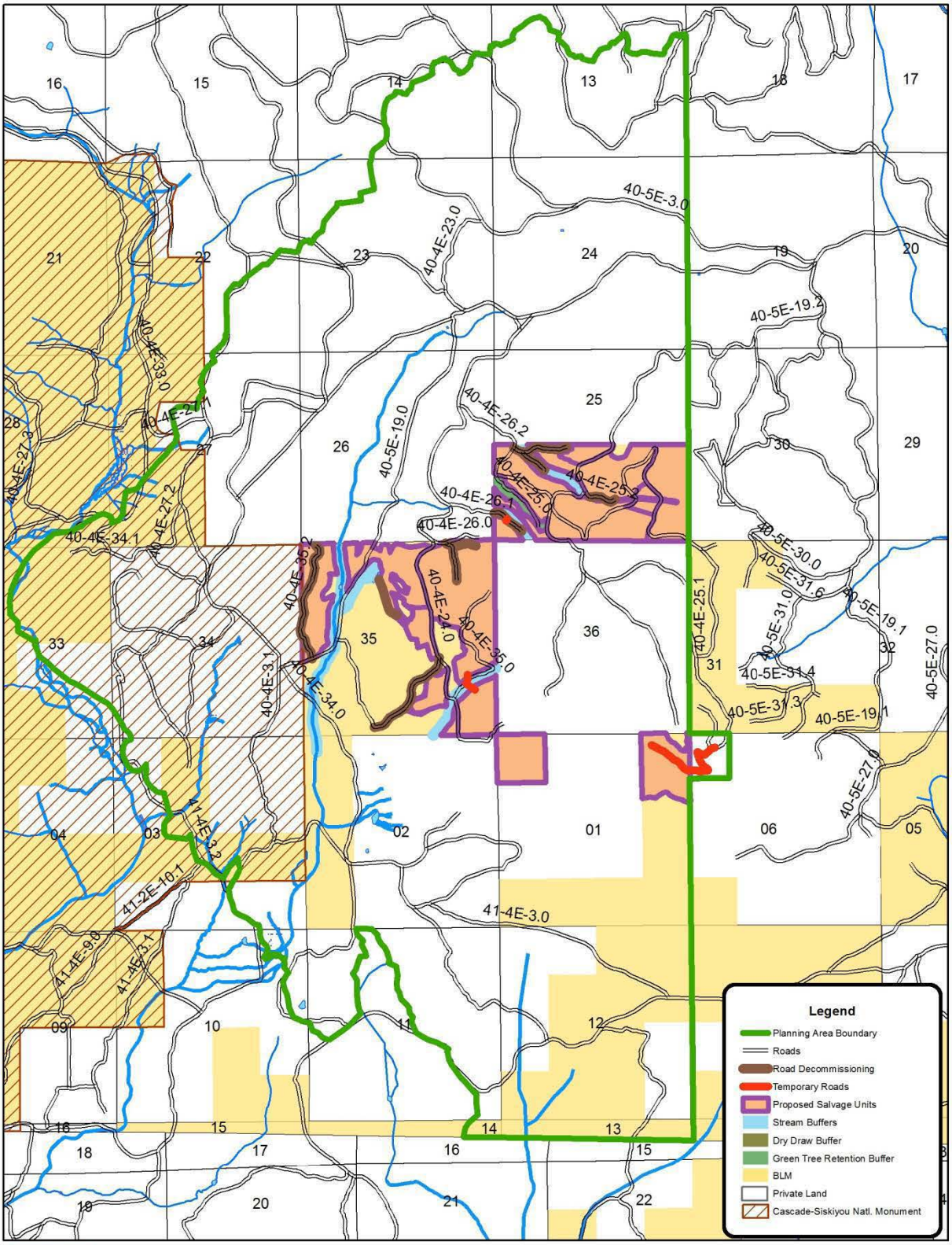
The Proposed Action would include commercial timber harvest utilizing ground- and cable-based systems. Under Alternative 2 (the Proposed Action), an estimated 20 miles of existing roads would be used as haul routes and improved as needed to meet BLM standards, and construction of an estimated 0.6 miles of temporary roads would be decommissioned after harvesting is completed. The analysis also includes the proposal to decommission an estimated total length of 2.3 miles of existing roads.

The Oregon Gulch Fire Salvage Recovery Project Area is defined as the area proposed for salvage along with its associated road work. The Public Land Survey System description for the Oregon Gulch Fire Salvage Recovery Project units is: T. 40 S., R. 04 E., Sec. 25 and 35; and T. 41 S., R. 04 E. in Sec. 1; Willamette Meridian, Jackson County, Oregon (Map 1-1). The Planning Area for the Oregon Gulch Fire Salvage Recovery Project is the area that was under consideration during project development. For this project, the Planning Area is primarily the perimeter of the Oregon Gulch Fire on the Medford District plus approximately 32 acres on the Lakeview District (8,767 acres) (Map 1-2).

Map 1-1. Oregon Gulch General Location



Map 1-2. Oregon Gulch Recovery Project Planning Area



No warranty is made by the BLM for the accuracy, reliability, and completeness of the data. This information may not meet National Map Accuracy Standards.

C. WHY IS THE BLM PROPOSING THIS POST-FIRE RECOVERY PROJECT?

The post-fire recovery project is designed to support sustainable forest management and conserve habitat elements as defined by the Bureau of Land Management's Medford District Resource Management Plan (RMP) (USDI 1995). Timely salvage is critical to capture remaining merchantable timber values before further deterioration occurs. Salvaging dead or dying trees would allow the BLM to retrieve some economic value from these trees while retaining levels of coarse wood and standing snags needed to meet RMP standards and guidelines. Additionally, the effects of the fire to BLM-managed land have resulted in safety concerns such as danger (hazard) trees to BLM employees, other agencies, private land owners, forest workers, and the general public. There is a need to meet federal and the state of Oregon Occupational Safety and Health Administration (Oregon OSHA) regulations, provide safe employment conditions, as well as safe travel conditions for the public, contractors, and adjacent landowners with reciprocal rights on BLM roads.

The design and development of the Oregon Gulch Fire Salvage Recovery Project is consistent with the goals and resource management objectives in the 1995 Medford District ROD/RMP to maintain or restore healthy, functioning ecosystems from which a sustainable production of natural resources can be provided.

The 1995 Record of Decision (ROD) and Resource Management Plan (RMP) incorporated *the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (Northwest Forest Plan) (USDA and USDI 1994).

Specifically, this forest management proposal is designed to:

<u>Project Objectives and Management Direction for Salvage within the Matrix LUA</u>

- Provide for salvage harvest of timber killed or damaged by events such as wildfire, windstorms, insects or disease, consistent with management objectives for other resources (RMP, p. 72).
- Manage timber stands to reduce the risk of stand loss from fires, animals, insects and diseases (RMP, p. 72).
- Produce a sustainable supply of timber to provide jobs and contribute to community stability (RMP, p. 38).
- Harvest mortality of entire stands or of scattered trees that result from disturbance (RMP, p. 186).
- Harvest only mortality above the level needed to meet snag retention and other habitat goals and provide desired levels of coarse woody debris (RMP, p.186).
- Permit the salvage volume from these stands following partial or complete stand mortality provided residual structural objectives are met (RMP, p. 193).

<u>Project Objectives and Management Direction for Road Safety and Fire Planning within the Matrix LUA</u>

- Provide for the safety of forest users (including removing hazard trees along roads and trails in campgrounds, administrative sites, etc.) (RMP, p. 72).
- Remove trees along rights-of-way if they are hazard to public safety (RMP, p. 87).
- Manage and design road systems to reduce public health and safety hazards… (RMP, p. 88). Strive to provide safe travel conditions for employees, the public, contractors, and for users with reciprocal rights who may transport timber or mineral materials on roads managed by the BLM.

- Adhere to Federal OSHA standard: "Furnish to each employee a place of employment which are free from recognized hazards that are causing and are likely to cause death or serious physical harm (29 CFR 1960.8)."
- Utilize and incorporate guidelines identified in the 2008 Field Guide for Danger Tree Identification and Response as developed by Oregon OSHA, US Forest Service and Associated Oregon Loggers, Inc.

Purpose and Need for the Proposed Oregon Gulch Fire Salvage Recovery Project

The following discussion provides more detail concerning the purpose and need for post-fire forest management recovery and road management based on the 1995 RMP direction that applies to the General Forest Management Areas (Matrix) land allocation, current forest and road conditions, and their desired future conditions:

The BLM's purpose for the Oregon Gulch Fire Salvage Recovery Project is timely post-fire salvage recovery and replanting to reestablish healthy, growing forests for a sustainable supply of timber in compliance with the objectives and management actions/direction for Matrix lands (USDI 1995, pp. 38-39, 72-73, 186).

One of the applicable laws governing the major portion of BLM-administered lands in the Oregon Gulch Fire Salvage Recovery Project Area is the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act of 1937 (O&C Act), for which sustainable timber production is the primary purpose.

Matrix lands within the Oregon Gulch Fire Salvage Recovery Project Area are intended to achieve sustainable timber production and other forest commodities, providing jobs and contributing to community stability through both growth and harvest, while also promoting the development of fire-resilient forests (USDI 1995, p. 38). Timber products produced from this area would be sold in support of the District's Allowable Sale Quantity (ASQ) declared in the 1995 RMP (USDI 1995, pp. 17, 72-73).

The 1995 Medford District RMP adopted a set of silvicultural treatments for managing conifer forests on Matrix lands (USDI 1995, Appendix E, pp. 179-196); the Oregon Gulch Fire Salvage Recovery Project proposes mortality salvage, replanting, and retention of structural components (coarse woody material and snags) to initiate new forest development, reduce the impacts of insect and diseases, and increase fire resiliency on forest stands to the extent possible.

Another purpose within the Oregon Gulch Fire Salvage Recovery Project Area is to repair and maintain a transportation system that serves the needs of users in an environmentally sound manner, and reduce minor collector and local road densities where high road densities and problems exist (USDI 1995, p. 84).

The Medford District RMP provides direction for road management: to "[d]evelop and maintain a transportation system that serves the needs of users in an environmentally sound manner" (USDI 1995, p. 84). Roads throughout the Project Area were reviewed for the need for maintenance to restore and/or improve road surfaces, cross drains, and roadside drainage ditches in order to reduce road-related erosion and sedimentation to stream courses. Some roads in the Project Area were identified for decommissioning where it was determined that they are not needed for administrative purposes in the immediate future, and are not encumbered with reciprocal agreements or where agreement holders consented to the roads proposed for decommissioning.

The Project Area was also reviewed to determine existing and needed access to facilitate salvage in proposed units. Temporary road construction is proposed to facilitate access to areas proposed for treatment in order to meet Matrix land objectives and the Oregon Gulch Fire Salvage Recovery Project purpose and need. Road improvements are designed for this project to facilitate access to harvest units, as well as to reduce road-related erosion and sedimentation to stream courses; per the RMP, "[s]tandards

will be the minimum necessary to meet resource and allocation objectives while having minimal impacts on the environment" (USDI 1995, p. 88).

D. DECISION FRAMEWORK

This Final Environmental Assessment (EA) will provide the information needed for the responsible official, the Ashland Resource Area Field Manager, to select a course of action to be implemented for the Oregon Gulch Fire Salvage Recovery Project. The Ashland Resource Area Field Manager must decide whether to implement the Proposed Action Alternative as designed or whether to select the No-Action Alternative.

The decision will also include a determination whether or not the impacts of the Proposed Action are significant to the human environment. If the impacts are determined to be within the range analyzed in the 1995 RMP Environmental Impact Statement (EIS) (USDI 1995), or otherwise determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and the decision implemented. If this EA determines that the significance of impacts are unknown or greater than those previously analyzed and disclosed in the RMP/EIS, then a project-specific EIS must be prepared.

The forthcoming decision record will document the authorized officer's rationale for selecting a course of action based on the needs/objectives described above, the effects documented in the EA, and the extent to which the decision:

Meets the Guidelines for Salvage in Matrix Lands

- Produces and re-establishes a sustainable supply of timber to provide jobs and contribute to community stability.
- Harvests only dead and dying trees above the level needed to meet snag retention and other habitat goals and provide desired levels of coarse woody debris.
- Reduces the risk of stand loss from fires, animals, insects and diseases.

Contributes to Road Safety and Fire Planning within the Matrix LUA

- Provides for the safety of forest users (including removing hazard trees along roads and trails in campgrounds, administrative sites, etc.).
- Manage and design road systems to reduce public health and safety hazards… (RMP, p. 88). Strive to provide safe travel conditions for employees, the public, contractors, fire suppression activities, and for users with reciprocal rights who may transport timber or mineral materials on roads managed by the BLM.

Contributes toward the District's Allowable Sale Quantity

The Oregon Gulch Fire Salvage Recovery Project is located on BLM-administered lands allocated to produce a sustainable supply of timber (the Matrix land use allocation). The post-fire recovery activities are to primarily support sustainable forest management in addition to conserving habitat elements as defined by the RMP. Timber products removed to meet Timber Resource Objectives (USDI 1995, pp.17 and 72-73) would contribute toward the District's Allowable Sale Quantity (ASQ)

Meets the BLM's obligation to protect resources consistent with existing laws, policy, and the direction of the 1995 Record of Decision and Resource Management Plan

Section E: *Land Use Conformance and Legal Requirements* provides the context for determining the Project's consistency and conformance with land use plans, agency policy and regulations, and existing laws.

E. LAND USE CONFORMANCE AND LEGAL REQUIREMENTS

Conformance with Land Use Plans

The Medford District designed this project to be in conformance with the 1995 RMP. The 1995 Medford District RMP incorporated the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (USDA and USDI 1994).

The Oregon Gulch Fire Salvage Recovery Project is consistent with the Medford District Resource Management Plan as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD); the *BLM Vegetation Treatments Using Herbicides Final Programmatic EIS Record of Decision* (USDI 2007); Record of Decision (BLM): Vegetation Treatments Using Herbicides on BLM Lands in Oregon (USDI 2010); *Medford District Integrated Weed Management Plan Environmental Assessment* (USDI 1998) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS, USDI 1985). This project utilizes the December 2003 Survey and Manage species list. This list incorporates species changes and removals made as a result of the 2001, 2002, and 2003 Annual Species Reviews (ASRs) with the exception of the red tree vole.

Native American Tribal Consultation

Letters describing the Proposed Action initiating consultation with the local federally recognized Native American Tribes were sent in November 2014. Further consultation in the form of meetings, phone calls, and emails did not identify any concerns with the proposed activities.

No Consultation Needed with the U.S. Fish and Wildlife Service

Habitat assessments for Special Status botanical and wildlife species were completed in September 2014. These assessments determined that there is no habitat remaining for the northern spotted owl, the Pacific fisher, or other Special Status species due to the fire severity of the Oregon Gulch Wildfire in the Project Area; therefore, field surveys are not required for this project.

The determination not to consult with the USFWS is consistent with the BLM 6840 Special Status Species Management Policy: "If the BLM determines, after a review of the project and any interrelated or interdependent actions, that there is no reasonable likelihood that listed species are in the action area, or that there will be no direct or indirect effects to the species in the action area, the action is determined to have 'no effect' on listed species or critical habitat. No consultation is required under these circumstances."

Special Status Species

The Oregon Gulch Fire Salvage Recovery Project is consistent with BLM Manual 6840 (USDI 2008), the purpose of which is to provide policy and guidance for the conservation of BLM Special Status Species and the ecosystems upon which they depend on BLM-administered lands. BLM Special Status Species include those species listed or proposed for listing under the Endangered Species Act (ESA), as well as those designated as Bureau Sensitive by the State Director. The objectives of the BLM Special Status policy are:

- To conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species; and
- To initiate proactive conservation[1] measures that reduce, or eliminate, threats to Bureau Sensitive species to minimize the likelihood of and need for listing of these species under the ESA (USDI 2008, Section .02).

1 Conservation: as applied to Bureau Sensitive species, is the use of programs, plans, and management practices to

Statutes and Regulations

The Proposed Action Alternative is designed to be in conformance with the direction given for the management of public lands in the Medford District and the following:

- **Oregon and California Lands Act of 1937 (O&C Act)**. Requires the BLM to manage O&C lands for permanent forest production. Timber shall be sold, cut, and removed in accordance with sustained-yield principles for the purpose of providing for a permanent source of timber supply, protecting watersheds, regulating stream flow, contributing to the economic stability of local communities and industries, and providing recreational facilities.

- **Federal Land Policy and Management Act of 1976 (FLPMA)**. Defines BLM's organization and provides the basic policy guidance for BLM's management of public lands.

- **National Environmental Policy Act of 1969 (NEPA)**. Requires the preparation of environmental impact statements for major federal actions which may have a significant effect on the environment.

- **Endangered Species Act of 1973 (ESA)**. Directs Federal agencies to ensure their actions do not jeopardize species listed as "threatened and endangered" or adversely modify designated critical habitat for these listed species.

- **Clean Air Act of 1990 (CAA)**. Provides the principal framework for national, state, and local efforts to protect air quality.

- **Clean Water Act of 1987 (CWA)**. Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.

- **Safe Drinking Water Act (SDWA) of 1974 (as amended in 1986 and 1996)**. Protects public health by regulating the Nation's public drinking water supply.

- **Archaeological Resources Protection Act of 1979 (ARPA)**. Protects archaeological resources and sites on federally-administered lands. Imposes criminal and civil penalties for removing archaeological items from federal lands without a permit.

- **National Historic Preservation Act of 1966 as Amended (NHPA).** Requires Federal agencies to take into account the effect of their Federal or Federally licensed undertakings on historic properties, whether those properties are Federally-owned or not.

- **Native American Graves Protection and Repatriation Act (NAGPRA) of 1990**. NAGPRA establishes procedures for inadvertent discoveries of cultural items on Federal or Tribal lands and a repatriation process to return NAGPRA items to lineal descendants and cultural affiliated Tribes.

F. RELEVANT ASSESSMENTS AND PLANS

Klamath-Iron Gate Watershed Analysis (USDI 2000) and Topsy-Pokegama Landscape Analysis (USDI 1996)

Watershed analysis (and landscape analysis as it was called for the area managed by the Lakeview District) is a procedure used to characterize conditions, processes and functions related to human, aquatic, riparian and terrestrial features within a watershed. Watershed/landscape analysis is issue driven. Analysis teams of resource specialists identify and describe ecological processes of greatest concern in a particular "fifth field" watershed (also referred to as Fifth Field Hydrologic Unit Codes, or HUC5s), and

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reduce or eliminate threats affecting the status of the species, or improve the condition of the species' habitat on BLM-administered lands (USDI 2008, Glossary p. 2).

recommend restoration activities and conditions under which other management activities should occur. Watershed/landscape analysis is not a decision making process. The resulting watershed/landscape analysis is not a decision document under NEPA, and there is no action that is proposed for implementation with the completion of the analysis. Rather, watershed/landscape analysis provide information and non-binding recommendations for agencies to establish the context for subsequent planning, project development, regulatory compliance and agency decisions (See Federal Guide for Watershed Analysis 1995, p. 1).

The Oregon Gulch Fire Salvage Recovery Project Area falls within Klamath-Iron Gate Watershed Analysis area and the Topsy-Pokegama Landscape Analysis area. The watershed and landscape analyses focused on the use of existing information available at the time each analysis was conducted, and provides baseline information. Additional information, determined to be necessary for completing an analysis of the Oregon Gulch Fire Salvage Recovery Project, has been collected and is considered, along with existing information provided by the 2000 *Klamath-Iron Gate Watershed Analysis* and the 1996 *Topsy-Pokegama Landscape Analysis.* Management objectives and recommendations provided by the watershed/landscape analyses were considered and addressed as they applied to the Oregon Gulch proposal.

The *Klamath-Iron Gate Watershed Analysis* describes conditions and interrelationships of ecosystem components of the Klamath-Iron Gate Watershed resulting from a multitude of natural processes and human actions that have taken place over many decades.

The *Topsy-Pokegama Landscape Analysis* presents conditions of the Topsy/Pokegama landscape including current understanding of the processes and interactions of concern. The scope of analysis generally follows the boundary of the Upper Klamath River fifth-field watershed with some modifications.

The current conditions of the lands affected by the Proposed Action Alternative are described in Chapter 3 under the Affected Environment sections specific to each resource. The current conditions described in the Affected Environment reflect the natural processes and human actions that have taken place over many decades within the watersheds. This EA will address the effects of the Oregon Gulch Fire Salvage Recovery Project, which includes post-fire mortality salvage; site rehabilitation through planting trees, retaining snags and coarse woody debris; temporary road construction; and repairing/maintaining road facilities by analyzing the potential for cumulative impacts that may result when adding the incremental effects of the Oregon Gulch Fire Salvage Recovery proposed actions together with the effects of past, current and reasonably foreseeable future actions.

U.S. Department of Interior, Bureau of Land Management, Western Oregon Districts, Transportation Management Plan (1996, updated 2002 and 2010)

This transportation management plan is not a decision document; rather, it provides guidance for implementing applicable decisions of the 1995 Medford District Resource Management Plan (which incorporated the Northwest Forest Plan).

Southwest Oregon Fire Management Plan (ODF 2014)

The Southwest Oregon Fire Management Plan (FMP) provides Southwest Oregon with an integrated concept in coordinated wildland fire planning and protection among Federal, State, local government entities and citizen initiatives.

The FMP introduces fire management concepts addressing fire management activities in relation to resource objectives stated in the current Land and Resource Plans (parent documents) of the federal agencies, the laws and statutes that guide the state agencies and private protective associations, and serves as a vehicle for local agencies and cooperators to more fully coordinate their participation in relation to those activities.

G. PUBLIC INVOLVEMENT

Scoping

Scoping is the process the BLM uses to identify issues related to the proposal (40 CFR 1501.7) and determine the extent of environmental analysis necessary for an informed decision. It is used early in the NEPA process to identify (1) the issues to be addressed, (2) the depth of the analysis, (3) alternatives or refinements to the Proposed Action, and (4) potential environmental impacts of the Proposed Action.

A letter briefly describing the Proposed Action and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on October 10, 2014. Comments were requested to be received by November 14, 2014.

Articles submitted to the BLM for review during the scoping process are included in the Reference section of the EA under "public submissions." The BLM reviewed these documents, and considered the information in developing the Proposed Action Alternative.

Public Field Trip

On October 29, 2014, the BLM held a public field trip to the Project Area to review the project proposal, visit sample units, and to provide an understanding of the overall magnitude of the wildfire. Five members of the public attended the field trip.

Public Comments

The following public comments were received in response to the Proposed Action Alternative during scoping. The public comments listed below were considered when assessing the merits and the consequences to the physical, biological, and human environment of implementing the Oregon Gulch Fire Salvage Recovery Project.

- Take into account the economics of various logging systems. Consider local mill infrastructure, species of material used, and log quality (e. g. small diameter pine or white fir may not be merchantable). Analyze the social and economic impact to the local mill industry, counties, and communities for the action and no action alternatives.
- Clearly state why, where, and how many leave trees (snags, etc.) will remain on site to alleviate concerns for snag retention, coarse woody debris, wildlife habitat, etc.
- Don't arbitrarily apply upper diameter limits on salvage trees.
- Clearly explain in the EA that salvage harvesting is an important role in successful establishment of new stands of trees, reducing fuel loadings that could lead to re-burns, lessen damage to seedlings as snags deteriorate and fall, and its importance for safety: OSHA standards for tree planters, road users, and adjacent land owners.
- Keep safety and logging feasibility at the forefront of the analysis and implementation. Retaining individual or groups of snags or green trees can be difficult or dangerous from a logging standpoint if not implemented carefully. Please develop a logging plan early in the planning process so retention tree layout can be designed with safety and logging logistics in mind.
- Clearly identify the benefits of temporary road construction for treating and rehabilitating the area, and the negatives if they aren't used.
- Highlight the number and miles of roads to be decommissioned, and the resulting reduction in road density. Only roads not needed for future access should be considered for closure.
- Instead of fully decommissioning roads that may be needed in 20 years, consider removing culverts, waterbarring, and closing the rocked roads to use.
- Analyze the long-term effects on sustained yield should the no action be taken.

- Apply the full Riparian Reserve buffers of the Northwest Forest Plan, including no skid trails or yarding, and retain all large woody and coarse woody debris. Concerns have been expressed that salvage logging would not attain Aquatic Conservation Strategy objectives.
- Concerns have been expressed that the proposed action would significantly increase hazardous fuels and the risk of a severe reburn by relocating biomass to the ground. The commenter states the National Fire Danger Rating System rates logging slash as the most significant contributor to fireline intensity of any fuel type.
- Give a hard look at potential significant effects of post-fire logging on public health and safety, including foreseeable wildland fire control efforts. Disclose post-logging fuel load and fire hazard in the project area at the scale of each activity unit from field-verified vegetation/fuels correlations to the extent feasible, such as planar intercept transects.
- Concern was expressed that tree planting may increase the likelihood of a catastrophic reburn. The commenter felt it illustrates a conflict of land management policy with natural fire ecology. Young, even-aged and structurally homogeneous tree plantations contain unnaturally dense and combustible fuel complexes that increase potential severity. There are concerns that planted stands would produce warm, windy and dry microclimates compared to what would exist in an unlogged burned forest with more structural diversity, ground shading and barriers to lateral wind movement.
- The analysis should consider the degree to which forest recovery objectives may be met without tree planting. There are concerns that salvage and related activities could potentially reduce the full development of early successional ecosystems by removing important legacies, eliminating important constituent species, and abridging the duration of early successional development.
- Create salvage-exemption zones that would limit the amount of disturbance-derived biological legacies (e.g., burned trees, logs) that can be removed.
- Analyze in the EA that larger diameter, fire killed snags can remain standing for many decades and are important to long-term forest recovery and productivity because they offer the best storage of organic matter (including nitrogen) and moisture in the ecosystem.
- Concern was expressed that vehicle and logging equipment moving on burned soils would increase the likelihood of exotic weed invasion with potentially significant effects to forest composition and recovery after fire disturbance.
- Analyze the significant erosion impacts by disclosing the current soil conditions and describing the direct and indirect effects of the proposed action to burned soils.
- Analyze the distance eroded soil particles may travel to determine how much sediment may be delivered to a water body from post-fire road “repair,” log haul and other actions that directly affect Riparian Reserves.
- Analyze the effects of fire, salvage logging, and road use to special status species. The commenter believes the effects may be significant if they reduce large wood input to riparian habitat, increase soil heating or thermal loading in streams, impair hydrologic recovery, or accelerate landslide movement or surface erosion.
- Address sediment delivery or prevention of delivery where stream buffers cross roads through Project Design Features.
- Concern was expressed that post-fire logging could potentially change bird species composition, reflecting effects of large woody debris removal. The commenter stated the three-toed woodpecker consistently shows negative responses to post-fire logging with significantly more nests found in unlogged sites.

- For bird species that were relatively abundant in or relatively restricted to burned forests, stand-replacement fires may be necessary for long-term maintenance of their populations.
- Analyze the positive contribution that unlogged snags supply to soils, wildlife and forest recovery, and not just assert that minimal levels of coarse wood retention are sufficient to comply with the resource management plan. The commenter states standards and guidelines for coarse wood retention are predicated on the biological needs of species associated with unburned forests, and they are not meaningful in a post-fire environment.
- Analyze the effects cattle grazing may cause in the fire area including livestock disturbance to soils, as vectors for spreading exotic seed, and reducing competitive and reproductive capacities of native species.
- Include the following fire suppression activities in the cumulative effects analysis:
    - Soil damage from emergency road, fire line or helispot construction
    - Hydrologic impacts caused by roads, fire lines and artificial clearings, which disrupt soil infiltration by water and route overland water flow
    - Chemical pollution of water and soil from aerial flame retardant drops
    - Destruction of snags and other ecologically significant large woody debris
    - Spread of highly flammable exotic plants
- Include all federal salvage and fire recovery projects associated with the Oregon Gulch fire in the cumulative effects analysis under an EIS, such as projects in California, Western Medford District, Eastern Klamath Falls, and Klamath Falls side for the previous Wild Gal sale.
- Alternative Development requested:
    - Hazard tree removal only logging alongside roads that are to remain open.
    - Decommission roads and no road building.
    - Remove slash piles (not leaving them for up to 2 years).
    - No machine piling – just hand piling (to minimize impacts to soils).
    - For northern spotted owl Recovery Action 12, maintain 2% of forest in early post-fire habitat and of which retain 40-50% of such stands unlogged. Where salvage logging occurs, retain all snags > 20 inches diameter breast height (dbh) and half of all snags 12-20 inches dbh.
- Consider retention of 30% of standing fire-killed vegetation to allow return of numerous snag-associated wildlife species.
- Consider replanting conifer species at a low density and with irregular distribution.
- Retain 10 snags per acre greater than 10 inches dbh with a focus on retaining the largest snags in the stand and pre-existing snags.
- For the effects analysis include untreated acres burnt in the Cascade-Siskiyou National Monument (deferred from salvage).
- Apply full body of available science to describe possible trajectories of ecological recovery and plant community succession under various alternatives.

Relevant Issues

An interdisciplinary (ID) team of resource specialists reviewed the proposal and all pertinent information including public input received, and identified relevant issues to be addressed during the environmental analysis. Issues are points of dispute or contention, and areas of concern or uncertainty. Some issues identified as relevant to this project proposal were analyzed in association with broader level environmental analyses. Where appropriate this EA will incorporate by reference the analysis from broader level NEPA documents 40 CFR §1508.28), to be considered along with project specific analysis.

Producing an Economically Viable Sale for Local Mills

- The salvage sale will need to be both economically and logistically feasible.
- The capabilities of local mills should be considered (timber species, log quality, and log size) in the design of the salvage sale.

Safety

- There are a large number of fire-killed snags that pose a safety hazard for forest workers, and adjacent landowners.

Adequate Number of Trees Retained for Snags, Coarse Woody Debris, and Wildlife Habitat

- Salvage logging operations my affect the number of snags and down wood that will remain on site for snag retention, coarse woody debris, wildlife habitat, etc.

Re-establishing Stands for Sustainable Timber Production and Recovery

- Salvage and related activities could potentially reduce the full development of early successional ecosystems by removing important legacies, eliminating important constituent species, and abridging the duration of early successional development.
- Salvage logging and planting activities may affect the trajectories of ecological recovery and plant community succession.

Hydrologic Function and Water Quality

- There is potential for short-term effects to water quality from increased sediment produced from salvage operations, temporary road construction, road decommissioning, road renovation, and log hauling activities.
- Concerns were raised that salvage logging (and associated skid trails, landings and temporary road construction) could adversely affect hydrologic flow, peak flow and low flow, potentially leading to increased erosion or effects to stream channels.

Site Productivity

- Activities associated with fire salvage may have impacts on soils and site productivity from compaction and displacement.
- Soils with reforestation issues due to moisture, soil temperature, and surface rock are prevalent within the Project Area; consider impacts that salvage harvest may have on reforestation efforts.

Potential Increase in Hazardous Fuels

- Would tree planting increase the likelihood of a catastrophic re-burn?
- There are concerns that salvage logging and tree planting could increase the fire hazard.

Potential Spread of Noxious Weeds

- Salvage and planting operations potentially increase the risk of introduction and spread of noxious weeds.

Potential for Impacts to Special Status Wildlife Species

- Salvage activities may affect special status wildlife species within the Planning Area.

Potential for Impacts to Black-back Woodpecker

- Salvage of the burned trees may affect black-back woodpeckers that forage on beetle larvae that invade stands post-fire.

Potential for Cumulative Effects

- There is a potential for adverse cumulative effects on watershed conditions (soils, water quality, hydrologic function, aquatic habitat) and wildlife habitat within the Oregon Gulch Planning Area from road construction, timber harvest activities, grazing, emergency stabilization treatments, and road maintenance on BLM and private lands.

Comments and Concerns Considered but not Further Analyzed

The following comments or concerns were discussed by the interdisciplinary team. The BLM determined that these issues were beyond the scope of this project. These issues, along with a rationale for their being "considered but not analyzed in detail" in this EA, are listed below. Also see Chapter 2, *Actions and Alternatives Considered but Eliminated from Detailed Analysis* for options and alternatives considered but not further analyzed.

Consider the extent that owls forage in severe wildfires is unclear: Consider the formal declaration submitted to the U.S. District Court by Patricia Manley, supervisory scientist at the Pacific Southwest Research Station (Oct 2014) when conducting analysis pertaining to the northern spotted owl. There is no conclusive research that supports the notion that the amount of burnt NRF (post-fire foraging) and how much of this is harvested has an effect on spotted owl occupancy, survival, dispersal or any of its essential life functions.

> ***Rationale for eliminating from detailed analysis:*** Post-fire habitat assessments determined there is no NRF habitat remaining for the northern spotted owl due to the intensity of the Oregon Gulch Wildfire in the proposed salvage Project Area. In addition, the commenter is recommending that we consider a declaration submitted to a federal district court in California, specific to litigation in that court and referring to a different subspecies of spotted owl. The BLM is familiar with the declaration and the science underlying it, but the declaration itself cannot be considered outside of the specific court case in which it was offered.

Potential adverse effects to northern spotted owls: There is concern that there could be significant effects to owls where post-fire logging removes large woody debris from occupied areas. The commenter requests consultation with U.S Fish and Wildlife Service.

> ***Rationale for eliminating from detailed analysis:*** Habitat assessments completed in September 2014 determined there is no spotted owl habitat remaining in the Project Area. The Proposed Action would only occur in stands that suffered moderate to high fire severity; these stands no longer provide owl habitat. The proposed action would not modify existing nesting, roosting, foraging, or dispersal habitat, and there is no need to consult with the U.S. Fish and Wildlife Service for activities that would have no effect to Threatened and Endangered Species or their habitat. The next closest known owl site to the Project Area is 2.6 miles away. As with all projects, if new owl locations are discovered, prior or during project implementation, the projects would stop as noted in the Project Design Features of the EA. At that time, the BLM would assess the situation and apply necessary seasonal restrictions, other mitigation, and complete any additional NEPA and Section 7 consultation that may be warranted. There is no designated Critical Habitat or RA32 habitat located in the Planning Area.

Additional comment period: Provide after the agency presents a detailed analysis of the project's effect and prior to finalizing the Environmental Assessment or Environmental Impact Statement.

> ***Rationale for eliminating from detailed analysis:*** The scoping letter invited adjacent landowners, interested individuals, organizations, and other agencies to attend a BLM held field trip to the proposed project in October 2014 to review the project proposal, visit sample units, and to provide an understanding of the overall magnitude of the wildfire. The 30-day public review period is another opportunity for the public to comment on the project proposal and the environmental analysis documented in the Environmental Assessment. All relevant comments are taken into consideration prior to any decisions made on the project.

Analyze effects to barred owls and goshawks.

> ***Rationale for eliminating from detailed analysis:*** Areas considered for salvage under the Oregon Gulch Fire Salvage Recovery Project were burned at moderate to high fire severity and no habitat remains for northern spotted owls, barred owls, or goshawks. Only Federally-listed, Survey and Manage, and Bureau Sensitive Species known or suspected to be present in the Project Area and may be affected by the Proposed Action will be analyzed in detail in this EA. Since the project would not affect spotted owl habitat, the barred owl was not discussed further. Also goshawks are not listed as Sensitive or Strategic species in Final State Director's Special Status Species List or USFWS Birds of Conservation Concern.

Meadow foam and herbicide: Concerned *Limnanthes flocossa spp. bellingeriana* may be sprayed with herbicide.

> ***Rationale for eliminating from detailed analysis:*** There are no known meadow foam sites in the Project Area. Use of herbicides would be limited to targeted noxious weeds and the BLM would survey for special status species to avoid spraying managed plant species.

CHAPTER 2 - ALTERNATIVES

A. INTRODUCTION

This Chapter describes the Proposed Action Alternative developed by the ID Team to achieve the objectives identified in the Purpose and Need statements in Chapter 1. In addition, a "No Action" Alternative is presented to form a baseline for analysis. Project Design Features (PDFs), which apply the Best Management Practices (BMPs) as described in Appendix D of the 1995 RMP (and modified by Resource Management Plan Maintenance dated July 12, 2012), are integral to the design of the Proposed Action. The PDFs are included as features of the Proposed Action in the analysis of anticipated environmental effects.

B. COMPONENTS OF THE PROPOSED ACTION ALTERNATIVE

The Oregon Gulch Fire Salvage Recovery Project is designed to implement post-fire forest management recovery objectives in the 1995 Medford District ROD/RMP for managing lands designated for timber management and production.

1. Silvicultural Objectives and Prescriptions

Alternative 2 (Proposed Action) proposes to salvage fire-killed or fire-injured trees through harvest and removal. For the purpose of this analysis, a fire-killed tree is defined as the tree crown exhibiting 100% scorch with brown needles, or the crown is black with no needles. A fire-injured tree may retain some green needles and the crown may not be entirely scorched. Fire-injured trees have incurred cambium damage, bark char, and are potentially girdled or partly girdled by fire (see Figure 2-1).

The salvage harvest would occur on approximately 683 acres in the Matrix land use allocation of the Medford District RMP (Maps 2-1, 2-2, and 2-3). Salvage harvesting is not prescribed in Riparian Reserves (RRs) for this project. The only proposed activities in the Riparian Reserve would be limited to three temporary roads (less than 0.1 miles) with no new landings. Table 2-1 provides a summary of activities proposed in Alternative 2.

Salvage harvest is proposed primarily within areas that sustained high burn severity (86.3%). Small inclusions of moderate burned severity (12.7%) are mixed inseparably within the areas selected for salvage harvest (Map 2-A). The larger aggregations of moderate and low severity burned areas within the fire perimeter were not considered for salvage harvest. Treatment areas were developed using a combination of soil and vegetation burn severity models and ground reconnaissance. The Southwest Oregon Forest Insect and Disease Service Center (SWOFIDSC) guidelines (SWOFIDSC 2001 and USDA 2014) are based on published research and professional judgment of local forest entomologists. These guidelines are directly incorporated into the silvicultural prescription for this project. Silvicultural prescriptions are the same regardless of the differing objectives: salvage for economic recovery, road safety and/or fire planning. Incidental felling and removal of live trees may occur to mitigate safety hazards and to facilitate salvage activities such as for yarding corridors, skid trails, landing and road construction, or road renovation. Below is a summary of the silviculture prescription:

Within stands burned at a mixed severity, fire-killed and fire-injured conifers 8 inches diameter at breast height (dbh) and greater that exhibit a high probability of mortality would be targeted for salvage. Trees less than 8 inches dbh would be left on site. Targeted trees would be based on species specific crown scorch amounts which would result in a 75% or greater probability of mortality.

One 20-acre green tree retention area (Map 2-2) adjacent to proposed salvage Units 25-3 and 25-4 will not be salvaged to protect live trees where the fire severity was low (Figure 2-2 and Map 2-2). Activity in this area would be limited to one designated skid trail about 325 to 350 feet long.

Figure 2-1. Photographs Illustrating Wildifre Burned Area in Proposed Units

The photograph above is of proposed Unit 35-5. The high severity wildland fire burned the trees into the canopy layer and little to no duff layer is left. The rocky substrate is exposed. The high presence of standing dead trees poses a safety hazard for the public and for forest workers replanting the stands.

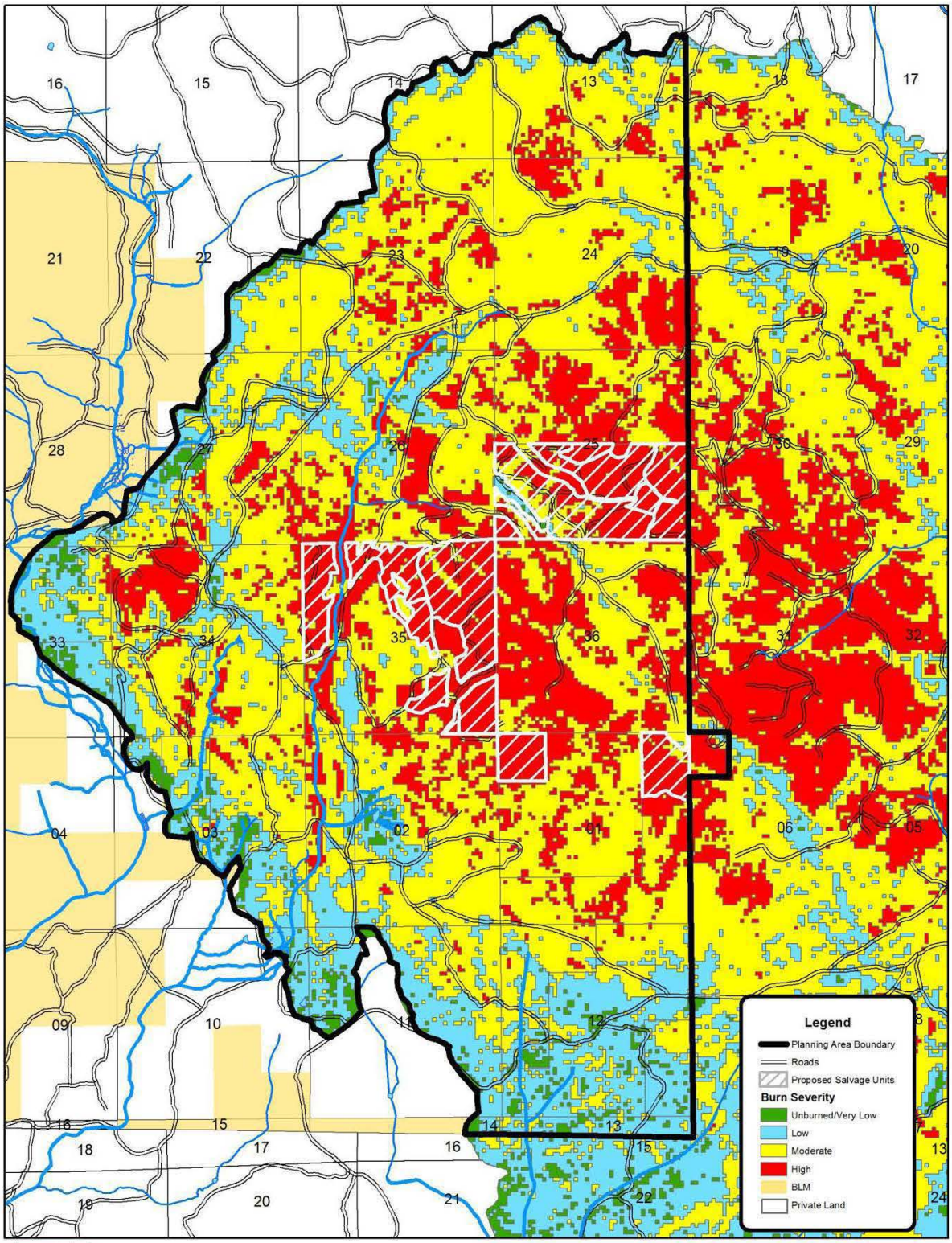
The photograph above is of proposed Unit 35-1. This stand also experienced a high severity burn. Conditions are similar to the photograph above in proposed Unit 35-5. There is no organic matter left on the soil surface.

The photograph above is another portion of proposed Unit 35-1. This portion of the stand experienced a slightly less intense fire severity. The fire still reached the canopy, but some trees retained a larger portion of their needles. Though most of the ground layer vegetation is gone; there are remnants of shrub species on the ground.

Figure 2-2. Twenty-Acre Green Tree Retention Area in T. 40 S., R. 4 E., Section 25

The photograph above is a 20-acre green tree retention area. Activity in this area would be limited to one designated skid trail (about 325 to 350 feet). It is adjacent to proposed Units 25-3 and 25-4.

Map 2-A. Oregon Gulch Fire Severity



0 0.275 0.55 1.1 Miles

No warranty is made by the BLM for the accuracy, reliability, and completeness of the data. This information may not meet National Map Accuracy Standards.

Tree Planting

The Proposed Action includes 683 acres of planting nursery seedling stock trees after salvaging is complete. Two-year bare root nursery stock Douglas-fir, ponderosa and sugar pine, and incense cedar trees would be planted in the late winter or spring of 2017 to ensure a higher probability of tree survivability. Improved seed would be used for both Douglas-fir and sugar pine seedlings.

Maintenance treatments typically used to enhance growth or increase the chance of seedling survival during the first few years after planting include:

- scalping or grubbing planting sites to reduce grass and shrub competition during seedling establishment;
- mycorrhizae root dipping to reduce drought stress and enhance seedling vigor in sterilized soils;
- paper mulching or installing vispore to reduce competition and prevent soil moisture loss around plantings;
- tree netting to prevent browsing by wildlife;
- applying delay release fertilizer packets with seedlings during planting;
- gopher trapping to prevent loss of seedlings to gopher damage; and
- after planting - brushing or hardwood control to reduce light and moisture competition.

2. Salvage Harvest Methods

Trees designated for removal per the forest stand prescriptions described above would be moved from forest stands to landing areas using tractor or cable yarding methods. Within all tractor units, the potential for the use of mechanized ground-based yarding methods also exists. No tractor skidding or ground-based yarding associated with harvesting would occur in the RRs.

Tractor Yarding: utilizes tractors to drag trees to landing locations. Tractor yarding occurs on lands with less than 35% slope. This method requires narrow skid trails (approximately 9 to 12 feet wide). Skid trail locations are approximately 150 feet apart, but vary depending on the site-specific terrain, and the locations are pre-determined by the contractor and approved by the BLM Contract Administrator (designated skid trails). Pre-determined locations of skid trails minimize the area of ground a tractor operates on, thus minimizing soil disturbance and compaction. Trees posing safety hazards would be removed, and trees in skid trails and landing areas may be removed when operationally required.

Mechanized Ground-Based Yarding: the utilization of ground-based harvester/forwarder or feller/buncher systems would be limited to designated skid trails. The area detrimentally compacted (> 15% increase in bulk density) would not exceed the overall unit rate of 12%.

Cable Yarding: trees are end-lined to the corridor then in-hauled up the slope to a landing area on or near a road with one end suspended and one end on the ground. Corridors would be generally less than 15 feet wide, depending on the size of trees to be removed and the terrain; locations are approved by the BLM Contract Administrator. Landings would be a minimum of 150 feet apart as operationally feasible. Guyline trees (approximately 3 per landing area), corridor trees and trees posing safety hazards would be removed when operationally required.

3. Post-Harvest Fuels (Activity Fuels) Reduction Treatments

Post-activity fuels treatment is normally an important component of commercial harvesting because it can increase the existing fuel loading (fire hazard). Due to the intensity of the Oregon Gulch Wildfire, there is very little organic material present and the proposed salvage is not expected to increase the fire hazard within units, therefore post-activity fuel treatments are not proposed in units for this project.

4. Road Work (Road Decommissioning, Road Maintenance, Road Renovation and Temporary Road Construction)

Road Decommissioning

The Oregon Gulch Fire Salvage Recovery Project proposes to decommission 2.3 miles of existing roads in the Project Area not needed for management purposes in the immediate future. Decommissioning would prevent vehicle use of these roads. Methods may include scarifying the surface, installing waterbars, scattering slash and other debris along the length, and camouflaging and blocking the entrance using an earthen berm, logs, boulders or a combination of these.

> **Decommission (long-term closure):** Closures based on resource protection needs and RMP directives. Road segments would be closed to vehicles on a long-term basis, but may be used again in the future. Prior to closure, the road would 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 would be treated to reduce sedimentation. The road would be closed with an earthen barrier or its equivalent. This category can include roads that have been or would be closed due to natural processes (abandonment) and may be opened and maintained for future use.
>
> **Full Decommissioning (permanent):** Roads determined through an interdisciplinary process to have no future need may be subsoiled (or tilled), seeded, mulched, and planted to re-establish vegetation. Cross drains, fills in stream channels, and unstable areas would be removed, if necessary, to restore natural hydrologic flow. Roads would be closed with an earthen barrier or its equivalent. The road would 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.
>
> **Natural Decommissioning:** No active management would occur to further decommission the road. Natural processes will be allowed to vegetate the road prism. The road location will be maintained in the GIS database but defined as fully decommissioned.

Road Maintenance

This action involves activities on an existing road designated as part of the transportation network to keep a road at its original design standard. Typical maintenance would include, but is not limited to: blading and shaping; cleaning of ditches, catch basins and culverts; brush cutting and vegetation removal from roadway; surface patching and pot hole repair; surface replacement; culvert replacement; and slide removal.

Temporary Road Renovation

This action involves opening a closed road, blading the brush out of the running surface, and re-establishing drainage features where needed. BLM Road 40-4E-25.0 would be opened for the proposed salvage logging and once the harvest is complete would be fully decommissioned.

Temporary Road and Spur Construction

Proposed road work associated with the fire salvage recovery project includes 0.6 miles of temporary road and spur road construction to access proposed units. Temporary roads and spurs would be fully decommissioned after harvesting is complete. No road construction activities would occur in RRs except for three short temporary spur roads (less than 0.1 miles) to be constructed for access into Units 25-4, 35-1 and 35-5.

C. ALTERNATIVES DESCRIBED IN DETAIL

1. Alternative 1—No Action Alternative

The No Action Alternative describes a baseline against which the effects of the Proposed Action can be compared. This alternative describes the existing conditions and the continuing trends, given the effects of other present actions and reasonably foreseeable actions identified. Under the No Action Alternative, the post-fire salvage, tree planting, temporary road construction, road renovation, road decommissioning, or project specific road maintenance associated with this project would not occur. The analysis of the No Action Alternative answers the question: What would occur to the resources of concern, if the Proposed Action does not take place?

The Oregon Gulch fire recovery projects associated with the Emergency Stabilization and Rehabilitation Plans for the Medford and Lakeview Districts would continue to occur which include stabilization efforts to minimize the effects of the wildfire on the landscape. These efforts may include the seeding and mulching of bare soil areas, tree planting, coarse woody debris creation, repairing existing fences, constructing temporary fences, and repairing road facilities. Additionally, the Klamath Falls Resource Area of the Lakeview District may use site-specific ground herbicide application to treat known populations of medusahead and other noxious weeds in the fire area.

The Klamath Falls Resource Area of the Lakeview District is also proposing a fire salvage recovery project entitled the Oregon Gulch Fire Salvage and Rehabilitation Project in T. 40 S., R. 5 E., Sections 31and 35; T. 41 S., R. 5 E., Sections 1, 3, 5-8, 11, 12,15, 17; and T. 41 S., R. 6 E., Sections 5-7 and 18. This project proposes timber salvage and tree planting on 1,650 acres, planting up to an additional 941 acres outside of salvage areas, constructing less than 0.3 miles of temporary road for unit access, decommissioning 0.81 miles of road, treating 268 acres of medusahead rye (noxious weed) followed by seeding with native perennial grasses, and replacing a 1,500-gallon water tank for wildlife.

It is assumed that all private forest lands with merchantable timber within the Analysis Area would be harvested within the next year. The actual timing of any timber harvest on private land is dependent on many factors, including valuations based on supply/demand, ownership, etc. However, the assumption that the timber on private land will be harvested within the next year is based on the time period the burnt timber retains its maximum value. Most areas that could be harvested on private lands are accessible by existing roads, therefore, it is unlikely that new road construction would occur.

On the Medford District, in addition to the emergency stabilization and rehabilitation work described above, only normal programmed road maintenance would be performed. Selection of the No Action Alternative would not constitute a decision to reallocate these lands to non-commodity uses. The decision maker does not need to make a specific decision to select the No Action Alternative. If that is the choice, the Proposed Action would simply be dropped and the decision process ends for this project. Future harvesting, other connected actions, and road management in this area would not be precluded and could be analyzed under subsequent NEPA documents.

Not implementing portions of the Proposed Action (Alternative 2) would be consistent with the No Action Alternative (Alternative 1). In this instance, an explanation of why portions of the Proposed Action would not be implemented would be included in the Decision Record (DR).

2. Alternative 2—Proposed Action

Alternative 2 was developed to achieve the objectives of the Purpose and Need described in Chapter 1 for the Oregon Gulch Fire Salvage Recovery Project. Alternative 2 would salvage about 683 acres using the silvicultural prescriptions as described above, and would reestablish conifer forests by planting trees. There would be one designated tractor skid trail (320 ft.) outside a proposed salvage unit in a 20-acre green tree retention buffer (no treatment) adjacent to Unit 25-4. The green tree retention area would protect live trees where the fire severity was low adjacent to proposed units (Figure 2-2). Harvest units

would primarily be accessed from existing roads. Approximately 0.4 miles of road renovation would occur to access Unit 25-3 and 25-4; this road would be barricaded for a long-term closure after harvest. Collectively, an estimated 0.6 miles of temporary road would be constructed for access to Units 1-1, 25-4, 35-1, and 35-5 and would be fully decommissioned following harvest. An additional 2.3 miles of roads that are not needed for management purposes in the immediate future would be decommissioned from the road network.

Unit-specific information is displayed in Table 2-1 and Maps 2-1, 2-2, and 2-3.

Table 2-1. Alternative 2—Units by Harvest Method, Silvicultural Prescription, and NSO Habitat

Unit No.	Acres	Harvest Method	Silvicultural Prescription		Associated Treatments
			Harvest Prescription	NSO Habitat Type*	
1-1	49	Tractor	Salvage	Capable	Plant w/ mixed conifers
1-2	41	Tractor	Salvage	Capable	Plant w/ mixed conifers
25-1	61	Tractor	Salvage	Capable	Plant w/ mixed conifers
25-2	66	Tractor	Salvage	Capable	Plant w/ mixed conifers
25-3	116	Tractor	Salvage	Capable	Plant w/ mixed conifers
25-4	17	Tractor	Salvage	Capable	Plant w/ mixed conifers
25-5A	10	Cable	Salvage	Capable	Plant w/ mixed conifers
25-5B	12	Cable	Salvage	Capable	Plant w/ mixed conifers
35-1	132	Tractor	Salvage	Capable	Plant w/ mixed conifers
35-2	54	Tractor	Salvage	Capable	Plant w/ mixed conifers
35-3	54	Tractor	Salvage	Capable	Plant w/ mixed conifers
35-4A	18	Cable	Salvage	Capable	Plant w/ mixed conifers
35-4B	17	Cable	Salvage	Capable	Plant w/ mixed conifers
35-4C	4	Cable	Salvage	Capable	Plant w/ mixed conifers
35-5	32	Tractor	Salvage	Capable	Plant w/ mixed conifers
TOTAL	683				

***** *Capable habitat is forest that is currently not spotted owl habitat, but can become NRF or dispersal in the future as trees mature and canopy fills in.*

Proposed Haul Routes (Existing Roads)

An estimated 20 miles of existing roads would be used as haul routes and maintained as needed to meet BLM road maintenance standards identified in the BLM's 2010 Western Oregon Transportation Management Plan (Table 2-2). In addition, BLM Roads 40-5E-31.1 and 40-5E-31.2, in the Klamath Falls Resource Area of the Lakeview District, are proposed for road maintenance under this project.

Table 2-2. Alternative 2—Proposed Haul Routes on Existing Roads in the Project Area

Road Number	Approximate Length (miles)	Existing Surface	Control	Seasonal Restriction
40-4E-03.01 A1-C1	4.7	AGG	PVT	1
40-4E-03.01 D	0.1	AGG	BLM	1
40-4E-03.01 E	0.3	AGG	PVT	1
40-4E-03.01 F	0.6	AGG	BLM	1
40-4E-03.01 G-H	0.8	AGG	PVT	1
40-4E-23.00	0.6	AGG	PVT	1
40-4E-24.00 A1-A2	1.6	AGG	PVT	1
40-4E-24.00 B1-B2	1.2	AGG	BLM	1
40-4E-24.00 C1	0.2	AGG	PVT	1
40-4E-25.00	0.4	NAT	BLM	2
40-4E-25.01	3.5	AGG	BLM	1
40-4E-25.02	0.2	NAT	BLM	2
40-4E-25.03	0.1	NAT	BLM	2
40-4E-25.04	0.3	AGG	BLM	1
40-4E-25.05	0.2	NAT	BLM	2
40-4E-26.00 A	0.03	AGG	PVT	1
40-4E-26.00 B	0.1	AGG	BLM	1
40-4E-26.01 A	0.3	AGG	BLM	1
40-4E-26.01 B	0.2	AGG	PVT	1
40-4E-26.02 A	0.4	AGG	PVT	1
40-4E-26.02 B	0.5	AGG	BLM	1
40-4E-35.00	0.9	AGG	BLM	1
40-4E-35.01	0.1	NAT	BLM	2
40-4E-35.02	0.4	NAT	BLM	2
40-4E-35.03	0.3	NAT	BLM	1
40-4E-35.04	0.1	NAT	BLM	1
40-5E-19.00 D	0.8	AGG	BLM	1
40-5E-19.00 E	0.2	AGG	PVT	1
40-5E-19.02 B	0.9	AGG	BLM	1
40-4E-2.0	0.3	NAT	PVT	1
Total Mileage	20			

Abbreviations:
Existing Surface: NAT=natural; PRR=Pit Run Rock; ASC=Aggregate Surface Course; BST=Bituminous Surface Treatment
Control: BLM=Bureau of Land Management; PVT=Private
Seasonal Restrictions (for log hauling):
1 = hauling restricted between 10/15 and 6/1
2 = hauling restricted between 11/15 and 5/15

Note: Seasonal restrictions could be modified as approved by the Authorized Officer if conditions warrant (e.g. dry conditions occur during the wet season ((see Section 3. Project Design Features (d. Roads and Landings, Objective 2: Prevent Offsite Soil Erosion (2)). In addition, purchaser may be allowed to extend timber haul by placing rock on roads if approved by the Authorized Officer.

Proposed Temporary Road and Spur Construction and Road Renovation

Under Alternative 2, construction of approximately 0.6 miles of temporary road construction would provide access to Unit 1-1, 25-4, 35-1, and 35-5 (Table 2-3). Following harvest activities, these roads would be fully decommissioned according to the terminology adopted in the 2010 Western Oregon Transportation Plan (USDI 2010, p. 34). Associated landings are incorporated into the temporary road design, and analyzed as such.

The temporary roads would be dry weather-use only, and would be decommissioned after use, resulting in no net increase in road density in the Iron Gate Reservoir-Klamath River and Copco Reservoir-Klamath River Watersheds. There are three temporary spurs that may be constructed to access Units 25-4, 35-1 and 35-5 (totaling < 0.10 miles) in Riparian Reserves. Construction of these three temporary spurs would prevent the need to construct landings in Riparian Reserves, which would cause more ground disturbance than the construction of these three temporary spurs. The spurs would be decommissioned in the same operating season as the salvage operation. Special provisions would be applied to their location, design, construction, and decommissioning to ensure protection of the Riparian Reserve and water quality (see Section 3. Project Design Features (c. Harvest and Yarding, Objective 1: Protect Riparian Reserves (2)).

Approximately 0.4 miles of road would be renovated to access Units 25-3 and 25-4 (Table 2-3). This road would be barricaded for a long-term closure after harvest.

Table 2-3. Alternative 2—Proposed Temporary Road Construction and Road Renovation

Road Description	Approximate Length (miles)	Surface	Control
Temp Road (41-5E-6.1) into Unit 1-1	0.60	Natural	BLM
Temp Spur into Unit 35-5	0.04	Natural	BLM
Temp Spur into Unit 35-1	0.04	Natural	BLM
Temp Spur into Unit 25-4	0.01	Natural	BLM
Road Renovation (40-4E-25.0)	0.38	Natural	BLM

Proposed Road Decommissioning and Long-Term Closures of Existing Roads

Ten roads are proposed for decommissioning or long-term closure under Alternative 2 (Figure 2-3, Table 2-4, and Table 2-5). Roads proposed for decommissioning in this Project Area are not currently needed for management purposes. Decommissioning and road closures would use methods that may include scarifying the surface, installing waterbars, scattering slash and other debris along the length, and camouflaging and blocking the entrance using an earthen berm, logs, boulders or a combination of these. The intent is to prevent use of these roads by off-highway vehicles (OHVs) following full decommissioning or long-term closures.

Figure 2-3. Existing Roads Proposed for Decommissioning

Road 40-4E-26.0 (0.13 miles) would be fully decommissioned after the salvage harvest.

Road 40-4E-35.1 (0.22 miles) is considered non-existent and naturally decommissioned, with regard to use and future planning.

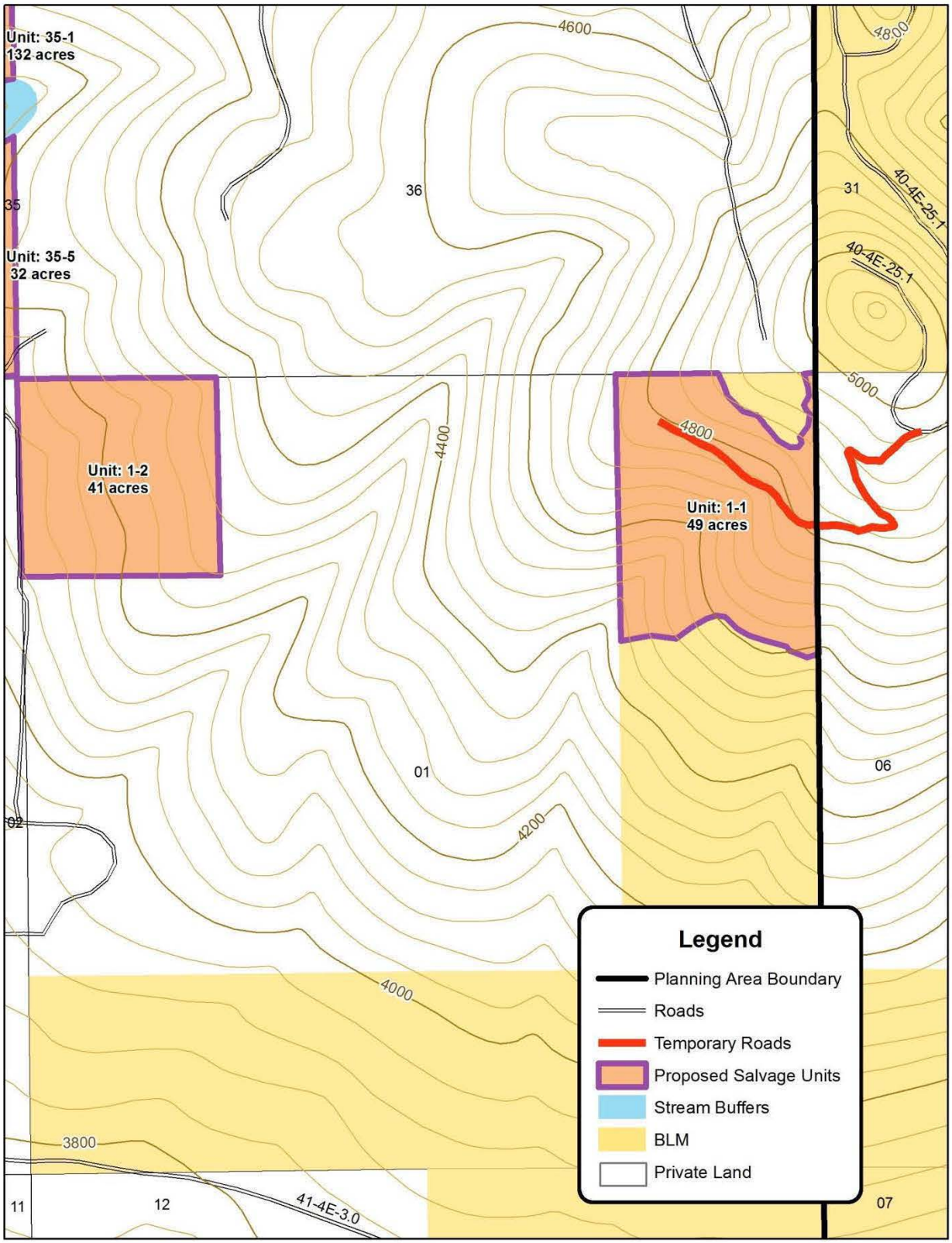
Table 2-4. Alternative 2—Proposed Road Decommissioning

Road Number	Approximate Length (miles)	Surface	Control	Decommission/Closure Type
40-4E-35.2	0.7	Natural	BLM	Fully Decommission, Mechanical
40-4E-35.1	0.2	Natural	BLM	Fully Decommission, combination of Mechanical and Natural Decommissioning
40-4E-26.0	0.1	Natural	BLM	Fully Decommission, Mechanical
40-4E-26.1	0.2	Aggregate	BLM	Fully Decommission, Mechanical
40-4E-25.4	0.3	Aggregate	BLM	Fully Decommission, Mechanical
40-4E-25.5	0.2	Natural	BLM	Fully Decommission, Natural
40-4E-25.2	0.1	Natural	BLM	Fully Decommission, combination of Mechanical and Natural Decommissioning
Jeep Road	0.5	Natural	BLM	Fully Decommission, Natural
Total Mileage	2.3 miles			

Table 2-5. Alternative 2—Proposed Long-Term Road Closures

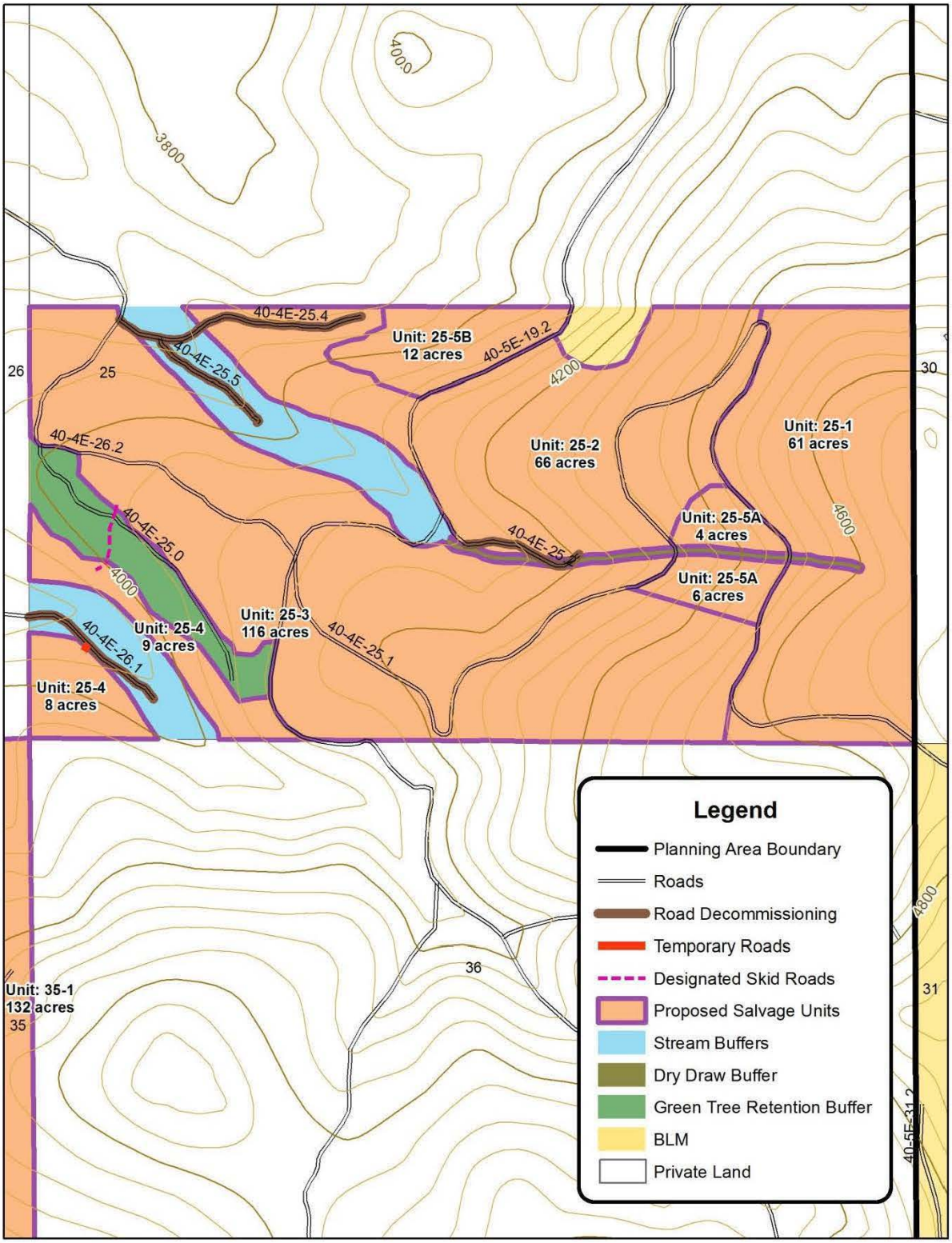
Road Number	Approximate Length (miles)	Surface	Control	Decommission/Closure Type
40-4E-35.3	0.3	Natural	BLM	Long Term Closure
40-4E-25.00	0.4	Natural	BLM	Long Term Closure
Total Mileage	**0.7**			

Map 2-1. Oregon Gulch Fire Salvage Recovery Area
T. 41 S., R. 4 E., Section 1



No warranty is made by the BLM for the accuracy, reliability, and completeness of the data. This information may not meet National Map Accuracy Standards.

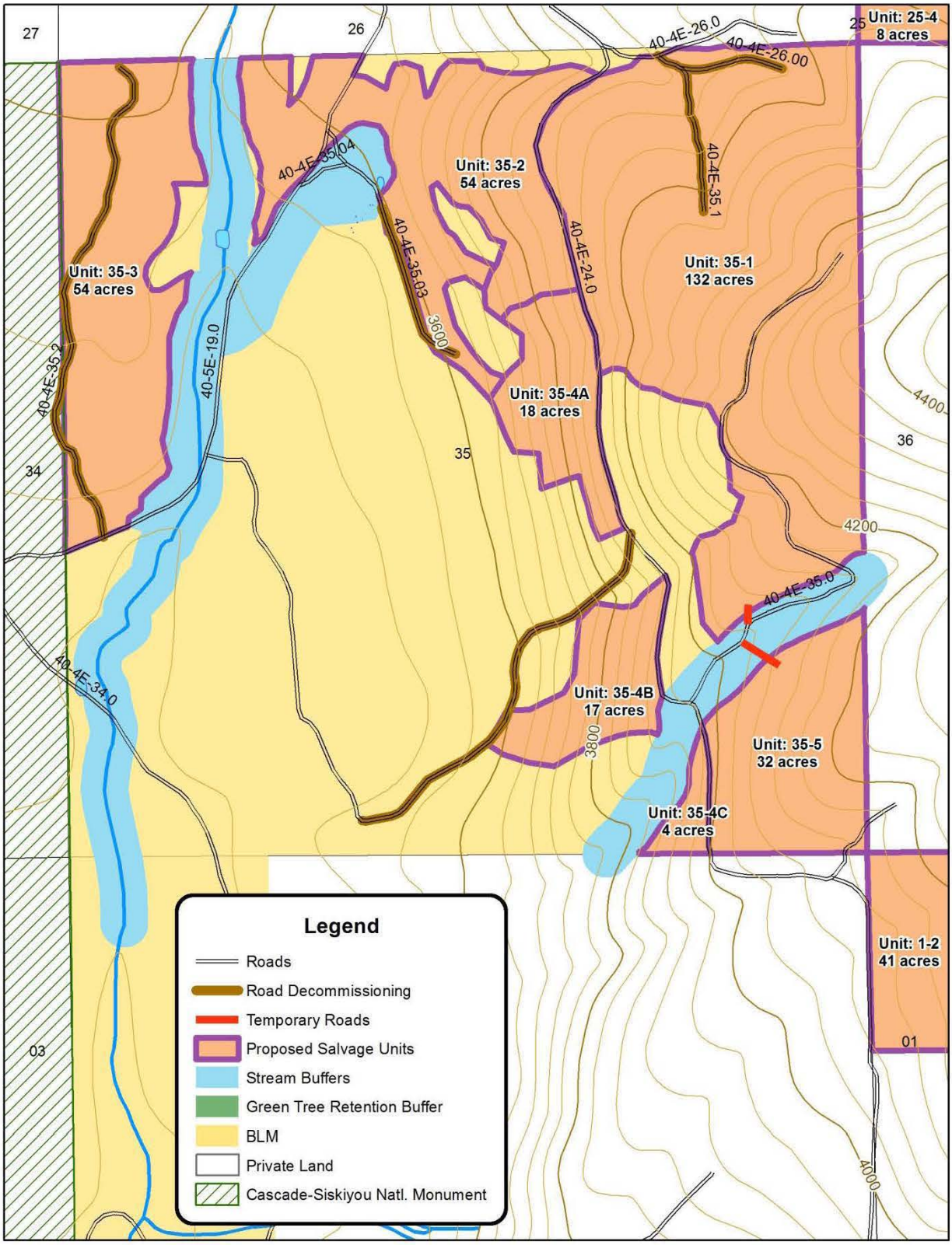
Map 2-2. Oregon Gulch Fire Salvage Recovery Area
T. 40 S., R. 4 E., Section 25



0 0.05 0.1 0.2 Miles

No warranty is made by the BLM for the accuracy, reliability, and completeness of the data. This information may not meet National Map Accuracy Standards.

Map 2-3. Oregon Gulch Fire Salvage Recovery Area
T. 40 S., R. 4 E., Section 35



0 0.05 0.1 0.2 Miles

No warranty is made by the BLM for the accuracy, reliability, and completeness of the data. This information may not meet National Map Accuracy Standards.

3. Project Design Features

Project Design Features **(**PDFs) are an integral part of the Proposed Action (Alternative 2). PDFs include seasonal restrictions on many activities in order to minimize erosion and reduce disturbance to wildlife. PDFs also outline protective buffers for sensitive species, mandate the retention of snags, and delineate many measures for protecting Riparian Reserves throughout the project. PDFs included in this Project description are carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the operations of contractors to ensure that contract specifications are implemented as designed.

The PDFs with an asterisk (*) are Best Management Practices (BMPs) required by the Federal Clean Water Act to reduce non-point source pollution to the maximum extent practicable. BMPs are methods, measures, or practices incorporated into the 1995 Resource Management Plan through an RMP plan maintenance action in July of 2012. The purpose is to minimize or prevent sediment delivery to the waters of the United States. A review of forest management impacts on water quality concluded that the use of BMPs in forest operations was generally effective in avoiding significant water quality problems; the report noted that proper implementation of BMPs was essential to minimizing non-point source pollution (Kattelmann 1996). BMPs would be monitored and, where necessary, modified to ensure compliance with Oregon Water Quality Standards. The PDFs listed below apply to the Proposed Action (Alternative 2).

a. Measures Common to All Project Activities

- Any project-related activities would be suspended if conditions develop that cause a potential for sediment laden runoff to enter a wetland, floodplain or waters of the state. All exposed soil with potential for sedimentation to reach surface water would be covered or otherwise temporarily stabilized. Sediment trapping devices would be properly installed to hydrologically disconnect sites. Operations may resume when sediment control devices are in place and conditions allow turbidity standards to be met. *
- Seasonally restrict all project activities including rehabilitation operations to the dry season; generally beginning May 15th and ending Oct 15th. The season may be extended if wetting winter rains have not occurred, the weather forecast is monitored daily, and all winterization actions can reasonably occur prior to the season-ending storm event. *

b. Riparian Reserves (RRs)

Northwest Forest Plan (NWFP) Riparian Reserves, as incorporated by the Medford District RMP, are located on federal lands throughout the Planning Area. A BLM hydrologist and fish biologist conducted surveys within the Oregon Gulch Fire Salvage Recovery Planning Area to ensure that all areas needing Riparian Reserve protection were identified. They assessed stream conditions, documented the location of wetland and unstable areas, and determined whether stream channels were perennial, intermittent, or dry draws (USDA and USDI 1994, pp. C30-C31). Stream maps were updated with the new information. Riparian Reserves are excluded from salvage units by clearly marking unit boundaries on the ground.

Widths for RRs were determined using the NWFP Standards and Guidelines (USDA and USDI 1994, pp. C-30-31) and the average site potential tree heights for each fifth-field watershed were updated in 2009 by the Medford District based on soil conditions. For the Iron Gate Reservoir-Klamath River Watershed the site potential tree height is 160 feet. See Maps 2-2 and 2-3 for RR locations within the Oregon Gulch Fire Salvage Recovery Project Area. Site-specific widths for each RR have been mapped in GIS and would be implemented under the Proposed Action alternative. No ground disturbing activities would occur in RRs for this project, except for three short temporary spur roads (less than 0.1 miles) to be constructed for access into Units 25-4, 35-1 and 35-5. Application of PDFs would be used to minimize or avoid impacts and all of which would be constructed, used, and decommissioned in the same dry season to the greatest extent possible.

RR widths in the Project Area are as follows:

- Fish-bearing streams: 320 feet slope distance on each side of the stream.
- Perennial non-fish-bearing streams: 160 feet slope distance on each side of the stream.
- Intermittent non-fish-bearing streams: 160 feet slope distance on each side of the stream. Intermittent streams have a defined channel, annual scour and deposition, and are further described as short-duration or long-duration:
    - ***Short-Duration Intermittent***: A stream that flows only during storm or heavy precipitation events. These streams can also be described as ephemeral streams.
    - ***Long-duration Intermittent Stream***: A stream that flows seasonally, usually drying up during the summer.
- A 25 feet no-treatment area in the dry channel that borders Units 25-2, 25-3, 25-5A, and 25-5B, and passes through Unit 25-1 will remain to protect rooting strength in this draw. This area has a higher potential for downcutting and erosion in winter storm events due to the lack of vegetation and high road density.
- Springs, seeps and other non-stream wetlands less than one acre in size: RRs consist of the wetland and the area from the edges of the wetland to the outer edges of the riparian vegetation or 100 feet slope distance, whichever is greatest.
- Constructed ponds and reservoirs, or wetlands greater than one acre in size: RRs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation; or the extent of the seasonally saturated soil; or the extent of unstable or potentially unstable areas; or to a distance equal to the height of one site potential tree; or 160 feet slope distance from the edge of the wetland greater than 1 acre; or the maximum pool elevation of constructed ponds and reservoirs, whichever is the greatest.

Imminent hazard trees felled for safety reasons, and any portions of trees accidentally felled toward streams, that land within RR boundaries would be retained on site for fish/wildlife habitat.

c. Harvest and Yarding

Objective 1: Protect Riparian Reserves (RR)

(1) There would be no use of skid trails in RRs. *

(2) Trees would be directionally felled away from RRs, dry draws, and any irrigation ditches. Trees would be felled toward the skid trails. Any irrigation ditches present in the Project Area would be protected from damage and kept free of slash. *

(3) Imminent safety hazard trees could be felled in RRs. Felled trees or portions of trees in RR would be left onsite, or if necessary for safety reasons would be removed by non-ground disturbing methods.

Objective 2: Prevent Offsite Soil Erosion and Soil Productivity Loss

(1) When operationally feasible, all units would be yarded in such a way that the coarse woody material remaining after logging would be maintained at or greater than current levels to protect the soil surface and maintain soil productivity. *

(2) All tractor skid trail locations would be approved by the BLM Contract Administrator prior to construction (designated skid trails). Existing skid trails would be used whenever practical. Maximum area in skid trails used would be less than 12% of the harvest unit. 150-foot spacing would be maintained between designated skid trails and skid trail width, including turning points, would average 12 feet.

(3) All cable yarding corridor locations would be approved by the BLM Contract Administrator prior to tree felling and use. Landings would be required to be approximately 150 feet apart. Convergent yarding corridors would be minimized to the greatest extent possible; no more than three converging yarding corridors would occur per landing.

(4) Tractors would be equipped with integral arches to obtain one-end log suspension during log skidding.

(5) Use of blades would not occur while tractor yarding to minimize soil disturbance and to retain organics on site. Tractor operations and skid trail locations would be restricted to slopes less than 35%. The intent is to minimize areas affected by tractors and other mechanical equipment (disturbance, particle displacement, deflection, and compaction) and thus minimize soil productivity loss. *

(6) Designated skid trails would be located on the contour, near the contour, or on a slope diagonal on topography greater than 20%.

(7) Tractor yarding on designated skid trails would occur between May 15th to October 15th. Variations in these dates would be permitted dependent upon weather and soil moisture conditions as determined by the Authorized Officer in consultation with aquatic and/or soils scientists. Tractor yarding on designated skid trails would be allowed when soil moisture content is 25% or less to ensure that soil rutting or displacement beyond the trail does not occur.

(8) When measuring soil moisture, a minimum of four gravimetric water content samples using the oven dry method would be required. Soil samples must be collected between depths of 4-6 inches. Samples would be collected in the areas likely to have the highest water content.

(9) All skid trails and yarding corridors would be waterbarred according to BLM standards prior to the wet season; corridors would be covered with as much slash as available or straw/mulch would be applied for erosion control. Where soil erosion is not expected to occur (e.g. flat ground), waterbars would not be necessary. Main tractor skid trails, where they intersect haul roads and radiate from landings, would be barricaded and camouflaged by scattering slash, cull logs, or rocks as available. The intent is to reduce the potential for use of these features by OHVs and the resulting resource damage, and to minimize erosion and routing of overland flow to streams by decreasing disturbance (e.g. unauthorized use by OHVs). *

(10) Where the width of the trail permits and damage to residual trees would not result, skid trails within tractor units would be discontinuously subsoiled to a depth of at least 12-18 inches or to a point where 10 inches diameter stones are the dominant substrate (whichever is shallower), seeded, water-barred, mulched, and blocked during dry soil conditions, upon completion of current harvest. Where it is determined by the Authorized Officer that subsoiling skid trails would cause unacceptable damage to the root systems of residual trees along a majority of the skid trail, such as where new skid trails are constructed within the dripline of leave trees, subsoiling may be intermittent, or scarification may be used instead. Equipment must be able to avoid rocky areas and adapt to changes in rock depth. These trails would be seeded, water-barred as needed, mulched, and blocked by Oct 15th of the year of harvest unless a waiver is in place for ground-based yarding to extend the dry season. Waterbars would be installed at the same time as sub-soiling/ripping, unless skid road would be needed to complete harvest the following season. In this case, water-bars would be constructed and mulch would be applied to exposed soil prior to fall rains to reduce sedimentation during winter months. Waterbar spacing on tractor skid trails would be based on the RMP BMPs erosion control measures for timber harvest which considers slope and soil series (USDI 1995, p. 167).

(11) For all cable yarding, maximum operational suspension would be maintained on slopes greater than 50%. Maximum operational suspension would be practiced to alleviate gouging and other disturbance on draw side slopes and headwalls. Minimum corridor widths (generally less than 15 feet wide) would be utilized to reduce soil productivity loss. *

(12) Waterbars would be constructed manually on steeper slopes with higher erosion potential to direct water off the cable yarding corridors. *

(13) Skyline and tractor yarding would be avoided up and down dry draws to minimize the occurrence of erosion and compaction in existing areas of concentrated surface or substrate flow. *

(14) The BLM would immediately shut down all timber harvest and yarding operations if excessive soil damage would occur due to weather or soil moisture conditions.

d. Roads and Landings

Objective 1: Protect Riparian Reserves

(1) No construction of new landings would be allowed in RRs.

(2) No ground disturbing project activities would occur in RRs, except for three short temporary spur roads (less than 0.1 miles) to be constructed for access into Units 25-4, 35-1 and 35-5. *

Objective 2: Prevent Offsite Soil Erosion

(1) All natural surface BLM-controlled roads opened for salvage operations would be closed following harvesting operations. *

(2) Road and landing construction, road maintenance, and decommissioning would not occur during the wet season (October 15th to May 15th) when the potential for soil erosion and water quality degradation exists. This restriction could be waived under dry conditions and with a specific erosion control plan specifying measures to stabilize soils and protect water quality (e.g. rocking, waterbarring, seeding, mulching, barricading) in the event of forecasted rain anticipated to saturate soils to the extent there is potential for movement of sediment to streams. All construction activities would be stopped during a rain event of 0.2 inches or more within a 24-hour period or if determined by the Administrative Officer that resource damage would occur if construction is not halted. If on-site information is inadequate, measurements from the nearest Remote Automated Weather Station (RAWS) would be used. Construction activities would not resume until determination is made by the Contract Administrator. *

(3) All new landing areas would be rehabilitated to reduce soil compaction, minimize sedimentation, and improve site productivity. Landings outside of existing road prisms would additionally be planted with conifers following use.

(4) During rehabilitation of landings, runoff water would be diverted away from headwalls or steep erodible fill slopes. *

(5) Landings would be located on stable locations that minimize sediment delivery potential to streams (e.g., ridge tops, stable benches or flats, and gentle-to-moderate convex or planer side-slopes). Placement of landings on headwalls would be avoided. *

(6) Temporary roads would not be located on or above a headwall, or on slopes in excess of 60%. *

(7) No temporary roads would be constructed in RRs, except for three temporary spurs to access Units 25-4, 35-1 and 35-5. The spurs would total approximately 500 feet in length, and would be used to access landings outside of RRs. The temporary spurs would not have stream crossings. All temporary roads would be constructed, used, and discontinuously subsoiled to a depth of at least 12-18 inches or to a point where 10-inch diameter stones are the dominant substrate (whichever is shallower), seeded, water-barred, mulched, and blocked during dry soil conditions in the same year of the salvage harvest to stabilize soils and to hydrologically disconnect the temporary spurs from the intermittent channel before winter rains. Slash, boulders and other debris would be placed along the roads entire length as determined by availability of materials to provide ground cover and discourage mechanized use. Blockage at the entrance would consist of

placing logs, slash, boulders, berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle access is precluded. *

(8) Blading and vegetation removal would be avoided unless necessary to remove drainage impediments when maintaining inboard ditches. Sediment control measures would be evaluated and implemented if necessary, where ditchline blading is required within 200 feet of streams. *

(9) Waste material from road maintenance activities would be placed in stable disposal areas a minimum of 200 feet from any stream and in a location where sediment laden runoff can be confined. Where necessary, erosion control would be provided to minimize sediment delivery to streams. *

(10) When cleaning ditchlines, undercutting of cut-slopes would be avoided. Routine machine cleaning of ditches and blading during the wet season would be avoided. *

(11) Low-growing vegetation on cut-and-fill slopes would be retained (i.e. grasses, ferns).

(12) Bare soil due to temporary roads and landing construction/renovation would be protected and stabilized prior to fall rains to reduce soil erosion and sediment potential. Methods used would be dependent on site conditions and may include: mulching and seeding with native grasses or other approved seed; surfacing with durable rock material; or leaving "as is" where natural rock occurs or where vegetation/topography prevents movement of sediment. Any pile burning on these landings would occur after the first wet season of operation to allow for vegetation establishment.*

(13) Any remaining debris at the landing sites would be chipped, removed for biomass utilization, made available for firewood, lopped-and-scattered, or piled and burned.

(14) Landings used during dry conditions within the wet season would have silt fencing or other sediment control measures in place during periods of non-use if they are hydrologically connected to streams, directly or indirectly via ditchlines. Any captured sediment would be disposed of outside of RRs. *

(15) Fill slopes on all new landings would be seeded with native or approved seed and mulched, except where rock occurs. *

Objective 3: Protect Natural Discharge Patterns

(1) Culvert inlets and outlets, drainage structures and ditches would be inspected and maintained before the wet season to diminish the likelihood of plugged culverts and the possibility of washouts. *

e. Hauling

Objective 1: Prevent Offsite Soil Erosion

(1) No hauling would occur on natural surfaced roads during the wet season (generally October 15th to May 15th). This would protect the road from damage and decrease the potential for off-site sediment movement.

(2) Hauling would be allowed between May 15th and November 15th on roads surfaced with adequate surfacing (as determined by a BLM Engineer and approved by the Authorized Officer). Some variations in these dates would be permitted dependent upon weather, soil moisture conditions of the roads, or frozen road conditions. The Authorized Officer may approve a conditional waiver for hauling if it is determined by the authorized officer with input from BLM's engineer and hydrologist/aquatic specialist that hauling would not result in road damage or the transport of sediment to nearby stream channels (based on soil moisture conditions, frozen conditions, or rain events).

(3) Haul would not occur on hydrologically-connected natural surface or rocked roads when water is flowing in the ditchlines, or during any conditions that would result in any of the following: fines

being pumped through road surfacing from the subgrade; road drainage causing a visible increase in stream turbidities, or any condition that would result in water being chronically routed into tire tracks or away from designed road drainage during precipitation events. Hauling on natural surface or rocked roads would be stopped during a rain event of 0.2 inches or more within a 24-hour period, and until road surface is sufficiently dry to prevent any of the above conditions from reoccurring, and as approved by the Authorized Officer. * If on-site information is inadequate, measurements from the nearest Remote Automated Weather Station would be used. Construction activities would not resume until determination is made by the Contract Administrator that resource damage would not occur.

(4) Spot rocking of the road surface would occur prior to, and during, all hauling operations, as necessary to protect the road surface from damage.

(5) No ditch maintenance shall occur during the wet season unless for safety or resource protection. Other road maintenance activities may be considered (e.g. rocking, blading of aggregate roads, cutting brush). Work would be suspended during precipitation events or when observations indicate that saturated soils exist to the extent that there is visible runoff or a potential for causing elevated stream turbidity and sedimentation. Emergency road work could occur during the wet season. *

(6) Dust abatement may be accomplished by applying water or lignin to the road surface, except for BLM Road 40-4E-26.1, 40-4E-35.3, 40-5E-19.0 near Fall Creek which would be limited to water application only.

f. Oil and Hazardous Materials Emergency Response

(1) During operations, the operator would be required to have a BLM-approved spill plan or other applicable contingency plan. In the event of any release of oil or hazardous substance, as defined in Oregon Administrative Rules (OAR) 340-142-0005 (9)(d) and (15), into the soil, water, or air, the operator would immediately implement the site's plan. As part of the plan, the operator would be required to have spill containment kits present on the site during operations. The operator would be required to be in compliance with OAR 629-605-0130 of the Forest Practices Act, Compliance with the Rules and Regulations of the Department of Environmental Quality. Notification, removal, transport, and disposal of oil, hazardous substances, and hazardous wastes would be accomplished in accordance with OAR 340-142, Oil and Hazardous Materials Emergency Response Requirements, contained in Oregon Department of Environmental Quality regulations. *

(2) Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition to minimize potential for leakage into streams. No re-fueling of chainsaws or heavy equipment would occur within 150 feet of streams, stream crossings or wet areas. Absorbent materials would be required to be onsite to allow for immediate containment of any accidental spills. *

(3) Re-fueling of chainsaws and heavy equipment would be done no closer than 150 feet of any stream or wet area. Spilled fuel and oil would be cleaned up and would be disposed of at an approved disposal site. *

g. Silviculture

Objective 1: Maintain vigorously growing conifer forest for permanent forest production

(1) To the extent operationally feasible, avoid damage to remaining healthy green trees (conifers and hardwoods) along haul routes, planned skid roads and yarding corridors, or adjacent to landings.

h. Terrestrial Wildlife

Objective 1: Provide Wildlife Trees & Habitat for Cavity Dependent Species

(1) Retain all existing down coarse woody material.

(2) All hardwoods (live or dead) would be retained where available and protected to the greatest extent possible from disturbance. If any hardwoods need to be felled for safety reasons, they would remain on site to provide for course woody material.

(3) A minimum of 2 dead/dying trees (snags) per acre would be retained on average across each project unit to meet RMP guidance for maintaining snags well-distributed across the landscape (RMP, p. 40). Retained snags would generally be grouped in clusters and would reflect the species mix of the original stand. Emphasis would be placed on retaining the largest snags available (RMP, p. 39, 47). If a retention snag needs to be felled for safety concerns it would be left on site.

(4) A minimum of 120 linear feet of coarse woody debris logs (on the ground or standing for future recruitment if not enough exists on the ground) per acre greater than or equal to 16 inches in diameter and 16 feet long (meeting decay class 1 and 2 logs) would be left per the RMP management direction. Post-salvage sale monitoring would occur to determine if treatment units are deficient of coarse woody debris upon completion of the harvest. The BLM would use service contracting to fell future recruitment trees to make up any deficits. All existing coarse wood material would be retained where available and protected to the greatest extent possible from disturbance.

(5) Even spacing of the retention snags is not required; however, they would generally be clustered in groups when possible. These trees are meant to act as wildlife trees/snags and future coarse woody debris on the harvested areas. The untreated clusters would be selected in a location within the unit to avoid felling the trees to meet federal and Oregon OSHA regulations.

(6) Cull logs would be left on site as coarse woody debris and to provide organic material unless they must be moved for operations or to mitigate a safety hazard.

(7) Generally, live trees without a high probability of mortality would be retained. However, some live trees may be felled and extracted for cable yarding operations, skid trails, landing construction, and road construction or renovation. Yarding corridors and skid trails through patches of live trees would be minimized to reduce effects to live trees and any patches of live forest stands. However, all potential yarding corridors and skid trails were factored into the effects to habitat for each unit.

(8) Trees with heavy branching or poor form would be targeted for retention because they provide habitat for numerous wildlife species. Snags that exhibit a greater chance of remaining on the landscape and surviving future windstorms would also be targeted for retention, where safety allows.

(9) For the first year of salvage, operations would not begin prior to May 15th, so that black-backed woodpecker surveys can be conducted. Known black-backed woodpecker nests would be protected until fledging is confirmed (approximately July 31st). This seasonal restriction would be waived if no presence is detected by May 15th or no nesting is confirmed by May 31st. If nesting is confirmed, the nest tree will receive a 0.40 mile radius buffer until fledging is confirmed or nesting failure has occurred. Known nests would be monitored weekly to determine fledging status. If salvage continues after the first year of operation, the seasonal restriction would be applied to project activities starting March 15th (start of breeding season) so surveys can be conducted where project activities have not yet been completed. The seasonal restriction could be waived by the same criteria described above. If nesting is confirmed, the above buffer would be applied and monitoring would also occur.

Objective 2: Protect Wildlife Species Which Have Mandated Protections

(1) A variety of raptors occur across the landscape within, or near, the Project Area. Any nest sites located prior to or during harvest would be protected from human disturbances that may disturb or interfere with nesting using a 0.25 mile seasonal buffer between approximately March 1st and July 15th (USDI 1995, p. 48).

(2) If a northern spotted owl is located prior to or during salvage operations, operations would be suspended to allow biologists to determine occupancy (single, pair) and reproductive (nesting, not nesting, fledglings present) status. If nesting is confirmed the following restrictions would be implemented:

- Seasonally restrict habitat modifying activities from March 1st to September 30th within 0.25 miles of known northern spotted owl nest sites.

(3) Work activities that produce loud noises above ambient levels would not occur within specified distances (Table 2-7) of any documented owl nest site during the critical early nesting period, March 1st and June 30th, or until two weeks after the fledging period. This seasonal restriction may be waived if protocol surveys determine the activity center is not occupied, owls are non-nesting, or owls failed in their nesting attempt. The distances listed in Table 2-6 may be shortened with U.S. Fish and Wildlife Service Level 1 Team concurrence if substantial topographical breaks or blast blankets (or other devices) would muffle sound between the work location and nest sites.

(4) The BLM Resource Area Biologist may extend the restricted season until September 30th during the year of harvest, based on site-specific knowledge (such as a late or 2nd nesting attempt).

(5) Burning would not take place within 0.25 miles of documented spotted owl sites from March 1st through June 30th, or until two weeks after the fledging period, unless substantial smoke would not drift into the nest patch.

Table 2-6. Mandatory Spotted Owl Restriction Distances

Activity	Zone of Restricted Operation
Heavy Equipment (including nonblasting quarry operations)	105 feet
Chain saws	195 feet
Impact pile driver, jackhammer, rock drill	195 feet
Small helicopter or plane	360 feet*
Type 1 or Type 2 helicopter	0.25 miles*
Blasting; 2 pounds of explosive or less	360 feet
Blasting; more than 2 pounds of explosives	1 mile

* If less than 1,500 feet above ground level

(6) Forest management activities would be prohibited within a 1.0 mile radius of active gray wolf dens and rendezvous sites from April 15th through August 31st. Prior to the spring, communication between U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife, and the BLM will occur to determine if any wolf activity has expanded or moved into the Project Area.

i. Botanical Resources

Objective 1: Minimize the spread of noxious weeds

(1) Clean all equipment prior to entry on BLM-managed lands. Cleaning is defined as removal of dirt, grease, plant parts, and material that may carry noxious weed seeds onto BLM-managed lands. Cleaning prior to entry onto BLM-managed lands may be accomplished by using a pressure hose.

(2) Prior to initial move-in of any equipment, and all subsequent move-ins, the operator would make the equipment available for BLM inspection at an agreed upon location off federal lands.

(3) Seed and straw used for rehabilitation, decommissioning, winterization, covering bare soil, and post treatment re-vegetation activities throughout the Project Area would be weed-free species mixtures approved by the BLM project botanist. All seeding and mulching would be contingent on availability of materials.

(4) Known noxious weed infestations in the Project Area, along haul routes, and at rock sources, would be treated contingent upon available funding and resources.

Objective 2: Protect Plant Species Which Have Mandated Protections

(1) If new Special Status plant sites are found during implementation, the BLM project botanist would prescribe appropriate protection measures based on species, proposed treatment, site-specific environmental conditions, and available management recommendations.

j. Recreation and Public Safety

- The Purchaser shall provide sufficient warning signs to control traffic on all major haul roads where they pass through the contract area whenever harvest operations are occurring.

k. Rangeland Resources/Grazing

Objective 1: Protect Rangeland Improvements

(1) During logging operations, use of techniques such as directional falling will be used to prevent damage to fences, cattle guards, livestock watering developments and other improvements.

(2) If damage to range improvements does occur, the BLM shall be notified and proper repair or replacement will occur within 2 weeks of the completion of logging activities. Proper repair of fences and gates includes keeping wire properly attached to posts, splicing or replacing broken wire in kind, repairing structures such as corners, stress panels or gates, and any other work necessary to keep improvements functional. Repair or replacement of structures, such as stress or corner panels, gates, and water developments requires pre-approval by BLM staff. Repair or cleaning of cattle guards damaged or filled with sediment by logging activities will require approval of BLM engineering staff for structural integrity and public safety compliance.

l. Cultural Resources

Objective 1: Avoid Impacts and Protect Cultural Resources

(1) Archaeological sites eligible to the National Register of Historic Places and paleontological sites occurring within activity areas would be flagged for avoidance or would otherwise be mitigated in consultation with the State Historic Preservation Office and identified to the operator/BLM Ashland Resource Area Timber Manager mapped as reserve areas where no activities are allowed. Site flagging would be placed 25 feet from the site perimeter. No disturbance would occur in the buffered areas.

(2) If avoidance is not possible, BLM in consultation with the State Historic Preservation Office (SHPO) and Federally recognized Tribes would design appropriate mitigation measures to avoid adverse impacts to the identified site.

(3) Trees proposed for salvage removal would be directionally felled away from site boundaries for up to one tree length (160 feet) and no skidding would occur through the site boundary.

(4) If during project implementation the contractor encounters or becomes aware of any objects or sites of paleontological or cultural value on federal lands, such as fossils, historical or pre-historical ruins, graves, grave markers, or artifacts, the contractor shall immediately suspend all operations in the vicinity of the cultural value and notify the Authorized Officer of the findings. The project may be redesigned to protect the cultural resource values present, or evaluation and

mitigation procedures would be implemented based on recommendations from the Resource Area Archaeologist with concurrence by the Ashland Field Manager and State Historic Preservation Office.

4. Implementation Monitoring

The majority of actions described under the Proposed Action are implemented through a timber sale or service contract. Implementation monitoring is accomplished through the BLM's contract administration process. Project Design Features included in the project description are carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the daily operations of contractors to ensure that contract specifications are implemented as designed.

If work is not being implemented according to contract specifications, contractors are ordered to correct any deficiencies. Timber sale contract work would be shut down if infractions of the contract are severe. The contract violations would need to be corrected before the contractor would be able to continue work or timber harvest. If contract violations are blatant, restitution could be of a monetary value of up to triple the amount of damage.

D. ACTIONS AND ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

NEPA requires that Federal agencies explore all reasonable alternatives, and briefly discuss the reasons for eliminating any alternatives that were explored but not developed in detail (40 CFR 1502.14 (a)). The following alternatives or actions have been considered but eliminated from detailed study for the reasons stated and/or because they would not meet the objectives and Needs for this project.

Inclusion of a Citizen's Alternative, as Submitted during the Scoping process

Scoping comments received included submission of a Citizen's Alternative that would include the following:

- Remove only hazard trees;
- Decommission roads and do not construct any roads;
- Remove slash piles right after harvest so they are not left up to 2 years;
- To minimize soil impacts, do not machine pile slash. Just hand pile slash;
- Maintain 2% of the forest in early post-fire habitat and 40-50% of such stands unlogged. Where salvage logging occurs retain all snags greater than 20 inches dbh and half of all snags 12-20 inches dbh;
- Retain 30% of standing fire-killed vegetation to allow return of numerous snag-associated wildlife species;
- Replant conifer species at a low density and with irregular distribution; and
- Retain 10 snags per acre greater than 10 inches dbh with a focus on retaining the largest snags in the stand and pre-existing snags.

Remove Only Hazard Trees

This alternative would have eliminated any removal of trees within units.

Rationale for Elimination: This alternative was eliminated from detailed analysis as it would not meet the purpose and need identified for the Oregon Gulch Fire Salvage Recovery Project, which is to provide for the salvage harvest of timber killed or damaged by wildfire in support of providing a sustainable supply of timber that will provide for jobs and contribute to community stability. Additionally, this alternative was eliminated because it would not meet silvicultural needs for replanting and supporting a sustainable supply of timber in a timely manner as directed by the Medford District RMP. No treatment within stands would not meet the purpose and need to contribute to safety in the project by leaving varying types of hazards such as danger (hazard) trees

and the existing conditions may increase future fuel loading, as well as the potential for re-burn in some areas.

No New Road Construction

This alternative would have eliminated any new road construction needed (including temporary) to improve vehicle access for the purpose of managing forest stands**.**

> ***Rationale for Elimination:*** The RMP directs that all silvicultural systems (forest thinning strategies) applied to achieve forest stand objectives would be economically practical (ROD/RMP p. 180; PRMP/EIS p. 2-62). The elimination of any new road construction would have required unit 1-1 to be helicopter yarded which would have made it uneconomical to harvest this unit otherwise accessed by proposed new temporary road construction. An economic comparison for unit 1-1 was prepared to compare the cost of tractor logging with road construction versus helicopter logging without road construction. Current prices and costs were used for this comparison. The economic comparison showed that tractor logging with road construction would cost approximately $78,735.00 while helicopter logging without the 0.60 mile of temporary road construction would cost approximately $219,495.00. The difference in logging cost is approximately $140,760.00. The value of the logs at the landing for both methods would be approximately $233,305. Tractor logging with road construction would result in net gain of approximately $154,570.00. Helicopter logging without road construction would result in a net gain of approximately $13,810.00. Therefore, requiring helicopter yarding of this unit would have challenged the overall economic feasibility of the sale, and dropping the unit altogether would not have been consistent with RMP direction for managing units for sustained timber production. An additional 0.10 miles of temporary road is proposed under Alternative 2 to reduce the amount of disturbance in Riparian Reserves. Not constructing this 0.10 mile of temporary road would have made necessary the construction of approximately ½ acre (21,780 square feet) of landings in riparian reserves. By constructing narrow roads (about 12 foot in width) (6,336 square feet) to move the landings outside of the Riparian Reserve, disturbance is reduced in the Riparian Reserve by moving landings out of Riparian Reserves.

No Road Construction in Riparian Reserves

This alternative would not constructed new roads (including temporary) in Riparian Reserves.

> ***Rationale for Elimination:*** Less than 0.10 miles of temporary road is proposed under Alternative 2 to reduce the amount of disturbance in Riparian Reserves adjacent to three units. Not constructing this 0.10 mile of temporary road would have made necessary the construction of approximately ½ acre (21,780 square feet) of landings in riparian reserves. By constructing narrow roads (about 12 foot in width) (6,336 square feet) to move the landings outside of the Riparian Reserve, disturbance is reduced in the Riparian Reserve by moving landings out of Riparian Reserves.
>
> The IDT evaluated the feasibility of salvaging the units using helicopter yarding. As mentioned above requiring helicopter yarding of these units would have challenged the overall economic feasibility of the sale and dropping the units from consideration would not have met the purpose and need of this project which includes providing a timely post-fire salvage recovery and replanting to reestablish healthy, growing forests for a sustainable supply of timber in compliance with the objectives and management actions/direction for Matrix lands (USDI 1995, pp. 38-39, 72-73, 186).

Remove Slash Immediately after Harvest

This action was requested to ensure slash was removed immediately to reduce fire hazard.

> ***Rationale for Elimination:*** This action was eliminated from detailed analysis because post-harvest fuel model will be low fire hazard and immediate removal of slash does not warrant expense of treating. Post-activity fuels treatment is normally an important component of commercial harvesting because it can increase the existing fuel loading (fire hazard). However, due to the intensity of the Oregon Gulch Wildfire, there is very little organic material present and the proposed salvage is not expected to the change the fuel model. The fire hazard would remain low due to the low tonnage of surface fuels and the absence of ladder and aerial fuels. Therefore post-activity fuel treatments are not needed for this project. Should there be any debris at the landing sites, it would be chipped, removed for biomass, made available for firewood, or piled and burned. Any landing slash would need to cure/dry before it could be burned efficiently and burning would need to occur during periods of wet weather, so the burning or removal of slash immediately could not occur. Any biomass removal opportunities would be encourage but are dependent on the markets for chip material and cannot be guaranteed.

Northern Spotted Owl Recovery Action 12 - Maintain 2% of Forests in Early Post-Fire Habitat and 40-50% of Stands Unlogged

> ***Rationale for Elimination:*** There are no percentages for retention noted in Recovery Action 12. This recovery action is intended for spotted owl designated critical habitat, which is not present in the Planning Area. This recovery action's purpose is to maintain older structures for the northern spotted owl in lands where management is focused on the development of spotted owl habitat. There is no spotted owl habitat present in the Project Area and there is no live older structure to retain. However, the proposed salvage project would maintain trees with heavy branching and a minimum of 2 dead/dying trees (snags) per acre on average across each project unit, and 120 linear feet per acre logs $\geq$ 16 inches in diameter and 16 ft. long to retain larger structures.

Retain Snags >20 inches dbh and half of all snags 12-20 inches dbh. Retain 30% of Snags for Return of Snag Related Wildlife. Retain 10 Snags/Acre >10 inches dbh while Retaining the Largest Snags and Pre-existing Snags

> ***Rationale for Elimination:*** This action was eliminated from detailed analysis because it does not meet the purpose and need, which is to provide for the salvage harvest of timber killed or damaged by wildfire in support of providing a sustainable supply of timber that will provide for jobs and contribute to community stability. Retention of all snags greater than 20 inches and half the snags 12 to 20 inches would result in a 60 to 65 percent reduction in volume and associated value, yet the operator would be required to cover the same number of acres to salvage 50% of the snags 12 to 20 inches diameter. Additionally, the request to retain all snags greater than 20 inches, half of all snags 12 to 20 inches diameter would retain substantially more snags on the landscape and therefore would not have met the purpose and need to provide for safety of forest users, employees, contractors, fire suppression activities, and OSHA requirements. Therefore this action was eliminated from detailed analysis as it would not meet the purpose and need to recover timber value and provide for safety.
>
> The request to retain 30 percent of snags for return of snag related wildlife is being met in the Proposed Action Alternative which would retain 32% of black-backed woodpecker habitat within the perimeter of the Oregon Gulch Wildfire on the Medford District undisturbed. Therefore a separate alternative to retain 30 percent of the snags was not analyzed in detail as it would be nearly the same as what is analyzed under the proposed action alternative. As stated above, large snags and coarse woody debris would be retained to meet or exceed the guidelines of the 1995 Medford District Resource Management Plan (p. 39, 40, 47).

Replant Conifer Species at a Low Density with Irregular Distribution

Rationale for Elimination: Due to the natural variation of planting sites that includes rocky and/or thin soils, fallen snags, and coarse woody debris, tree spacing would be inherently heterogeneous under the Proposed Action. Natural mortality would further contribute to variable spacing. Beginning with a low planting density would not be effective in meeting the purpose and need to sufficiently re-establish healthy, growing stands in a timely manner.

Offer an alternative that is an ecological benefit to the fisher.

Rationale for eliminating from detailed analysis: Fishers are found in forest woodland landscape mosaics that include a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor. They will disperse and forage through a variety of habitat types within their home range but require relatively high canopy cover (Lofroth et al. 2010). Northern spotted owl (NSO) nesting, roosting, and foraging (NRF) is used as a surrogate for fisher habitat as it adequately describes suitable fisher denning and resting habitat because there is a direct correlation of key habitat features used to assess NSO habitat and fisher habitat (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). Using northern spotted owl habitat as a surrogate for fisher habitat has been accepted by the courts as a reasonable practice (*KS Wild v. US BLM*, Case No. 06-3076-PA, Order and Judgment 9/10/2007). All NSO suitable habitat was removed by the Oregon Gulch Wildfire; therefore, no habitat exists for the fisher. The likelihood that fishers utilized this area prior to the fire is low due to the extensive managed private timberlands.

Have "no harvest zones" on steep slopes with fragile soils, including areas of conservation and public health concern such as late-successional and old-growth forests, riparian areas, aquatic watersheds essential to drinking water municipalities, and roadless areas.

Rationale for eliminating from detailed analysis: The project does include no harvest zones for Riparian Reserves, a green tree retention area, and one dry draw. However, the project did not consider "no harvest zones" to the extent requested by this commenter. Slopes are flat to moderate within the project area. There are no overly steep slopes, late successional or old-growth forests, areas of conservation or public health concern, roadless areas, or essential drinking water municipalities; therefore this request is not applicable to the project area.

Proactively treat Riparian Reserves (RRs): Salvage and plant trees in RRs so thermal regulation provided by mature tree canopies will not be delayed and ACS objectives can be obtained.

Rationale for eliminating from detailed analysis: While the Resource Management Plan does not prohibit salvage in Riparian Reserves, the BLM decided not to salvage within Riparian Reserves to minimize sediment from entering streams in this high fire severity area. While the proposed action does call for three temporary spur roads (<0.1 mile) within Riparian Reserves (to keep landings outside of Riparian Reserves), trees felled to accommodate safety and operations of these spurs would be left on site to provide for soil stability and coarse woody material requirements. The BLM may consider planting in riparian areas under a separate environmental analysis.

Eliminate any limited operation periods and allow flexibility for a variety of equipment access: Delay to operations affect the merchantability/value of the materials to be removed. Allow flexibility for operators to design and implement mitigation measures so they can work throughout the year. Specify damage tolerance levels rather than firm restrictions to use equipment to its maximum efficiencies, such as quantifying residual stand damage thresholds, and use of processors and/or fellerbunchers.

Rationale for eliminating from detailed analysis: The complete elimination of limited operation periods was considered but not analyzed in detail in order to comply with Oregon Water Quality Standards, the Clean Water Act, and the Medford District BLM Resource Management Plan. Best Management Practices (BMPs) and Project Design Features (PDFs) are incorporated into the project design to "reduce nonpoint source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon Water Quality standards and to ensure project compliance with the federal Clean Water Act. Implementation of PDFs, in addition to establishment of Riparian Reserves, would equal or exceed Oregon State Forest Practice Rules. A review of forest management impacts on water quality concluded that the use of BMPs in forest operations was generally effective in avoiding significant water quality problems; the report noted that proper implementation of BMPs was essential to minimizing non-point source pollution (Kattelmann 1996)," (Final EA, p. 2-16). Application of BMPs and PDFs also ensure that the effects from project activities do not exceed those analyzed in the Northwest Forest Plan and Medford District Resource Management Plan.

Some activities, such as hauling on roads, road and landing construction, and cable yarding, would be authorized during dry conditions outside the dry season (May 15th through October 15th). "The Contracting Officer may approve a conditional waiver for hauling if it is determined that hauling would not result in road damage or the transport of sediment to nearby stream channels (based on soil moisture conditions, frozen conditions, or rain events).," (EA, p. 2-20). "This restriction [road and landing construction] could be waived under dry conditions and with a specific erosion control plan specifying measures to stabilize soils and protect water quality (e.g. rocking, waterbarring, seeding, mulching, barricading) in the event of forecasted rain anticipated to saturate soils to the extent there is potential for movement of sediment to streams, (EA, p. 2-18)."

Mechanical harvesting would be limited to designated skid trails to minimize effects to soils recovering from such a high severity fire. This approach would limit the amount of compaction within a unit to less than 12%, and the amount of combined soil productivity loss from compaction and disturbance to less than 5%. This would also reduce the total amount of ground that would experience topsoil loss or detrimental disturbance to less than 15% of the unit and the subsequent initial source of erosion from timber harvest activities.

Flexibility in operating periods and equipment use would be allowed to the extent that it would meet Oregon Water Quality standards, the Clear Water Act, and the effects would not exceed those analyzed in the Northwest Forest Plan and the Medford District RMP.

Develop an alternative that would salvage every economically feasible acre.

Rationale for eliminating from detailed analysis: The management of BLM-administered lands is not a singular objective. The Medford District RMP calls for salvaging fire killed and damaged timber consistent with the management objectives of other resources (RMP p. 72). Therefore, not every acre of fire killed and damaged timber was considered for harvest as it would not have been in compliance with the Medford District RMP. The areas that were collectively economical to harvest at this time were including in the proposed project while conserving habitat elements as defined by the 1995 Medford RMP.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

This chapter describes the present conditions of each affected resource, followed by a comparison of the estimated environmental effects of implementing the No Action Alternative and the Proposed Action Alternative(s). The Environmental Consequences portion of this chapter provides the analytical basis for the comparisons of the alternatives (40 CFR § 1502.16) and reasonably foreseeable other actions, and the reasonably foreseeable environmental consequences to the human environment of each alternative on the relevant resources. Impacts can be beneficial, neutral or detrimental, or some combination. The affected environment is described to the level of detail needed to determine the significance of impacts to the environment of implementing the Proposed Action. The analysis of the direct, indirect, and cumulative effects is organized by resource and the Analysis Areas for actions proposed under the Final EA vary by resource. Analyses for all resources include the Project Area, which encompasses the areas where actions are proposed for the Oregon Gulch Fire Salvage Recovery Project.

1. Areas: Project, Planning, and Analysis

The terms **Project Area, Planning Area** and **Analysis Areas** are used throughout this chapter. The following defines each term:

> The terms **Project Area** and treatment area are used interchangeably to describe where action is proposed, such as units where salvage is proposed and where temporary road construction or road improvements/maintenance are proposed.
>
> The term **Planning Area** is used to describe the overall area of consideration that was reviewed for the development of the Oregon Gulch Fire Salvage Recovery Proposed Action for the BLM Medford District (Map 1-2).
>
> **Analysis Areas** vary by resource and include those areas that could potentially be affected by the Proposed Action. In some cases the Analysis Area is confined to the Project Area and in others the Analysis Area extends beyond the Project Area.

2. Consideration of Past, Ongoing, and Reasonably Foreseeable Actions in Effects Analysis

The current condition of the lands affected by the Proposed Action is the result of a multitude of natural processes and human actions that have taken place over many decades. A catalogue and analysis, comparison, or description of all individual past actions and their effects which have contributed to the current environmental conditions would be practically impossible to compile and unduly costly to obtain. Ferreting out and cataloguing the effects of each of these individual past actions would be a time consuming and expensive task which would not add any clearer picture of the existing environmental conditions.

Instead of incurring these exorbitant costs in terms of time and money, it is possible to implement simpler, more accurate, and less costly ways to obtain the information concerning the effects of past actions, which is necessary for an analysis of the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." (See the definition of "cumulative impact" in 40 CFR § 1508.7). For the Oregon Gulch Fire Salvage Project, aerial photograph analysis and GIS databases were utilized in helping to determine past actions on both federal and private lands.

43 CFR § 46.115 states that when considering cumulative effects analysis, the agency must analyze the effects in accordance with relevant guidance issued by the Council on Environmental Quality (CEQ). As the CEQ points out in guidance issued on June 24, 2005, the "environmental analysis required under

NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." Use of information on the effects of past action may be useful in two ways according to the CEQ guidance: for consideration of the Proposed Action's cumulative effects, and as a basis for identifying the Proposed Action's direct and indirect effects.

The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." The importance of "past actions" is to set the context for understanding the incremental effects of the Proposed Action. This context is determined by combining the current conditions with available information on the expected effects of other present and reasonably foreseeable future actions.

Effects analyses completed for resources potentially affected by the Oregon Gulch Fire Salvage Recovery Project describe indicators of importance along with the spatial (Analysis Area) and temporal scale of importance for determining the effects of multiple actions (past, current, and reasonably foreseeable) on affected resources. As discussed above, the current condition assessed for each affected resource inherently includes the effects of past actions.

The analysis of the effects of other present and reasonably foreseeable actions relevant to the effects of the proposed action is necessary. How each resource analysis uses information concerning other ongoing or reasonably foreseeable activities is, however, dependent on the geographic scale of concern and attributes considered during each resource analysis.

Oregon Gulch Fire Salvage and Rehabilitation Project (Lakeview District) – Reasonably Foreseeable

The Klamath Falls Resource Area of the Lakeview District has made a decision to salvage log and plant approximately 1,650 acres, planting an additional 941 acres outside of salvage areas, constructing 0.3 miles of temporary road for unit access, treating 268 acres of medusahead rye (noxious weed) followed by seeding with native perennial grasses, and replacing a 1,500 gallon water tank for wildlife. The proposed project is located in T. 40 S., R. 5 E., Sections 31 and 35; T. 41 S., R. 5 E., Section 1, 3, 5-8, 11, 12, 15, and 17; and T. 41 S., R. 6 E., Sections 5-7 and 18.

Wild Gal Salvage Project (Lakeview District) – Reasonably Foreseeable

The Wild Gal Timber Sale was being harvested at the time of the Oregon Gulch Wildfire. The timber sale was approved as a salvage operation on 250 acres within the boundaries of the 546-acre timber sale under a categorical exclusion. The project is located in T. 41 S., R. 5 E., Sections 5 and 17.

Oregon Gulch Post-Fire Emergency Stabilization Rehabilitation Plan (Medford and Lakeview Districts) - Ongoing

These rehabilitation projects include stabilization efforts to minimize the effects of the wildfire on the landscape such as seeding and mulching bare soil areas, tree planting, creating coarse woody debris, repairing existing fences, constructing temporary fences, and repairing road facilities. Additionally, the Klamath Falls Resource Area of the Lakeview District is planning to use site-specific ground herbicide application to treat known populations of medusahead and other noxious weeds in the fire area.

Rangeland Grazing - Ongoing

Livestock grazing is a component of the Medford District's multiple-use program. The 1995 Medford District Record of Decision and Resource Management Plan (RMP) provide Management Objectives and Direction for Grazing on the Medford District. Livestock grazing will be managed in accordance with 43 CFR 4180.2 and *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington*

(USDI 1997). Grazing is to be maintained at levels listed in Appendix B of the 1995 RMP (USDI 1995, pp. 127-133), unless adjustments are needed to make progress towards meeting the Standards and Guidelines for Rangeland Health for Oregon and Washington.

Dixie Allotment

The Dixie Allotment is the only allotment that falls within the Planning Area on the Medford District. The Klamath Falls Resource Area of the Lakeview BLM District administers the BLM portions of the Dixie Allotment as it crosses the boundaries of both Districts. Within this allotment, grazing is permitted from May 1-August 15.

On March 16, 2015, the lessee of the Dixie Allotment voluntarily signed an agreement with the Klamath Falls Resource Area to suspend livestock grazing, in part, on a temporary basis, in response to the Oregon Gulch Wildfire. The agreement was subsequently modified as part of a protest resolution on June 10, 2015. The lessee will rest the entire Dixie Allotment (burned and unburned) for one full year (2015). In 2016, grazing on the unburned portion of the allotment will not resume until monitoring data and/or professional judgment indicate that health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise, the rest period will be extended until the vegetation has recovered and resource management objectives are met. The burned portion of the allotment will continue to be rested during both years. If conditions are favorable to graze outside the fire area in 2016, the number of Animal Unit Months (AUMs) (one AUM is the amount of forage necessary for the sustenance of one cow or its equivalent (cow/calf pair) for a period of one month) available for use will be proportional to the number of BLM unburned acres versus the total BLM acres in the allotment (GIS analysis shows 24% of the BLM land in the allotment is unburned, therefore 24% of the total AUMs may be available). Forage availability in the unburned portion of the allotment (in addition to rangeland health standards) will be a determining factor as to whether and how many AUMs are authorized in 2016.

The lessee has agreed to take 320 AUMs of non-use within the Dixie Allotment for the 2015 growing season and 243 AUMs of non-use within the Dixie Allotment for the 2016 grazing year, resulting in authorized grazing of 77 AUMs or approximately 22 cow/calf pairs in 2016 if vegetation objectives for the unburned portion of the allotment are met as described above. Appropriate administrative actions to remove cattle in accordance with 43 CFR 4150 will take place if cattle graze on the Dixie Allotment in 2015 or on BLM burned lands within the allotment in 2016 (if grazing is authorized).

The Dixie Allotment is approximately 28,334 acres and is located in T. 39 S., R. 4 E., Sections 35 and 36; T. 39 S., R. 5 E., Sections 31-32; T. 40 S., R. 4 E., Sections 1-4, 9-16, 22-27, 33-36; T. 40 S., R. 5 E., Sections 5-8, 17-20, 29-32; T. 41 S., R. 4 E., Sections 1-4, 9-16; and T. 41 S., R. 5 E., Sections 5-8, 17-18. The allotment includes approximately 5,674 acres of BLM-administered land, of which approximately 3,397 acres are within the Medford District and about 2,277 acres are within the Lakeview District. On the Medford District, there are approximately 2,350 acres of the BLM-administered portion of the Dixie Allotment within the Oregon Gulch wildfire perimeter. Of those acres, approximately 1,672 acres were burned at a moderate or high severity.

Standard Road Maintenance and Hazard Tree Removal

Routine road maintenance to support the BLM's road infrastructure outside of fish-bearing streams is covered programmatically on the Medford District through a categorical exclusion. It includes activities such as blading and shaping roads, cleaning ditches, catch basins and culverts, cutting brush and removing vegetation from the roadway, repairing surfacing, removing slides, and installing and repairing waterbars and waterdips.

Hazard tree removal, covered programmatically on the Medford District through a categorical exclusion, is the felling of trees that pose a safety hazard to road users because they are likely to fall across a road. Tree felling is limited to 1.5 tree lengths on either side of open or seasonally open road systems, or adjacent to developed facilities or private property. Trees will either be left on site as coarse woody debris or removed; removed trees are used for habitat restoration projects.

Activities on Private Lands

It is assumed that all private forest lands with merchantable timber within the Oregon Gulch Fire would be harvested within the next year. The actual timing of any timber harvest on private land is dependent on many factors, including valuations based on supply/demand, ownership, etc. However, the assumption that the timber on private land will be harvested within the next year is based on the time period the burnt timber retains its maximum value. Most areas that could be harvested on private lands are accessible by existing roads, therefore, it is unlikely that new road construction would occur. Following harvest, the lands would likely be planted.

B. SILVICULTURE

1. Affected Environment

The scale of analysis for vegetation resources is the area proposed for salvage, associated road work, and a designated skidding corridor outside a unit. Collectively, this is the affected area of vegetation from the Oregon Gulch Fire Salvage Recovery Project to support tree establishment and growth on BLM-managed land.

a. Abiotic Condition

The elevation in the Oregon Gulch Fire ranges from 3,500 feet to 5,000 feet. The Medford BLM portion of the fire is relatively flat and dry. Temperatures range from zero degrees Fahrenheit (°F) at upper elevations in January to 110 °F in the interior valleys in August. Extended summer drought is common. Average annual precipitation varies from near 40 inches per year in the interior eastern valleys to approximately 49 inches per year in the western portions. Approximately 10% of the yearly total precipitation falls from June to September.

Precipitation patterns have an effect on vegetation growth, vigor, and its response to disturbances such as fire. The National Oceanic and Atmospheric Administration (NOAA) in Medford, Oregon recorded 0.8 inches (20 mm) of precipitation for the month of January 2014; the seventh driest January in a 103-year record. On the state ranking map for the last 12 months, Oregon had the fourth driest February-January on record and, during August 2013-January 2014, had the ninth driest August-January on historical record, adding that "snowpack in California and Oregon has been abysmal so far this season and reservoirs have been in severe decline." From the November 2013 to January 2014 period, Oregon was the third driest state in the 1895-2014 precipitation pattern record (NOAA 2014). These droughty conditions, especially on south facing slopes and lower sites, can have lasting effects on the landscape, causing widespread stress to individual trees and their ability to recover from fire damage.

b. Pre-Fire Condition

Vegetation Pattern

This section describes the pre-fire condition within the scale of analysis. The Oregon Gulch Fire occurred in mature mixed conifer stands of dry Douglas-fir and pine forest as well as oak woodlands. Forest management and fire (and later, fire suppression) have greatly affected historical vegetation patterns. Prior to European settlement the area was characterized by more frequent, low intensity fires in the area, resulting from both lightning and Native American ignitions (USDI 1999b, p.11). Active fire exclusion has allowed the area to grow into dense forests.

The landscape of southwestern Oregon is divided into six distinct vegetation zones which are primarily established along lines dictated by elevation and temperature (Franklin and Dyrness 1973). The Oregon Gulch Fire is located primarily in the Mixed Conifer Zone, which is characterized by an overstory of primarily Douglas-fir, sugar pine, and incense cedar. A hardwood component is also present on south aspects and dry sites. Moisture and depth of soil are selectors for species distribution and abundance.

Atzet and Wheeler (1984) said "The last group of associations has no modifier. They are simply the Douglas-fir associations. In terms of plant growth, these are the poorest of the Series. Shallow soils with low water holding capacity, high evaporative demand, and high radiation loads combine to significantly limit growth. Silvicultural techniques that reduce the effects of these problems will increase survival and growth. Directly increasing available water is presently economically impossible, but indirect measures such as reduction of radiation loads, evaporative demand, and competition can be applied beginning with the stand prescription."

Fire suppression has also allowed needles, bark, and limbs of trees to accumulate at tree bases raising the chances for fires to burn more severely and reside longer to kill cambiums and roots. Where fire has been excluded for 50^{+} years, hardwoods have likely developed large burls that could vigorously resprout after disturbance (Tappeiner et al. 2007, 285). Section 3.C of the Final EA discusses fire and fuels in greater depth including the existing post-fire condition, fire severity, and other effects on vegetation.

Insects and Diseases

Bark beetles, woodborers, and fir engravers have been detected inside the Oregon Gulch Fire boundary. Several areas of mountain pine beetle and western pine beetle infestation were detected within the Project Area. Douglas-fir engravers were in pole-sized Douglas-firs approximately a mile to the east of the Project Area but within the Oregon Gulch Fire boundary in 2012 and at several locations within the Project Area in 2014 (SWOFIDSC 2011-2013, WWETAC 2014). The fir engraver can cause patch, branch or top kill of Douglas-firs, as well as mortality, especially in root disease pockets or during periods of drought. It is possible that the very dry spring through fall last year may have stressed those Douglas-firs sufficiently to induce fir engraver attack (SWOFIDSC 2014).

The Southwest Oregon Forest Insect and Disease Service Center (2014) provided the following discussion:

> The probability that fire-injured trees will be infested by insects varies widely among fires depending on several factors. These include tree ages, site quality, time of year of fire, fire intensity, weather conditions in the years after a fire, and whether or not insect populations are high in stands adjacent to those involved in a fire. It is therefore important to estimate insect population size within the footprint of or adjacent to the Oregon Gulch Fire. Aerial detection surveys are flown annually over the forested areas of Oregon, mapping recent tree mortality and other current year insect, tree disease and abiotic impacts visible from low flying, fixed wing aircraft. This data can indicate the presence and relative annual trend in abundance of insects such as bark beetles, whose killed hosts are detectible due to their faded tree crowns. While not exactly quantitative, such aerial reconnaissance is an important monitoring tool.

Bark beetles are not restricted to hosts that are dying and there are instances of population increases within fires that then disperse subsequent generations into lightly burned or adjacent green stands (SWOFIDSC 2014). Bark beetle outbreak can occur when there is an abundance of favorable breeding material resulting from wildfires (Figure 2) and other events (Filip et al. 2007). Bark beetles are strongly associated with attacks on large fire-injured trees in dense stands with moderate levels of bole char and light to moderate levels of crown scorch (Hood et al. 2007; Fettig et al. 2007; Parker et al. 2006). Woodborers, particularly the flatheaded fir borer (*Phaenops drummondi*), although less aggressive than bark beetle species, commonly breed in felled trees or those weakened by fire, defoliation, drought, or other types of disturbance.

The flatheaded fir borer is a primary cause of Douglas-fir mortality in southwestern Oregon, including fire-affected hosts (SWOFIDSC 2014). The flatheaded fir borer prefers infesting wounded, diseased, dying, or fire-injured conifer hosts, causing its greatest impacts on Douglas-fir (SWOFIDSC, Shaw et al., 2009, 5), attacking trees in a wide range of diameters. The flatheaded fir borer does not wait for the tree to die, but rather eats the cambium of a live tree which inhibits the tree from producing new phloem, subsequently killing the tree. Shaw and others (2009, p. 15) state that management recommendations to avoid the detrimental effects of subsequent post-fire insect related damage include removing fire-damaged trees at high risk of attack (i.e. trees with more than 50% crown scorch).

The mountain pine beetle, *Dendroctonus ponderosae*, and the flatheaded fir borer were active at low levels within the fire area prior to the burn (USDA et al. 2014). Even at low levels, Larsson and others (1983) suggest that comparatively few mountain pine beetles are needed to kill low vigor ponderosa pine trees. Flowers and Kanaskie (2007a) add that "the mountain pine beetle (MPB) is the most destructive tree-killing beetle in Oregon." Because it can be difficult to differentiate MPB attacks from those made by western pine beetle *(D. brevicomis)* and because both species infest the same pine, some of these aerial survey observations could include western pine beetle. Western pine beetle and flatheaded fir borer are both known to readily infest fire-injured hosts.

c. Post-Fire Condition

The scale of analysis for vegetation resources is the Project Area as it is the affected area of vegetation from the Oregon Gulch Fire Salvage Recovery Project to support tree establishment and growth on BLM managed land.

Vegetation Pattern

The Oregon Gulch Fire burned with high to moderate soil burn severity (Map 3-1) which denuded large areas of trees and vegetation. The fire significantly impacted wildlife habitat, created soil and water stabilization issues, exposed cultural sites, created health and safety issues through the formation of snags and obliteration of road signs, and left the landscape susceptible to noxious weed invasion.

According to Fowler and Sieg (2004), most post-fire tree mortality to will occur by the end of the second year following fire while noting that "mortality was higher for trees with greater than 50 percent crown scorch volume and greater than 75 percent basal girdling." Post-fire mortality is typically expected in fire-injured trees with low amounts of green foliage, deep cambium burns around the boles of trees, and in weakened trees susceptible to mortal insect attack. Tree survival will depend on tree size, amount of crown scorch, extent of cambium injury, and proximity to active bark beetle populations. Shrub dominance and competition is expected to be moderate to high for the next 10 to 20 years.

In the Oregon Gulch Fire Salvage Recovery Project Area, there is a lack of green trees able to produce a viable cone crop. Dispersal distances from the few remaining green trees are inadequate to establish regeneration across the Project Area. The majority of Douglas-fir seed is dispersed within 330 feet of parent trees. Douglas-fir seed is produced approximately every eight years. Ponderosa pine has large, heavy seeds with relatively small wings that disperse fairly close to parent trees (1 to 1.5 times tree height). Ponderosa pine seed is produced almost every year, with abundant crops every two to five years (Boldt and Van Deusen 1974). While the remaining green trees with undamaged cones would provide a seed source for the establishment of conifers, natural or artificial regeneration from seed is unreliable for timely reforestation (Uchytil 1991, Burns and Honkala 1990). Studies on the Biscuit and Timbered Rock Fires have shown that post-fire natural regeneration was highly variable in density and strongly dominated by single species (USDA/USDI 2014).

Thick-barked large diameter conifers with high canopy base heights and shaded understories in southwest Oregon are more fire resistant. Through management intervention, development of large fire-resilient stand structure can be accelerated; a no-treatment alternative that relies on natural regeneration would slow this process by decades. Salvage harvesting would expedite tree planting and ensure that more fire resilient species become established and protected from future fire (Tappeiner et al. 2007; 289, 256). Planting trees allows the establishment of a diverse species mix with an appropriate genetic makeup. The Oregon Gulch Fire Salvage Recovery Project Area has blister rust and seedlings in the area can be detrimentally affected by heavy frost.

Moderate to high burn severity acres in the Oregon Gulch Fire Salvage Recovery Planning Area amounted to approximately 1,700 acres on BLM lands. Plantations experienced higher severity than other burn areas, likely due to lower canopy base heights.

In areas of severe vegetative mortality, the successional pathway of forest stands has been reset to early seral conditions. With early seral conditions, the live tree crown cover is open to non-existent; dead structural stand components are present; and shrub, forbs, and grass dominance and competition is expected to be moderate to high for the next 10 to 20 years or longer.

The remaining green trees with undamaged cones would provide a limited seed source for the establishment of conifers. However, the reliance on natural seeding is neither guaranteed nor predictable and depends on burn severity, proximity to seed source, the variety of abiotic factors that stimulates seed proliferation and germination (moisture, temperature, wind, seedbed etc.), and biotic factors of post-fire colonization that can result in intense competition and delayed reestablishment. Germination of Douglas-fir occurs readily on exposed mineral soil. Douglas-fir cannot survive, however, under the dense shade cast by competing understory vegetation (Uchytil 1991). Ponderosa pine and sugar pine require similar conditions for regeneration.

Competition is accentuated on dry sites where shrubs inhibit conifer establishment, even when germinating together (Tappeiner et al. 2007, 288). Tree planting during this stage accelerates the process of conifer establishment and ensures a greater diversity of conifer species (USDA/USDI 2014). In southwest Oregon, natural regeneration strongly dominated by Douglas-fir is expected at varying densities (USDA/USDI 2014). Total crown kill of needles, buds, and cones of overstory trees greatly reduces post-fire seeding. The availability of a seed source is limited to areas adjacent to green trees within and outside of the fire perimeter; in some instances, green trees may be ¼ mile away or more.

Fire damage stimulates new vegetative growth, particularly through sprouting. However, conifers in southwest Oregon lack the ability to re-sprout. Tappeiner et al. (2007, p. 287-288) states that the larger and denser the cover of hardwoods and shrubs before the fire, the more likely they would quickly create a dense canopy afterward. Frost and disruption from gophers or other animals can affect the ability for conifers to re-establish. However, active forest management such as grubbing, scalping, and brushing could help minimize shrub competition, and the development of thick understory that would impede tree growth and survival.

The Jenny Creek Watershed is adjacent to the Copco Watershed and given its topographic and vegetative similarities to the Project Area, recommendations in the Jenny Creek Watershed Analysis (USDI 1995) can be applied to the Oregon Gulch fire area. The Jenny Creek Watershed Analysis (USDI 1995) lists several goals for the active recovery of BLM-administered land in the Jenny Creek Watershed. In order to achieve cool stream temperatures, it is recommended to plant native species from local genetic stock to create a stand that will result increased tree height and density. To achieve channel restoration, it is recommended to promote riparian conifer growth for future large wood recruitment and to encourage wood vegetation versus annual species and to increase slope stability. These goals are especially pertinent after a large scale disturbance that denuded the landscape of vegetation such as the Oregon Gulch Fire.

Insects and Diseases

Disturbances in established forest stands invite secondary disturbance agents. Because fire-injured trees have a reduced ability to produce defensive compounds to resist attack, they are at greater risk of damage or mortality from bark beetles or woodborers.

Most insect activity in fire-affected areas occurs during the first three years post-fire, with the majority of activity occurring in the first year or two (SWOFIDSC 2014). Trees can be infested and killed by bark beetles and woodborers as many as four or five years post-fire. Douglas-fir, sugar pine, and ponderosa pine are the most susceptible species to insect infestations in the Project Area. If populations of insects increase to high levels, the next generation can infest trees of normal vigor as well as low-vigor trees. Host-specific insects including the flatheaded fir borer , Douglas-fir beetle, fir engraver, western pine beetle, pine engraver, other *Ips* species beetles, red turpentine beetle, and mountain pine beetle, will be active and may attain elevated populations in burned trees.

Woodborers and ambrosia beetles are early players in the ecological processes of decomposition and nutrient recycling; they are often referred to as the cleanup crew. "They can severely degrade the quality and value of wood intended for our use by creating tunnels and introducing staining and decay fungi" (SWOFIDSC 2014). Infestation of severely burned trees by woodborer species, as well as by ambrosia beetles is already in progress in the Project Area. These insects are part of the normal decomposition process that is primarily mediated by decay fungi. Other than the flatheaded fir borer, other woodborers and ambrosia beetles are not known to kill trees, depending instead upon dying and dead trees for habitat. However, the value of salvaged timber infested by these organisms decline significantly as their feeding continues.

Bark beetles and fir engravers have been detected inside the Project Area. Several areas of mountain pine beetle and western pine beetle infestation were detected within the Project Area prior to the fire. Douglas-fir engraver was in pole-sized Douglas-firs approximately a mile to the east of the Project Area but within the Oregon Gulch Fire boundary in 2012 and at several locations within the Project Area in 2014 (SWOFIDSC 2011-2013, WWETAC 2014). The fir engraver can cause patch, branch or top kill of Douglas-firs, as well as mortality, especially in root disease pockets or during periods of drought. It is possible that the very dry spring through fall last year may have stressed those Douglas-firs sufficiently to induce fir engraver attack (SWOFIDSC 2014).

The pine engraver or other *Ips* species and red turpentine beetles attack weakened ponderosa and sugar pine. The mountain and western pine beetles attack pine that are under stress, especially when they are damaged by fire, and their attacks result in the death of their hosts. Large, concentrated populations of western and mountain pine beetles are known to attack and kill otherwise healthy pines. Western pine beetle is also more successful and active in killing hosts during years with below normal precipitation; it is known to be attracted to fire-affected trees and will be an important species to monitor (SWOFIDSC 2014). Unlike with western pine beetle, fires are not known to induce mountain pine beetle population increases. Existing populations, however, have been known to attack pines with moderate levels of fire injury, especially sugar pine (SWOFIDSC 2014).

Snags and Coarse Woody Debris

Coarse woody debris provides habitat for wildlife, invertebrate, microbial, and fungal species, as well as important ecological functions such as moisture retention, soil stabilization, and nutrient recycling. The amount and decay class of woody debris reflects the stage of stand development. In a natural cycle, two stages (stand initiation and old growth) typically have the greatest amounts of coarse woody debris.

The wildfire created an abundance of snags across the Oregon Gulch Fire, which will provide cavity nesting habitat for a variety of wildlife species. However, snags pose a safety hazard to humans with snag fall and fragmentation that occurred during and immediately after the fire. There will be continued significant tree and branch failure in the months and years following the fire unless intervening management action reduces the number of snags.

2. Environmental Consequences

a. Alternative 1 – No Action

Vegetation Pattern

The Oregon Gulch Fire burned at moderate to high severity on approximately 1,700 acres of BLM-administered lands on the Medford District, Ashland Resource Area. Timber investments would not be recovered if salvage of dead and dying trees fails to occur within 1 to 2 years. Under the No Action Alternative, the timber would become un-merchantable due to rot. Additionally, a lack of salvage operations would delay replanting efforts, further delaying the growth of healthy, sustainable forests. Mortality from fire is not confined to the immediate impact of the burn. Tree survival would depend on tree size, amount of crown scorch, extent of cambium injury, and proximity to active insect populations.

Fryer (2008) provides the following observation that hardwoods and shrubs:

> …are likely to dominate post-fire succession for decades in areas where conifer seed sources were greatly reduced by wildfire, especially if re-burns occur before early-seral conifers become large enough to resist fire damage.

Tree planting, monitoring, and follow-up treatments may not occur due to safety hazards posed by the large numbers of snags. When overhead hazards are not reduced, tree planting would become unsafe for tree planters or may not occur at all.

The moderate to high burn severity on BLM lands in the Planning Area (approximately 1,000 acres) limits the available conifer seed source available for natural regeneration of conifers. Because the likelihood of tree planting diminishes with Alternative 1, no action would result in a higher proportion of hardwoods and shrubs than conifers, with a lower proportion of drought- and fire-resistant conifer species. Without prompt establishment of desired species across the landscape, regeneration targets and timeframes are less likely to be met (USDI 1995, p. 184). A no action scenario allows nature to take its course, which runs the risk of delaying or not achieving long-term sustained growth and yield objectives as well as meeting species diversity goals and key watershed protection. Without conifer tree planting, re-establishment of a conifer stand through natural regeneration could be delayed for 100 years or longer.

Natural regeneration of conifers would consist predominantly of Douglas-fir whereas planted seedlings would provide for greater diversity of conifer species (USDA/USDI 2014). Because fires facilitate the rapid establishment of hardwoods and shrubs, timely management in the first one to two years post-fire is critical in the future outcome of the forest. Alternative 1 would make it increasingly difficult with each post-fire year to regenerate a diversity of conifer species to assure regeneration targets and timeframes in addition to survival and species diversity goals are met per RMP direction (USDI 1995, p. 184).

Figure 3-1. Post-fire shrub vegetation in the Klamath-Siskiyou Ecoregion, Southern Oregon. Source: Hibbs and Jacobs 2011.

To regenerate post-fire conifer sites in southwest Oregon, Fryer (2008) states that "the time and energy required to shift the dominance in favor of the crop tree species increases significantly with delays." The first few post-fire years are critical to the outcome of a recovering site. In a no-treatment scenario, natural establishment of conifer germinants may occur if a seed source is available. However, conifer ingrowth is neither predictable nor reliable to meet stocking objectives or ensure that regeneration standards and species composition are met.

A recent post-fire study in southwest Oregon showed that a marked decrease in abundance and stocking occurred at distances from a seed source greater than ¼ of a mile (USDA/USDI 2014). The study also found limited post-fire establishment of fire resilient conifers. Short-term effects of no-treatment would result in increased competition with desired conifer species from colonizing and re-sprouting hardwoods and shrubs. Relying on natural regeneration "results in the loss of the ability to use genetically-selected stock and the potential for delayed regeneration due to the unpredictability of seedfall (RMP 1995, 184)." Fire-resilient ponderosa pine only produce large seed crops every 4 to 8 years; during off-years competing vegetation can inhibit their establishment (Tappeiner et al. 2007, 283). Delays would therefore forestall the establishment of desirable species in a timely manner that meets regeneration targets and timeframes. Maintaining conifer productivity among competing shrubs and hardwoods becomes more difficult and costly with delays in salvage logging and site preparation - the longer the wait, the greater the cost. For example, the average cost per acre for planting where minimal site preparation is needed (using hoe to scrape a 2'x 2' planting site) is about $375/acre versus having to clear shrub layers using chainsaw and grubbing thick grass prior to planting which could average $600/acre including planting.

The effect of Alternative 1 would, be no harvesting of fire-killed and fire-injured trees. Alternative 1 also inhibits the ability to safely expedite tree planting to successfully establish, maintain, and monitor forestland to meet long-term sustained timber productivity objectives. Suspension of grazing in the Dixie Allotment is the only ongoing/reasonably foreseeable future action that is relevant to the analysis of silviculture/vegetation. The entire allotment will be rested for one year (2015). The burned portions of the Dixie Allotment will be temporarily suspended and rested from grazing for two full years (2015 and 2016). In 2016, the unburned portion of the allotment will not resume until monitoring data and professional judgment indicate that the health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered and resource management objectives are met. If grazing occurs in 2016, the AUMs would be reduced proportionally, authorizing 77 AUMs (equivalent to 24 percent of the area of the Dixie Allotment).

Insects and Diseases

Aerial detection surveys in 2012 and 2013 show scattered, low level bark beetle and flatheaded fir borer, and fir engraver populations in or near the Project Area. Although large-scale outbreaks are not anticipated, the very dry spring through fall of 2014 may have stressed the firs and pines sufficiently to induce insect attacks. "Western pine beetle is more successful and active killing hosts during years with below normal precipitation, as are many other bark beetles, especially fir engraver. Western pine beetle is known to be attracted to fire-affected trees and will be an important species to monitor" (SWOFIDSC 2014).

Most of the insect activity in fire-affected areas occurs during the first three years following the fire, with the majority of activity occurring in the first year or two. As previously noted, Shaw and others (2009, p.15) state that management recommendations to avoid the detrimental effects of subsequent post-fire insect related damage include removing fire-damaged trees at high risk of attack (i.e., trees with more than 50% crown scorch). Leaving all fire-damaged trees greater than 50% crown scorch would likely invite insect attacks that could then spread to trees not damaged by the fire. This could result in additional tree mortality within and beyond the fire perimeter that was not the direct result of the fire itself. The SWOFIDSC (2014) add that extant populations have been known to attack pines with moderate levels of fire injury, especially sugar pine. Alternative 1 would leave all host material for attracting insect infestations. This increases the likelihood of insects infesting and killing additional residual and adjacent green trees that would have otherwise survived the fire. This effect may last several years after the fire (Peterson et al. 2009). The potential for subsequent increases in insect-related mortality is an indirect effect of the No Action Alternative.

Snags and Coarse Woody Debris

The Medford District RMP (USDI 1995, p. 40) recognizes the need to retain snags at levels sufficient to support wildlife population levels. The Medford District RMP (p. 45) identifies a need to provide a

renewable supply of well distributed large down logs in a manner that meets the needs of species and provides for ecological functions. Depending on tree diameter and species, the rate of deterioration of fire-killed trees varies. Douglas-fir trees greater than 24 inches dbh are likely to remain standing for 10 years or more following the fire. Most twigs and branches would be absent after 5 years, with large limbs beginning to fall after eight to ten years. Smaller trees would decline more rapidly with breakage occurring within the first three to four years after the fire.

As snags begin to fragment and fall to the forest floor they would gradually provide important ecological functions such as moisture retention, structural complexity, soil stabilization, nutrient recycling, and dead tree shade for the reestablishment of conifer tree species. Fire-killed trees would contribute to snags and coarse woody debris amounts and would provide habitat for wildlife, invertebrate, microbial, insect predator, and fungal species.

Post-fire studies in Oregon have demonstrated that while fires provide a huge volume of snags, post-fire snag fall and fragmentation add so much wood to the forest floor that it constitutes a disturbance in itself (Brown et al. 2013), potentially exceeding pre-fire fuel accumulations by 20% (Tappeiner et al. 2007, 274). Snag fall and fragmentation could destroy emerging regeneration.

Under Alternative 1, post-fire deterioration as well as the failure of tops, limbs, and boles of snags would reduce access to planting sites, pose safety hazards to tree planters, and increase susceptibility of the stand to future severe fires (Tappeiner et al. 2007; 289, 256). The widespread retention of snags under Alternative 1 would impede safe and effective tree planting, monitoring of planting success, determination of the amount of natural regeneration, and follow-up maintenance and protection treatments, thereby inhibiting reforestation success.

Peterson et al. (2009) suggest that without treatment or removal of post-fire deadwood density, “high fuel loads may complicate the reintroduction of low-severity fire to the recovering forest.” Physical damage from insects can kill trees, which can then provide fuel for the next wildfire. Trees may remain standing for the first two decades, but will eventually fall to the forest floor.

Summary

Alternative 1 does not meet the Purpose and Need to provide a sustained yield of timber and to address safety hazards and future wildland fire potential (Section 1.C). Medford District Resource Management Plan Matrix land use allocation objectives of producing a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability (USDI 1995, p. 38). It also fails to meet the timber resource objectives of providing for salvage harvest of timber killed or damaged by events such as wildfire (USDI 1995, p. 72).

Salvage harvest is utilized primarily to recover mortality and anticipated mortality and to prepare inadequately stocked areas for safe tree planting. Under Alternative 1, the District would forgo the recovery of timber investments and economic recovery. It would also forgo safe access to work sites to safely implement and monitor tree planting, limit abilities to control future fire hazard, provide initial control of the site to channel resources to desired vegetation, adversely influence the plant community that redevelops on the site, and ensure the retention of site productivity (USDI 1995, p. 183). Because the likelihood of tree planting diminishes under Alternative 1, the prompt establishment of desired species to assure that regeneration targets and timeframes are met (USDI 1995, p. 184) diminishes as well. A no-action scenario allows nature to take its course, which runs the risk of delaying or not achieving sustained growth and yield objectives as well as objectives to grow large fire resistant long term woody structure for future wildlife components.

Without recovering dead wood densities, tree planting becomes far less effective, unsafe for tree planters, or may not occur at all. Short-term effects of no treatment would result in increased competition of desired species with colonizing and resprouting of hardwoods and shrubs. The first few post-fire years are critical to the outcome of a recovering site. In a no treatment scenario, natural establishment of conifer germinants may occur if a seed source is available. However, conifer ingrowth is neither

predictable nor reliable to meet stocking objectives and to assure that regeneration standards and species composition are met. A recent study in southwest Oregon showed that a marked decrease in abundance and stocking occurred at distances from a seed source greater than ¼ of a mile (USDA/USDI 2014). Limited conifer establishment is expected where hardwoods and shrubs, particularly aggressive tanoak, pioneer the post-fire site. The likelihood of tree planting diminishes where harvest does not occur as a site preparation treatment. Another long term effect comes from insect damage, whose populations can build, spreading into green trees. Moreover, recovering the economic loss of timber investments would be foregone.

A delay in or lack of tree planting would result in delayed watershed recovery. Currently, the landscape is denuded of vegetation, putting the streams at risk for high temperatures and increased channelization of the stream beds. To meet the objectives of the Jenny Creek Water Quality Restoration Plan (2011) a program of conifer planting is necessary.

Alternative 2 – Proposed Action

Vegetation Pattern

The silviculture prescription, consistent with RMP standards and guidelines, includes:

- Snags: Retain an average on a 40-acres basis of 2 snags per acre, ≥ 10 inches DBH
- Coarse Woody Debris (CWD): Retain a minimum of 120 linear feet (≥16 inches diameter x 16ft) per acre in decay classes 1 and 2. Where this management direction cannot be met with existing CWD, merchantable material would be used to make up the deficit.
- Tree planting a diverse conifer mix of sugar pine, ponderosa pine, Douglas-fir, and incense cedar at variable spacing with 340 trees per acre.

Through salvage logging, the Proposed Action improves access to planting sites and reduces the safety hazard to tree planters associated with burned snags. It also removes the future episodic contribution of large wood (as the snags fall and fragment), thus reducing the risk of destroying emerging regeneration and the risk of large fuel accumulation and future severe fires.

Alternative 2 would assist land managers in quickly regenerating a forested stand at the site, acquiring initial control of the site to channel resources to desired vegetation, influence the plant community that redevelops on the site, and ensure the retention of long term site productivity (USDI 1995, p. 183). Site preparation techniques in advance of tree planting would be used to provide physical access to planting sites, provide initial physical control of the site, channel the limited resources on the site into desired vegetation, and influence the developing plant community to insure site productivity (USDI 1995, p. 183). Salvage of fire-killed or damaged trees would improve access for tree planting (Tappeiner et al. 2007, 256). The prompt establishment of desired species to assure that regeneration targets and timeframes are met (USDI 1995, p. 184) is more likely to occur in Alternative 2. Removal of trees would be accomplished using tractor and cable logging systems. To facilitate operations, 0.6 miles of temporary roads are proposed.

Tree planting would be conducted on 683 acres using a genetically appropriate and diverse mix of sugar pine, ponderosa pine, Douglas-fir and incense cedar. This includes the initial planting of nursery seedling stock after site preparation has been completed on a harvest unit. By planting rust-resistant sugar pine and frost-resistant Douglas-fir, seedling mortality is reduced and species diversity is increased.

In most cases, the entire unit would be planted in late winter or spring of 2017. For Douglas-fir, ponderosa and sugar pine, and incense cedar bare root nursery stock. Improved seed would be used for both Douglas-fir and sugar pine. The sugar pine seedlings would be rust-resistant and the Douglas-fir seedlings have shown increased frost resistance in local trials.

Often included with tree planting are maintenance treatments to enhance growth or increase the chance of seedling survival in the first years after planting including:

- scalping or grubbing planting sites to reduce grass and shrub competition during seedling establishment;
- mycorrhizae root dipping to reduce drought stress and enhance seedling vigor in sterilized soils;
- paper mulching or installing vispore to reduce competition and prevent soil moisture loss around plantings;
- tree netting to prevent browsing by wildlife;
- applying delay release fertilizer packets with seedlings during planting;
- gopher trapping to prevent loss of seedlings to gopher damage; and
- after planting - brushing or hardwood control to reduce light and moisture competition

Due to the natural variation of planting sites that includes rocky and/or shallow soils, fallen snags, and coarse woody debris, tree spacing would inherently be heterogeneous. Natural mortality would further contribute to variable spacing. It is possible that subsequent planting would be needed to address the natural mortality that occurs in the first one to three years after planting.

In Alternative 2, mortality and anticipated mortality of timber would be recovered. Fire-killed and fire-injured trees in excess of those needed to meet snag and coarse woody debris requirements would be salvaged. Fire-injured trees with green foliage may be removed if there is a high probability of mortality or potential of insect infestation within the next four years (SWOFIDSC 2001, USDA 2014). The prescription leaves trees with a low probability of mortality (where trees do not meet the crown scorch guidelines that signify ≥ 75% probability of mortality). In these areas, live canopy closure would vary between 0 to 40 percent; with the majority of units at 0% canopy as few green trees remain. Retained overstory trees, snags, and down logs would provide for structural and biological legacies (Franklin 1992; Hansen et al. 1991; Hunter 1995) necessary to maintain ecosystem processes throughout the management cycle (USDI 1995, p. 188).

Through management intervention, development of large fire-resilient tree structure can be accelerated by many decades. Salvage harvesting would expedite tree planting and ensure that more fire-resilient species become established and protected from future fire (Tappeiner et al. 2007; 289, 256). Maintaining control of diverse conifer species establishment ensures “that in addition to survival goals, species diversity goals could be met” (RMP 1995, p. 184).

Scalping and grubbing sites 3-5 years after sites are planted with trees and brushing every 3-5 years after scalping and grubbing would ensure proper stand development and minimize the development of a thick understory that would impede tree growth and survival.

Insects and Diseases

Salvage of fire-injured trees on Matrix lands would reduce but not eliminate the potential for the build-up of insect populations. With the reduced amount of breeding habitat, there would be a corresponding reduction of insects and potential for green tree mortality in areas salvaged prior to beetle emergence. In other areas, such as green islands, insect populations could increase if insects move from burned salvaged areas to adjacent areas with green trees.

Infestation of severely burned trees by woodborer species in the insect families *Cerambycidae* and *Buprestidae*, as well as by ambrosia beetles (Family *Curculionidae*, subfamily *Scolytinae*) is already in progress. The actions of these insects are part of the normal decomposition process that is primarily mediated by decay fungi. Other than the flatheaded fir borer, other woodborers and ambrosia beetles are not known to kill trees, depending instead upon dying and dead trees for habitat. However, the value of salvaged timber infested by these organisms declines as their feeding continues.

Snags and Coarse Woody Debris

Snags that pose a safety hazard to humans would be reduced on 683 acres. Snag fall and fragmentation will continue to occur on harvest-deferred land as well as in snag retention areas of treatment units. However, in treatment units, the safety risk to humans would be reduced because there would be fewer remaining snags and the increased spacing between snags/snag patches would reduce the likelihood of humans coming in contact with these hazards. Snags and future sources of snags would be left at a minimum rate of 2 trees per acre (averaged on a 40-acre basis) at least 10 inches in diameter, where available. In salvage areas, 120 linear feet of decay class 1 and 2 logs per acre on average, greater than or equal to 16 inches in diameter and 16 feet long, would be left. Where this management action/direction cannot be met with existing coarse woody debris, merchantable material will be used to make up the deficit (USDI 1995, p.39, 44, 73).

Alternative 2 lowers the density of dead and dying trees. The average size of dead trees would increase due to the emphasis on retention of the largest snags available to provide the unique structure and functions associated with these large trees (USDI 1995, p.39, 47, 75). Retaining large diameter snags in clumps serves to maintain habitat for cavity nesting birds as a management goal (USDI 1995, p.40; Russell et al. 2006).

Cumulative Effects: Proposed Action

The following is a summary of the direct and indirect impacts of Alternative 2 to vegetation. These impacts are confined to the Oregon Gulch Project Area. Alternative 2 would have measurable beneficial impacts on the recovery of conifer stands within the project area.

With the implementation of site-specific PDFs, long-term forest productivity would be maintained for the establishment and growth of vegetation, namely commercial conifer species.

- Timber salvage would function to expedite safe and effective tree planting operations and future monitoring for conifer establishment. Both short- and long-term regeneration targets and timeframes are more likely to be met.
- Salvage and subsequent conifer planting would result in establishing conifer stands in 10 to 20 years versus an estimated 100 plus years that would be expected under a natural regeneration scenario presented under the No Action Alternative.
- Coarse woody debris would be provided in a manner that meets the needs of species and provides for ecological functions per RMP requirements and snag retention would emphasize the largest trees available to ensure their longevity and to provide the unique structure and functions associated with these large trees (USDI 1995, p. 39).
- Large insect infestations are not expected and the reduction of host material for the insects would limit the potential damage and prolong the standing retention of snags.

There would be no effects to the vegetation pattern (including the establishment of conifer trees), insects and disease, or snags and coarse woody debris from the one ongoing/reasonably foreseeable project (suspension of the Dixie grazing allotment) that falls within the analysis area. Livestock grazing would not affect insect build-up, snags and coarse woody debris, or set back the establishment of conifer plantations because the burned portions of the Dixie Allotment will be temporarily suspended and rested from grazing for two full year (2015 and 2016). The unburned portion (which is not within the Project Area) will be rested for one full year and a reduced amount of grazing may occur in 2016 on the unburned portion of the allotment if monitoring data and professional judgment indicate that the health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered and resource management objectives are met.

Since there would be no effect to vegetation pattern, insects and disease, or snags and coarse woody debris from the Dixie grazing allotment, Alternative 2 would not have any incremental cumulative effect when considering other projects within the spatial and temporal scales of analysis.

Table 3-1. Short-Term Vegetation Effects (0-10 years) of the Proposed Action Alternative

Stand Condition	No Treatment	Alternative 2
Commercial Value of Standing Timber	100% loss of any commercial/economic value	Harvesting 683 acres would meet reforestation objectives of the project and provide for a sustainable yield of timber. Timber value declines with delays in recovering mortality and anticipated mortality. By the second post-fire year, heartrot spreads; grade reductions added as insects infest timber. Rate of volume loss lower for larger logs than small logs. Immediate to severe decline in value during the first months post-fire in poles to small sawlogs; Immediate but lesser decline in the first months of medium and large sawlogs. After 5 yrs 50% loss in merchantable volume in trees 11-40 inches dbh; ~100% loss in merchantable volume in trees 11-20 inches dbh after 10 yrs. Pine, especially insect infested pine, would exhibit greater decay rates than Douglas-fir.
Potential to Meet Reforestation Density Standards and Timelines	Low (tree planting, monitoring, and follow-up treatments may not occur due to overhead dangers posed by large numbers of snags. Growth/vigor of regeneration could be slowed by shade. Natural regeneration is unpredictable in establishment and growth may not meet or be timely in meeting reforestation objectives or place the new stand on a developmental trajectory that can meet LUA objectives)	High potential. Tree planting (where needed) and monitoring will occur on sites where overstory snags are removed. Follow-up maintenance and protection treatments would occur as needed and as available funding permits. Establishment of regeneration and growth is more predictable and there is a much higher likelihood of meeting reforestation and LUA objectives.
Conifer Species Establishment / Growth	Potentially long time frames required as many areas will likely be entirely dependent upon natural regeneration. Decrease in tree planting effectiveness resulting in increased competition with shrubs and hardwoods	Increase in tree planting effectiveness resulting in improved likelihood of reforestation success. Planted seedlings would provide for greater diversity and disease resistance of conifer species.
Hardwood Species	Sharp increase in areas not managed as plantations, particularly tanoak	Increase then decrease as control of competing vegetation ensues in plantations
Shrubs/Brush/ Forbs	Sharpest increase of vegetation cover in areas not managed as plantations	Increase then decrease as control of competing vegetation ensues in plantations
Snags	Decrease in pole and small sawlog size boles Slight decrease in larger sizes	Decrease across all sizes except for minimum of 2 large snags/ac maintained
Coarse Woody Debris	Sharp increase in pole and small sawlog size boles; Slight increase in larger sizes	At least 120 linear feet (16 inches x 16 ft) per acre (DC 1 & 2) maintained
Hazardous Fuels	Sharp increase in pole and small sawlog size boles; Slight increase in larger sizes	At least 120 linear feet (16 inches x 16 ft) per acre (DC 1 & 2) maintained. Activity fuels would be reduced to acceptable levels.
Windthrow Hazard	Susceptibility of all size classes especially in severe fire mortality areas	Sharp decrease. Slight increase in green trees retained in units
Ability to Respond to Future Silvicultural Treatments	Decrease as windfall of small size snags and lower limbs and tops of larger snags accumulate creating impediment to manage vegetation	Sharp increase as tree planting effectiveness improves and efficiency of maintaining plantation improves

Stand Condition	No Treatment	Alternative 2
Rate of Development of Older Forest Characteristics	Decreased rate as delays in growth of large woody species compete with hardwoods and shrubs (likelihood of effective tree planting diminishes with no treatment)	Slight increase as tree planting effectiveness of species that produce large woody structure improves

Table 3-2. Long-Term Vegetation Effects (11+ years) of Proposed Action Alternative

Stand Condition	No Treatment	Alternative 2
Commercial Value of Standing Timber	100% loss of any commercial/economic value	683 acres would provide for economic recovery. Areas not considered for detailed analysis: viability of timber value no longer present. 100% volume loss in trees 11-20 inches and 80% volume loss in trees 21-30 inches after 10 yrs. Pine, esp. insect infested pine would have greater decay rate than Douglas-fir Commercial value invested in planted seedlings to potentially provide crop tree in 60 years.
Potential to Meet Reforestation Density Standards and Timelines	Low (as unpredictable vegetation recolonizes the post-fire environment)	High provided silvicultural plantation maintenance.
Conifer Species Establishment / Growth	Depends on prefire vegetation colonizing the site	Increase in tree planting effectiveness resulting in improved likelihood of reforestation success
Hardwood Species	Sharp increase in areas not managed as plantation	Increase then decrease as control of competing vegetation
Shrubs/Brush/ Forbs	Sharp increase in areas not managed as plantations	Increase then decrease as control of competing vegetation
Snags	Decrease in pole and small sawlog size boles Moderate decrease in larger sizes	Decrease across all sizes except for minimum 2 large snags/ac maintained
Coarse Woody Debris	Sharp increase in pole and small sawlog size boles; Slight increase in larger sizes	At least 120 linear feet (16 inches x 16ft) per acre (DC 1 & 2) maintained
Hazardous Fuels	Sharp increase throughout due to the buildup of fallen trees. By 15 years of no post-fire logging, fuels would have accumulated sufficiently to reburn	At least 120 linear feet (16 inches x 16ft) per acre (DC 1 & 2) moving into older decay classes. Standing dead minimum 2-4 in CHU) large snags/ac dropping lower limbs, tops, eventual tree failure depending size.
Windthrow Hazard	Susceptibility of all size classes especially in severe fire mortality areas	Slightly increased hazard of snags in recovery units as roots deteriorate. Decreased hazard of green trees as windfirmness established.
Ability to Respond to Future Treatments	Decrease as windfall of all size snags accumulate creating impediment to manage vegetation	Continued increase with growth trajectory of acceptably stocked planted conifers provided plantation maintenance
Rate of Development of Older Forest Characteristics	Depends on prefire vegetation colonizing the site	Slight increase as tree planting effectiveness of species that produce large woody structure improves

C. FIRE HAZARD

The scale of analysis for fire hazard is the units proposed for salvage logging; also referred to as the project area. This is the area potentially affected by Medford BLM's proposal to salvage fire killed and damaged timber, and subsequently plant conifer seedlings on about 683 acres in the Oregon Gulch fire area. This is the appropriate scale because the effects of the proposed salvage and tree planting on fire hazard would not extend beyond the proposed units.

1. Affected Environment

The Project Area evolved with frequent fires affecting the vegetation and other key components of the ecosystem. Since the establishment of Euro-settlement in this area, human relations and interactions with these landscapes have affected many of the processes that had previously played a large part in the evolution of the site. Of these interactions, one management decision that has affected one of the evolutionary processes has been fire exclusion.

Fire is recognized as a key natural disturbance process throughout southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen 1996). Early settlers to this area used fire to improve grazing and farming, and to expose rock and soil for mining. Fire has played an important role in influencing successional processes.

Historically, frequent, low-intensity fires maintained dry Douglas-fir and pine forest types in more open conditions than exist today (Agee 1993). These fires served as a thinning mechanism by naturally regulating the density of the forests. A more open crown structure would have allowed fire to travel more rapidly across the site with intensities that were short-lived. The light, flashy surface fuels (grasses, shrubs, and conifer/hardwood litter), the repeated reduction of conifer reproduction underneath the overstory, and the repeated consumption of large fuels and duff build-up would have reduced the post-fire effects (also described as fire severity) found on these sites historically. The qualities of the open crown structure would also provide better avenues for the heat intensity to vent out of the site without scorching the crowns to the lethal limit.

a. Fire Hazard

Fire hazard generally refers to the difficulty of controlling potential wildfire. Fire hazard is defined by how a fire reacts to fuel, weather, and topography which affect the fire behavior. Fire behavior characteristics such as flame lengths, rate of spread, intensity, severity, crowning, spotting, fire duration and resistance-to-control are common denominators (Brown et al., 2003).

Modeling was used to determine resistance of control in the project area for both pre- and post-fire, and post-project. Outputs from *Behave 5.0.5* were used to model fire behavior. *Behave* models surface fire spread only. Material up to 3 inches in diameter has the greatest influence on the rate of spread and flame length of a fire, which has direct impacts on fire suppression efforts. With flame lengths of 0 to 4 feet, direct attack with crews is feasible. With flame lengths of 4-8 feet direct attack with engines, dozers and retardant can be effective. Flame lengths greater than 8 feet present serious control challenges.

The following assumptions were utilized in the *Behave* modeling:

- 30% slope
- 5 mph winds (eye level)
- 1-hour fuel moisture of 3%, 10-hour fuel moisture of 4%, 100-hour fuel moistures of 5%
- Live herbaceous moisture of 120%. Live woody moisture of 150%
- Air temperature of 90° F

Pre-fire Condition
Prior to the Oregon Gulch wildfire that occurred in the summer of 2014, the fuel model for the stands proposed for salvage logging would be best described as a timber understory (TU5 -very high load, dry climate timber-shrub). The understory trees (less than 8 inches in diameter) ranged from 5 to 10 tons per acre in these stands. The fire hazard for these stands before the fire occurred was moderate to high. Potential flame lengths of 8 feet would occur utilized the *Behave* model.

Post-fire Condition
The Oregon Gulch wildfire burned in a mixed-severity pattern over multiple ownerships and jurisdictions. Areas proposed for salvage harvest under this project, burned at a moderate and high fire severity (Map 3-1), which have corresponding high levels of tree mortality, influenced by weather (i.e., low relative humidity, high temperatures, high winds), topography (steep slopes and limited access), and fuel loading (surface, ladder and canopy cover). The majority of the moderate and high severity burn areas were reset to an early serial condition (early-successional stage) and a large amount of snags remain on site.

The areas proposed for salvage logging have little to no surface, ground and ladder fuels present due to the intensity of the wildfire. Aerial fuels have been burned so needles and many of the small diameter limbs are absence from the trees that would otherwise contribute to fire hazard conditions during harvest operations. Existing fuel loadings in these stands would not sustain a fire due to the absence of surface, ground, ladder, and aerial fuels. The fire hazard for the acres proposed for salvage logging is currently low and in most stands there is no current fire hazard present.

2. Environmental Consequences

a. Alternative 1 – No Action
Over time, the fire hazard would increase in project units. The main contributor to increased fire hazard over time will be the growth of grasses and brush. The fuel models that best describe what the area would be over the next few decades would be a grass shrub (GS2-moderate load, dry climate grass-shrub) and a shrub (SH2-moderate load dry climate shrub) with potential flame lengths of 2 feet. The area would be in this fuel model in approximately five years and would remain in this fuel model until dead trees fall to the ground in approximately 10 to 20 years. Once the dead trees fall to the ground over time (10 to 20 years) this would result in an addition of another fuel model for the area which would be a slash blowdown (SB3-high load activity fuel or moderate blowdown). When this occurs, the fire hazard would be high. Utilizing the *Behave* model, potential flame lengths of 12 feet are predicted to occur.

The large amount of snags that would remain on site would have an impact to fire suppression activities for decades. The amount of snags per acre would not allow direct attack in these stands due to concerns for safety of firefighters. This would be the case even when fire behavior (flame lengths) would allow for direct attack. This scenario occurred in southwest Oregon in 2013 on the Labrador fire. The Labrador fire started in an area of the Biscuit Fire, which occurred in 2002. The large amount of snags prevented direct attack and an indirect attack strategy had to be taken. The indirect attack strategy increased the acres that were burned and significantly increased the cost of the Labrador fire.

There would be no smoke impacts since there would be no prescribed burning under the No Action Alternative.

b. Alternative 2 – Proposed Action
As in the No Action Alternative, the main contributor to increased fire hazard over time will be the growth of grasses and brush. The fuel models that best describe what the area would be over the first two decades would be as grass shrub (GS2-moderate load, dry climate grass-shrub) and a shrub (SH2-moderate load dry climate shrub) with potential flame lengths of 2 feet.

Salvage logging would contribute woody material on the ground sooner than the No Action Alternative due to the logging operations. This would create an additional fuel model. It is estimated the tons per

acre of material less than three inches in diameter after salvage logging would range from 3 to 5 tons. The fuel model of the area immediately after harvest operations would be a timber litter (TL1-Low load compact conifer litter) with potential flame lengths of 1 foot. This fire behavior would be a low fire hazard. The fuel model would change to grass shrub (GS2) fuel model in approximately five years.

Under Alternative 2, the project units would be planted with conifer trees to reforest the site. In 15 to 20 years the planted seedlings will reach a height and the fuel model would be comparable to a brush fuel model. The fuel model that would best describe the area would be a shrub (SH5-High load, dry climate shrub) with potential flame lengths of 13 feet. With this fire behavior the fire hazard would be high. This fuel model would be present until the planted conifers become mature (40-50 years). This is based on observations of clear-cuts that were planted 30 to 40 years ago.

Over time (10-20 years) the remaining snags would increase the fire hazard of these stands as they fall to the ground. Alternative 2 would result in a fuel model of grass shrub (SB2) (moderate load activity fuel) with potential flame lengths of 8 feet. When this occurs the fire hazard would be moderate to high.

The amount of snags that would remain on site could have an impact to fire suppression activities (fire fighter safety). The distribution of snags in the units would not be as uniform as in the No Action Alternative. There would be areas were no snags exist due to logging and direct attack could occur as long as fire behavior conditions would allow for direct attack. The 683-acres project area would have significantly less snags and the hazard could be mitigated by felling them in the event of a fire so direct attack could occur.

There is no potential for adverse cumulative effects to fire hazard following the salvaging of fire killed and damaged trees because the fire hazard within project units would still remain low following fire salvage. As described above, the response of grass and shrub growth would occur whether or not proposed fire salvage and tree planting takes place. The contribution of woody material less than 3 inches diameter to the forest floor is of such small amount that fire hazard would still remain low, less than 1 foot flame lengths where direct fire suppression would still remain safe and effective. Since there is no change in fire hazard, there would be no potential for adverse cumulative effects as a result of fire salvage. Over time (about 5 years and beyond), shrub and grass growth would occur regardless of fire salvage and tree planting. The contribution of conifer seedlings from tree planting was modeled and would result in one additional foot of flame length (about 13 foot flame lengths) as opposed to 12 foot flame lengths predicted under the No Action Alternative, resulting in nearly the same fire behavior as the No Action Alternative. Therefore, the long-term potential for the Proposed Action to contribute to adverse cumulative effects is low.

Smoke Impacts

The Proposed Action would use prescribed fire to burn landing slash piles. Consequently, there would be some smoke related impacts as described below. Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan.

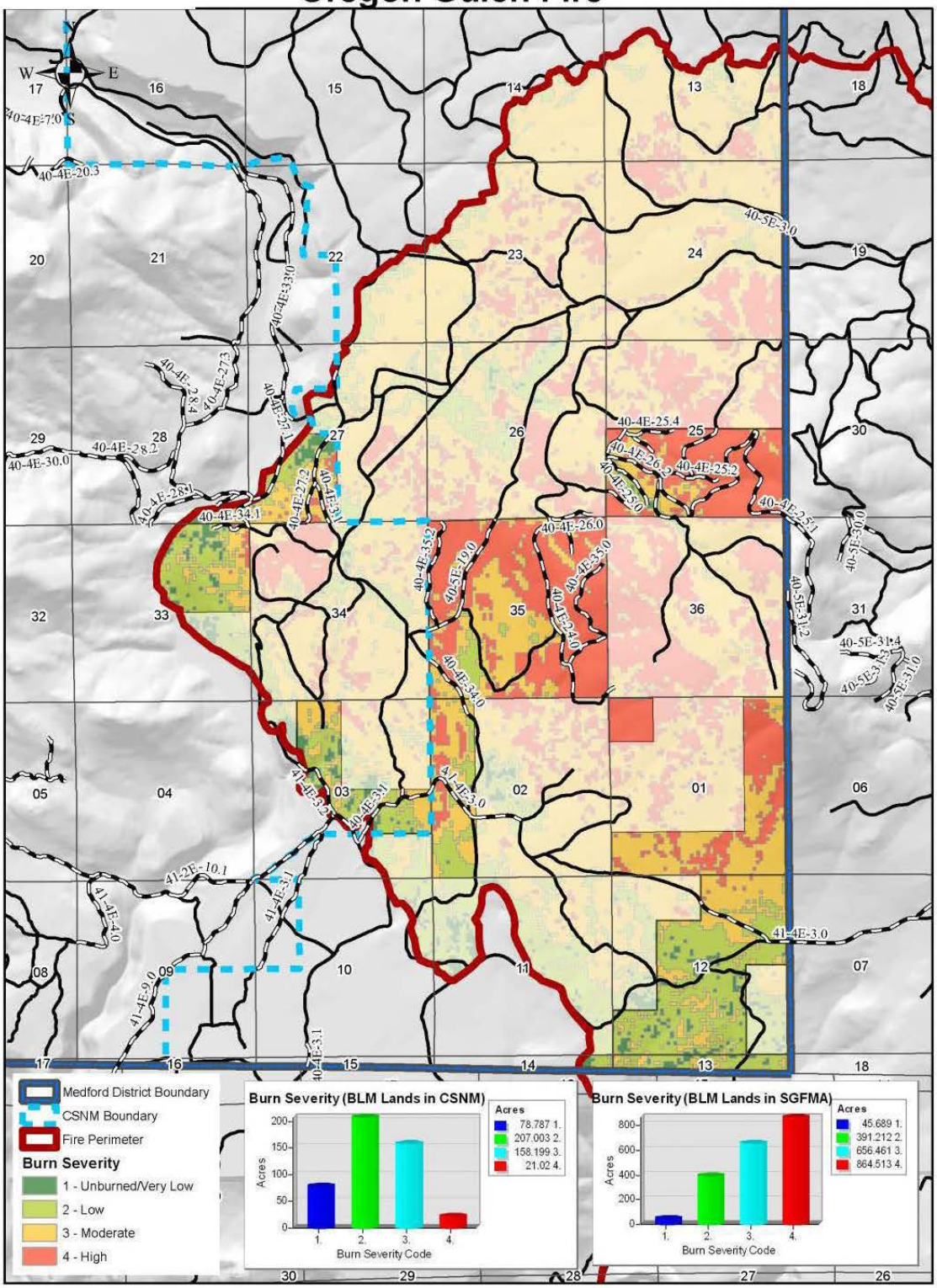
Prescribed burning would result in smoke emissions but those emissions are not expected to adversely affect annual PM 2.5 attainment within the Grants Pass, Klamath Falls, and Medford/Ashland SSRA. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration because prescribed burning would be scheduled primarily during the period starting in November and ending in February. Smoke dispersal is easier to achieve during this treatment period due to the general weather conditions that occur at this time of year. There is no causal mechanism for prescribed burning of landing slash piles to have any effect outside of the SSRA.

Finally, prescribed burning operations would follow all requirements of the Oregon Smoke Management Plan and the Department of Environmental Quality Air Quality and Visibility Protection Program. Under the authority of the State Forester, prescribed burning throughout southwest Oregon is administered, coordinated, and in situations where air quality of the entire State or part thereof is, or would likely

become adversely affected by smoke, additional restrictions are applied to avoid cumulative effects of prescribed burning across multiple ownerships.

Map 3-1

Burn Severity - BARC
Oregon Gulch Fire



Date: 8/21/2014

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Medford District

D. SOIL RESOURCES – PRODUCTIVITY AND COMPACTION

1. Affected Environment

The scale of analysis for soil productivity and compaction encompasses the proposed salvage units, temporary road construction, and the designated skid trail outside of Unit 25-4 (in the green tree retention area) as it the area where ground disturbing activities would occur for the Oregon Gulch Fire Salvage Recovery Project. This area will be referred to as the "Analysis Area" for this section.

The Analysis Area lies within the High Cascade Mountains Geologic Province. The High Cascade Mountains were formed in the late Miocene with the extrusion of andesite and basalt. These flows originated from shield volcanos and fissures. In the recent Holocene, cinder cones were formed. They are made up of poorly consolidated ejecta of ash, cinders, scoria, and volcanic bombs. The top of Grizzly Mountain from around 4,200 feet to the peak at 5,100 feet is mapped as a mafic vent complex with basalt, breccia and cinder. Lower down on the side slopes of Grizzly Mountain is Ridge capping Basalt and Basaltic Andesite. Due to the cold climate and relative youth of this landform, the soils are in early or intermediate stage of development (Entisols and Inceptisols).

There are many different soil properties among the suite of soil types. Proposed treatment areas fall primarily within Farva, Campfour, Paragon, Pinehurst and Greystoke soil series. Soil series located in Analysis Area but not in units: Randcore, Shoat are very shallow and typically drive meadow like vegetation. The Skookum soil series is also not present in the proposed units.

a. Soil Series in Proposed Units

The Campfour soil is very deep and well drained. Typically, the surface is covered with a layer of needles and twigs about 1 inch thick. The surface layer is a loam about 21 inches thick, the subsoil is a clay loam about 29 inches thick. The next 10 inches are a gravelly clay loam. The depth to bedrock is 60 inches or more. In some areas the surface layer is stony. Permeability is moderately slow. Available water capacity is about 8 inches. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Farva soil is moderately deep and well drained. Typically, the surface is covered with a layer of needles, leaves, and twigs about 0.5 inches thick. The surface layer is a very cobbly loam about 12 inches thick. The subsoil is an extremely cobbly loam about 23 inches thick. Weathered bedrock is at a depth of about 35 inches. In some areas the surface layer is stony. Permeability is moderately rapid. Available water capacity is about 3 inches. The effective rooting depth is 20-40 inches. Runoff is rapid, and the hazard of water erosion is high.

The Greystoke soil is deep and well drained. The surface is covered with a layer of needles and twigs about 1 inch thick. The surface layer is a stony loam about 3 inches thick, the next 10 inches are a very cobbly loam. The subsoil is a very cobbly loam for another 10 inches then an extremely gravelly clay loam for the last 19 inches. Weathered bedrock is at a depth of about 42 inches. Permeability is moderately slow in the Greystoke soil. Available water capacity is about 4 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate.

The Paragon soil is moderately deep and well drained. Typically, the surface is covered with a layer of needles and twigs about 1 inch thick. The surface layer is a cobbly loam about 13 inches thick. The subsoil is a gravelly clay loam about 12 inches. Weathered bedrock is at a depth of about 25 inches. In some areas the surface layer is stony or very cobbly. Permeability is moderately slow. Available water capacity is about 3 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

The Pinehurst soil is very deep and well drained. Typically, the surface is covered with a layer of needles and twigs about 1 inch thick. The surface layer is a loam about 15 inches thick. The subsoil is a clay loam about 45 inches thick. The depth to bedrock is 60 inches or more. In some areas the surface layer is

stony. Permeability is moderately slow. Available water capacity is about 10 inches. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

Post-Fire Condition

Soil series in the Analysis Area are different now from how they were mapped in soil survey due to the fire. The biggest change from mapping would be the depth of the O horizon (top surface soil layer) and amount of organic matter in the A horizon (second surface soil layer). Also, there may be color changes in the surface horizon from the volatilization of humus. Otherwise, the pre-fire soil descriptions are expected to be accurate to the current condition. All of the soils in the Analysis Area were rated as having a low potential of being damaged by wildfire in Web soil survey. This was mostly based on the soil texture and rock fragments of the soils. The ratings in this interpretation indicate the potential for damage to nutrient, physical, and biotic soil characteristics by fire.

b. Soil Productivity

Due to the extent and vastness of the 35,302- acre Oregon Gulch Wildfire and the management direction of promptly meeting reforestation objectives (RMP, p.184), tree planting is a top priority to maintain productivity. Tappeiner et al. (2007) lists five major ecosystem functions of forest soils that influence forest productivity: 1) water storage, 2) nutrient accumulation, 3) carbon storage, 4) structural support, and 5) habitat for organisms. Forest soil maintenance is a key factor for sustaining productive forests. Fires can cause varying degrees of soil effects depending on temperature of the fire, duration of heating, and soil moisture, lasting from a few years to a few decades (Peterson et al. 2009). When organic matter is removed in intense wildfires, the potential for soil erosion increases since organic matter serves as structural support. In severely burned areas carbon and nitrogen are displaced from the underlying mineral soil layer. Carbon aids in nutrient retention and water infiltration while nitrogen provides compounds for plant growth. Nearly all soil nitrogen is in organic matter. In severe fire areas, nitrogen is lost when organic matter is neutralized. However, in lower fire severity areas, a burst of nitrogen availability occurs that helps regeneration thereby improving forest productivity. In intensely burned areas, soil productivity is reduced through losses of organic matter and nutrients. Heat resulting from large scale and intense fires can also damage soil biology such as mycorrhizae, nitrifying bacteria, and other soil organisms in proportion to burn intensity, adversely affecting soils for up to 10 years (Barnett 1989).

The major management limitations and soil characteristics identified by Natural Resources Conservation Service for the soils and soil complexes found within the Activity Area were used in the selection of proper BMPs and Project Design Features (PDFs) that have been incorporated into the Oregon Gulch Fire Salvage Recovery Project (Chapter 2, C. 3. c. Harvest and Yarding, Objective 2: Prevent Offsite Soil Erosion and Soil Productivity Loss).

Soil Compaction

Soil compaction is the packing together of soil particles by physical pressure at the soil surface that results in an increase in soil density and a decrease in pore space. A decrease in soil pore space results in restricted movement of water, nutrients, air, and plant roots, and generally decreases site productivity in most soil types. Chapter 2 of the Final EA describes PDFs to limit soil compaction and effects to soil productivity. Tractor yarding and cable yarding are the harvest methods proposed for use in this project. Tractor yarding causes the most compaction. Tractor yarding effects can be mitigated using the PDFs described in Chapter 2 (C. 3. c. Harvest and Yarding, Objective 2: Prevent Offsite Soil Erosion and Soil Productivity Loss) causing less than 12% compaction of logged areas. Cable/skyline yarding suspends at least one end of the logs above the ground avoiding most physical abrasion of the forest floor and mineral soil (Peterson et al. 2009). Utilizing PDFs described in Chapter 2 for cable yarding would cause no more than 7% compaction of logged areas under the Northwest Forest Plan and Medford District RMP. These percentages are based on research by Adams and Froehlich, 1981, Dryness, 1967, and Clayton, 1981.

Timber Production Capacity Classification (TPCC)

The TPCC is a land classification system used to categorize all public lands for sustainable timber production on BLM-administered lands (BLM 1986a). Nonsuitable Woodland TPCC lands include all landslide prone areas and other unstable soils (which are not in the Project Area) as well as soils with reforestation issues. They are identified as not suitable for timber harvest (RMP, p.41). In the Water Resources Analysis Area (10,000 acres) (see Chapter 3, Section F), 1,549 acres were identified as Nonsuitable Woodland. In the project development, soils with Fragile Groundwater Withdrawn (FWNW) were excluded from consideration for treatment for this reason. Also included in the Project Area are reforestation suitable restricted woodlands: Low Site Woodland (LSW), Non-Commercial Woodland (NCW). This is approximately 10 acres out of the 683 acres of proposed units.

Portions of the Oregon Gulch Fire Salvage Recovery Project Area are classified as having TPCC reforestation limited soils under the TPCC Handbook (BLM 1986a) (Table 3-3). These soils require harvest, reforestation techniques, or timing to be modified, or additional protection measures to be implemented to be capable of meeting minimum stocking standards and to minimize productivity loss as a result of nutrient loss, high soil surface temperatures, reduced moisture supply, and rocky soil conditions.

These TPCC classifications were made from the years 1981-1986. As such, these areas can be assessed and updated during site specific field review. The field data collected ultimately determines the specific areas where timber management is suitable. The majority (669 acres) of the proposed units are restricted-suitable commercial forestland for reforestation (RMR, RTR and RSTR).

- RMR- Reforestation Problem/ Soil Moisture/ Suitable
- RTR- Reforestation Problem/ Temperature/ Suitable
- RSTR-Reforestation Problem/ Surface Rock_ Temperature/ Suitable
- LSW – Low Site (forested but will not produce 20 ft^3/ac/year)/Withdrawn (Suitable Woodland)
- NCW- Non-Commercial Woodland

The reforestation TPCC classifications in the Project Area are captured in the following table.

Table 3-3: TPCC Reforestation Classifications in the Project Area

TPCC Category	Classification	Units Affected	Acres	Logging System
RMR	Reforestation Moisture - Suitable Restricted	25-1, 25-5B, 25-3, 25-4, 35-1, 35-2, 35-4A	155	Ground Based/ Cable
RTR	Reforestation Surface Temperature Suitable-Restricted	25-2, 25-5A, 35-3, 35-1, 35-5, 35-4c, 1-1, 1-2	492	Ground Based/Cable
NCW	Non Commercial Woodland	Small portion of Unit 1-1	2	Tractor
LSW	Low-Site Productivity Withdrawn	Small portions of various units	8	Tractor
RSTR	Reforestation Surface Rock Temperature Suitable-Restricted	35-4B	20	Cable

Reforestation protection considerations:

- **Moisture-** these sites have low available soil moisture due to low growing season precipitation and/or competing vegetation that reduces conifer seedling survival.
- **Temperature-** these sites have high solar radiation coupled with low available soil moisture. Seedlings mortality could occur from high evapo-transpiration stress and long exposure to high surface temperature soil.

- **Surface Rock-** these sites have surface coarse fragments limiting planting spot access and/or reducing conifer seedling survival, and the soil is of sufficient depth to support conifer growth.

2. Environmental Consequences

a. Alternative 1- No Action

Not treating the fire area would leave 683 acres of fire-killed and fire-injured trees. Fire-killed trees would contribute to snags and coarse woody debris amounts. Depending on tree diameter and species, the rate of deterioration of fire-killed trees would vary. Most twigs and branches would be absent after 5 years, with large limbs beginning to fall after 8 to 10 years. Wood borers and bark beetles would be active within the first year of the fire with wood decay evident within two years. Smaller trees would decline more rapidly with breakage occurring within the first 3 to 4 years after the fire. As snags begin to fragment and fall to the forest floor they would gradually provide important ecological functions such as moisture retention, structural complexity, soil stabilization, nutrient recycling, and dead tree shade for the reestablishment of conifer tree species (Oliver and Larson 1996).

Summary

Ongoing and foreseeable federal activities in the Oregon Gulch Fire Salvage Recovery Project analysis area for soil compaction and productivity include the ongoing Medford District emergency stabilization rehabilitation work for the fire, and future grazing (after 2016) on the burned areas of the Medford BLM portion of the Dixie allotment once vegetation recovery and resource management objectives are met.

The rehabilitation plans include seeding and mulching of bare soils, tree planting, and construction and repair of temporary fences which would assist in returning soil productivity at treated sites and would minimize compaction from other sources such as OHVs and cattle. Surface disturbance from cattle grazing on the BLM portion of the Dixie allotment (after 2016) would be managed through cattle distribution and lease duration.

As stands develop without implementation of the Oregon Gulch Fire Salvage Recovery Project, over time, improvements in stand and landscape scale resiliency to fire, climate change, and disturbance processes would likely occur with density reduction.

In the next 20 years, compaction levels should remain at current levels which are less than 12% on BLM lands. New plant growth from the fine roots of early seral vegetation would loosen compacted soil. Needlecast from scorched trees, snag fall, tree fragmentation, and other litter from the vegetation would continue to add organic material to the soil. Severely burned areas have greatly reduced overhead canopies that generally function as a shelter over frost prone understory floors. On frost prone sites, namely lower valley bottoms and wide flat topographic features, the effects of frost may slow growth and productivity. In undisturbed areas within the fire perimeter, the effects of soil freeze and thaw would continue to reduce compaction. Depending on site conditions, this may take decades instead of years. There would be no increase of compaction in undisturbed areas. However, in areas that would remain roaded and would have regular harvest activity, compaction would not be reduced.

b. Alternative 2 - Proposed Action

Mortality salvage is defined in the Medford District RMP as the harvest of dead and dying timber (USDI 1995, p.108). Mortality of entire stands or of scattered trees that results from disturbance would be harvested in salvage operations; only mortality above the level needed to meet snag retention and other habitat goals and provide desired levels of coarse woody debris would be harvested (USDI 1995, p.186). Alternative 2 proposes the removal of dead and dying trees through salvage logging. The salvage harvest would occur on approximately 683 acres consisting of 622 acres of ground-based yarding and 61 acres of cable/skyline yarding. Removal of trees would be accomplished using conventional logging systems. One designated skid trail (320 feet) would be constructed outside of Unit 25-4, through the 20-acre green tree retention buffer. To facilitate operations, 0.6 miles of temporary road is proposed.

Best Management Practices (BMPs) in the Medford District Resource Management Plan (USDI 1995, p.166) describe the use of designated skid roads within stands to limit horizontal soil compaction to less than 12% of the harvest area. These activities would result in an estimated 75 acres of soil compaction and displacement over new and existing footprints within the units that will be harvested using ground-based systems. Approximately 7% of skyline/cable yarding acres would be compacted[1]. Therefore, it is estimated that in the skyline units, 4 acres would be compacted. Total compaction/displacement associated with temporary roads, tractor skid trails, landings and cable yarding corridors would account for approximately 79 acres (11.6% of the project activity area[2]). Project Design Features in Chapter 2 (pp. 2-15 through 2-18) would ensure that each proposed Oregon Gulch Fire Salvage Recovery Project harvest unit would result in no more than 12% compaction and 5% productivity loss as analyzed in the 1994 Medford District FEIS RMP. The specific elements of the Proposed Action that would affect the physical, chemical, or biological properties of soils in proposed harvest units are described below. Skid trails would be mechanically subsoiled after harvest to alleviate the compaction. Coarse woody debris requirements would be met where possible and additional snags will be retained within areas where there coarse woody material is not currently present. Post-salvage sale monitoring would occur to determine if treatment units are deficient of coarse woody material upon completion of the harvest. The BLM would use service contracting to fell future recruitment trees to make up any deficits. All existing coarse wood material would be retained where available and protected to the greatest extent possible from disturbance.

Soil Productivity

Salvage harvesting is not proposed in lands classified as Nonsuitable Woodland. Nonsuitable Woodland classifications include all fragile nonsuitable forest land and sites that are not biologically and/or environmentally capable of supporting a sustained yield of forest products (BLM 1986a, p.6). On Fragile Nonsuitable Woodland sites, future production would be reduced even if special harvest and/or restrictive measure are applied due to inherent site factors such as soil, geologic materials, topography, and groundwater tables (BLM 1986a, p.4). Nonsuitable woodlands, which include all landslide prone areas and other unstable soils, are identified as not suitable for timber harvest (USDI 1995, p.41). The areas mapped as non-suitable in the Project Area are due to reforestation issues, vegetation type or water, not landslide or unstable soil potential.

Timber harvest activities cause forest soil disturbance that have implications for site productivity (Bockheim et al. 1975). The Medford District RMP provides the guidance to apply BMPs during all ground and vegetation-disturbing activities to improve or maintain soil productivity (USDI 1995, p.44). Implementing BMPs and minimizing disturbance of fragile areas will keep losses in soil productivity to a minimum (RMP, p.44). Practices incorporating BMP guidelines are listed in Chapter 2 of the Final EA.

Soil Compaction/Displacement

Roads

Temporary roads are not intended to be part of the permanent or designated transportation network system. Temporary road construction of four roads would occur on 0.6 miles of BLM land. This would be approximately 2.8 acres of soil temporarily compacted and removed from productivity. All roads are located in the Farva very cobbly loam. Construction of the temporary road would compact the soil on ground that has already been disturbed. Approximately 2.8 acres would be temporarily taken out of vegetative productivity. Although this soil has a low[3] resistance to compaction (which is based on different soil characteristics such as percentages of different soil particle sizes, soil structure, organic material amount, soil productivity and percentage of coarse fragments) it has a high potential for

2 Units identified for tractor yarding are calculated at 12% compaction and cable-yarded units are calculated at 7% compaction, and helicopter yarded units are calculated at 4% compaction. These compaction percentages are based on research by Adams and Froehlich (1981) and Clayton (1981).

3 This is a rating created by the Natural Resources Conservation Service. A low rating means that the soil has one or more features that favor the formation of a compacted layer, in comparison, a high rating indicates that the soil has features that are very favorable to resisting compaction.

recovery. Therefore, when the road is subsoiled, the affected soil is expected to return to its former productive state both functionally and structurally in the long-term (10+ years) where ripping occurs. Full ripping may not happen on the whole length of road due to the boulders present in the soil. The freezing and thawing of the water in the soil can cause boulders to be pushed up to the surface resulting in more boulders at the surface. In areas where full ripping would not occur, soil is expected to remain compacted and will take a longer time to recover. The restoration potential is based on rainfall, soil depth, and other indicators that affect the time and ability for a soil to be restored (Natural Resources Conservation Service 1993).

Temporary road construction on federal land would be decommissioned after harvesting is completed. There would be some short-term loss of soil productivity where temporary roads were constructed due to displacement of soil organics. Soil productivity would recover within 1-3 years as disturbed sites become revegetated. Sub-soiling road surfaces would occur to aid in site recovery. Manual revegetation with native species may occur to further accelerate rehabilitation. There would be an increase in soil productivity within the unit along these temporary roads in areas where the organics were deposited (e.g., fill-slopes). Sub-soiling road surfaces of temporary roads would ameliorate compaction. Road decommissioning for this project would involve blocking roads, sub-soiling the road surface to allow for water filtration, installing waterbars, and applying seed and mulch. Waterbars would filter water runoff and direct drainage off the road surface and away from streams and into vegetation that is adequate to slow surface water, and allow for deposition of detached soil particles. Mulching helps minimize surface erosion and seeding helps to establish vegetation re-growth. Sub-soiling road surfaces on all BLM managed temporary roads would help alleviate the compaction from the road construction.

Approximately 2.3 additional miles of roads are proposed to be decommissioned (8 different roads). This would amount to approximately 9.3 acres of land with soils being restored. Some of the roads are already naturally decommissioned, whereas 1.6 miles (6.5 acres) would be sub-soiled. Decommissioning would likely not return the soil to the original bulk density in the short-term. However, seeding and mulching would discourage soil displacement, reintroduce organic material and rooting systems into the soil, and facilitate the vegetative recovery of the soil. Soil productivity is expected to be returned in the long-term.

BLM Roads 40-4E-35.3 and 40-4E-25.0 (total of 0.7 miles) are proposed for long-term closure. The soils are not expected to return to vegetated productivity in the long term, and it is expected that these roads may be used again, but closing the road is expected to reduce the amount of erosion occurring from the natural surfaced roads in the short-term.

Approximately 0.4 miles of road is proposed for renovation. There is currently a footprint which has begun to recover; however, it was not expected to be fully returned to natural productivity levels. This road would be used and then subsoiled after use in the same manner as other decommissioned roads. This would also contribute to the net decrease in roaded and compacted mile in the Analysis Area.

Landings, Skid trails, and Cable Yarding Corridors

Landings, and other areas of exposed soils resulting from this activity, would be winterized by properly installing and/or using water bars, berms, sediment basins, certified weed-free hay bales, wood straw, small dense woody debris, seeding, and/or mulching, as directed by the Authorized Officer. All new landing areas would be rehabilitated to reduce soil compaction, minimize sedimentation, and improve site productivity. Landings outside of existing road prisms would additionally be planted with conifers following use.

Existing skid trails would be utilized whenever practical. New skid trails would be pre-designated and approved by the Authorized Officer. There is an additional designated skid trail (320 feet) proposed through the 20-acre green tree retention buffer adjacent to Unit 25-4. The skid trail would follow the same PDFs as skid trails within harvest units. Skid trails including turning points would be 12 feet width on average. Peterson et al. (2009) notes that “the presence of even a thin litter layer can substantially reduce soil erosion” and that “when soils are bared by wildfire, slash produced during logging can be used

to cover the soil surface and reduce erosion." Many units exhibit a widespread ground cover of surface litter. Tops and limbs of harvest trees would be left on site for nutrient cycling until slash depth exceeds 18 inches. The presence of even a thin layer of surface litter can substantially reduce soil erosion (Peterson et al. 2009).

Tractors would be equipped with an integral arch to minimize soils disturbance and equipment would walk over as much ground litter as possible to reduce compaction. Utilized skid trails would be rehabilitated upon completion of harvest. Rehabilitation includes sub-soiling to restore productivity. Rocky areas may be avoided during sub-soiling Ground based equipment would be limited to slopes less than 35% and yarding equipment would be limited to designated skids. Use of blades while ground based yarding would not occur to minimize soil disturbance.

Timber Production Capacity Classification (TPCC)

The proposed tree planting and PDFs in Chapter 2 of the Final EA would protect salvaged stands' reforestation capability. In units harvested using ground-based logging systems, the PDF to require equipment to stay on designated skid trails would markedly contribute to reforestation success. This way, at least 78% of the ground-based units would not have additional compaction effects. The 12% compacted would be subsoiled to assist in regaining productivity over time.

Cumulative Effects: Proposed Action

The following is a summary of the direct and indirect impacts of Alternative 2 to soils. These impacts are confined to the Oregon Gulch Project Area (Analysis Area for effects to soil resources).

With the implementation of site-specific PDFs and BMPs, long-term soil productivity would be maintained.

- Soil compaction from harvesting is limited to the footprint of skid trails and landings within harvest units, the proposed temporary roads for access, and the one designated skid trail outside Unit 25-4.
- All skid trails and landings will be subsoiled to reduce compaction and restore productivity.
- All temporary roads will be decommissioned following harvest operations. Approximately 2.8 acres of soil would temporarily compacted in association with these temporary roads. Soil productivity would recover within 1-3 years as disturbed sites become revegetated.
- An additional 2.3 miles of roads would be decommissioned. This would amount to approximately 9.3 acres of land in which soil productivity would be restored.
- Long-term site productivity would improve where tree planting occurs. For this project, tree planting would occur following harvest treatments. Tree planting would accelerate natural regeneration processes of conifer ingrowth and establishment. Tree planting treatments involve fertilization, mycorhizae inoculation and paper mulching which would all have a positive effect on soil productivity/fertility.

Beyond the proposed project, the ongoing and foreseeable activities in the Analysis Area that affect soil compaction and productivity (Project Area) include the ongoing Medford District emergency stabilization and rehabilitation work for the fire, and future grazing on the burned areas of the Medford BLM portion of the Dixie Allotment once vegetation recovery occurs and resource management objectives are met (post 2016).

There would be no effects to the soil resource in the Analysis Area from future livestock grazing in the Dixie Allotment as grazing would be temporarily suspended for two full years while vegetation recovers. Surface disturbance from future cattle grazing on the BLM portion of the Dixie Allotment would be managed through cattle distribution and lease duration.

The rehabilitation plans include seeding and mulching of bare soils, tree planting, and construction and repair of temporary fences which would assist in returning soil productivity at treated sites and would minimize further compaction from other sources such as OHV and cattle.

Since there would be no effects to soil productivity from future livestock grazing and positive effects from ongoing rehabilitation work, Alternative 2 would not have any incremental cumulative effect when considering other projects within the spatial and temporal scales of analysis.

E. SOIL RESOURCES – SOIL EROSION

1. Affected Environment

The scale of analysis for soil erosion encompasses the proposed salvage units, temporary road construction, and the designated skid trail outside of Unit 25-4 as it the area where ground disturbing activities would occur for the Oregon Gulch Fire Salvage Recovery Project. This area will be referred to as the "Analysis Area" for this section. Where this analysis identifies that soil erosion would be transported offsite into streams, or other hydrologically connected conduits, those impacts are analyzed in the Water Resource Section 3. F of the Final EA. Refer to the Soils Resources – Productivity and Compaction Section of Chapter 3 for the general Affected Environment for soils (it applies to both sections). The topography is characteristically that of a broad upland plateau that has scattered volcanic cones. This area has only been slightly modified by erosion.

These soils have a moderate erosion hazard on slopes less than 35%, and a severe hazard of erosion on steeper slopes. The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

The major management limitations and soil characteristics identified by NRCS for the soils and soil complexes found within the Planning Area were used in the selection and development of Best Management Practices (BMPs) and Project Design Features (PDFs) which have been incorporated into the Oregon Gulch Recovery Project. Soil maps and descriptions of project soil characteristics are available at the USDA Natural Resource Conservation Service (NRCS) web site: http://www.or.nrcs.usda.gov/pnw_soil/or_data.html.

Restricted TPCC reforestation classifications could have limitations for establishing new trees within 5 years due to temperature, moisture, and surface conditions (i.e., rocky) without further management, rather than have impacts to the physical structure and stability of the soils. These sites have a higher degree of sensitivity for various reasons, but are all considered to be suitable for all actions required to perform commercial harvest through application of the PDFs in Chapter 2. The reforestation problem soils are not associated with a higher potential for erosion than other sites.

Additional TPCC classifications that overlap units in this Analysis Area are specific to reforestation difficulties rather than impacts to the physical structure and stability of the soils. The Soil Productivity and Compaction section identifies and describes the specific limiting factors for each of these classifications.

Introduction

Erosion is an inclusive term for the detachment and removal of soil and rock. On hillslopes in southern Oregon the dominant natural processes of erosion are, action by raindrops, running surface water, subsurface water, and mass wasting. The amount of erosion that occurs is a function of the eroding power of the action and the erodibility of the soil. The natural physical and chemical characteristics of the soil combined with the past land use management alterations are determining factors in soil erodibility.

Ground cover by forest litter, duff, and organic material is the most import component of the forest environment for protecting the mineral soil from erosion (Elliot et al. 1996). Vegetation type and density

also plays a key role in soil erodibility. Vegetation influences soil erodibility through the action of its roots, intake of water and nutrients, and by providing organic matter and cover to protect the soil surface. Vegetative cover reduces the particle detachment rate, and through the binding capacity of root masses, the sediment transport rate. Therefore surface erosion, from disturbed soils that are not compacted, is normally greatly diminished within 1-3 years, following the regrowth of vegetation. Soils protected by litter are also less prone to erosion (SOLO, 2006; Rothacher and Lopushinsky 1974).

Soil compaction is the packing together of soil particles by physical pressure at the soil surface that results in an increase in soil density and a decrease in pore space. A decrease in soil pore space results in restricted movement of water, nutrients, air, and plant roots, and as such generally decreases site productivity and vegetative growth in most soil types. Reduced pore space also reduces water infiltration, causing an increase in surface runoff and accelerated erosion. Road decommissioning that includes proper subsoiling greatly reduces the recovery period and type of long-term impacts to soils that have been compacted. In cases where compacted soils have not been subsoiled during rehabilitation, chronic erosion and other soil impacts can persist for 40- 80 years, or more (Wert and Thomas, 1981).
Sources of Accelerated Erosion

In this Analysis Area, alterations to the soil profile from past and current management actions that apply force to, or alter the vegetative cover, are extensive. Past management on federal lands alike, have increased the erodibility of soils through road construction, maintenance and use, timber management, and fire.

All roads contribute to accelerated erosion at different levels depending on the surface type, type of use, location, maintenance frequency, and moisture levels of the road surface during use. Roads modify hydrology both through interception of precipitation on the road surface, and through interception of subsurface flow. Poorly located roads that channelize flow on hillslopes are recurrent sources of accelerated surface erosion, and in some cases mass wasting (Wemple and Jones, 2003). Unsurfaced or poorly surfaced roads open to public use and management during wet conditions, in addition to poorly located roads that have failed or are failing, are one of the largest chronic sources of accelerated erosion in the Analysis Area.

Watersheds with large areas that are in an unnaturally open condition can also increase erosion by reducing protective cover, root mass, and decreasing vegetative uptake of water. Additionally, wildfire increases the erodibility of the soil by altering the organic surface layer and chemical composition. (Barnett 1989).

Pre-Fire Road Erosion

Within the two 7th field drainages associated with the project area (Map 3-2), there are approximately 51 miles of system roads. Existing roads proposed for haul and maintenance as part of this project are paved, rocked, or native surface. Based on GIS data, none of the roads in the two drainages are paved. Rocked roads account for approximately 34% (25% aggregate, 9% pit run) of the roads. Approximately 20% of the roads within these drainages are unsurfaced. These roads are generally the largest sources of erosion, especially if they are open to year round public motor vehicle use. The remaining 46% of roads in these two drainages are unclassified surface types. Nearly all of these roads occur on private lands. The percentage of these roads that are paved, rocked, or natural surface is unknown.

Pre-Fire Timber Harvest (Skid Trails, Yarding Corridors, and Landings)

The construction and use of landings, skid trails, and yarding corridors have resulted in the compaction and displacement some of the soils in the Analysis Area. Locations where units are proposed do not appear to have been logged for at least 20 years based on GIS data. Not all open areas in the GIS are due to logging either, some are naturally grassland. There are old skid roads and landing footprints. With the regrowth of vegetation, the magnitude of these impacts on the erodibility of the soil decreased over time. It is estimated, based on the type of impact, stand type, aspect, and time since the impact occurred, that the majority of these impacted acres have enough vegetative cover to keep erosion onsite. Within

previously harvested units in this Analysis Area, evidence of past compaction is still present along tractor skid trails. Based on field surveys, erosion from past timber management within the treatment units has generally subsided or stabilized.

Post-Fire Conditions

The majority of the Analysis Area burned at high severity (Map 3-1). There are no dozer lines from the fire suppression activities in proposed units.

The high severity fire burned a lot of the organic matter and vegetation on the soil surface leaving a high percentage of the soil bare. Some emergency stabilization actions have already occurred in the Analysis Area. Areas of high burn severity were mulched and seeded with native grass or forbes, which reduces the amount of bare soil and intercepts soil particle movement. Even with these ESR actions, there is a higher than average amount of exposed soil, and with that there was likely upland soil erosion in the burned area during the first rains. Once the seeded ground germinates and plants mature, the erosion during rain events is expected to stabilize within 1-2 years.

Handlines are waterbarred as necessary to prevent gullying if present in steep terrain but since they are typically only 2-4 feet wide they generally do not require rehabilitation to prevent chronic erosion. Since these sites are so narrow, adjacent vegetation and ground litter typically covers the site within the first 1-2 years, preventing further erosion.

Post-Fire Road Erosion

During and following the fire, road use in this Analysis Area increased due to fire suppression, rehabilitation, emergency stabilization, non-Federal timber salvage, replanting, and other land management actions. This increased use, has resulted in an increase in surface erosion from roads in the Analysis Area. The ESR plan involved stabilizing roads by clearing the ditchline, culverts and catch basins.

2. Environmental Consequences

a. Alternative 1 – No Action

Under Alternative 1, this project would not have any adverse impacts to soil resources as a result of road construction, road use, yarding corridors, skid trails, landings, any needed activity fuel treatment of landing pile slash associated with the Oregon Gulch Fire Salvage Recovery Project. Areas that do not currently have adequate cover would be subject to surface erosion in the short term, but the majority of the Analysis Area would likely dissipate to pre-fire conditions within a few years as vegetation reestablishes on the site.

Grazing on the burned portions of the allotment will be temporarily suspended and rested for two full years (2015 and 2016) and would not resume until vegetation recovery and resource management objectives are met. On-site soil erosion from future cattle grazing on the BLM portion of the Dixie allotment would be managed through cattle distribution and lease duration.

Road maintenance activities including danger tree removal where they could fall or slide onto roadways are current and foreseeable in the Analysis Area. Where these actions occur in the Riparian Reserve on BLM lands, felled trees would be left onsite, or if necessary for safety, would be removed. All associated impacts are covered under the analysis of the Medford District's Hazard Tree Felling/Removal Categorical Exclusion for calendar years 2014-2018 and the Road Maintenance Categorical Exclusion for 2012-2016.

The post-fire emergency stabilization rehabilitation plans of the Medford District that would assist with soil stabilization and minimize soil erosion are seeding and mulching bare soil areas, tree planting, retaining coarse woody debris, repairing existing fences, constructing temporary fences, and repairing road facilities.

b. Alternative 2 – Proposed Action

Field surveys were used to identify and defer all areas that have the potential to result in chronic erosion, excessive soil displacement, or landslides as a result of this project. BMPs and PDFs were then identified and incorporated into the Oregon Gulch Fire Salvage Recovery Project's Proposed Action to address the remaining general management concerns identified for each soil type.

The only project action that could result in offsite erosion would be hauling and maintenance activities on roads that are hydrologically connected via ditchlines or stream crossings. Instances of offsite erosion and stream sedimentation from hauling and road maintenance would remain within state water quality standards and would not be of a magnitude to result in a negative impact to aquatic organisms or fish habitat. Offsite erosion and stream sedimentation from hydrologically connected road maintenance and haul is discussed in the Water Resources section of Chapter 3 of the Final EA.

All other road use, temporary road, skid trail, and landing construction, road renovation, decommissioning, and yarding operations proposed under Alternative 2 would result in only localized increases in accelerated onsite erosion that would persist for 1-3 years. Below is the description of all activities that would result in accelerated onsite erosion.

Road Haul Activities and Road Maintenance

There are 0.6 miles of new temporary road proposed for haul and 20 miles of existing road proposed for haul and maintenance. This haul and road maintenance on unpaved roads would contribute to accelerated erosion at different levels depending on the moisture levels of the road surface during haul, and the type of maintenance applied. Hauling would be restricted to dry road conditions to minimize the amount of surface erosion and the transport of eroded material to streams. Other PDFs would help to limit the transport of eroded material to streams. PDFs related to water quality are discussed in the Water Resources Section of Chapter 3. All roads would be maintained as necessary to prevent road damage and excessive erosion.

Temporary Road Construction and Road Renovation

There are four temporary road/spurs proposed (0.6 miles) to access Units 1-1, 25-4, 35-1, and 35-5 for timber salvage extraction. BLM Road 40-4E-25.0 would be re-opened through road renovation. The proposed temporary road into Unit 1-1 (0.5 miles) begins close to the top of Grizzly Peak on the right and gently switchbacks down the southwest slope towards the unit. Sideslopes range from 15 to 30%. The soil map unit of the entire road is 58E the Farva very cobbly loam. This temporary road is outside of Riparian Reserves and is hydrologically disconnected from streams and wet areas. This road is near the ridge with 50% or less side slope and would require no fill or minor cut and fill construction techniques. The three temporary spur roads that access Units 25-4, 35-1 and 35-5 (less than 0.1 miles) would be constructed in a Riparian Reserve to avoid constructing three landings in RRs, which would create more ground disturbance. The temporary spur roads would not cross streams and are located in Riparian Reserves with short-duration intermittent streams that flow less than 30 days of the year. Thus, there would be a low risk of sediment reaching a water bodies. Erosion prevention and sediment control measures implemented during the construction and subsequent decommissioning would greatly limit any offsite soil movement. These are also in the Farva very cobbly loam soil. These four spur roads are low grade, short and on a gentle side slope (<20%). The Farva is rated as having a moderate erosion risk.

Soil erosion from the construction and decommissioning of the temporary roads is expected to be avoided or minimized due to the use of Project Design Features. For example, seasonal restrictions during all road construction activities would reduce the potential for runoff and erosion from intensive winter storms and saturated soil conditions.

The temporary roads would be constructed, used, and decommissioned in the same dry season to the greatest extent possible. Subsoiling the compacted road surface would allow for unimpeded infiltration and ground water percolation processes to continue during the rainy season. If circumstances occur that

require a road to be winterized and utilized the following dry season, the road would have properly sized drainage installed and would be fully winterized. Then the roads would be decommissioned the next year following use. With the implementation of the prescribed PDFs, including subsoiling the road surface, installation of waterbars, and upland location, erosion after decommissioning would be minimized and would stay localized.

Through implementation of the PDFs, temporary road construction and decommissioning impacts to soils would be minimized. There would be a short-term impact to soil function on approximately 2.4 acres of roadbed, for 1-2 years until the road is decommissioned, as well as an increase in onsite erosion for 1-3 years until ground vegetation recovers.

Road Decommissioning

Eight roads are proposed for decommissioning totaling 2.3 miles. Of these roads, 0.7 miles would be naturally decommissioned. Two roads (0.6 miles) are proposed for a long-term closure from vehicle traffic, which would prevent future erosion from occurring on this road. The rest of the 6 roads (total of 1.6 miles) would be mechanically decommissioned or have a portion with natural decommissioning (see Tables 2-4 and 2-5 of Chapter 2 for further details).

Soil erosion from decommissioning roads is expected to be avoided or minimized due to the use of Project Design Features. For example, seasonal restrictions during all road construction activities would reduce the potential for runoff and erosion from intensive winter storms and saturated soil conditions.

Timber Harvest (skid trails, yarding corridors, and landings)

There are a total of 683 acres proposed for timber salvage and use of one designated skid trail (320 ft) outside of Unit 25-4 under this project. Due to the sensitivity of the landscape for a large-scale fire additional protection measures were designed and incorporated into this project to ensure erosion resulting from timber extraction actions remains onsite. Soil particles are not expected to be displaced past the units from timber harvesting activities. The decrease in soil pore space as a result of the compacted skid roads causes a slower infiltration rate. Although erosion rates would increase initially in the harvested units, most soil particles would not reach local waterways under normal rainfall conditions; erosion rates would be expected to return to near-normal rates within 5 years as vegetative cover is re-established. In most operations, a major portion of the harvest area would remain essentially undisturbed by harvesting equipment. Due to the sub-soiling (only in ground based units), slash placement and waterbaring of the disturbed areas, water infiltration is expected to be improved and surface runoff decreased.

The natural erosion rate in the Cascade Mountains is expected to be 0.2 $yd^3/ac/yr$ while harvested (clearcut) areas are estimated to be 0.7 $yd^3/ac/yr$ (Aramanthus et al.1985). A major difference in these estimates (and what is likely to occur from this project) is that unstable areas are not avoided as they are in this project. Consequently, the erosion rate is expected to be less than the estimated amount due to slope restrictions, seasonal restrictions, and the prescription. The rate of surface erosion is closely correlated with vegetative cover, especially litter on the soil surface. Litter protects the soil surface from raindrop impact and promotes infiltration. Litter and the stems of vegetation also bar the downslope movement of surface soils, which might be started by gravity, flowing water, or animals (Rice et al. 1972, p. 322). Seeding, mulching, and planting disturbed soils through application of the PDFs for this project is of upmost importance since a high amount of the surface organic matter has been volatized from the fire.

Short-term erosion rate potential would increase moderately (15-50% over undisturbed rates) in the tractor units where slopes exceed 20% and where the skid trails are not on the contour. Most of the eroded particles would not reach waterways as a result of Riparian Reserve buffers, waterbars and the dispersal of yarding skid trails. The decrease in soil pore space, as a result of the compacted skid roads, causes a slower infiltration rate and larger amounts of sediment laden surface runoff. On slopes less than 20% and where skid roads that follow the contour, runoff velocity tends to be reduced and soil particles are transported only a short distance.

Geppert (1984) concluded that cumulative surface erosion should result from the construction and existence of road networks, but that forest harvest and site preparation should not result in cumulative erosion, except when poorly applied on poor or harsh sites (Beschta 1978). There are no harsh or poor sites being treated in Alternative 2, as such sites were screened through the Timber Productivity Capability Classification process (USDI 1994, p. 3-85) and removed from the timber harvest base. The reforestation restricted sites identified in the TPCC are not expected to be more prone to erosion than other soils. The concern is rather about soil productivity and reforestation (Soil Resources – Productivity and Compaction section of Chapter 3 of the Final EA).

Implementation of Harvest and Yarding Project Design Features described in Chapter 2 (pp. 2-17 through 2-19) would greatly reduce the amount of soil compaction, surface disturbance, and the amount of exposed soil following treatments that would occur as a result of Alternative 2. These PDFs would also eliminate offsite transport mechanisms and keep erosion from yarding, skid trails, and landings onsite and out of the stream network.

PDFs would ensure the amount of slash and coarse wood available on site to provide ground cover and erosion control is maintained or increased in treatment areas. This would reduce fire caused surface erosion impacts in proposed treatment units that currently do not have adequate ground cover onsite.

Summary of Effects for Soil Erosion

The actions proposed in Alternative 2 would result in onsite soil erosion due to the bare soil conditions resulting from the fire, which would be minimized through the use of PDFs intended to prevent offsite erosion (Chapter 2, pp. 2-17 through 2-21). There would be no instances of chronic erosion or excessive soil displacement that would occur as a result of this project.

The only instance of offsite erosion that would occur as a result of Alternative 2 would be where hydrologically connected road maintenance and hauling activities on rocked and natural surface roads would result in localized instances of offsite erosion at stream crossings and where roads are adjacent to, and in close proximity to streams. These impacts are addressed in the Water Resources Section of Chapter 3.

Cumulative Effects: Proposed Action

The direct and indirect effects to soil erosion in the Analysis Area (Project Area) associated with implementation of Alternative 2 are expected to result in low levels of onsite erosion that would be minimized through implementation of PDFs.

- Soil particles are not expected to be displaced past the units from timber harvesting activities. The decrease in soil pore space as a result of the compacted skid roads causes a slower infiltration rate. Although erosion rates would increase initially in the harvested units, most soil particles would not reach local waterways under normal rainfall conditions; erosion rates would be expected to return to near-normal rates within 5 years as vegetative cover is re-established. In most operations, a major portion of the harvest area would remain essentially undisturbed by harvesting equipment. Subsoiling of skid trails, slash placement and waterbaring of the disturbed areas will improve water infiltration and reduce any surface runoff.
- Hauling would be restricted to dry road conditions to minimize the amount of surface erosion and the transport of eroded material to streams.

- The temporary roads would be constructed, used, and decommissioned in the same dry season to the greatest extent possible. Subsoiling the compacted road surface would allow for unimpeded infiltration and ground water percolation processes to continue during the rainy season.
- There would be a short-term impact to soil function on approximately 2.4 acres of roadbed (temporary road construction), for 1-2 years until the road is decommissioned, as well as an increase in onsite erosion for 1-3 years until ground vegetation recovers.

- Soil erosion from decommissioning roads is expected to be avoided or minimized due to the use of Project Design Features. For example, seasonal restrictions during all road construction activities would reduce the potential for runoff and erosion from intensive winter storms and saturated soil conditions.

Activities associated with this project, including temporary road and landing construction, use, and decommissioning; timber salvage, yarding corridors and skid trails would all result in low levels of onsite erosion that would not persist for more than 3 years.

Beyond the proposed project, the ongoing and foreseeable activities in the Analysis Area that affect soil erosion (Project Area) include the ongoing Medford District emergency stabilization and rehabilitation work for the fire, road maintenance activities, and future grazing on the burned areas of the Medford BLM portion of the Dixie Allotment once vegetation recovery occurs and resource management objectives are met (post 2016).

There would be no effects to soil erosion in the Analysis Area from future livestock grazing in the Dixie Allotment as grazing would be temporarily suspended for two full years while vegetation recovers. Surface disturbance from future cattle grazing on the BLM portion of the Dixie Allotment would be managed through cattle distribution and lease duration.

The post-fire emergency stabilization rehabilitation plans of the Medford District that would assist with soil stabilization and minimize soil erosion are seeding and mulching bare soil areas, tree planting, retaining coarse woody debris, repairing existing fences, constructing temporary fences, and repairing road facilities.

Road maintenance activities including danger tree removal where they could fall or slide onto roadways are current and foreseeable in the Analysis Area. Where these actions occur in the Riparian Reserve on BLM lands, felled trees would be left onsite, or if necessary for safety, would be removed. All associated impacts are covered under the analysis of the Medford District's Hazard Tree Felling/Removal Categorical Exclusion for calendar years 2014-2018 and the Road Maintenance Categorical Exclusion for 2012-2016.

The effect of implementing Alternative 2 with the required site-specific PDFs and BMPs will result in low levels of soil erosion confined to the Project Area for a short duration (until vegetation recovers). Alternative 2 would not have any incremental cumulative effect when considering other projects within the spatial and temporal scales of analysis.

F. WATER RESOURCES

1. Affected Environment

The *Klamath-Iron Gate Watershed Analysis* (USDI 2000) and the *Topsy-Pokegama Landscape Analysis* (USDI 1996) provide general water resources background information for the Analysis Area. Stream identification and associated GIS mapping were completed for all federal lands and private lands within the Analysis Area. All streams within the Project Area (salvage units) were field verified by BLM hydrology and fisheries staff. Riparian Reserve locations and widths were determined site-specifically using the guidelines in the Northwest Forest Plan, and incorporated on-the-ground verification of stream types, wetlands, fisheries data, and site potential based on soils.

Water-related issues associated with the Oregon Gulch Fire Salvage Recovery Project have been identified through public scoping or interdisciplinary team specialist input, and will be addressed in this document. These relevant issues are:

- There could be short-term increases in sediment from roadbed and drainage ditch disturbance associated with road maintenance activities.

- Concerns have been expressed that timber harvest activities could lead to increased access for off-highway vehicles (OHVs) potentially increasing impacts to soils, water quality, and aquatic and terrestrial habitat.
- Logging (particularly tractor yarding) and road construction could increase soil compaction, and alter hydrologic flow, including peak flow and low flow.
- Concerns have been expressed that water quality may be impacted due to increased sediment produced from disturbance associated with timber harvest activities including road construction, timber yarding, and timber hauling.
- The effects of timber harvest and road construction, when combined with other past, ongoing, and reasonably foreseeable future actions on public and private lands, could potentially contribute to adverse cumulative effects to water quality and hydrologic function.

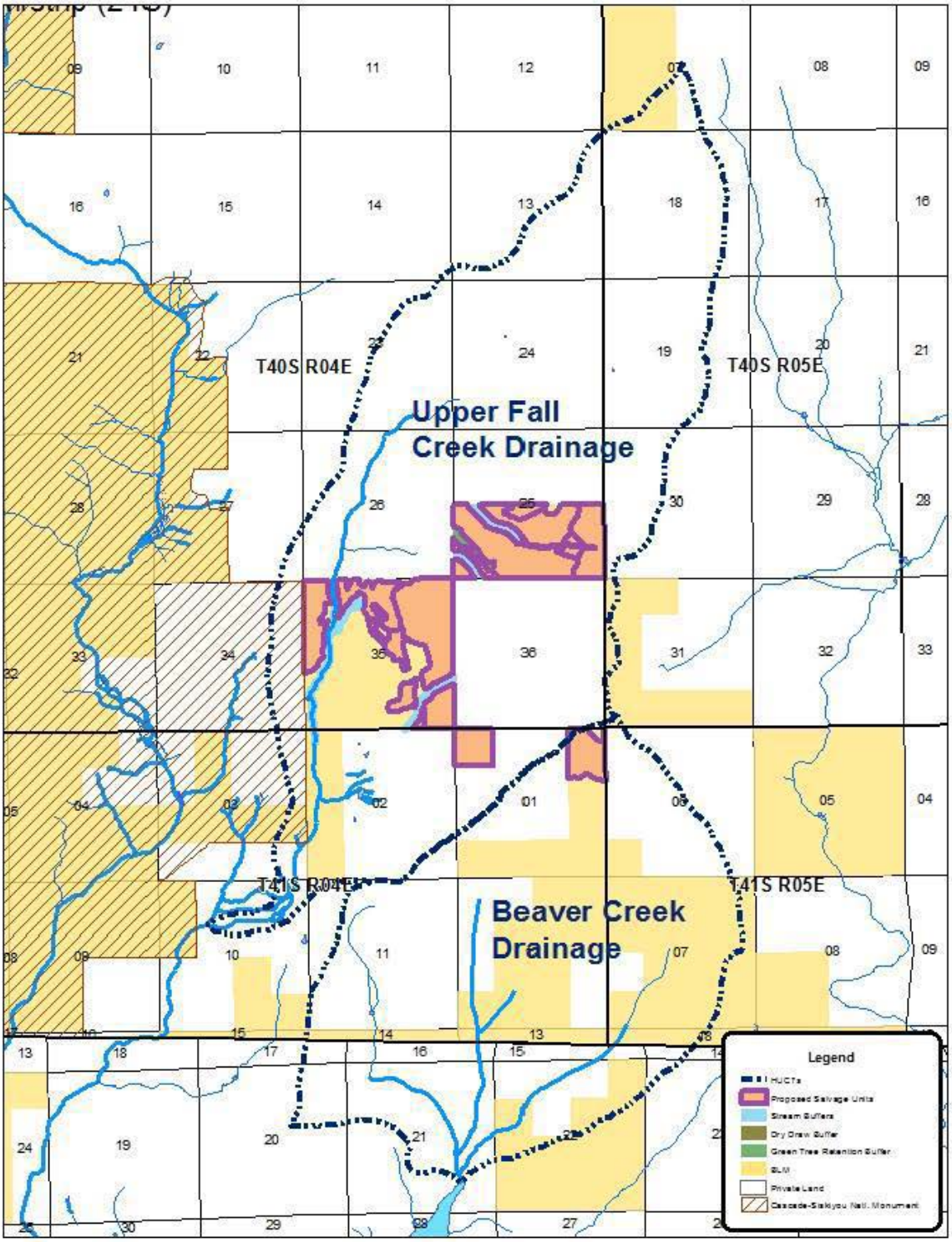
a. Analysis Area Description

The Oregon Gulch Fire Salvage Recovery Project is proposed primary in the Upper Fall Creek seven-field drainage of the Iron Gate-Klamath fifth-field watershed. One 50-acre unit and 0.5 miles of temporary road construction are proposed near the ridge of the adjoining Beaver Creek seventh-field drainage of the Copco Reservoir-Klamath River fifth-field watershed. The two seventh-field drainages will constitute the Analysis Area for water resources.

The total size of the Analysis Area is 10,000 acres, or 15.6 square miles. The rationale is that adverse (or beneficial) effects to water resources are easier to detect in smaller catchments (Bosch and Hewlett 1982) and as one nears the treatment site. The size of a drainage area is large enough to assess the cumulative effect of actions that, taken individually at the site-scale may not be significant, but when combined with effects from other actions in the drainages, may have a potential impact (i.e. cumulative effect). The Analysis Area is located almost entirely within the Transient Snow Zone (TSZ). In the TSZ at elevations between 3,500 feet and 5,000 feet, a mixture of snow and rain occurs. A small portion of the Analysis Area is below these elevations. The lowest elevation in the Analysis Area is approximately 2,700 feet. Precipitation falls predominately from November through March and summer months are typically dry. The precipitation patterns in the winter months are wide-based, with relatively low-intensity and long-duration storms, in contrast to localized, short-duration, and high-intensity summer storms that occasionally occur.

The BLM manages 29% of the land within the Analysis Area. Private lands encompass the remainder of the Analysis Area, and include land owned by industrial forest companies, residential landowners, and cattle ranches.

Map 3-2. Oregon Gulch Fire Salvag Recovery Area Seventh-Field Drainages (HUC7s)



0 0.35 0.7 1.4 Miles

No warranty is made by the BLM for the accuracy, reliability, and completeness of the data. This information may not meet National Map Accuracy Standards.

b. Streams and Water Features

Surface water in the Oregon Gulch Fire Salvage Recovery Area includes streams, springs, small wetlands, and small seasonal instream reservoirs. During the development of the Klamath- Iron Gate Watershed Analysis, streams were classified, using aerial photographs, as perennial, intermittent, and dry draws with ephemeral flow. Stream types on streams in the Project Area were field verified through site visits. Streams categorized as perennial or intermittent on Federal lands are required to have Riparian Reserves as defined in the *Northwest Forest Plan* (USDA and USDI 1994). Dry draws do not meet requirements for streams needing Riparian Reserves because they lack the combination of a defined channel and annual scour and deposition (USDI 1995, p. 27). Streams on private forest lands are managed according to the Oregon Forest Practices Act, which classifies and protects streams based on three beneficial use categories (fish use, domestic water use without fish use, and all other streams). Springs, wetlands, lakes/ponds, and small impoundments on BLM-administered lands in the Analysis Area have been identified and mapped in GIS. These waterbody features are also contained within Riparian Reserves.

According to the Klamath-Iron Gate Watershed Analysis, there are 8.6 stream miles in all three of the Fall Creek drainage areas (Upper Fall Creek is the largest drainage area of the three). Of that total, approximately 62% are intermittent streams. Field verification of streams in the Project Area, a small portion of the drainage area, indicates that the mileages of perennial and intermittent streams in the Watershed Analysis were overestimated. The 50-acre unit and 0.6 miles of temporary road construction are near the drainage ridge and over a mile from any streams. Generally speaking the Analysis Area is relatively dry, with the exception of the perennial springs and the lower portions of the drainages.

c. Soil Compaction and Peak Flow

Soil compaction (due to ground-based logging and fuels treatment equipment, and the presence of forest roads and trails) may increase the frequency and magnitude of peak streamflows (Harr 1976). In undisturbed forest soils in western Oregon, infiltration capacities far exceed the maximum rates of rainfall so that all water enters the soil, thus minimizing overland flow. Compaction can reduce the infiltration properties of the soil, resulting in increased runoff. Soil compaction can also impede the subsurface movement of water as it moves downslope in shallow aquifers. Peak flows for small, headwater streams appear to be increased where at least 12% of a watershed was severely compacted by road building, tractor skidding, or tractor windrowing of slash (Harr 1976). Factors that influence the contribution of a compacted area to increased runoff include: proximity of compacted area to streams, connectivity of compacted areas to streams, and watershed characteristics (Harr et al. 1979). Severe fire that exposes bare soil can also reduce the infiltration properties of the soil, resulting in increased runoff.

Post-fire Peak Flows

Most of the Analysis Area burned with moderate to high intensity and has little to no canopy cover or groundcover. Increases in peak flows may occur within drainages where a high proportion of the landscape is compacted from roads and other disturbances and where vegetation has been modified resulting in a reduction of canopy cover. These effects can be magnified within the TSZ, where the likelihood of synergistic effects from rain and snowmelt are elevated. When this occurs, increased sedimentation and habitat alteration can result from increased channel scour and bank erosion. Although there have been numerous studies in the Pacific Northwest that examine the effects of forest harvest on peak flows, the published results vary widely, depending on a number of factors including the type of event (rain; rain-on-snow; snow melt), the characteristics of the drainage basin, and the location in the basin of roads and clearcuts. Peak flow change does not appear to be related in any simple way to the percentage of basin area cut or basal area removed (Moore and Wondzell 2005). The magnitude of peak flow increases declined with increasing event magnitude in most cases, with the greatest increases typically associated with autumn rain events on relatively dry catchments. These autumn events resulted in small peak flows with little hydraulic consequence (Moore and Wondzell 2005). Peak flow increases for flow events with a return interval of 5 years or greater were either small or there was no increase (Beschta et al. 2000).

Roads have three primary effects on hydrologic processes: (1) they intercept rainfall directly on the road surface and road cutbanks, and affect subsurface water moving down the hillslope; (2) they concentrate flow, either on the surface or in an adjacent ditch or channel; and (3) they divert or reroute water from paths it otherwise would take were the road not present. Roads connected to stream channels through ditch lines effectively extend the stream channel network, changing runoff timing and ultimately increasing the magnitude of peak flows (Wemple et al. 1996). The effect of roads on peak streamflows depends strongly on the size of the watershed. For example, capture and rerouting of water can remove water from one small stream while causing major channel adjustments in another stream receiving the additional water. Roads have relatively insignificant effects on peak flow in large watersheds where they constitute a small proportion of the land surface, as they do not seem to change annual water yields, and no studies have evaluated their effect on low flows. Even though the Upper Fall Creek seventh-field drainage has a road density greater than 4.1 miles per square mile, the roads are largely hydrologically disconnected, which collectively would have a relatively minimal effect on annual water yields. The Beaver Creek drainage has a relatively low road density at 1.8 miles per square mile.

Roads that cross dry draws have the potential to route storm flow into the dry draw. Subsurface flow through the colluvium (i.e. loose rock and soil at the base of the slope) can also be intercepted by a road cut or compaction from a road that crosses the bottom of a dry draw, initiating surface flow with scour and deposition in the draw. This has the potential to change the downstream flow characteristics of the draw to a short-duration intermittent stream, affecting the size of downstream peakflows due to the more rapid delivery of storm flow to downstream reaches. (Water flows much faster through the defined surface channel of a short-duration intermittent stream than it does, subsurface, through the colluvium of a dry draw.)

Well-designed roads with a properly functioning drainage system attempt to mimic the local natural drainage pattern by keeping the local downslope movement of water similar to the pre-road condition. However, during extreme events (drought or peak flow) any hydrologic differences between the artificial drainage associated with the road system and the natural system become more critical and can cause noticeable effects to the local environment.

d. Water Quantity

Average annual precipitation in the Oregon Gulch Fire Salvage Recovery Analysis Area is about 28 inches (USDI 2000 and BLM-unpublished internal precipitation data). Low streamflows normally coincide with the period of low precipitation from July through October. The highest streamflows usually occur from January through May. Significant flows can also be produced by local, high-intensity summer storms, although these events are relatively rare and their effect is limited to the local area.

Water quantity in the Oregon Gulch Fire Salvage Recovery Analysis Area is a function of natural and human-caused factors. Natural site factors include climate, geology, and geographic location. Natural processes that have influenced water quantity include floods, wildfires, and drought. Past human activities that have altered water quantity in the Analysis Area include: timber harvest, roads, water withdrawals, dam building for instream reservoirs, and fire suppression.

Streamflows are naturally low during the summer due to low precipitation, reduced soil drainage, and sustained high evapotranspiration. Fire suppression has resulted in many overly dense forest stands with high evapotranspiration rates that likely contribute to decreasing the amount of water available for summer streamflows. Past harvests in the Analysis Area often included riparian vegetation. Vigorous regrowth of phreatophytic (i.e. deeply rooted trees that obtain their water from the water table) hardwoods following past harvest of riparian areas significantly increased evapotranspiration rates during the growing season, causing a reduction in summer flows. Based on the fire intensity, streamflows in the Analysis Area are expected to increase following an event of this magnitude. However, precipitation in the year preceding the fire was nearly half of normal and streamflows remained low. Low summer streamflows are expected until the Analysis Area recharges from a year of normal precipitation.

e. Sources of Sedimentation (Roads, Off-Highway Vehicles, and Timber Harvest)

Road density provides a general index of relative extent of the amount of road in the Analysis Area. There are a total of 51 miles of road in the Analysis Area on private lands and BLM-administered lands. Both road mileage and road density within Riparian Reserves are gross indicators of the level of road impacts in watersheds. High road density, greater than 4.0 miles per square mile (King and Tennyson 1984) is found within the Analysis Area. Although road density is a useful indicator, it should be noted that not all roads impart similar effects. For instance, the magnitude of impacts from roads on steep slopes is different than those from roads located on flat terrain. Roads located near streams and road stream crossings are responsible for the majority of sediment delivered to channels.

Roads located near a stream or mid-slope generally have a greater chance of directly affecting the hydrologic function of the stream system. Concentration of runoff by road drainage systems may contribute to more rapid delivery of storm runoff directly to streams, resulting in increased peak flows and/or timing to peak. Road segments linked to the channel network increase flow routing efficiency and offer a plausible mechanism for peak flow increases (Wemple et al. 1996).

General field observations indicate limited OHV activity across the Analysis Area. Gates on private land adjacent to BLM administered land restrict access to portions of the Analysis Area. In addition, this area is far from any population center which also limits recreational OHV use, except during hunting season in the fall. Casual observations by field going staff have not documented any sediment input to aquatic systems from OHV trails or use in the project area.

Timber harvesting operations have variable effects on sediment production. A study in Washington State (Rashin et al. 2006) concluded that the primary operational factors that influenced the effectiveness of timber harvest Best Management Practices in controlling sediment delivery to streams were: the proximity of timber falling and yarding activities to streams and particularly whether yarding routes crossed streams; the presence or absence of designated stream buffers; and the use of special timber-falling and yarding practices to prevent direct mechanical disturbances of stream channels. Stream buffer practices were most effective where timber falling and yarding activities were kept at least 10 meters (32.8 feet) from streams and outside of steep inner gorge areas. The overall effectiveness of streamside buffers was diminished by cable yarding routes or skid trails that crossed buffers and streams.

Excluding commercial harvest from Riparian Reserves prevents disturbance to stream channels during the felling and yarding operations. Increased surface erosion can result from ground disturbance and soil compaction caused by tractor logging.

Most of the increase in sedimentation associated with forestry activities is attributed to forest roads. There are two processes by which roads increase sediment in streams: 1) by increasing the incidence of mass movement; and 2) by erosion of the road surface, cut banks, and ditches and subsequent transport of this material to the stream. In the Oregon Gulch Fire Salvage Recovery Analysis Area, surface erosion from road surfaces, cut banks, and ditches represents the dominant source of road-related sediment input to streams. In the Oregon Gulch Fire Salvage Recovery Analysis Area, mass movement is not an issue, as most of the topography of the Analysis Area has gentle topography.

There is high variability in sediment production from road segment to road segment. Most segments produce little sediment, while only a few produce a great deal (Luce and Black 1999). Sections of road having a steep gradient, being heavily used, and draining directly into larger streams have the highest potential to produce and deliver material of a size most apt to deposit on or in the streambed. Older roads in mid-slope positions dominate the production of sediment during extreme storms (Wemple et al. 2001). Ridgetop roads usually have the least effect on streams. The majority of roads in the Analysis Area are located on relatively gentle topography, do not have ditches draining to streams, have adequate surfacing, and therefore, are not hydrologically connected to the local waterways.

Natural or unsurfaced roads are generally more likely than surfaced roads (rocked or paved) to contribute sediment to streams. Roads on BLM-administered lands in the Analysis Area are stable and not readily predisposed to landsliding. As a consequence, road sediment sources are primarily surface erosion from natural surfaced roads and road ditches that connect to streams. Grazing and sediment from chronic erosion of natural surface roads are the two leading sediment sources in the Analysis Area.

Stream crossings by roads are particularly effective at increasing sediment yields because of their direct connection to the channel and failure of inadequately designed and constructed culverts adds large amounts of sediment to streams. Although any stream crossing will have some impact on the channel, careful engineering, construction, and maintenance can limit the severity (Kattelmann 1996). According to BLM GIS data, there are a total of 40 stream crossings in the Analysis Area (30 of which are in the Upper Fall Creek Drainage Area). One half of the stream crossings in the Upper Fall Creek Drainage are on natural surfaced roads.

Studies conducted in western Washington and Oregon found that 80% of the road runoff points emptied directly into the drainage system (Duncan et al. 1987). In this study, of the stream entry drainage points, 88% entered first or second order channels while only 13% emptied directly into permanent water. Thus, the delivery of road sediment to larger streams often depended on its transport through these smaller, often ephemeral channels. Woody material in these small channels acted to trap and hold larger sediment, thus preventing it from reaching larger channels downstream. According to field observations, most roads in the Oregon Gulch Fire Salvage Recovery Analysis Area are not hydrologically connected to streams.

Sediment production from forest roads declines substantially with time. A study of 74 road segments with road surfaces graded in western Oregon found 70% recovery by the second year and 90% recovery by the third year (Luce and Black 2001). Closure of unsurfaced roads during the wet season can also help to reduce erosion (Kattelmann 1996).

f. Water Quality

A review of forest management impacts on water quality concluded that the use of BMPs (see Chapter 2 of the Final EA; USDI 1995, Appendix D and as modified by Resource Management Plan Maintenance dated July 12, 2012) in forest operations was generally effective in avoiding significant water quality problems. However, the report noted that proper implementation of BMPs was essential to minimizing non-point source pollution. Such implementation must include ephemeral channels, often overlooked in the application of BMPs (Kattelmann, 1996, p. 871). Ephemeral streams displaying evidence of a defined channel and annual scour and deposition on BLM-administered lands ("short-duration intermittent") have designated Riparian Reserves along them, and are subject to all of the PDFs/BMPs applicable to Riparian Reserves, and additional PDFs/BMPs apply to other non-riparian draws with no active stream channel and not meeting the Riparian Reserve criteria ("dry draws"). In general, because all stream crossings (whether by road, culvert or bridge) are coincident with the active channel, there is little opportunity to buffer any inadequacies of design or construction. While any crossing will have some impact, careful engineering, construction and maintenance can limit the severity (Kattelmann 1996, p. 892). The use of BMPs in forest operations is generally effective in avoiding significant water quality problems (Kattelmann 1996, p. 871). As this project incorporates PDFs and BMPs into the design of the project, much can be done to protect water quality simply by avoiding activities in sensitive areas, such as riparian zones, areas susceptible to mass movement, and areas where soils may become saturated and produce overland flow (Kattelmann 1996, p. 871).

Stream sediments may negatively impact aquatic species such as salmonids, amphibians and insects, and may impair the quality of domestic water supplies. Sediment suspended in water increases turbidity, limiting the depth to which light can penetrate if turbidity is increased to a sufficient degree. High turbidity levels can severely limit the ability of sight-feeding fish to find and obtain food.

The 1996 amendments to the Safe Drinking Water Act (SDWA) mandated that state agencies conduct source water assessments for every public water system. Municipal water rights are held by the City of Yreka for water in Fall Creek. The majority of the water is diverted into Fall Creek from Spring Creek. The water from Fall Creek above the transfer from Spring Creek, originates from springs in 41S-02E, section 2 of the Oregon Gulch Fire Salvage Recovery Analysis Area. Therefore, the Oregon Gulch Fire Salvage Recovery Analysis Area falls within a source water area. However, the intake for the pumping station for the City of Yreka is over six miles away, outside of the Analysis Area. During high intensity storm events in the first 3-5 years following the fire, it is likely that sediment will be transported episodically from headwater streams to Fall Creek. The potential for the transport of sediment from the Analysis Area to the intake is low because of the sediment storage capacity in the low gradient sections of Fall Creek, within and downstream of the Analysis Area, and the six mile distance to the intake. The porosity of the rocky soils found in much of the Analysis Area also provide stability during the recovery of vegetation. As hydrologic and vegetative recovery continues in the first 3-7 years, substantial declines in erosion and sediment yield is expected.

The Oregon Environmental Quality Commission has adopted numeric and narrative water quality standards to protect designated beneficial uses. In practice, water quality standards have been set at a level to protect the most sensitive uses. The Oregon Department of Environmental Quality (ODEQ) is required by the Federal Clean Water Act (CWA) to maintain a list of stream segments that do not meet water quality standards for one or more beneficial uses. This list is called the 303(d) list because of the section of the CWA that makes the requirement. DEQ's 2010(d) list is the most recent listing of these streams (ODEQ 2010). There no 303(d) listed streams in the Analysis Area.

Previous ground-disturbing activities, such as road building, logging, and livestock grazing, maintenance of irrigation diversions, irrigation return flows, and irrigation ditch blowouts, have contributed sediment to streams in the Analysis Area. It should be noted that all known current and past irrigation activities are in the lower portions of the Analysis Area.

Within the Iron Gate Reservoir-Klamath River and Copco Reservoir-Klamath River Watersheds, cattle operations are the largest non-forestry agricultural venture. Livestock grazing has occurred throughout the Analysis Area since the mid-1800s (USDI 2000). Cattle were driven from lower valley pastures to high plateau meadows each summer during the mid-1800s to the early 1900s. These livestock had an adverse impact on watershed conditions, especially along stream courses and near springs and meadows (USDI 2000). Current grazing occurs on BLM-administered lands within the Analysis Area. The Analysis Area encompasses large portions of the Dixie Grazing Allotment, a grazing allotment administered by the BLM Klamath Falls, Lakeview District. The lessee will rest the entire Dixie Allotment (burned and unburned) for one full year (2015). In 2016, grazing on the unburned portion of the allotment will not resume until monitoring data and/or professional judgment indicate that health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise, the rest period will be extended until the vegetation has recovered and resource management objectives are met. The burned portion of the allotment will continue to be rested during both years. If conditions are favorable to graze outside the fire area in 2016, the number of Animal Unit Months (AUMs) will be proportionally reduced to 77 AUMs. Forage availability in the unburned portion of the allotment (in addition to rangeland health standards) will be a determining factor as to whether and how many AUMs are authorized in 2016. Appropriate administrative actions would be followed if cattle graze on BLM burned lands.

The Analysis Area includes portions of the 80,885 acre Pokegama Wild Horse Management Area. The Pokegama wild horse population has been around since the early 1900s. The management level for the herd is set at 30 to 50 head (USDI 2000). Field observations this summer and fall by BLM fisheries and hydrology staff indicate the use of springs and streams in the Analysis Area.

The advent of the Northwest Forest Plan in 1994 (USDA and USDI 1994) followed by the Medford District Record of Decision and Resource Management Plan in 1995 (USDI 1995) resulted in major

improvements for stream and watershed protection and restoration on Federal lands. Riparian Reserves establish protection for all fish-bearing streams as well as nonfish-bearing perennial and intermittent streams, wetlands, lakes, and ponds. Over the past 10 years, road construction has declined and road decommissioning and upgrading has slightly increased. Implementation of best management practices during road and logging operations have reduced impacts on water quality. Water quality on federally-administered lands appears to be on an upward trend with reductions in sediment input.

2. Environmental Consequences

Because no new management is proposed under Alternative 1, the effects described reflect current conditions and trends that are shaped by ongoing management, reasonably foreseeable future actions, and events unrelated to the Oregon Gulch Fire Salvage Recovery Project. Discussion for Alternative 2 reflects the direct and indirect impacts of the Proposed Action. The effects discussion also includes cumulative impacts of those direct/indirect actions when added incrementally to actions past, present, and reasonably foreseeable. Short-term effects are defined as those lasting ten years or less and long-term effects last more than ten years (USDI 1994, p. 4-4).

a. Alternative 1—No Action Alternative

Cumulative effects to vegetation are considered within the spatial and temporal scale of this analysis as described as the Analysis Area. On the Medford BLM portion, salvage activities would not occur in the Oregon Gulch fire area under Alternative 1 (the No Action Alternative). The foreseeable actions in the Oregon Gulch Fire Salvage Recovery Project analysis area for water resources are: the ongoing Medford and Lakeview District emergency stabilization rehabilitation work for the fire, future grazing on the Dixie Allotment, the Oregon Gulch Post-Fire Salvage and Rehabilitation Project (Lakeview District), and private industry salvaging on non-federal lands.

Under Alternative 1, there would be no changes to canopy cover on BLM lands (nearly all of which burned in the fire)**,** areas of compacted soil, or road densities. There would, therefore, be no change to the potential of increasing the magnitude and frequency of peak flows on BLM-administered lands beyond the effects of the fire.

Roads in the area would be sporadically maintained but not upgraded and would continue to influence runoff and to a lesser extent, groundwater flow. In the long-term, roads with improper drainage are more likely to chronically deliver sediment to channels, modify flow, and experience road failures during extreme precipitation events.

Due to the intensity of the Oregon Gulch fire, the amount of vegetation loss made more groundwater available for streamflow and low summer flows would likely increase in the year following the fire. However, the absence of vegetation may also result in an increased risk of higher peak flows. In a relatively short time (1-3 years), vegetation will re-establish and summer flows will return to pre-fire levels. It will take a longer period of time for vegetation, particularly canopy cover, to recover sufficiently for peak flows to return to their normal range. This high-severity fire will also reduce or eliminate riparian vegetation and expose large areas of bare soil to the erosive forces of rainfall, potentially increasing soil erosion and sedimentation. Full hydrologic recovery would take much longer, as it is dependent upon the recovery of the forest canopy, which could take up to 30 years.
Past events in the Analysis Area that currently have the potential to influence peak streamflows and increase erosion rates include grazing, timber harvesting, the Oregon Gulch wildfire, road construction, and land development. These activities potentially influence peak streamflows and water yield through canopy removal, soil compaction, or drainage network alteration, while roads, ground disturbance and wildfire can elevate sediment yields. Analysis for potential increased peak flows and sediment consider the effects of these past actions in their methodology.

Under Alternative 1, there would be no reduction in road density in the Analysis Area on BLM-administered lands. Surface erosion from roads would be expected to remain a concern, and the risk of

sediment inputs to streams from roads would be expected to remain relatively constant. A minimum level of BLM road maintenance would occur to adequately drain roads, provide for public safety, and repair drainage failures. This work may benefit water quality; however, since there would be no road closures or decommissioning, there would be no decrease in road interactions with streams and resource impacts, particularly in Riparian Reserves.

Reasonably foreseeable future actions planned for BLM-administered lands in the Analysis Area include salvage, planting, and herbicide application on the Lakeview District's proposed Oregon Gulch Fire Salvage and Rehabilitation EA, soil stabilization projects identified in the Emergency Stabilization and Recovery Plan (ESR), routine road maintenance activities, livestock grazing, and wild horse use on both BLM Districts. The funded ESR plan included seeding and mulching of potential sediment sources along roads and in disturbed areas. The ESR plan on the Medford District also included 3 miles of temporary fence on perennial portions of Spring Creek and Upper Fall Creek to protect riparian vegetation from grazing pressure during recovery.

The entire Dixie Allotment will be rested for one year (2015). The burned portions of the Dixie Allotment will be temporarily suspended and rested from grazing for two full years (2015 and 2016). In 2016, the unburned portion of the allotment will not resume until monitoring data and professional judgment indicate that the health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered and resource management objectives are met. If grazing occurs in 2016, the AUMs would be reduced proportionally, authorizing 77 AUMs (equivalent to 24 percent of the area of the Dixie Allotment). After the temporary fencing proposed under the ESR is removed in 2017, livestock grazing on the Dixie allotment could affect water quality by increasing turbidity/sedimentation if cattle cause streambank disturbance and riparian vegetation removal. Additionally, impacts on springs and riparian areas from the Pokegama herd of wild horses would continue.

The Klamath Falls Resource Area of the Lakeview District is proposing approximately 15.5 acres of salvaging and planting in the Upper Fall Creek drainage and 3.4 acres in the Beaver Creek drainage. There are 153 additional acres proposed for planting in the Beaver Creek drainage. Herbicide and seeding is proposed for 2.4 acres in the Upper Fall Creek drainage, and 67 acres in the Beaver Creek drainage. This project would be implemented using standard PDFs which would greatly reduce the amount of potential erosion and sedimentation that could impact aquatic habitat from salvage activities and would be consistent with the impact analysis of the 1994 Lakeview EIS.

Road maintenance activities including danger tree removal where they could fall or slide onto roadways are current and foreseeable in the Analysis Area. Where these actions occur in the Riparian Reserve on BLM-administered lands, felled trees would be left onsite, or if necessary for safety, would be removed. All associated impacts are covered under the analysis of the Medford District's Hazard Tree Felling/Removal Categorical Exclusion for calendar years 2014-2018 and the Road Maintenance Categorical Exclusion for 2012-2016.

For reasonably foreseeable future actions on private lands, it is assumed that all private forest lands within the Analysis Area would be harvested within the next year, which is estimated to be approximately 71% of the Analysis Area. The actual timing of any timber harvest on private land is dependent on many factors, including valuations based on supply/demand, ownership, etc. However, the assumption that the timber on private land will be harvested within the next year is based on the time period the burnt timber remains merchantable. It is assumed that there will be no canopy cover after the timber harvest on private lands. Most areas that could be harvested on private lands are accessible by existing roads, so no new road construction is included in the reasonably foreseeable future.

In conclusion, past actions from the 1850s to the 1980s on both private and federal lands throughout the Analysis Area contributed to water quality degradation. However, water quality conditions have improved with the cessation of some activities, such as intensive grazing, and the moderation of impacts

from other activities, such as logging and road building. Natural surface roads and OHV trails that are used during the wet season and ground skidding on moderate slopes would likely continue to have erosion concerns and contribute sediment to nearby streams. Reasonably foreseeable future actions on private lands would be required to adhere to the Total Maximum Daily Loads (TMDLs) and Water Quality Management Plan (WQMP) by ODEQ, and water quality in the Analysis Area would be expected to continue to improve. Reasonably foreseeable future livestock grazing on private (and to a lesser extent, BLM-administered land) may continue to alter stream banks and cause increases in turbidity/ sedimentation to area streams.

b. Alternative 2—Proposed Action

Yarding

Tractor yarding for the proposed salvage units would be limited to designated skid trails, thus minimizing the compacted area to 12% or less. Observations of the units proposed for harvest reveal many old skid trails are still apparent across the landscape, and where feasible, these old skid trails would be re-used. Designating skid trails and re-using old skid trails would reduce the area that would be compacted during logging operations. The use of a mechanical harvester would not cause any additional detrimental compaction as a result of using such equipment during dry soil conditions and on designated skid trails. Additionally, designated skid trails would be decommissioned, seeded, water-barred, mulched, and blocked by October 15th of the year of harvest. Decompacting designated skid trails and adding surface cover such as slash is central to reducing sediment production from these areas (Wagenbrenner et al 2014). Hydrologic recovery would occur over time and as vegetation becomes established.

Actions proposed under Alternative 2 would not affect streamflows in the Analysis Area, as little-to-no net change in soil compaction is anticipated due to reusing old skid trails, designating skid trails, and limiting harvest to dry soil conditions. Because canopy cover would not be reduced below existing condition (currently minimal or nonexistent across the burn area), it is unlikely streamflows would be affected further. Peak streamflows are not expected to be affected by soil compaction resulting from this project because there would not be any connectivity from the yarding activities to stream channels**.** Project Design Features and BMPs, such as decommissiong skid trails, seeding, mulching, and waterbarring tractor skid trails and not expanding existing landings into Riparian Reserves would prevent surface flow from reaching stream channels.

Recent research indicates that effects from peak flows, although of concern, should be confined to a relatively discrete portion of the network where channel gradients are less than approximately 2.0% and streambeds are composed of gravel and finer material. Furthermore, data supports the interpretation that if peak flow increases do occur, they can only be detected in flows of moderate frequency and magnitude. Beyond that, they are likely not detectable (Grant et al. 2008). This suggests that if increases in peak flows occur, they are unlikely to result in adverse effects to the higher gradient channels located within the Analysis Area. Also, peak flows are only detectable in smaller storm events with return periods of six years or less, where channel forming processes are minor in effect. No noticeable increase in the magnitude or frequency of peak streamflows would be expected as a result of canopy cover reductions proposed under Alternative 2, since the existing canopy cover is minimal to nonexistent since the fire.

Roads

Road operations proposed under Alternative 2 include temporary construction, maintenance, renovation (opening up closed roads), decommissioning, and landing construction. Road-related actions would have the greatest potential for increasing the amount of sediment delivered to streams in the Analysis Area. All road work would be done during dry conditions, primarily during the dry season to prevent or minimize sediment delivery to streams to the maximum extent practicable.

Proposed road treatments under Alternative 2 would not result in an increase in road density or percent of area in roads in the Analysis Area. Temporary road construction would be short-term; roads would be fully decommissioned after use by decompacting the surface, scattering slash and other debris, and blocking vehicle access after use. All other road treatments would occur on existing roads.

Under Alternative 2, four new temporary road segments, totaling approximately 0.6 miles, would be constructed. These roads would be located on stable, low-to-flat slopes (topographic benches), with no culvert or ditch installations. Most of this total (0.5 mile) is a temporary road in the Beaver Creek drainage to provide access to Unit 1-1, located near the top of a ridge over a mile from any watercourse. Due to the lack of hydrologic connectivity to transfer sediment, there are no potential effects expected to water resources in Beaver Creek drainage from this action. The temporary road is anticipated to be decommissioned within the same dry season that it would be constructed or it would be winterized to prevent sediment from transferring offsite.

To avoid the construction of three new landings in Riparian Reserves which would create more ground disturbance, three short spurs (one 50 feet and the other two less than 500 feet each) are proposed in the Riparian Reserves in Units 35-1, 35-5, and 25-4. None of these temporary spurs would have a stream crossing and are in Riparian Reserves with short-duration intermittent streams with flows less than 30 days of the year. These spurs would originate from an existing system road, and proceed away from the channel up very gentle slopes. The spurs would be constructed, used, and obliterated during a single dry season or would be winterized to prevent sediment transfer offsite. Disturbed surfaces would be seeded, mulched, and stabilized before the onset of fall rains. Because the spurs would have no direct hydrological connectivity with the aquatic system and they would be rehabilitated before the onset of fall rains, there would be no surface flow in the stream from the spurs' construction, use, and decommissioning to contribute sediment into the streams. Thus, there would be a low risk of sediment reaching a water body from these temporary spurs.

The subsequent decommissioning of all temporary roads in the project area would include decompacting the surface and placing slash and other debris to camouflage and block the roads to vehicle traffic. Work would be conducted during the dry season, when streamflows are not present in the short-duration intermittent channels.

There would be a slight decrease in overall road density with decommissioning of existing roads. Alternative 2 also includes natural and mechanical decommissioning of eight roads, totally 2.3 miles. Of these, four were identified as candidates for decommissioning in the Klamath-Iron Gate Watershed Analysis. During the decommissioning activities, one stream culvert on an intermittent stream would be removed. The road decommissioning would provide long-term benefits to soil, water, and aquatic species, and is consistent with direction contained in the Klamath-Iron Gate Watershed Analysis (USDI 2000). Overall, road decommissioning activities would remove 0.5 miles of road from Riparian Reserves and decrease road density in Upper Fall Creek from 4.1 mi/mi^2 to 3.9 mi/mi^2. The reduction of road densities and the elimination of current or potential impacts would result in a slight long-term decrease of adverse effects to soil and water in the Analysis Area.

Although Alternative 2 proposes actions to reduce existing soil and water impacts from OHV use, a secondary effect of timber harvest is the potential to increase unauthorized motorized vehicle access by opening up the forest stand along with the presence of skid trails, especially when the topography is gentle. This alternative would implement PDFs designed to discourage this by blocking and scattering slash and other debris on skid trails that connect to roads and radiate from landings.

Under Alternative 2, one new landing in an existing opening would be constructed outside Unit 25-4 associated with the designated skid trail to cross the 20-acre green tree retention buffer. Where necessary, renovation of existing landings would not occur during the wet season (October 15th to June 15th), when the potential for soil erosion and water quality degradation is higher. As necessary, stabilization of landings (i.e. seeding and mulching, or other approved methods) would be implemented prior to the onset of seasonal rains. Erosion from the landings would be minimal due to their location, low gradient slopes within the Analysis Area, and application of erosion control measures, which will greatly reduce the likelihood of any sediment from entering stream channels.

Best Management Practices and Project Design Features for road related activities including road maintenance would reduce and in some cases eliminate sediment from entering stream channels. The use of these roads is expected to be short term and limited by weather conditions as specified in the Project Design Features. Under Alternative 2, rocked and native surface haul roads would receive road surface and ditchline maintenance as necessary to protect the integrity and drainage of the road during use. Where roads are connected to streams, sediment would enter stream channels. The extent of these deposits would be indiscernible beyond background levels following the first few rains. Effects to water quality from hauling and road maintenance would not be discernible from background levels within the larger tributary or mainstem streams in the Analysis Area. These actions would therefore be in compliance with applicable State and Federal statutes, such as the Clean Water Act (CWA). Alternative 2 is also consistent with the standards and guidelines set forth under the 1994 Medford RMP EIS.

Overall, road use in and near streams could increase sedimentation in the short-term, although any increases would likely be undetectable beyond background levels Sedimentation as a result of log truck travel on roads in the Analysis Area would be low due to the use of existing surfaced roads, dust abatement, and BMPs for seasonal hauling restrictions. Natural surface roads used as haul routes during the dry season have the potential to directly transport airborne particulates to stream channels. Repeated use of the roads during dry conditions would create dust that may settle into the channels. However, through following standard BMPs, such as watering roads, it is unlikely that enough dust would reach a stream channel at any one time to create enough turbidity to exceed DEQ's turbidity limit.

Harvest

The proposed salvage harvest would include tree felling and log yarding. The potential for sediment in commercial harvest units to reach stream channels is low due to erosion prevention BMPs, such as no harvest or yarding in Riparian Reserves, limiting the extent of skid trails, and the relatively flat topography. Waterbars on tractor skid trails would prevent water from concentrating on bare compacted ground and move it to adjacent vegetated or slash-covered slopes.

Cumulative Effects: Proposed Action

The following is a summary of the direct and indirect impacts of Alternative 2 to water quality. Alternative 2 would have minimal adverse effects on water quality because:

- Proposed temporary road construction would occur on flat or gentle terrain during the dry season, minimizing the risk of road erosion;
- Proposed temporary road construction in Riparian Reserves would be decommissioned within the same season;
- The reduction of road densities via road decommissioning would result in a slight long-term decrease of adverse effects to soil and water within the Analysis Area.
- The potential for sediment from commercial harvest units to reach stream channels is low with implementation of PDFs and BMPs; and
- No landing construction or expansion would occur inside Riparian Reserves, and BMPs would greatly limit any sediment moving off-site.

Under Alternative 2, road decommissioning may provide a minor long-term benefit to water quality. Road decommissioning is identified as important for watershed restoration in the Klamath-Iron Gate Watershed Analysis (USDI 2000). Long-term cumulative benefits to water quality from road decommissioning proposed under Alternative 2 would be slightly greater than under Alternative 1.

Existing human-caused sediment sources in the Analysis Area are primarily related to the existing road network, limited OHV use, and grazing. The primary sediment source resulting from Alternative 2 would likely occur from ground disturbance caused by log hauling and road activities. However, the impact is expected to be minimal and indiscernible from background levels given the implementation of PDFs and BMPs. All project elements, including temporary road construction, road renovation, decommissioning, yarding, and hauling would be limited to the dry season or dry conditions. Tractor yarding would utilize

existing skid trails where possible. All tractor and cable corridors and decommissioned road segments would be water barred, seeded (roads and tractor skids), and slashed and/or mulched after use.

No cable or tractor yarding would occur in Riparian Reserves. The yarding would be limited to the dry season or dry conditions, to designated skid trails, and PDFs would require that all cull material felled in a unit be left in the unit to retain/generate organic material and ground roughness. PDFs would also require that all skid trails be rehabilitated before the onset of fall rains. Rehabilitation would include de-compacting the trails, installing water bars, and seeding, slashing and/or mulching the yarding trails. For these reasons, yarding operations are not anticipated to result in increased contributions of sediment to aquatic habitat beyond that which is likely to occur in general due to post-fire conditions.

Long-term, climate change projections indicate that the West and Pacific Northwest are likely to experience continued warming and increased precipitation along with more extreme wet and dry years (Furniss et al. 2010). Declines in snow water equivalent occurring in low and mid-elevation sites may result in earlier spring flows and lower late season flows. Changes in average annual streamflows are also expected to decrease. Flood severity is expected to increase because increased interannual precipitation variability will cause increased runoff in wet years and increased rain-on-snow probability in low-elevation snowpacks. Given these impacts, effective climate change adaptation strategies will need to focus on maintaining watershed resiliency. A reduction in road densities would maintain or slightly improve watershed resiliency. However, given the uncertainty in climate models and predicted effects on a site specific scale, it is not possible to make accurate statements pertaining to this projects effect on climate change and resultant impacts.

It is expected that a reasonably foreseeable future action is harvesting of burnt timber on private industrial timberlands. Private timber land with the potential for harvest in the next year is approximately 71% of the Analysis Area. Fire severity on private lands was similar to that documented on BLM lands.

The entire Dixie Allotment will be rested for one year (2015). The burned portions of the Dixie Allotment will be temporarily suspended and rested from grazing for two full years (2015 and 2016). In 2016, the unburned portion of the allotment will not resume until monitoring data and professional judgment indicate that the health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered and resource management objectives are met. If grazing occurs in 2016, the AUMs would be reduced proportionally, authorizing 77 AUMs (equivalent to 24 percent of the area of the Dixie Allotment). After the temporary fencing proposed under the ESR is removed in 2017, livestock grazing on the Dixie allotment could affect water quality by increasing turbidity/sedimentation if cattle cause streambank disturbance and riparian vegetation removal. Additionally, impacts on springs and riparian areas from the Pokegama herd of wild horses would continue.

Grazing impacts on private lands will likely continue to occur at near present levels, with expected improvements on BLM-administered lands. Additionally, mixed ownership of lands within the Analysis Area makes a comprehensive effort to address vehicle use and access more complex and less likely to occur. Resource damage is likely to continue, particularly when soils are wet or saturated.

Drainages that may be at an elevated risk of experiencing adverse cumulative effects typically have both high road densities and large percentages of canopy cover at less than historic levels. The Upper Fall Creek drainage has both these attributes while Beaver Creek has lower road densities, but less canopy cover than at historic levels. Drainages with large percentages of private land with forested stands greater than 60 years old were also included in this analysis. Since it is likely those acres will be harvested, potential cumulative impacts would be magnified. Harvesting these units on private land will not reduce canopy cover further from current condition.

On BLM-administered lands, emergency stabilization actions areas are ongoing on both Districts. Areas of high burn severity were mulched and seeded with native grass or forbes, which reduces the amount of

bare soil and intercepts soil particle movement. Even with these ESR actions, there is a higher than average amount of exposed soil, and with that there was likely upland soil erosion in the burned area during the first rains. Once the seeded ground germinates and plants mature, the erosion during rain events is expected to stabilize within 1 to 2 years.

The Klamath Falls Resource Area of the Lakeview District is proposing approximately 15.5 acres of salvaging and planting in the Upper Fall Creek drainage and 3.4 acres in the Beaver Creek drainage. There are 153 additional acres proposed for planting in the Beaver Creek drainage. Herbicide and seeding is proposed for 2.4 acres in the Upper Fall Creek drainage, and 67 acres in the Beaver Creek drainage. This project would be implemented using standard PDFs which would greatly reduce the amount of potential erosion and sedimentation that could impact aquatic habitat from salvage activities and would be consistent with the impact analysis of the 1994 Lakeview EIS.

This is a final entry on BLM-administered lands for approximately the next 60 to 80 years. Hydrologic and vegetative recovery of the area has already begun, and would continue to occur over the next several decades, with substantial declines in erosion and sediment yield expected to occur within the first 2 to 4 years. Full hydrologic recovery would take much longer, as it is dependent upon the recovery of the forest canopy, which could take up to 30 years. As vegetation recovers within Riparian Reserves, shade and large wood recruitment will improve.

On BLM-administered lands, Alternative 2 would not result in additional adverse effects from loss of canopy cover or increase in total road density. Sediment production resulting from road use and maintenance may slightly increase in the short-term, but slightly decrease in the long-term due to road decommissioning, and closures. In many cases, riparian vegetation vigor would improve over time, thus potentially decreasing stream temperatures and improving root strength in riparian areas. Although there are both natural and human induced risk factors for cumulative effects, because road density or canopy cover metrics remain unchanged beyond existing condition, Alternative 2 is not expected to increase these risk factors within the Analysis Area drainages.

G. AQUATIC HABITAT AND FISH

1. Affected Environment

The proposed Oregon Gulch Fire Salvage Recovery Project would occur within the Iron Gate Reservoir-Klamath River and Copco Reservoir-Klamath fifth-field watersheds, primarily within the Upper Fall Creek seventh-field drainage. There is a small amount of salvage (Unit 1-1) and 0.5 miles of temporary road construction proposed near the ridge of the adjoining Beaver Creek seventh-field drainage that is a small tributary to Copco Lake. The two seventh-field drainages will constitute the Analysis Area for water resources.

The only fish bearing stream in the Analysis Area is Fall Creek, which supports redband trout (*Oncorhynchus mykiss sp*.) in its perennial reach. Redbands are not listed or proposed to be listed for protection under the Endangered Species Act. There are no Threatened or Endangered fish species or their habitats in the Analysis Area or within the greater watersheds. Therefore, there is no designated critical or essential fish habitat and no consultation with the National Oceanic and Atmospheric Administration or the USFWS is required under Section 7 of the ESA.

The Analysis Area is relatively flat and relatively dry, and aquatic habitat is limited to Upper Fall Creek itself and to two small low gradient intermittent streams, a few small springs, and a couple of cattle ponds and pump chances. There are four non-fish bearing perennial channels in the Beaver Creek drainage located over a mile distance from any project elements. Aquatic habitat within the Analysis Area has been impacted by several past activities, including timber harvest, road building, livestock grazing, and most recently and notably, the high severity stand replacing Oregon Gulch fire. The primary impact from these activities is manifested as increased sedimentation and turbidity to aquatic habitat.

The loss of ground cover from the fire in particular is likely to result in increased soil erosion rates and subsequent transport of sediment to aquatic habitats during high intensity precipitation events. Salvage operations have the potential to adversely affect aquatic habitat above and beyond that which is likely to occur as a result of the fire, primarily due to increased compaction of yarding trails and corridors which can increase run off and erosion rates (Wagenbrenner et al 2014), and which can also increase the length of time to vegetative and hydrologic recovery. Within the burned area, eroded particulates can be easily displaced during precipitation events, washed downslope, and, if riparian buffers are compromised, be hydrologically connected and deposited into drainage channels, resulting in increased sedimentation and turbidity. This sediment can fill in pools, cover spawning gravels, and smother eggs in downstream fish bearing habitat. Additionally, reduced substrate availability and complexity may decrease the diversity and quantity of aquatic organisms, upsetting the ecological balance of the stream system. Increased turbidity from high sediment amounts can disrupt feeding and territorial behavior of juvenile salmonids, which can lead to decreased growth rates and increased mortality (Meehan 1991). Within the Analysis Area, riparian areas generally were subject to similar burn intensities as adjacent uplands, hence there is very little ground cover left within the entire Analysis Area, and the degree of hydrological connectivity has likely been greatly increased relative to pre-fire conditions.

Increased openings in forest canopy created by past federal and private road and landing construction and harvest of live trees have the potential to alter hydrologic processes, such as increasing peak flows, changing the timing of peak or base flows, and increasing the likelihood of uncommon events, such as debris torrents. Peak flow increases and debris torrents can dramatically alter aquatic habitat, as stream channels must adjust to accommodate greater volumes of water. Given the amount of high burn severity which occurred in the Analysis Area, it is reasonable to assume that hydrologic processes have been altered.

Increased summer stream temperatures have also likely resulted from reduced riparian cover and impounded water bodies (cattle watering ponds, pump chances, trampled springs, etc.) as well. This situation has almost certainly been exacerbated in Fall Creek, as the riparian corridor along its spring fed upper perennial reach was completely burned in the fire. The fire severity adjacent to Beaver Creek was low.

2. Environmental Consequences

a. Alternative 1—No Action Alternative

Under the No Action Alternative, there would be no ground disturbance associated with salvaging downed timber on Medford BLM District managed lands in the Planning Area. Therefore, there would be no additional disturbances to fish or aquatic habitats beyond the baseline conditions. Because of the stand replacing fire which impacted most of the Analysis Area, it is anticipated that sediment transport to aquatic habitats will occur episodically during high intensity rain events until vegetative and hydrological recovery progresses to the point that soils are stabilized and roughness (vegetation) is present on the ground to capture displaced soil particles. It is also likely that peak and base stream flow increases will occur as a result of canopy and ground cover loss from the fire. Hydrologic and vegetative recovery of the area has already begun, and would continue to occur over the next several decades, with substantial declines in erosion and sediment yield expected to occur within the first 2 to 4 years. Full hydrologic recovery would take much longer, as it is dependent upon the recovery of the forest canopy, which will take up to 30 years.

Reasonably foreseeable future actions planned for BLM-administered lands in the Analysis Area include salvage, planting, and herbicide application on the Lakeview District's proposed Oregon Gulch Fire Salvage and Rehabilitation EA, soil stabilization projects identified in the Emergency Stabilization and Recovery Plan (ESR), routine road maintenance activities, livestock grazing, and wild horse use on both BLM Districts. The funded ESR plan included seeding and mulching of potential sediment sources along roads and in disturbed areas. The ESR plan on the Medford District also included 3 miles of temporary

fence on perennial portions of Spring Creek and Upper Fall Creek to protect riparian vegetation from grazing pressure during recovery.

The entire Dixie Allotment will be rested for one year (2015). The burned portions of the Dixie Allotment will be temporarily suspended and rested from grazing for two full years (2015 and 2016). In 2016, the unburned portion of the allotment will not resume until monitoring data and professional judgment indicate that the health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered and resource management objectives are met. If grazing occurs in 2016, the AUMs would be reduced proportionally, authorizing 77 AUMs (equivalent to 24 percent of the area of the Dixie Allotment). After the temporary fencing proposed under the ESR is removed in 2017, livestock grazing on the Dixie allotment could affect water quality by increasing turbidity/sedimentation if cattle cause streambank disturbance and riparian vegetation removal. Additionally, impacts on springs and riparian areas from the Pokegama herd of wild horses would continue.

The Klamath Falls Resource Area of the Lakeview District is proposing approximately 15.5 acres of salvaging and planting in the Upper Fall Creek drainage and 3.4 acres in the Beaver Creek drainage. There are 153 additional acres proposed for planting in the Beaver Creek drainage. Herbicide and seeding is proposed for 2.4 acres in the Upper Fall Creek drainage, and 67 acres in the Beaver Creek drainage. This project would be implemented using standard PDFs which would greatly reduce the amount of potential erosion and sedimentation that could impact fish habitat from salvage activities and would be consistent with the impact analysis of the 1994 Lakeview EIS.

Road maintenance activities including danger tree removal where they could fall or slide onto roadways are current and foreseeable in the Analysis Area. Where these actions occur in the Riparian Reserve on BLM-administered lands, felled trees would be left onsite, or if necessary for safety, would be removed. All associated impacts are covered under the analysis of the Medford District's Hazard Tree Felling/Removal Categorical Exclusion for calendar years 2014-2018 and the Road Maintenance Categorical Exclusion for 2012-2016.

For reasonably foreseeable future actions on private lands, it is assumed that all private forest lands within the Analysis Area would be harvested within the next year, which is estimated to be approximately 71% of the Analysis Area. The actual timing of any timber harvest on private land is dependent on many factors, including valuations based on supply/demand, ownership, etc. However, the assumption that the timber on private land will be harvested within the next year is based on the time period the burnt timber remains merchantable. It is assumed that there will be no canopy cover after the timber harvest on private lands. Most areas that could be harvested on private lands are accessible by existing roads, so no new road construction is included in the reasonably foreseeable future.

b. Alternative 2—Proposed Action

The action alternative proposes to salvage burnt timber on 683 acres of Matrix lands. To facilitate equipment access to units, 0.6 miles of new temporary road and spur construction is also proposed. The project would decommission 2.3 miles of existing road as a restorative action. Both mechanical and natural decommissioning is proposed, including roads in Riparian Reserves. The elements of this proposed salvage that have potential to increase erosion rates and impact aquatic habitat are the falling of standing dead trees, yarding of logs to roads/landing sites, hauling of the logs off site, new temporary road and spur construction and decommissioning, and existing road decommissioning. Applicable Project Design Features (PDFs) incorporated into this project primarily to protect aquatic resources include: No ground disturbing project activities would occur in RRs except for three temporary spurs (less than 0.1 miles) to be constructed for access into Units 25-4, 35-1 and 35-5. Construction of the three temporary spurs would avoid the construction of three new landings in a Riparian Reserve, which would create more ground disturbance. Neither of these temporary roads would have a stream crossing. Thus, there would be a low risk of sediment reaching a water body. Erosion prevention and sediment control

measures implemented during the construction and subsequent decommissioning would greatly limit any offsite soil movement.

All project elements, including temporary road construction, road renovation, decommissioning, yarding, and hauling would be limited to the dry season or dry conditions. Tractor yarding would utilize existing skid trails where possible. All tractor and cable corridors and decommissioned road segments would be water barred, seeded (roads and tractor skids), and slashed and/or mulched after use (see Project Design Features Chapter 2 of the Final EA).

Falling standing trees would not lead to greater increases in canopy openings, because all trees that would be felled are already dead and lacking a functional canopy. Therefore, this activity would not further alter hydrologic processes beyond the existing scenario. Hence, this element of the salvage would have no effect to fish or aquatic habitat.

No cable or tractor yarding would occur in Riparian Reserves. The yarding would be limited to the dry season or dry conditions, to designated skid trails, and PDFs would require that all cull material felled in a unit be left in the unit to retain/generate organic material and ground roughness. PDFs would also require that all skid trails be rehabilitated before the onset of fall rains. Rehabilitation would include de-compacting the trails, installing water bars, and seeding, slashing and/or mulching the yarding trails. Mulching is generally considered the most effective treatment in reducing post-fire runoff and erosion (Wagenbrenner et al 2014). Dry season yarding would limit compaction and soil disturbance relative to wet season operations. De-compacting, seeding, and mulching trails after salvage operations would ensure they function to the extent possible as the existing adjacent un-salvaged baseline ground conditions (i.e. similar infiltration rates, roughness, and vegetative recovery period). For these reasons, yarding operations are not anticipated to result in increased contributions of sediment to aquatic habitat beyond that which is likely to occur in general due to post-fire conditions.

Tractor yarding corridors (skid trails) would use existing trails to the extent possible, and maximum area in compacted ground (skid trails, roads, landings, etc.) for any unit would not exceed 12% of the total area (see PDFs), a threshold suggested that if compacted surface area remains below, no detectable affects to flows occur (Harr 1975). Hence, yarding operations would not measurably affect stream flows. Because flows would not be affected, and as sediment would not be contributed to stream channels, yarding operations (including follow up rehabilitation) are not anticipated to affect fish or aquatic habitat.

The 0.6 mile proposed temporary road to access Unit 1-1 in the Beaver Creek drainage would be located on a ridge top far (greater than 1 mile) from any water courses, would be constructed, used, and rehabilitated during a single dry season or would be winterized to prevent sediment transfer offsite, and therefore, would have no potential to contribute effects to aquatic habitat because it is not hydrologically connected to any streams. Three short temporary spurs (total less than 0.1 miles) are also proposed in Riparian Reserves of short-duration intermittent streams with flows less than 30 days of the year. The spurs are necessary to allow for the decking of logs outside of the Riparian Reserve. These spurs would both originate from an existing system road, and proceed away from the channel up very gentle slopes. The spurs would be constructed, used, and obliterated during a single dry season or would be winterized to prevent sediment transfer offsite. Construction of these three temporary spurs would prevent the need to construct landings in Riparian Reserves, which would cause more ground disturbance than the three temporary spurs. Disturbed surfaces would be seeded, mulched, and stabilized before the onset of fall rains. Because the spurs would have no direct hydrological connectivity with the aquatic system and they would be rehabilitated before the onset of fall rains, there would be no surface flow in the stream from the spurs' construction, use, and decommissioning to contribute sediment into the stream.

Decommissioning of 2.3 miles of roads is proposed for this project, which would result in a considerable reduction of road densities in the Upper Fall Creek drainage, from 4.1 to 3.9 mi/sq. mi. Just over 0.5 miles of the decommissioning would occur within Riparian Reserves, and would include one crossing over an intermittent channel (BLM Road 40-4E-25.4). Decommissioning would be accomplished via

mechanical and natural means, as described in Chapter 2 of the Final EA. All the roads to be decommissioned, except BLM Road 40-4E-25.4 are hydrologically disconnected and they would be decommissioned during the dry season, stabilized before the onset of winter precipitation, and would have no causal mechanism to contribute sediment to any stream channels.

BLM Road 40-4E-25.4 would be decommissioned mechanically, and the crossing (a single culvert with shallow-fill) would be pulled with an excavator. To minimize sediment deposition, the work would occur during the dry season, when the stream would not be flowing. A small amount of unconsolidated fine sediment may be transported downstream at the onset of rains and surface flow in the intermittent channel. However, past small culvert removal projects the BLM has performed suggest that less than a cubic yard of sediment at the crossing would be contributed to the intermittent channel. Sediment contributed to the small stream would likely work its way down stream to Fall Creek (~0.9 mile downstream) by the end of the first spring following decommissioning, where it would be assimilated into the existing substrate, or flushed through the system as a brief plume of increased turbidity. In either scenario the contribution would be inconsequential to aquatic organisms, and would be less than the chronic contributions the road could contribute over the years should it not be decommissioned. In the long-term, decommissioning the road would reduce chronic erosion and sediment input into aquatic habitat, would restore aquatic connectivity in one small intermittent channel, and would allow for the eventual recovery of ~0.12 acres of riparian vegetation.

Timber hauling has the potential to introduce sediment to stream channels as repeated use of non-paved roads can break down surface material to small particulate sizes that are easily transported from the road system to stream channels during precipitation events, via the road surface or a parallel ditch. These inputs can occur at any point where a road and stream intersect. Properly engineered roads incorporate drainage features that enable the road and ditch systems to discharge much of the captured and routed water and transported sediment, into downslope vegetation where it can be filtered to the forest floor before crossing a channel. However, within the Analysis Area, nearly all of the ground cover was destroyed by the fire. For this reason, it is likely that the hydrological connectivity between roads and the aquatic system has been increased as compared with pre-fire conditions. To prevent hauling on non-paved roads from introducing sediment to stream channels, the primary season of haul would be during the dry season (generally May 15th through October 15th), though the season may be extended during dry conditions.

Within the Analysis Area, all haul would eventually terminate on the Copco Road, off of Hwy 66. Copco Road is a well rocked flat gradient road, with very limited hydrological connectivity (only five crossings along its almost 8 miles, all of which are over intermittent streams). Dry condition haul on this route would be very unlikely to contribute detectable quantities of sediment to fish or aquatic habitat; the surface is well armored, dry condition haul would have minimal potential to increase erosion on the road, and the road is so flat it is unlikely that detectable quantities of sediment would be mobilized towards the few crossings present. Secondary roads include an estimated 11.8 miles of rocked roads and 3.3 miles of native surfaced roads, with routes crossing 10 stream channels, all of which are intermittent, including over Fall Creek mainstem, at the upper most point of fish distribution. This crossing was observed to be completely dry during the summer and fall of 2014. These secondary haul routes are also located on relatively flat ground.

It is not anticipated the use of roads for haul would result in direct inputs of sediment into stream channels, since the haul routes are limited on the landscape, generally located in upland areas away from streams, the haul would be limited to dry conditions, and there are limited stream crossings distributed widely around the Analysis Area. The haul would not result in a detectable increase in sediment to aquatic habitat, because any haul generated sediment that would migrate into stream channels would only do so during high intensity precipitation events (winter rain events), and contributions would be small amounts that would be assimilated into, and undetectable beyond, background conditions that would occur during winter rains regardless of haul.

Cumulative Effects: Proposed Action

The only element of the proposed Oregon Gulch Fire Salvage Recovery Project that has potential to directly affect aquatic habitat is the decommissioning of one road segment and its associated crossing. However, the amount of sediment potentially generated by decommissioning would be less than that chronically contributed by the road and would be biologically insignificant to aquatic habitat. As such, implementation of the Oregon Gulch Fire Salvage Recovery Project would have no effect to fish, fish habitat, or upstream aquatic habitats.

It is expected that a reasonably foreseeable future action is harvesting of burnt timber on private industrial timberlands. Private timber land with the potential for harvest in the next year is approximately 71% of the Analysis Area. Fire severity on private lands was similar to that documented on BLM lands.

The entire Dixie Allotment will be rested for one year (2015). The burned portions of the Dixie Allotment will be temporarily suspended and rested from grazing for two full years (2015 and 2016). In 2016, the unburned portion of the allotment will not resume until monitoring data and professional judgment indicate that the health and vigor of desired vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered and resource management objectives are met. If grazing occurs in 2016, the AUMs would be reduced proportionally, authorizing 77 AUMs (equivalent to 24 percent of the area of the Dixie Allotment). After the temporary fencing proposed under the ESR is removed in 2017, livestock grazing on the Dixie allotment could affect water quality by increasing turbidity/sedimentation if cattle cause streambank disturbance and riparian vegetation removal. Additionally, impacts on springs and riparian areas from the Pokegama herd of wild horses would continue. Grazing impacts on private lands will likely continue to occur at near present levels, with expected improvements on BLM-administered lands.

The Klamath Falls Resource Area of the Lakeview District is proposing approximately 15.5 acres of salvaging and planting in the Upper Fall Creek drainage and 3.4 acres in the Beaver Creek drainage. There are 153 additional acres proposed for planting in the Beaver Creek drainage. Herbicide and seeding is proposed for 2.4 acres in the Upper Fall Creek drainage, and 67 acres in the Beaver Creek drainage. This project would be implemented using standard PDFs which would greatly reduce the amount of potential erosion and sedimentation that could impact fish habitat from salvage activities and would be consistent with the impact analysis of the 1994 Lakeview EIS.

On BLM-administered lands, emergency stabilization actions areas are ongoing on both Districts. Areas of high burn severity were mulched and seeded with native grass or forbes, which reduces the amount of bare soil and intercepts soil particle movement. Even with these ESR actions, there is a higher than average amount of exposed soil, and with that there was likely upland soil erosion in the burned area during the first rains. Once the seeded ground germinates and plants mature, the erosion during rain events is expected to stabilize within 1 to 2 years.

This is a final entry on BLM-administered lands for approximately the next 60 to 80 years. Hydrologic and vegetative recovery of the area has already begun, and would continue to occur over the next several decades, with substantial declines in erosion and sediment yield expected to occur within the first 2 to 4 years. Full hydrologic recovery would take much longer, as it is dependent upon the recovery of the forest canopy, which could take up to 30 years. As vegetation recovers within Riparian Reserves, shade and large wood recruitment will improve, which in turn will improve fish habitat.

Because all elements of this project would result in no effect, or undetectable or inconsequential effects, it would not have any incremental cumulative effect when considering other projects within the spatial and temporal scales of analysis.

H. CONSISTENCY WITH AQUATIC CONSERVATION STRATEGY

1. Introduction

The Northwest Forest Plan's (NWFP) Aquatic Conservation Strategy (ACS) has four components: Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. It is guided by nine objectives which are meant to focus agency actions to protect ecological processes at the fifth-field hydrologic scale, or watershed, at the sixth and/ or seventh-fields (subwatershed and or drainage), and at the site level. In this case, for example, the location of the culvert proposed for removal as part of BLM Road 40-4E-25.4 decommissioning is a site level location within a single seventh-field drainage of Upper Fall Creek. Fall Creek is composed of three such seventh-field drainages and is within the larger Iron Gate-Klamath River fifth-field watershed. How the four components of ACS relate to the Oregon Gulch Fire Salvage Recovery Project is explained below:

1. Riparian Reserves: Riparian Reserve widths for streams, springs, wetlands, and unstable soils have been determined according to the protocol outlined in the NWFPs Aquatic Conservation Strategy and are listed in the PDFs for the Oregon Gulch Fire Salvage Recovery Project.

2. Key Watersheds: Tier 1 Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. The Iron Gate-Klamath River is not a designated Key Watershed.

3. Watershed Analysis: BLM completed the *Klamath-Iron Gate Watershed Analysis* in 2000 and the *Topsy-Pokegama Landscape Analysis* in 1996. The analyses cover the Planning and Analysis Areas.

4. Watershed Restoration: Restorative activities in the watershed have been limited to date, as past and ongoing efforts have focused on watersheds with more fish habitat, and of more importance to fish. Furthermore, most of the watershed streams are within the Soda Mountain Wilderness Area and are relatively inaccessible and in relatively little need of restorative actions. Road decommissioning and riparian fencing are two notable past restoration projects which have occurred in the watersheds, and more are planned in the immediate future.

2. Consistency Review

1. Maintain and restore the distribution, diversity, and complexity of watershed and **landscape-scale features** to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

> Fire events periodically occur within watersheds and across the landscape, and in ways may be beneficial to aquatic systems as they may facilitate recruitment of large wood by stream channels. All ground disturbing project activities are outside of Riparian Reserves (RRs) except three temporary roads (for accessing Units 25-4, 35-1 and 35-5, less than 0.1 total miles) which would be fully decommissioned after harvest. None of the roads would have stream crossings. Initially, three landings that would have been partially located within RRs were proposed to facilitate the salvage logging. Construction of the temporary roads within the RRs will eliminate the need for landings within RRs and reduce the effects to the RRs. All prescribed salvage is outside of RRs and salvage of burnt trees outside of riparian areas would not affect aquatic systems at any spatial scale. The distribution, diversity, and complexity of watershed and landscape-scale features needed for the protection of aquatic systems would be maintained.

2. Maintain and restore **spatial and temporal connectivity** within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

No elements of the proposed salvage project would have any mechanism to influence this objective at any spatial scale. Chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species would be maintained.

3. Maintain and restore the **physical integrity** of the aquatic system, including shorelines, banks, and bottom configurations.

The removal of one culvert as part of proposed road decommissioning would result in a site level benefit, as the bottom configuration of the stream at the crossing location would be returned to natural substrate. The stream gradient would be restored to natural, and the banks pulled back to their natural angle of repose. The proposed activities would not manipulate or affect shore lines, banks or bottom configurations.

4. Maintain and restore **water quality** necessary to support healthy riparian, aquatic and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

The Oregon Gulch fire has affected this objective, as the loss of overhead canopy and ground cover will almost certainly result in elevated stream temperatures in Fall Creek and increased erosion rates and subsequent transport and deposition of fine sediment to aquatic habitat. The only element of the proposed salvage project with potential to further affect water quality is road decommissioning and log haul. However, given the limited amount of haul, the dry condition in which it would occur, and that there are very few stream crossings, affects would not be measurable at the drainage or watershed scales. Minute site level (i.e. inputs at each crossing) increases are possible, but these would be of insufficient magnitude to affect the integrity of the aquatic system. Road decommissioning is likely to contribute less than one cubic yard of sediment to a small intermittent stream, but this would be less than the road would contribute chronically over its lifespan if it were not decommissioned. The one time contribution would result in a site level impact, but would be inconsequential at the drainage and watershed scales.

5. Maintain and restore the **sediment regime** under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

See element #4. Minute site level inputs would not further compromise the sediment regime of the aquatic ecosystems in the Project Area, which has been impacted to a much larger degree by the stand replacing fire which barred thousands of acres of soils in the watershed.

Construction of the three temporary spur roads to access Units 25-4, 35-1 and 35-5 would avoid building three landings in the RRs. Landing construction (which was initially considered) would create more ground disturbance and potential to contribute sediment into the stream. None of the roads would have stream crossings and are in Riparian Reserves with short-duration intermittent stream which flows less than 30 days of the year. Thus, there would be a low risk of sediment reaching a water body. Erosion prevention and sediment control measures implemented during the construction and subsequent decommissioning would greatly limit any offsite soil movement. The temporary roads would be constructed, used, and decommissioned in the same dry season to the greatest extent possible.

6. Maintain and restore **instream flows** sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

The Oregon Gulch fire has affected the parameters of this objective. However, salvaging dead timber would not further affect peak or summer low flows, as canopy levels would not be

changed compared to existing conditions, and new compaction would be kept below critical thresholds for affecting flows.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in **meadows and wetlands**.

There are no meadows or wetlands that are connected to floodplains in or adjacent to salvage units and no project elements would influence these indicators in any event. Therefore, no causal mechanism exists between any element of the proposed salvage sale and this objective. It would not be affected at any spatial scale.

8. Maintain and restore the species composition and structural diversity of **plant communities in riparian areas** and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of **coarse woody debris** sufficient to sustain physical complexity and stability.

The Oregon Gulch fire burned most of the existing riparian vegetation in the Analysis Areas. The only activities proposed in Riparian Reserves that would influence this objective is the three temporary spur roads (less than 0.1 miles total) proposed into Units 25-4, 35-1 and 35-5 and the 2.3 miles of road decommissioning. The temporary spur roads would be constructed, used, and decommissioned in the same dry season to the greatest extent possible. These areas would eventually become re-vegetated. Road decommissioning would represent site level and drainage level improvements of this indicator as over time vegetation would recolonize the decommissioned roads. No other activities are proposed in RRs, and no other changes to this indicator would occur.

9. Maintain and restore **habitat** to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

See objectives # 4 and 5. Site level inputs of sediment from salvage operations would be too small of a magnitude to measurably degrade aquatic habitat. This action will have no measurable effect on this indicator.

I. TERRESTRIAL WILDLIFE

1. Introduction

This section discusses terrestrial wildlife habitats and the potential impacts to terrestrial wildlife species from the Proposed Action as described in Chapter 2 of this document. Only federally-listed, Survey and Manage, Bureau Sensitive Species, and other species of concern known or suspected to be present in the Project Area that could potentially be affected by the Proposed Action are analyzed in detail in the Final EA.

For the purpose of this analysis, this section will hereafter refer to three reference scales: the Project Area, the Planning Area, and the Wildlife Analysis Area.

Project Area: describes where the action is proposed, such as salvage units, temporary road construction, road renovation and road maintenance.

Planning Area: describes the overall area of consideration reviewed for the development of the Oregon Gulch Fire Salvage Recovery Project.

Wildlife Analysis Area: is the appropriate spatial scale in which the potential effects to a particular species from the Proposed Action are analyzed. The Wildlife Analysis Area may vary by species. For

example, species with larger home ranges and dispersal movements would have larger Wildlife Analysis Areas.

Wildlife-related issues associated with the Oregon Gulch Fire Salvage Recovery Project have been identified through public scoping or interdisciplinary team specialists and will be addressed in this document.

The following concerns related to wildlife were identified during scoping:

- Clearly state why, where, and how many leave trees (snags, etc) will remain on site to alleviate concerns for snag retention, coarse woody debris, wildlife habitat, etc.
- Concern was expressed that post-fire logging could potentially change bird species composition, reflecting effects of large woody debris removal. Consider the effects to bird species that may be sensitive to post-fire logging.
- Consider the importance of stand-replacement fires for bird species that depend on burned forests which may be necessary for the long-term maintenance of their populations.
- Concern was expressed that the standards and guidelines for coarse wood retention in the RMP are predicated on the biological needs of species associated with unburned forests, and they are not meaningful in a post-fire environment.
- Consider retention of 30% of standing fire-killed vegetation to allow return of numerous snag-associated wildlife species.

2. Affected Environment

a. Vegetation Conditions and Terrestrial Wildlife Habitats (General)

The proposed Oregon Gulch Fire Salvage Recovery Project is located in the Iron Gate Reservoir-Klamath River and Copco Reservoir-Klamath River fifth-field watersheds. The total size of the Oregon Gulch Fire is 35,302 acres, of which there are 2,425 acres managed by the Medford BLM. The remaining acreage is located on Klamath Falls Field Office BLM, Redding District BLM, U.S. Forest Service, State, and private managed lands.

The Planning Area is located near the convergence of the South Cascades Slope and Klamath River Ridges ecoregions. Vegetation types include mixed conifer, temperate coniferous, deciduous hardwood, grass-forb dry hillside, mountain shrubland, and chaparral.

The composition and distribution of vegetation in the Planning Area is influenced by site characteristics (soil types, aspect, and topography), natural disturbance (wildfires, insects, disease, etc.), rural residential development, grazing activities, timber harvest, fire suppression, and road building. The current habitat conditions have changed from that which existed in the pre-settlement environment. As a consequence, the variation and scales of landscape components are innumerable.

Due to the severity of this fire, the post-fire vegetation conditions in the perimeter were changed considerably. Much of the forest and shrubland areas were subject to a crown fire and were killed. Of the 35,302 acres in the Oregon Gulch Fire, approximately 23,450 experienced moderate to high fire severity. On the 2,425 acres of Medford District BLM lands, approximately 1,700 acres (70%) had the same fire intensity.

b. Special Status Wildlife Species - Affected Environment

Special Status Species are those species that are federally listed as Threatened or Endangered; proposed or candidates for federal listing as Threatened or Endangered; BLM-designated Sensitive species; Survey and Manage species; and USFWS Birds of Concern. Table 3-4 lists the Special Status and Survey and Manage species that are known, suspected or have habitat remaining in the Planning Area. Species

determined to have a very low likelihood of occurring in the Planning Area, or whose presence would be considered accidental, were not included in this analysis.

Table 3-4. Wildlife Species Known, Suspected or Habitat Occurs in the Planning Area

Common Name	Scientific Name	Status	Pre-Fire	Post-Fire
black-backed woodpecker	*Picoides arcticus*	RMP	Suspected	Known
chase sideband	*Monadenia chaceana*	SEN/SM	Known	No
evening fieldslug	*Deroceras hesperium*	SEN/SM	Known	No
fisher	*Pekania pennanti*	FP/SEN	Habitat	No
flammulated owl	*Psiloscops flammeolus*	RMP	Suspected	No
fringed myotis	*Myotis thysanodes*	SEN	Known	Suspected
golden eagle	*Aquila chrysaetos*	EPA	Habitat	Habitat
gray wolf	*Canis Lupus*	FE	Habitat	Habitat
Lewis's woodpecker	*Melanerpes lewis*	SEN	Suspected	Suspected
mourning dove	*Zenaida macroura*	GBBDC	Known	Suspected
northern spotted owl	*Strix occidentalis caurina*	FT	Known	No
olive-sided flycatcher	*Contopus cooperi*	BCC	Suspected	Suspected
Oregon shoulderband	*Helminthoglypta hertleini*	SEN/SM	Habitat	No
pallid bat	*Antrozous pallidus*	SEN	Known	Suspected
purple finch	*Carpodacus purpureus*	BCC	Suspected	No
pygmy nuthatch	*Sitta pygmaea*	RMP	Suspected	No
rufus hummingbird	*Selasphorus rufus*	BCC	Known	Suspected
Siskiyou hesperian	*Vespericola sierranus*	SEN	Habitat	No
travelling sideband	*Monadenia fidelis celeuthia*	SEN	Habitat	No
Western bumblebee	*Bombus occidentalis*	SEN	Habitat	No
white-headed woodpecker	*Picoides albolarvatus*	SEN/RMP	Suspected	Suspected

Status:
FE – Federally Endangered FT – Federally Threatened FP – Federally Proposed
FC – Federal Candidate SEN – Bureau Sensitive Species SM – Survey and Manage Species
RMP – Resource Management Plan BCC- Bird of Conservation Concern EPA – Bald and Golden Eagle Protection Act
GBBDC – Game Bird Below Desired Condition

Occurrence Pre- and Post-fire
Known – Species is known to occur in the Project Area
Suspected – Species not known to occur but reasonable potential to exist in the Project Area
Habitat – Less probable for species to occur but suitable habitat is found in the Project Area and is within the known or suspected range of the species

c. Federally Listed or Proposed Species - Affected Environment

Definitions

Northern Spotted Owl (Federally Threatened)

The northern spotted owl (NSO), a Federally-listed Threatened species, has been petitioned for listing as Endangered under the Endangered Species Act in 2012. The USFWS will be initiating a 12-month finding to determine if a change in listing status is warranted (USDI Fish and Wildlife Service 2015). The species remains Threatened and will be protected as needed.

The northern spotted owl had historically utilized habitat in the Oregon Gulch Fire Salvage Recovery Project Area. Spotted owls prefer coniferous forest with multiple vertical layers of vegetation and a variety of tree species and age classes with the presence of large logs and large diameter live and dead trees (snags), for nesting, roosting, and foraging habitat. They may also be found in younger stands with multi-layered, closed canopies, large diameter trees, and abundance of dead and down woody material. Based on studies of owl habitat selection (including habitat structure and use and prey preference

throughout the range of the owl), spotted owl habitat consists of four components: nesting, roosting, foraging, and dispersal (Thomas et al. 1990).

The Project Area is located in the provincial home range (1.2-mile radius from the site center) of one historic spotted owl site (Maps 3-3 and 3-4). The survey history for the NSO site in the Planning Area has varied over the years, but the majority of the survey efforts were done up to the early 1990s, and very limited surveys have been conducted across the Planning Area over the past 20 years. The last survey at this site was done in 1993 and only one male spotted owl was observed in five visits. The last year a pair of spotted owls was detected at this site was in 1992 and the last year young were detected at the site was in 1988.

Northern Spotted Owl Habitat

For the purposes of this analysis, the vegetation in the Planning Area was typed into habitat categories pertinent to the northern spotted owl. These habitat types are used throughout this document to describe and quantify habitat conditions across the landscape (Table 3-5).

Nesting, Roosting, Foraging Habitat (NRF)

Meets all spotted owl life requirements. Stands are generally older than 80 years, have a high canopy cover (greater than 60 percent), a multi-layered structure, and large overstory trees. Deformed, diseased, and broken-top trees, as well as large snags and down logs, are also present. NRF habitat also includes areas with more uniform structure that may not have nesting structures (*e.g.* mistletoe clumps), but provide roosting and foraging habitat with flying space for owls in the understory. NRF habitat can also function as dispersal habitat.

Dispersal

Dispersal habitat provides sufficient patchy cover to be used for travel between suitable stands, a minimum 40 percent canopy cover, and an average tree diameter greater than 11 inches with flying space for owls in the understory.

Capable

Forest that is currently not spotted owl habitat, but can become NRF or dispersal in the future as trees mature and canopy fills in.

Non-Capable

Lands that do not provide habitat for spotted owl and will not develop into NRF or dispersal in the future (open prairies, meadows, shrub lands, etc.)

Table 3-5. NSO Habitat in the Planning Area Pre-Fire and Post-Fire on Medford BLM Lands

Habitat Type	Pre-Fire Acres	Post-Fire Acres	Percent Change
Nesting, Roosting, and Foraging	425	15	-96%
Dispersal	496	117	-76%
Capable	354	1,143	323%
Non-Capable	1,150	1,150	0

Special NSO Habitat Designations

Known Spotted Owl Activity Centers

The Northwest Forest Plan provides a network of late-successional reserves, 100-acre Known Owl Activity Centers (KOACs), connecting riparian corridors, and connectivity blocks across the lands within the Planning Area. There are no KOACs located in the Project Area.

- KSOAC are the best 100 acres around northern spotted owl activity centers that were documented as of January 1, 1994 on Matrix and Adaptive Management Area (AMA) lands, and are managed as Late-Successional Reserves (LSR). LSR are managed to protect and enhance habitat conditions for late-successional and old-growth related species. These reserves are designed to

maintain a functional, interacting late-successional and old-growth ecosystem. The criteria for mapping these areas are identified on pages C-10 and C-11 of the Northwest Forest Plan Standards and Guidelines (USDA USDI 1994b).

Critical Habitat

Critical habitat is designated under the auspices of the Endangered Species Act of 1973 and was designated for the northern spotted owl first in 1992. The Revised 2012 Critical Habitat for the NSO designation is the current statutory designation. Critical habitat includes the primary constituent elements (PCE) that support nesting, roosting, foraging, and dispersal. It also includes forest land that is currently unsuitable, but has the capability of becoming NRF habitat in the future. There is no NSO designated Critical Habitat located in the Planning Area.

Recovery Action 32 Habitat

Structurally complex multi-layered conifer forests, or Recovery Action 32 habitat (RA32), is a sub-set of NRF habitat. Under the NSO Recovery Plan, the U.S. Fish and Wildlife Service recommends that agencies maintain and restore the older and more structurally complex multi-layered conifer forests on federal lands in order to not further exacerbate the competitive interactions between spotted owls and barred owls. These forests are characterized as having large diameter trees, high amounts of canopy, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags and large coarse wood (USFWS 2011). Due to the area's low vegetative productivity, it is unlikely that RA32 habitat existed prior to the fire. The Project Area was surveyed for RA32 habitat post-fire and none was located.

Spotted Owl Prey Base

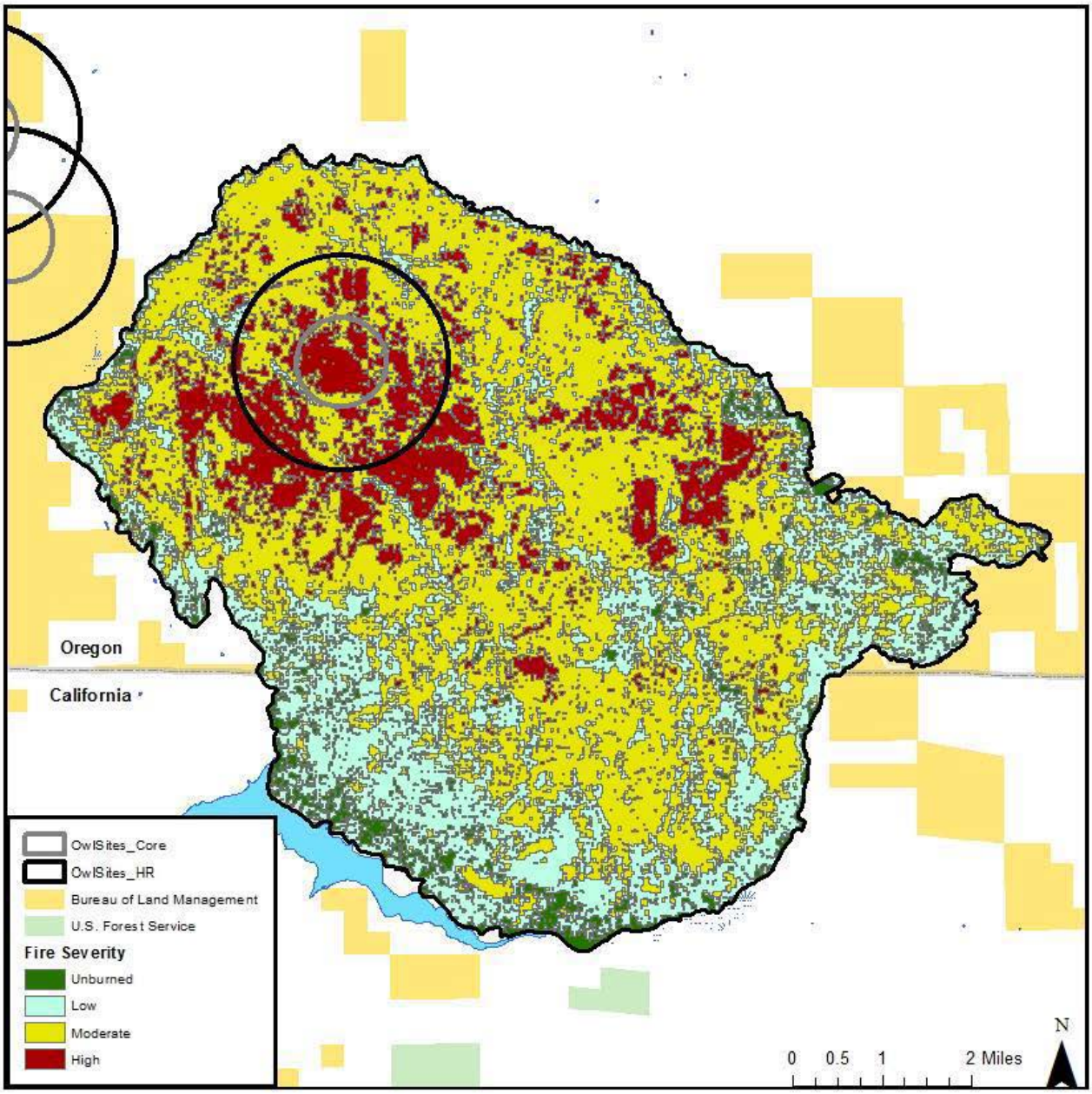
Dusky-footed woodrats, the primary prey species for spotted owls in southwest Oregon, are found in high densities in early-seral or edge habitat (Sakai and Noon 1993). Down wood is an important habitat feature for these major prey species in southwest Oregon. Dusky-footed woodrats build stick nests, sometimes incorporating logs as part of the structure. Northern flying squirrels are another major source of owl prey in southwest Oregon (Forsman 2004). In a post-wildfire environment, there may be a shift in prey species to rodents on the forest floor where fire has removed cover, making rodents more vulnerable.

Pre-fire and Post-fire Conditions

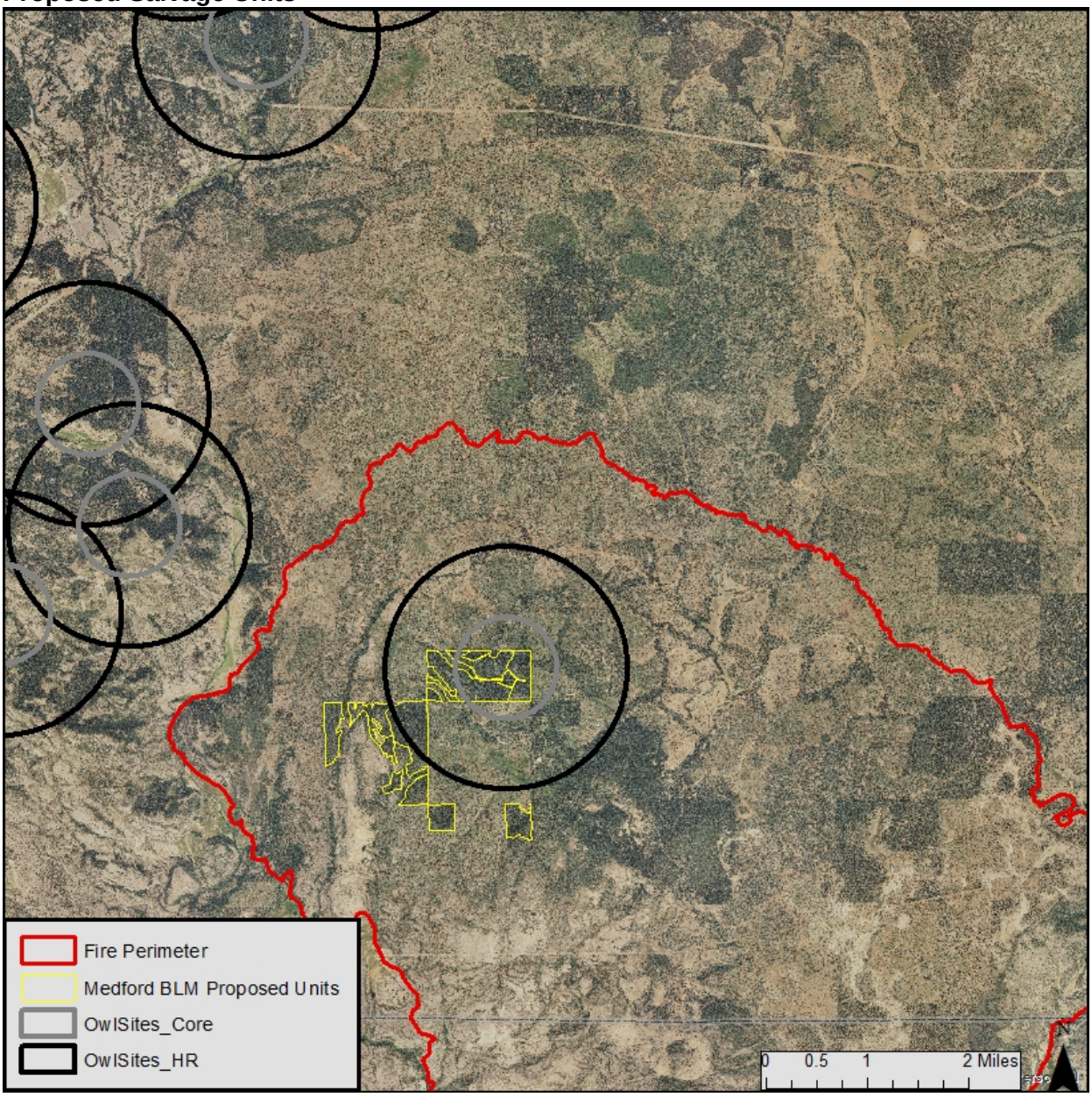
There is one northern spotted owl site on BLM-managed land in the perimeter of the Oregon Gulch Fire, the Grizzly Mountain NSO historic site. Of the twelve years that the Grizzly Mountain site was surveyed (during 1972-1993), successful nesting was documented three times. Prior to the Oregon Gulch Fire, NRF habitat amounts were low on federal lands within the home range (8.3%) and the 0.5 mile radius core area (29.2%). After the fire, the NRF habitat in the home range was reduced to less than 1% and to 0% at the 0.5 mile core area (Maps 3-3 and 3-4). Studies show that when less than 40 to 60% of the home range is NRF habitat, the likelihood for spotted owl presence is lower, and survival and reproduction may be reduced (Thomas et al. 1990, Bart and Forsman 1992, and Dugger et al. 2005). This site is surrounded by private timberlands that have been extensively managed and much of the area is in an early-seral stage. The historic suitable NSO habitat remaining post-fire is considered capable habitat and does not currently provide dispersal, nesting, roosting, or foraging opportunities. Surveys are not necessary due to the low likelihood of occupancy and lack of NRF habitat. Approximately 117 acres (24%) of the 496 acres of spotted owl Dispersal habitat remains in the Planning Area; however, much of that is fragmented.

As noted by the Revised Recovery Plan for the Northern Spotted Owl (2001), there is spotted owl post-fire research that found spotted owls may use burned forest stands and may be affected by post-fire salvage (2011 Recovery Plan). However, the Oregon Gulch Fire burned at such a high severity that stands that were previously typed as NRF habitat before the fire do not currently meet post-fire foraging habitat because the structure suitable for foraging and protection from predators was eliminated. Post-Fire foraging was a term developed by the Rogue Basin Level 1 team during the Douglas Fire Salvage consultation process to describe habitat that could be used by owls after fire, as described in research and the 2011 Revised Recovery Plan.

Map 3-3. Oregon Gulch Fire Burn Severity in Relation to Northern Spotted Owl Historic Site



Map 3-4. Pre-Fire Habitat Surrounding the Northern Spotted Owl Historic Site and Proposed Salvage Units



Pacific Fisher (Federal Proposed Species) - Affected Environment

Fishers, a Federally Proposed species under the ESA (Federal Register, Vol 79, no. 194, 10/7/14 pgs. 604190-60443), are found in forest woodland landscape mosaics that include conifer-dominated stands. Their occurrence is closely associated with low- to mid-elevation forests (generally less than 4,100 feet) with a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor (Aubry and Lewis 2003). Forest type is probably not as important to fishers as the vegetative and structural complexity that lead to abundant prey populations and potential den sites (Lofroth et al. 2010). Fishers do not appear to occur as frequently in early-successional forests as they do in late-successional forests in the Pacific Northwest (Powell and Zielinski 1994), but they will use harvested areas if patches of habitat with residual components (i.e., logs, hardwoods) and areas where patches of larger trees are left in the landscape (Lofroth et al. 2010). In addition, Buskirk and Powell (1994) hypothesized that the physical structure of the forest and prey associated with forest structures are the critical features that explain fisher habitat use, not specific forest types. Prey and

scavenged remains recovered from den and rest sites in southwest Oregon include rabbit, ground squirrel, flying squirrel, woodrat, opossum, skunk, porcupine, bobcat, deer and elk carrion, jay, woodpecker, grouse, berries, and yellow jackets (Lofroth et al. 2011 ; Aubry and Raley 2006).

The northern spotted owl NRF habitat-type described above adequately describes suitable fisher denning and resting habitat because there is a direct correlation of key habitat features used to assess NSO habitat and fisher habitat (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). Using northern spotted owl habitat as a surrogate for fisher habitat has been accepted by the courts as a reasonable practice (*KS Wild v. US BLM*, Case No. 06-3076-PA, Order and Judgment 9/10/2007).

Fisher surveys have been conducted over large areas east of Ashland for the past 12 years. The most suitable habitat closest to the Project Area was surveyed in 2008 and 2011 and no fishers were detected. The nearest known location to the Project Area is approximately 10 miles to the northwest. There was a low likelihood that fisher utilized or dispersed through the area pre-fire because it is surrounded by extensively managed private timberlands (see Map 3-4) and to the south is the Klamath River canyon, which does not represent suitable habitat.

Gray Wolf (Federally Endangered) – Affected Environment

The gray wolf is a federally listed species in Oregon west of Highways 395 and 78. Until 2011, gray wolves were only known to occur in Oregon east of these highways. In September 2011, one radio collared male wolf (OR-7) dispersed from the Imnaha pack in Northeastern Oregon. Since 2011 the Oregon Department of Fish and Wildlife (ODFW) has been tracking OR-7's dispersal movements, which included some time in Northern California.

At the time the environmental effects for the Oregon Gulch Fire Salvage Recovery Project were being analyzed, the project was located in the known wolf activity area of OR-7 (ODFW 2014). This area covered the southeastern portion of Douglas County, the eastern edge of Jackson County, and the western edge of Klamath County. Since March 2013, ODFW has documented OR-7 spending the majority of his time in the southwest Cascades. On June 4, 2014, ODFW announced that OR-7 and a mate produced offspring. In September 2014, ODFW released results from genetic analysis that showed OR-7’s mate was also from northeastern Oregon and that the pups were offspring from both adults.

The Medford BLM has conducted carnivore surveys for the past 12 years in the area from just north of the Project Area to north of the town Butte Falls. No wolves have been detected during these surveys. On January 27, 2015, ODFW updated the known wolf activity maps for the only known gray wolves in western Oregon, which found OR-7, his mate, and pups (Rogue Pack) are no longer in the Oregon Gulch Fire Salvage Recovery Project Area.

At this same time, ODFW identified a second Area of Known Wolf Activity (AKWA) known as the Keno Area. As of January 2015, ODFW has only indicated that two wolves are present, but their sex is unknown, so it is not known if a reproductive pair of wolves are present. The area of the Keno AKWA is approximately 177,380 acres in size. The Oregon Gulch salvage units are located at the southern edge of the AKWA and total only 0.02 percent of the AKWA.

Wolves have large home ranges and use a variety of habitats, but use of different habitat types primarily coincides with wild ungulate ranges, including winter range, summer range and calving/fawning areas (Mech and Boitani 2010). Important wolf habitat components for reproduction are denning sites and rendezvous sites. Den sites may be in hollow logs, clefts between rocks, deep riverbank hollows, spaces under upturned trees or rock overhangs, or in abandoned dens of other animals (Mech and Boitani 2010). They may use the same den for several years. After 1 to 2 months these natal dens are abandoned for an open area called a rendezvous site. At the rendezvous site pups are guarded by a few adult pack members, while the rest of the pack hunts (Mech and Boitani 2010).

d. Survey and Manage Species – Affected Environment

Mollusks

The **chase sideband** is commonly found within 30 meters of rocky areas, talus deposits and in associated riparian areas. Areas of herbaceous vegetation in these rocky landscapes adjacent to forested habitats are preferred. This species has not been documented in the Project Area; however, suitable habitat occurred pre-fire.

The **evening fieldslug** is associated with perennially wet meadows in forested habitats. Microsite habitats include a variety of low vegetation, litter and debris; rocks may also be used as refugia. Little detail is known about exact habitat requirements for the species, due to the limited number of verified sites. This species has been documented in the Fall Creek riparian area.

The **Oregon shoulderband** utilizes similar habitat as the chase sideband, but is generally associated with shrublands or rocky inclusions in forested habitat with substantial grass and subsurface water sources. This species has not been documented in the Project Area; however, suitable habitat occurred pre-fire.

e. BLM Bureau Sensitive Species – Affected Environment

Bureau Special Status Species (SSS) are species listed or proposed for listing under the ESA and species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. The SSS list was most recently updated in January 2012. This list has two categories: Sensitive and Strategic. Medford 1995 RMP guidance states, "Manage for the conservation of federal candidate and Bureau Sensitive species and their habitats so as not to contribute to the need to list, and to contribute to the recovery of the species." Per BLM Manual 6840 (Section .06), Bureau Sensitive species will be managed consistent with species and habitat management objectives in land use and implementation plans to promote their conservation and to minimize the likelihood and need for listing under the ESA or other provision of the BLM Manual 6840.02. In other words, the RMP requires that the BLM manage, over time and across the landscape, so as to not contribute to the need to list a species, and not for every action, to contribute to the recovery of the species. Project implementation will adhere to the requirements set forth in Section 6840.2.C. According to BLM Special Status Species Management (USDI BLM 2008), only Sensitive species are required to be addressed in NEPA documents. All Sensitive species were considered and evaluated for this project, and only those that could be impacted by the Proposed Action are discussed in more detail.

Western Bumblebee

This species is meadow-associated. Until recently, this species was common across much of the western United States. The species has experienced a population decline since the 1990s, likely due to the introduction of non-native pathogens, habitat alteration, and pesticide applications. They are found in a variety of habitats including open grassy fields, mountain meadows, chaparral, shrubland, and urban areas, where abundant flowering plants occur and serve as a food source. There are no recorded observations for the western bumblebee in the Project Area; however, suitable habitat existed pre-fire.

Lewis's Woodpecker

Important aspects of breeding habitat for Lewis's woodpeckers include an open canopy, a brushy understory offering ground cover, dead or downed woody material, available perches, and abundant insects. Their principal breeding habitats are open ponderosa pine stands, logged or burned pine stands, and riparian cottonwood communities, with large diameter dead or dying trees with existing cavities. Lewis's woodpeckers are secondary cavity nesters and seldom excavate their own cavities. They primarily glean insects but are unique for woodpeckers in their success at flycatching. They move to oak savannahs in the winter where they feed on acorns. Lewis's usually breed east of the Cascade Crest north of the Project Area but a couple of nest sites have been documented near the Upper Klamath River canyon just outside the fire's eastern perimeter (Broyles, pers. comm).

White-headed Woodpecker

The species is closely associated with open forested stands of old-growth ponderosa pine and other mixed pine/conifer stands with large seed producing cones. In addition to untreated old-growth, they utilize areas that have received silvicultural treatments as long as the old-growth component remains (Marshall 2006b). Local populations can be abundant in burned or cut forest where residual large-diameter live and dead trees are present (Raphael et al. 1987). White-headed woodpeckers tend to excavate nest cavities in snags in areas of open canopy and in larger diameter snags more than most woodpeckers. Besides feeding on seeds, they also glean on invertebrates and sap. They are predominantly found east of the Cascade Crest but are also sporadically detected along the Siskiyou Crest and have limited seasonal movements. White-headed woodpeckers have not been confirmed in the Project Area, but they could be present.

Pallid Bat

Pallid bats west of the Cascade Range are restricted to the drier interior valleys of the southern portion of the state. They are usually found in brushy, rocky terrain, but have been observed at edges of coniferous and deciduous woods and open farmland (Verts and Carraway 1998). Roost habitat includes buildings, bridges, large decadent snags, and rock outcrops. Pallid bats have not been confirmed in the Project Area, but they could be present.

Fringed Myotis Bat

This bat species appear adapted to live in areas with diverse vegetative substrates. They are associated with a variety of habitats including conifer forests and oak woodlands. They roost in buildings, caves, and mines, and in crevices and cavities in large trees. A single fringed myotis bat has been documented in the Planning Area.

Traveling Sideband (Mollusk)

Habitat attributes for this mollusk includes dry basal talus and rock outcrops, with oak and maple overstory components. Also, they have been found along spring run-off in rocks and moist silty alluvial benches adjacent to creeks with moist vegetation and detritus in mixed conifer-hardwood forest. This species has not been documented in the Project Area; however, suitable habitat occurred pre-fire.

Siskiyou Hesperian (Mollusk)

This mollusk species is primarily a riparian associate found in perennially moist habitat, including spring seeps and deep leaf litter along stream banks and under debris and rocks. This species has been documented in the Fall Creek riparian area.

f. Other Wildlife Species of Concern – Affected Environment

Cavity Nesters Requiring Additional Mitigation Measures

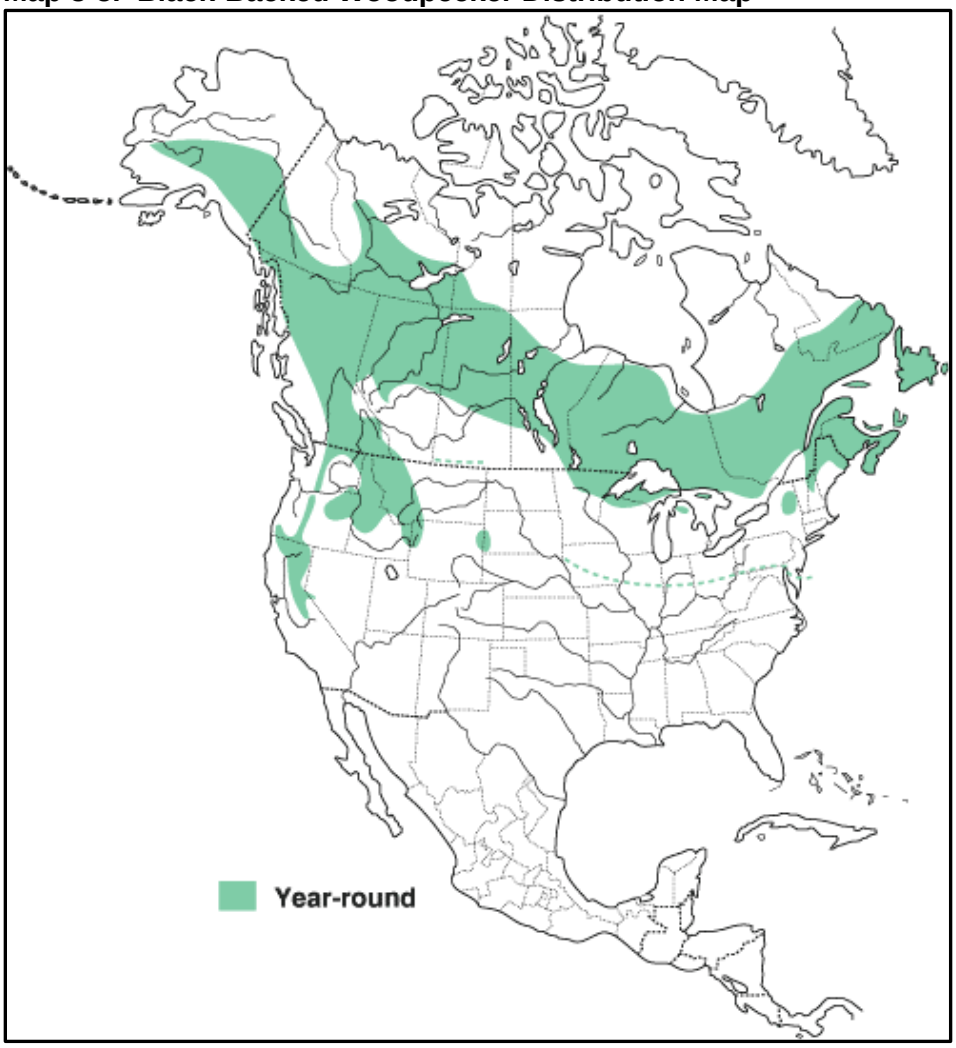
The black-backed woodpecker, pygmy nuthatch, flammulated owl, and the white-headed woodpecker (mentioned above) were determined not be sufficiently aided by applying mitigation measures for riparian habitat protection or other elements of the Northwest Forest Plan (USDA and USDI 2001). To ensure distribution and numbers of these species do not decline within their associated ranges on BLM Districts, adequate large snags and green-tree replacements for future snags will be maintained in sufficient numbers (USDI 1995).

Black-backed Woodpeckers (BBWO)

The scale for the effects analysis for the black-backed woodpecker is defined as the entire area of the Oregon Gulch fire (35,302 acres) since this species is dependent on forest stand disturbance such as high severity wildfires.

This widespread, but uncommon, species is a year-round resident in coniferous forests from eastern Canada to northwest Alaska, south down to the Northern Rockies and the Cascade Mountains into the northern Sierras, and with isolated populations in the Black Hills of South Dakota and Wyoming.

Map 3-5. Black-Backed Woodpecker Distribution Map



Dixon and Saab 2000

This species has been detected in most conifer forests types including lodgepole pine, ponderosa pine, and Douglas-fir/mixed conifer stands (Powell 2006). They are most common in forests with a high abundance of dead and dying trees, particularly in stands that have experienced high severity wildfires (Rota 2014, Tingley et al. 2014). They specialize in foraging on beetle larvae that invade stands post-fire. In recently severe burned areas, 1-5 years post-fire, the black-backed woodpecker has a higher likelihood of nesting success, in comparison to unburned stands. Nesting success decreases after the fifth breeding season because of increased mammalian nest predation as shrub cover recolonizes the burn and the reduction in wood-boring beetle prey availability decreases. Black-backed woodpeckers do not tend to show a strong preference for snag species or size when selecting nest trees (Saracco et al. 2011, Hutto 1995, Seavy et al. 2012). High snag density is the most important predictor of nest site occurrence (Seavy et al. 2012, Bond et al. 2012). Black-backed woodpeckers are primarily found east of the Cascade crest and higher elevation west of the crest and were suspected to occur in the Planning Area. Surveys were conducted in the Project Area for BBWO the spring of 2015. One female was detected on three separate visits but no nest cavities were located. This female wasn't exhibiting territorial behavior, which is typical for this species during broadcast call surveys, and could indicate that she was not nesting or there was nest failure. No males were detected.

The Medford District RMP provides for management of 100 percent of the potential population levels of BBWO in Matrix LUA by adding an additional amount of snag retention in timber harvest units which is intended for unburned forests (RMP, p. 48). The *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures (2001) (i.e.*

Survey and Manage ROD, 2001) further clarifies that the 100 percent population potential requires an additional 0.12 conifer snags per acre at least 17 inches diameter in forest habitats (Survey and Manage ROD, Standards and Guidelines, p. 34). Application of this management direction is to ensure that the distribution and numbers of the BBWO do not decline on BLM Districts and National Forests within the range of the northern spotted owl (Survey and Manage ROD, Standards and Guidelines, p. 33).

Neither the 1994 Standards and Guidelines in the Northwest Forest Plan nor the 2001 Survey and Management ROD management recommendations for the BBWO require management for 100 percent population potential in burned areas. The intent of the guidance in both documents is to maintain baseline populations in "green" forests. The 2001 ROD encourages application of current science to inform project planning, though it does not require population outcomes or management standards for burned areas to be greater than those described for general management purposes.

The summary of research since the Medford District RMP was published in 1995 indicates that the BBWO prefers unsalvaged to salvaged burned forest (Saab and Dudley 1998; Hutto 2006; Cahill and Hayes 2009; Odion and Hansen 2013); and if salvage is to occur, large blocks the size of home ranges (Koivula and Schmiegelow 2007) should be left untreated containing high snag densities (Saab et. al. 2009; Seavey et al. 2012).

The BLM is also a cooperator in The Partners in Flight (PIF) Habitat Conservation program. The PIF document, Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington (Version 1.0, June 2000), recommends retaining 40 percent of post-fire BBWO habitat for the BBWO as a focal species for old growth lodgepole pine. However, it does not provide BBWO recommendations for other habitat types such as those present in the Oregon Gulch Fire. While PIF documents provide valuable information, they are not regulatory requirements and do not represent the policies of any agency or organization. The BLM uses PIF information along with all other scientific literature to inform the effects of harvest of burned forest on the BBWO.

The BBWO is not a Bureau Sensitive species, but there have been petitions for listing under the ESA. The U.S. Fish and Wildlife Service determined that the petition presented sufficient information to suggest that listing *may* be warranted. This is not a determination that listing is warranted, but that further analysis is warranted. The finding that the petition is warranted does not, however, provide any special protections or requirements for the BBWO.

In addition, a petition to list this species under the State of California Endangered Species Act (ESA) was declined by the Department of Game and Fish (CGF). Their primary concerns with the evaluation were the lack of information about estimates of BBWO populations in unburned forests and that the petition may have understated the importance of the unburned forest habitat. CFG also concluded that "it seems likely that green forests sustain BBWO populations at relatively low, but stable, levels and occasionally rapidly expand when fires or insect outbreaks create opportunities."

Hence, there are no required standards and guidelines for the BBWO associated with managing the burned forest habitat that resulted from the Oregon Gulch Fire, but there is information to inform on the effects of proposed salvage harvest.

There is approximately 1,912 acres of suitable BBWO habitat on BLM lands, 803 acres are found on Medford BLM District lands and the remaining (1,109 acres) are on the Lakeview District. The total acres of BBWO habitat was determined by using northern spotted owl NRF and dispersal habitat that was burned at a moderate to high fire severity. The McKelvey habitat classification system classifies vegetation into six habitat categories. The McKelvey habitat types (Types 1, 2, and 5) used by northern spotted owls were used as a surrogate for BBWO habitat because they are the best available, and most extensively assessed, classification system to represent stand age and canopy cover, and as a result snag density created by the fire. The spotted owl habitat types utilized are described as follows:

Nesting, Roosting, Foraging Habitat (NRF) (McKelvey Habitat Types 1 and 2)
Meets all spotted owl life requirements. Stands are generally older than 80 years, have a high canopy cover (greater than 60 percent), a multi-layered structure, and large overstory trees. Deformed, diseased, and broken-top trees, as well as large snags and down logs, are also present. NRF habitat also includes areas with more uniform structure that may not have nesting structures (*e.g.* mistletoe clumps), but provide roosting and foraging habitat with flying space for owls in the understory.

Dispersal (McKelvey Habitat Type 5)
Dispersal habitat provides sufficient patchy cover to be used for travel between suitable stands, a minimum 40 percent canopy cover, and an average tree diameter greater than 11 inches with flying space for owls in the understory

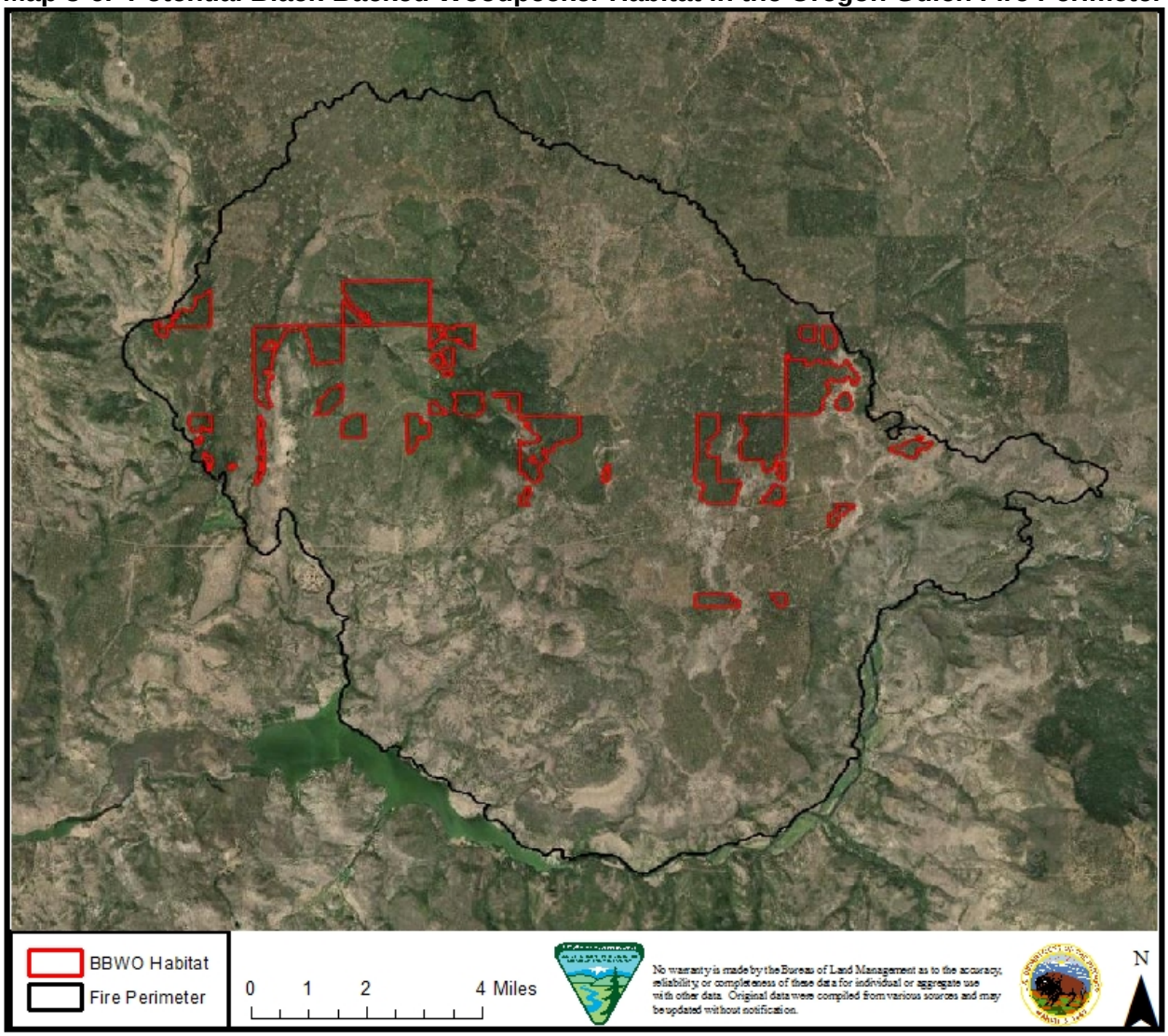
Fire severity in these habitat types was determined using the post-fire Burned Area Reflectance Classifications (BARC) data (see Map 3-3) and was field verified for accuracy. It was found to be highly accurate and it was also confirmed that trees in the moderate and high fire severity classification were killed and had little if any needles remaining.

Any private timberlands within the fire perimeter were not included as potential BBWO habitat because most of this private land has been extensively managed and is in an early-seral stage (see Map 3-6). In addition, any potential BBWO habitat on private land will likely soon be salvaged.

Home range size estimates for BBWO vary widely (Dudley and Saab 2007, Tingley et. al. 2014) but it is commonly accepted that they can be relatively large. Hanson and Cummings (2010) stated that "(t)here are several major difficulties with estimating abundance and population trend of BBWO in California. The first is the ephemeral and unpredictable nature of its habitat." and they went on further to state that "we estimated the current abundance of black-backed woodpeckers in suitable habitat in California based upon the best available science." In recently burned (1-5 years post-fire) unlogged stands a density estimate of 0.80 pairs per 100 ha (Hanson and Cummings 2010, Bond et al. 2012) equates to one pair of BBWO per approximately 300 acres.

Based upon the 1,912 acres of suitable BBWO habitat located on BLM-managed land and the nest density described above, the habitat could possibly support 2.7 nesting pairs on the Medford District and 3.7 nesting pairs on the Lakeview District. A conservative estimate of 4 breeding pairs on the Medford District and 5 pairs on the Lakeview District will be used for further analysis. The intent of calling this a conservative estimate is because the suitable BBWO habitat found within the fire perimeter is disjunct (see Map 3-6) and is surrounded by extensively managed private timberland. In addition, there could be home range overlap between adjacent breeding pairs. The largest single stand of BBWO suitable habitat is only 308 acres and is found on Medford BLM land.

Map 3-6. Potential Black-Backed Woodpecker Habitat in the Oregon Gulch Fire Perimeter



BBWO have an average clutch size of 3-4 and a mean fledgling success of 1.7 (Dixon and Saab 2000). BBWO have a relatively high nesting success in unsalvaged burned areas compared to other cavity nesters. An average nesting success of 85% was determined from several studies (Forristal 2009, Vierling et. al. 2008, Nappi and Drapeau 2009, Saab et. al. 2007). Conservatively assuming that there is 100% nesting success, the potential 9 breeding pairs (4 on the Medford District and 5 on the Lakeview District) of BBWO could successfully fledge 15 young each season for the first 1-5 years, if the habitat remains unlogged.

Pygmy Nuthatch

The bird species is predominantly found east of the Cascade Crest in mature and old-growth long-needled pine forests, such as ponderosa pine and Jeffrey pine, or in mixed conifer stands dominated by pines. They nest and roost in cavities in snags or dead portions of live trees (Kingery and Ghalambor 2001). They forage on mostly weevils and beetles on the outer branches in upper canopy on needle clusters, cones and emerging shoots. Although primarily a resident of the east half of Oregon, there have been numerous observations of pygmy nuthatches in Jackson County over the years.

Flammulated Owl

This owl's primary nesting habitat is mature to old-growth ponderosa pine stands with an open understory and relatively high canopy cover. They are a secondary cavity nester and commonly use cavities created

by pileated woodpeckers and Northern flickers. They usually chose cavities in snags but some are found in live trees. Flammulated owls mostly nest east of the Cascade Crest but have been reported throughout Jackson County (Buchanan 2006). They are unique among other owls found in the region because they feed primarily on insects and are neotropical migrants.

USFWS Birds of Conservation Concern and Game Birds Below Desired Condition – Affected Environment

Resident (found year-round) and neotropical bird species are addressed here due to widespread concern regarding downward population trends and habitat declines. The BLM has interim guidance for meeting Federal responsibilities under the Migratory Bird Treaty Act and Executive Order (EO) 13186. Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through Instruction Memorandum No. 2008-050. The Instruction Memorandum relies on two lists prepared by the U.S. Fish and Wildlife Service in determining which species are to receive special attention in land management activities; the lists are *Bird Species of Conservation Concern* (BCC) found in various Bird Conservation Regions (analysis area is in BCR 5) and *Game Birds Below Desired Condition* (GBBDC). Table 3-4 displays those species that are known or likely to be present in the Wildlife Analysis Area.

Current research indicates the most appropriate scale to study impacts to migratory birds is at the eco-regional scale (California Partners in Flight 2002). Breeding bird surveys in the Southern Pacific Rainforest Physiographic Region (which includes western Oregon) indicate that songbirds are declining. The exact cause of these declines is still unclear, but issues associated with their winter grounds (Central and South America) are suspected to be an important factor.

Mourning Doves

This dove species breed in variety of open habitats, including agricultural areas, open woods, deserts, forest edges, cities and suburbs. A dove may have up to five or six clutches in a single year. Human alteration of original vegetation in North America is generally beneficial for this species, with creation of openings in extensive forests and plowing of grasslands for cereal-grain production of particular importance. Mourning doves are one of the most widespread avian species in North America.

Olive-sided Flycatchers

This species is most often associated with forest openings, forest edges near natural openings (e.g., meadows, canyons, rivers) or human-made openings (e.g., harvest units), or open to semi-open forest stands. In Douglas-fir forests of northwest California, Olive-sided Flycatcher is the only common species detected more often at forest edges than in forest interior (Rosenberg and Raphael 1986). In rain forests of western Oregon, which are characterized by dense canopy closure and function as unsuitable habitat, Olive-sided flycatchers occur primarily in harvest units where at least a few large snags and live trees are retained.

Rufus Hummingbirds

This hummingbird's breeding habitat includes coniferous forest, second growth, thickets and brushy hillsides, foraging in adjacent scrubby areas and meadows with abundant nectaring flowers. They are associated with secondary succession communities and forest openings (Healy and Calder 2006). Nest sites are located in a variety of plants and sites including shrubs and drooping lower branches of conifers and oaks. There are reports of colonies of up to 20 nests only a few yards from each other in timber or second growth (Bent 1940).

Purple Finch

The purple finch mainly breeds in moderately moist, open conifer forests, and edge habitat at low-to-mid elevations. They use a variety of habitats including deciduous woodlands, riparian corridors and edge habitat (Marshall et al. 2003). They are more widespread in winter, using forests, shrubby areas, weedy fields, hedgerows, and backyards.

Golden Eagle

Currently, the golden eagle is not recognized as a federally or state listed species (under the Endangered Species Act) or under the Bureau's Special Status Species program. However, protection is afforded under the Bald and Golden Eagle Protection Act and under the 1995 Medford District RMP.

In Oregon, golden eagles inhabit a wide range of habitats, including shrub steppe, grasslands, juniper, open ponderosa pine, and mixed conifer/deciduous habitats. The preferred foraging habitat is generally open areas with a shrub component that provides food and cover for prey (primarily black-tailed jackrabbit). Nests are typically large (3-10 feet tall and 3 feet wide), and often built in large live ponderosa pines (>30 inches DBH) or on ledges along rims and cliffs (Marshall et al. 2003). There are no known golden eagles nests in the Planning Area, but they are often seen soaring above Hwy 66 in the hills east of Ashland, Oregon.

3. Environmental Consequences

Impacts to wildlife from the Proposed Action are best measured by the predicted potential changes in stand structure in different habitat types that would result from the activities proposed. Quantifying the predicted changes in wildlife habitat is the best method to evaluate the potential affects to wildlife species because they reflect the modification to and the resulting functionality of the residual stand after treatment. Each wildlife species would respond differently to these stand structure changes; some may be negatively affected, others may benefit, while still others may remain unaffected. The effects to key species associated with these habitats are linked to these changes in stand structures, as well as the magnitude (total treatment acres) and intensity of the treatments. Only federally listed, Bureau Sensitive species, Survey and Manage species, and other Species of Concern known or suspected to occur in the Planning Area and with the potential to be impacted by the Proposed Action will be addressed in detail further in the Final EA.

a. Alternative 1—No Action Alternative

Under the No Action Alternative, no vegetation management (salvage harvest, road construction, road renovation, road decommissioning and tree planting activities), would be implemented from the Proposed Action and there would be no direct, indirect, or cumulative effects to wildlife species from those activities. Without replanting, high severity burn stands would likely revegetate with brush and hardwoods (Fryer 2008) and delay reforestation for decades. Natural regeneration would slowly develop coniferous components. Recent trends in southwest Oregon illustrate that fire has been converting mature forest structure into earlier seral stages at a higher rate than harvest (Courtney et al. 2004; Spies et al. 2006).

Hazardous trees posing danger to public and forest workers using roadway systems are subject to OSHA regulations, and reciprocal right-of-way agreements allow parties to remedy trees posing hazardous conditions.

Northern Spotted Owl (NSO)

Changes to NSO habitat may occur on the landscape in the Planning Area regardless of the proposed Oregon Gulch Fire Salvage Recovery Project. Salvage harvesting on private timberland and within a portion of the Wildgal Timber Sale of the Lakeview BLM Klamath Falls Resource Area (KFRA) has already occurred since the fire, and is likely to continue. KFRA has also recently issued a decision on their Oregon Gulch Fire Salvage and Rehabilitation project. Their decision would salvage 135 acres of NSO dispersal habitat. On KFRA land, all of the pre-fire suitable NSO habitat, except for the 135 acres of dispersal habitat, was converted to capable or non-habitat due to the fire intensity (p. 40 Oregon Gulch Fire Salvage and Rehabilitation project EA)

Spotted owl suitable habitat on private land is expected to continue to be harvested, reducing both quantity and quality of habitat, particularly in and near moderate and severe burn areas to salvage dead

trees, and reduce damage from beetle borers. Severe fire-killed stands on BLM-managed land that are not harvested may provide foraging habitat for the spotted owl especially near the live forest edges at the fire perimeter, however, this may be short-term foraging habitat. In the long-term, it is likely to be avoided as open space, and would be reduced to capable habitat. the barred owl population is likely to increase as it has elsewhere in Oregon and Washington. Based on historical private land management practices, it is expected the reproduction and occupancy of spotted owl sites in the spotted owl analysis is likely to decrease as a result of private harvesting, barred owl occupancy, and loss of habitat and habitat quality from the Oregon Gulch fire.

Black Backed Woodpecker (BBWO)

There are 803 acres of suitable BBWO habitat located on Medford District land within the Planning Area. Based upon the nest density of one breeding pair per approximately 300 acres, the area could support 2.7 breeding pairs. As noted in the Affected Environment section above, a conservative estimate of 4 BBWO pairs was used for this analysis on the Medford District. BBWO have an average clutch size of 3-4 and a mean fledgling success of 1.7 (Dixon and Saab 2000). BBWO have a relatively high nesting success in unsalvaged burned areas compared to other cavity nesters. An average nesting success of 85% was determined from several studies (Forristal 2009, Vierling et. al. 2008, Nappi and Drapeau 2009, Saab et. al. 2007).

Under the No Action Alternative, assuming 100% nesting success, the 4 BBWO breeding pairs on Medford District land within the fire perimeter could successfully fledge 7 young each season for the first 1-5 years. This number of successful fledglings would likely decrease beyond the fifth breeding season. This is because of increased mammalian nest predation as shrub cover recolonizes the burn and the reduction in wood-boring beetle prey availability decreases.

The remaining 1,109 acres of BBWO habitat on the Lakeview District could conservatively support 5 breeding pairs and fledge 8 young per season for the first 1-5 years post-fire. Of these 1,109 acres, 668 are part of a fire salvage project on the Lakeview District and will presumably be harvested. In the first 5 years following the fire, this equates to a potential reduction of 20 individuals into the BBWO population (recruitment) each year following the harvest.

b. Alternative 2 – Proposed Action

Alternative 2 was developed to achieve the objectives of the Purpose and Need described in Chapter 1 for the proposed Oregon Gulch Fire Salvage Recovery Project. Alternative 2 would salvage about 683 acres using the silvicultural prescriptions as described in Chapter 2, and would reestablish conifer forests by planting trees. Harvest units would primarily be accessed from existing roads. Approximately 2.3 miles of road would be decommissioned. Additionally, an estimated 0.6 miles of temporary road would be constructed for access and would be fully decommissioned after harvesting.

Assumptions:

- If no Threatened and Endangered (T&E) or Special Status species habitat is known or suspected to be present in the Project Area, or the area is outside the range for the species, then no further analysis is needed. If habitat is present, but no activities are planned for that habitat or the project would not impact the population or habitat, no further analysis is needed. If a T&E or Special Status Species is known or suspected to be present and habitat is proposed to be disturbed, then the effects to the species is analyzed in further detail below.
- Coarse wood already on the ground would be retained and protected from disturbance to the greatest extent possible during treatment.
- If a retention snag needs to be felled for safety reasons, it would be left on site.

- Incidental felling and removal of live trees will be minimized, but could occur to facilitate safe salvage activities and would have insignificant effects to the species analyzed in further detail below.

Species Not Affected by the Proposed Action

As mentioned above, only species known or suspected to occur in the Planning Area and with the potential to be impacted by the Proposed Action will be analyzed in further detail in the EA. The following species were addressed in the Affected Environment section of the Final EA because of their occurrence in the Planning Area prior to the Oregon Gulch fire. They are not addressed in the Environmental Consequences section of the Final EA because due to the fire, they are now unlikely to be present in the area or their suitable habitat was removed (burned). For the species discussed in this section, the propose salvage and associated activities are not expected to remove suitable habitat, affect these species persistence in the Planning Area or Project Area units, nor contribute to the need to list the species as Threatened under the Endangered Species Act.

Federally Listed or Proposed for Listing Species

Northern Spotted Owl - Alternative 2

The Proposed Action would be limited to stands that suffered moderate to high fire burn severity and project activities would not occur in any existing NRF, dispersal, or post-fire foraging habitat. Proposed salvage occurs within the home range of a historic spotted owl site. Even though surveys have not been conducted at this site in over 20 years, there was a low likelihood this site was occupied prior to the fire due to the lack of habitat at the home range (8.3% NRF on federal lands) and 0.5 mile core area (29.2% NRF on federal lands). The likelihood of occupancy has decreased even more after the fire because NRF habitat exits on only one percent of the federal lands within the home range and no NRF is exists within the 0.5 mile core area. Private land within the home range do not provide additional NRF habitat because they have been extensively managed and much of the area is in an early-seral stage condition. It is unlikely that owls would occupy this owl site due to the considerable loss of habitat from the fire and the current NRF or older forests within the home range and core area are well below the amounts indicated in the affected environment to support occupancy, reproduction, and survival. The next closest known northern spotted owl site to the Project Area is 2.6 miles away and would not be affected by the proposed action because the salvage units are outside of the home range. As with all projects, if new NSO locations are discovered prior or during project implementation, the implementation would stop as noted in the Project Design Features of the Final EA (Chapter 2, h. Terrestrial Wildlife, Objective 2: Protect Wildlife Species Which Have Mandated Protections (1)). At that time, the BLM would assess the situation and apply necessary seasonal restrictions, other mitigation, and complete any needed additional NEPA and Section 7 consultation. There is no designated Critical Habitat or RA32 habitat located in the Planning Area.

There would be no effects to spotted owls because the proposed action does not occur in spotted owl NRF, dispersal, or post fire habitat, does not occur within potential disturbance distances of known spotted owl sites, and the proposed action is outside of designated spotted owl critical habitat,

The forseeable actions are described under the No Action Alternative on p. 3-71.

Pacific Fisher (Federal Proposed Species) - Alternative 2

Fishers are found in forest woodland landscape mosaics that include a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor. They will disperse and forage through a variety of habitat types within their home range but require relatively high canopy cover (Lofroth et al. 2010). Much of this suitable habitat, similar to that of the northern spotted owl, was removed by the Oregon Gulch Fire. As described earlier, there was a low probability that fishers utilized this area prior to the fire. Any fisher that may be dispersing through the area outside the fire perimeter would utilize another part of its home range during noise disturbing activities.

Gray Wolf (Federally Endangered) - Alternative 2

As noted in the Affected Environment section above, the Oregon Gulch salvage units are located within the Keno Area of Known Wolf Activity (AKWA). This is an area where two wolves have shown repeated use of an area over time and are not just dispersing wolves. The Oregon Gulch salvage units total only 0.02 percent of the Keno AKWA. The salvage is unlikely to affect gray wolves because the amount of habitat affected is insignificant compared to the large AKWA and large home ranges of gray wolves. Additionally, gray wolves are habitat generalists and activity areas are primarily chosen by availability of ungulates, their preferred prey species. Prior to project implementation, communication between U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife, and the BLM will occur to determine if any wolf activity is occurring in the Project Area. If wolves are found to denning in or adjacent to the project area prior to or during project implementation, projects activities would be suspended and the BLM would assess the situation, and complete any additional NEPA and Section 7 consultation that is needed. The Project Design Features of the EA would prohibit forest management activities within 1.0 mile radius of active gray wolf dens and rendezvous sites from April 15th through August 31st (Final EA, p.2-23)."

Survey and Manage Species - Alternative 2

Mollusks

These terrestrial mollusks, the chace sideband, evening fieldslug, and Oregon shoulderband, are found in forested stands and riparian areas. They are generally associated with moist areas and use rock substrate, herbaceous vegetation, and utilize large woody debris and talus deposts as refugia during the dry months (Duncan et al. 2003). There will be no effect to these species under the Proposed Action because any remaining suitable habitat in the Planning Area will not be removed or otherwise disturbed.

BLM Bureau Sensitive Species - Alternative 2

The Siskiyou Hesperian and traveling sideband have similar habitat requirements as the three mollusks discussed above. There will be no effect to this species under the Proposed Action because any remaining suitable habitat in the planning area will not be removed or otherwise disturbed.

The western bumblebee is associated with meadows and shrublands where they feed on nectaring vegetation. There will be no effect to this species under the Proposed Action because there are no activities proposed in its remaining suitable habitat and the species could benefit from the early successional vegetation that will colonize the area post-fire.

Other Wildlife Species of Concern - Alternative 2

The flammulated owl, pygmy nuthatch and white-headed woodpecker are all cavity nesters and have very similar habitat requirements (Marshall 2006a). They occur in mature ponderosa pine stands and mixed conifer dominated by ponderosa pine. Suitable habitat remains near the perimeter of the fire and these species will forage near this edge and the fire’s interior. There will be an abundance of snags in the unsalvaged areas adjacent to the nesting habitat in addition to the snag retention in the proposed salvage units. The fire also created snags in light burn and mixed-severity burn areas with individual trees or

small groups of trees throughout the fire area, resulting in both aggregated and dispersed snag retention. The units in the Proposed Action would not affect their nesting habitat and are 0.75 miles from the nearest suitable nesting habitat.

The purple finch mainly breeds in moderately moist, open conifer forests, and edge habitat. The units in the Proposed Action would not affect their habitat and are 0.8 miles from the nearest suitable nesting habitat.

There are no known golden eagle nests in or surrounding the Planning Area. In this part of Oregon, golden eagles nest typically in large ponderosa pine. They have large breeding territories and prefer to forage in open areas with a shrub component. Although the Proposed Action area does not include any suitable nesting structures, the area could be used for foraging. In accordance to the Medford RMP, any nest sites located prior to or during harvest would be protected from human distances that may disturb or interfere with nesting.

Species Potentially Affected by the Proposed Action

BLM Bureau Sensitive Species - Alternative 2

The fringed myotis and pallid bats utilize mines, caves, manmade structures, snags and rock outcroppings for roosting and hibernacula sites. There are no mines or caves in the Planning Area and very few manmade structures. No surveys have been conducted for these species but they are suspected to occur in the Planning Area. The Proposed Action is not expected to adversely affect local bat populations or long-term population viability of any bat species in the Planning Area. Live trees killed by the fire would be expected to be harvested prior to developing the loose bark or cavity character most utilized by bats for roosting. In addition, on Medford District BLM-managed lands in the Planning Area that experienced moderate to severe fire severity in forest stands, 32% would be retained and unharvested. Existing non-hazardous older decay class snags would be retained where available and protected to the greatest extent possible from disturbance. Because adequate habitat would remain post-harvest, the Proposed Action would have minimal negative effects and no negative cumulative effects are expected for these species that would increase the need to list as threatened.

Habitat for Lewis's woodpeckers include an open canopy, a brushy understory offering ground cover, downed woody material, available perches, and abundant insects. Their principal breeding habitats are open ponderosa pine stands, logged or burned pine stands with large diameter snags with existing cavities. Medford BLM-managed lands in the Planning Area that experienced moderate to severe fire severity in forest stands, 32% would be retained and unharvested. The fire also created snags in light burn and mixed-severity burn areas with individual trees or small groups of trees throughout the fire area, resulting in both aggregated and dispersed snag retention. Existing non-hazardous older decay class snags would be retained where available and protected to the greatest extent possible from disturbance. Years to follow the fire, the species would benefit as a brushy understory develops and more downed woody material is created from falling snags, and as a result the Proposed Action would have minimal negative direct, indirect, or cumulative effects on this species.

Other Wildlife Species of Concern- Alternative 2

Cavity Nesters Requiring Additional Mitigation Measures – Black Backed Woodpeckers

Studies have shown that BBWO may be intolerant of salvage logging (Cahall and Hayes 2009, Saab et al. 2007, Hutto and Gallo 2006, Koivula and Schiegelow 2007). Of the 803 acres of BBWO habitat on Medford BLM-managed land, salvage would potentially remove nests and foraging snags on approximately 545 (68%) acres while 258 (32%) acres would be excluded from logging. There is an additional 206 acres in areas of less snag density (NSO capable habitat) that experienced moderate to high burn severity that could be used for foraging. The fire also created snags in light- and mixed-severity burn areas with individual trees or small groups of trees throughout the fire area, resulting in both

aggregated and dispersed snag retention. In the proposed salvage units, a minimum of two snags per acre >16 feet dbh, of the largest available, representative of the species of the stand, averaged over no larger than 40 acres (USDI 1995, p. 40) would be retained in units where sufficient snags are available.

To minimize direct negative effects of nesting disturbance or the loss of individual birds from cutting an active nest tree, salvage operations in 2015 would not begin until May 15th, so that BBWO surveys can be conducted. Known BBWO nests would be protected until fledging is confirmed (approximately July 31st). This seasonal restriction would be waived if no presence is detected by May 15th or no nesting is confirmed by May 31st. If nesting is confirmed, the nest tree would receive a 0.40 mile radius buffer until confirmation of either fledging of young or nesting failure. This 0.4 mile radius was determined from the average breeding home range acres described in the Affected Environment (Final EA, p. 3-68).

Known nests would be monitored weekly to document nesting status. It is not anticipated that harvesting would continue into the following year, as it is expected the merchantable value of the timber would be lost to rot at that time. However, if salvage continues after the first year of operation, the seasonal restriction would be applied to project activities starting March 15th so surveys can be conducted where project activities are not completed. The seasonal restriction could be waived by the same criteria described above. If nesting is confirmed, the above buffer would be applied and monitoring would occur.

The proposed salvage of 68% of the fire-created BBWO habitat in the Wildlife Analysis Area on the Medford District would reduce the potential of this habitat to support nesting by BBWO. No salvage would occur until surveys for BBWO have been completed. The protection of all active nest sites would provide BBWO one full breeding season (two if some areas are not salvaged by the end of 2015) in all acres of BBWO habitat in the Planning Area on the Medford District.

Surveys were conducted in the Project Area for BBWO the spring of 2015. One female was detected on three separate visits but no nest cavities were located. This female wasn't exhibiting territorial behavior, which is typical for this species during broadcast call surveys, and could indicate that she was not nesting or there was nest failure. No males were detected.

The Proposed Action would retain 257 acres (32%) of the suitable BBWO habitat. The remaining habitat after salvage would be scattered between 6 stands encompassed in an approximate 2 square mile area. It is unknown if this remaining habitat would support successful BBWO fledging of young. If it would not, the potential loss to the BBWO regional population recruitment could represent up to 28 individuals in years 2-5 post-fire. This is based on the potential reduction of recruitment into the population from BBWO breeding pairs the area could have supported (if not salvaged). The actual number of individuals lost would likely be lower because the loss of habitat from salvage would not preclude adult BBWOs from breeding in other fire areas, green stands, or bug-kill areas the following seasons. Also, as the number of years pass, post-fire salvage, the number of successful fledglings would likely decrease due to increased predation on nests and a reduction in wood-boring beetles as a food source.

Black-backed woodpeckers have a wide range and distribution (see Map 3-5). Current research indicates the most appropriate scale to study impacts to migratory birds is at the eco-regional scale (California Partners in Flight 2002), which is the Cascade and Klamath Mountains in this area. Under the Proposed Action there will be a loss of suitable nesting habitat and the potential reduction of 28 individuals from the population. This is a conservative estimate of 28 individuals because it assumes 100% colonization and 100% nesting success, neither of which is likely because of how the habitat distributed across the planning area (see Map 3-6). Thus, while the Proposed Action would likely result in some level of reduced population recruitment, the effects would be local and not expected to lead to a regional population decline or contribute to the need to list the species under the ESA.

Cumulative Effects: Proposed Action

Based on pre-fire habitat analysis, personal knowledge of the stands, and observed post-fire salvage activity on private lands in the burned area, private lands are not expected to provide high quality habitat for cavity nesting species. The vast majority of the private lands intermixed with and surrounding the KFRA-managed lands in the burn area are managed intensively for timber production and were in early successional, or low tree density conditions pre-burn. There as a small amount of mature, high stem density, timber on private lands in the burn. Those areas were targeted for intensive salvage harvest by the landowner immediately post-fire. That work is likely to be completed in early spring 2015. Due to the lack of pre-fire stem density on some private lands and the lack of sufficient snags post-salvage operations on the rest of the private lands in the burn, private lands are not expected to provide suitable habitat for BBWO.

The 250 acres of post-fire salvage logging conducted for the Wild Gal Salvage Project on the Lakeview BLM District was considered to be non-habitat in this analysis due to the effects of the on-going salvage operations.

In addition to the 547 acres of salvage proposed in BBWO habitat within the Wildlife Analysis Area (WAA) on the Medford District, the Klamath Falls Resource Area (KFRA) of the Lakeview BLM District issued a Decision Record (April 14, 2015) to carry out salvage operations that fall within the WAA, which has been subsequently modified through a protest resolution. The KFRA would salvage 668 acres (60%) of fire-created BBWO habitat on the KFRA portion of the WAA. The combined proposed actions would retain 36% of suitable BBWO habitat within the Wildlife Analysis Area (Table 3-6). Even at 36% retention, the local BBWO population could be expected to utilize these areas along with low intensity burned, bug-killed and green stands, hence providing some recruitment to the regional population above what it would have been if no fire had occurred.

Additionally, the Oregon Gulch Fire was not the only fire to occur in 2014 in the region. For example, the 790 Fire burned more than 2,000 acres of conifer forest in the Sky Lakes Wilderness (approximately 40 miles north of the Planning Area). No salvage will take place in the wilderness. This and wildfires that receive no salvage treatment will provide dispersed areas across the Oregon Cascades and Klamath Mountains for BBWO nesting and population growth.

Thus, the effects to BBWO population from implementing Alternative 2, when added cumulatively to the effects of other foreseeable actions in the Analysis Area, are not anticipated to have a substantial effect on the species regional persistence and would not contribute to the need to list the species under the ESA.

Table 3-6. Anticipated changes in Black-Backed Woodpecker Habitat and Potential Recruitment Loss under the Medford District and Lakeview District Fire Salvage Recovery Projects

Medford Alternative	Medford Habitat Lost Acres (%)	KFRA Habitat Lost Acres (%)	Combined Habitat Lost Acres	Combined Acres Retained (%)	Potential Recruitment Loss (Individuals)	Combined Recruitment Loss (Individuals)
Alternative 1 (No Action)	0 (0)	668 (60)	668	65	20	20
Alternative 2 (Proposed Action)	547 (68)	668 (60)	1215	36	28	48

USFWS Birds of Conservation Concern and Game Birds Below Desired Condition-Alternative 2

The olive-sided flycatcher is most often associated with forest openings, forest edges near natural openings (e.g., meadows, canyons, rivers) or human-made openings (e.g., harvest units), or open to semiopen forest stands. Presence in early successional forest appears dependent on availability of snags or residual live trees for foraging and singing perches (Altman 2006). Suitable nesting habitat is located approximately 0.75 miles from the Project Area. There will be an abundance of snags in the unsalvaged areas adjacent to the nesting habitat in addition to the snag retention in the proposed salvage units and, as as a result, the Proposed Action is not expected to negatively affect available nesting or foraging habitat, or the species persistence in the Planning Area.

Mourning doves are one of the most abundant birds in North America and can have multiple clutches in a single breeding season. Human alteration of original vegetation in North America is generally beneficial for this species, with creation of openings in extensive forests and plowing of grasslands for cereal-grain production of particular importance (Otis et al. 2008). The Proposed Action is not expected to negatively affect available nesting or foraging habitat, or the species persistence in the Planning Area.

Rufus hummingbirds breed in forest openings, second growth, and shrubland. They forage in adjacent open areas with abundant nectaring flowers. The species could benefit from the early successional vegetation that will colonize the area post-fire. The Proposed Action is not expected to negatively affect available nesting or foraging habitat and may in fact provide more habitat over coming years as early seral stage vegetation colonizes the area.

Some migratory bird individuals other than USFWS species of concern may be disturbed or displaced during project activities. Some nests may be destroyed from timber harvest occurring during active nesting periods. However, there would be no perceptible shift in species composition as a result of the Proposed Action. Adequate undisturbed areas adjacent to the Project Area would maintain habitat for displaced individuals. Overall, populations in the region would be unaffected due to this small amount of habitat removal, and the increase of available similar habitat within the fire perimeter. Analyzing bird populations at this scale, as appropriate, is supported by both the USDI Fish and Wildlife Service (2008) and Partners in Flight (Altman and Alexander 2012). These species prefer open to semi-open forests, stand edges, woodlands, brush, early successional stages to nest and forage may benefit from the effects of the fire. The effects of fire has increased open to semi-open forests, stand edges, and brush fields, and this type of habitat for these species is expected to increase across the fire landscape. The proposed removal of 683 acres fire-injured or fire-killed trees would still result in a net increase of these types of habitats in untreated areas, therefore, no negative impacts are expected for these species.

J. BOTANY

1. Introduction

This section discloses the impacts to Threatened, Endangered, Bureau Special Status, and Survey and Manage plants (including fungi).

For the purpose of this analysis, this section will hereafter refer to two reference scales: the Project Area (Analysis Area), and the Planning Area.

Project Area: (same as Analysis Area for section J: *Botany*) describes where the action is proposed, such as units where salvage harvest, temporary road construction, road renovation, and road maintenance is proposed.

Planning Area: describes the overall area of consideration reviewed for the development of the Oregon Gulch Fire Salvage Recovery Project. Specifically, the burn area in the Medford District BLM boundary (2,425 acres).

Scoping (external and internal) generated the following issues/concerns and anticipated effects related to implementing the Proposed Action. These effects may or may not occur as a result of the Proposed Action but were of concern to members of the public or ID team specialists.

- Habitat alteration including reduced canopy cover and soil disturbance and compaction associated with harvest activities degrades habitat for native plant (including Special Status and Survey and Manage plant and fungi species) populations
- Concern: *Limnanthes floccosa* spp. *bellingeriana* may be sprayed with herbicide.
- Increases in spread of noxious weeds.
- Cattle grazing in the fire area: livestock disturbance to soils, as vectors for spreading weeds, and reducing competitive and reproductive capacities of native plants.
- Spread of highly flammable exotic plants.

Bureau Special Status Plants, Lichens, and Fungi (BSS) include species that are listed as Threatened or endangered under the Endangered Species Act (ESA), proposed or candidates for listing, State listed, and Bureau designated Sensitive species. Per BLM Manual 6840 (Section .06), Bureau Sensitive Species will be managed consistent with species and habitat management objectives in land use and implementation plans to promote their conservation and to minimize the likelihood and need for listing under the ESA. Project implementation will adhere to the requirements set forth in Section 6840.2.C.

Special Status Species are officially designated by the Washington/Oregon BLM State Director. The most recent Special Status Species list went into effect on December 21, 2011 (IM-OR-2012-018). This list has two categories: Sensitive and Strategic. Bureau Strategic species do not require protection or effects analysis, and therefore, will not be addressed further in this document. The BLM collects population and habitat data on these Strategic species to ascertain if a status upgrade to sensitive or removal as a common species is warranted.

Survey and Manage (S&M) plant species are rare and little- known species thought to be associated with late-successional and old-growth forests in the Northwest Forest Plan area. The Oregon Gulch Fire Salvage Recovery Project meets the conditions of the current S&M directive – the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards* with 2003 Annual Species Review.

2. Affected Environment

The proposed Oregon Gulch Fire Salvage Recovery Project is located in the Iron Gate Reservoir-Klamath River and Copco Reservoir-Klamath River fifth-field watersheds. The total size of the Oregon Gulch Fire is 35,302 acres, of which there are 2,425 acres managed by the Medford BLM. The remaining acreage is located on Lakeview District BLM, Klamath Falls Field Office, U.S. Forest Service, State, and private managed lands. The Analysis Area for Federally Threatened, Federally Endangered, Bureau Special Status and Survey and Manage plants is the 683 acres proposed for treatment in Alternative 2 – the Project Area. Forested areas in the Project Area consist of three Plant Association Series: Douglas-fir, Ponderosa pine, and White oak. For a description of Project Area and landscape scale vegetation, see section B: *Silviculture (*Affected Environment).

The Oregon Gulch Fire Salvage Recovery Project is entirely outside the range of all Federally Threatened or Endangered plant species found on the Medford District (*Arabis macdonaldiana*, *Limnanthes floccosa* ssp. *grandiflora*, and *Lomatium cookii*).

Survey Methods and Completion

In 2009, 156 acres or 23% of the proposed treatment area were surveyed for vascular and non-vascular plants for the postponed Fallback Project. Surveys were conducted using the BLM State Director's Bureau Sensitive Species List (February 7, 2008) and the 2001 Survey and Manage (without subsequent annual species reviews) plant lists and using the *Intuitively Controlled Survey Method* as described in the December 1998 *Survey Protocols for Survey & Manage Strategy 2, Vascular Plants, v. 2.0*. No fungi surveys have occurred in the Project Area.

Surveys are conducted using the intuitive controlled survey method. This method includes a complete survey in habitats with the highest potential for locating Special Status species. Surveys are completed by walking routes that cover a representative cross section (approximately 80%) of all major topographic (slopes, draws, benches ridges) and special features (wet areas, rock outcrops, riparian areas, serpentine areas, etc.) of each unit. In areas of high potential habitat, a more thorough and intensive survey is made. Field work is conducted during the stage of plant phenological development that assures visibility of characteristics necessary for accurate identification of BSS and S&M plant species. Multiple survey visits may be required in some habitats for certain species to ensure that the phenological development is such that accurate identification is possible. Timing of fieldwork takes into consideration seasonal climate, elevation, aspect, target species, and suitable habitat.

a. Vascular and Non-Vascular Plants

Botanical surveys documented no occurrences of Federally Threatened, Federally Endangered, BSS and/or S&M plant species in the Project Area. BSS species most likely to occur in the watershed grow in vernally wet meadows and open areas (*Limnanthes flocossa* ssp. *bellingeriana*, *Nemacladus capillaris*). No meadow habitat exists in the Project Area and therefore, no effects or cumulative effects are expected from this project.

b. Fungi

The 2001 *Survey and Manage Record of Decision (ROD) Standards and Guidelines* established timelines for the completion of Strategic Surveys for Category B fungi species (Standards and Guidelines, p. 9). If timelines for Strategic Survey completion are not met, the species will require "equivalent-effort" pre-disturbance surveys for projects in old-growth forests (in this case, defined as stands 180 years or older in age). For the Category B fungal species, the deadline for completion of Strategic Surveys was the beginning of fiscal year 2011. Because an evaluation of Strategic Survey results for Category B fungi has not been completed, equivalent-effort pre-disturbance surveys are required in those stands that meet the criteria for being considered "old-growth" (USDA 1993). The BLM assumes that surveying for fungi in stands 180-plus years old, protecting known and future found sites, and the existence of late-successional forest stands in reserves (i.e. Riparian Reserves, owl cores, etc.) across the landscape will ensure that BSS fungi species will not trend toward listing, and S&M fungi species will persist (OSO IB-OR-2004-145). Prior to the fire, stands $\geq$180 years old were not present in the Project Area (Forest Operations Inventory Database, BLM, accessed 12/18/14). Therefore, no surveys are required.

Fourteen Bureau Sensitive fungi are documented or suspected of occurring on Medford District BLM-administered lands (Table 3-7). Most BSS and S&M fungi grow in late-successional forested stands. Some are associated with moister conifer stands, while others grow in the drier hardwood-conifer plant associations.

Table 3-7. Medford District Sensitive Fungi Species

Scientific Name	Status	ORBIC List[1]	NWFP Sites[2]	Miles from Project Area to nearest site
Arcangeliella camphorata	SEN, S&M B	1	6	103
Boletus pulcherrimus	SEN, S&M B	1	23	9
Chamonixia caespitosa	SEN, S&M B	2	3	97
Dermocybe humboldtensis	SEN, S&M B	1	4	85
Gastroboletus vividus	SEN, S&M B	1	5	64
Gymnomyces fragrans	SEN	3	2	28
Helvella crassitunicata	SEN, S&M B	1	29	48
Phaeocollybia californica	SEN, S&M B	3	50	66
Phaeocollybia oregonensis	SEN, S&M B	1	15	79
Pseudorhizina californica	SEN	3	42	17
Ramaria spinulosa var. *diminutiva*	SEN, S&M B	3	1	78
Rhizopogon chamaleontinus	SEN, S&M B	1	1	74
Rhizopogon ellipsosporus	SEN, S&M B	2	5	45
Rhizopogon exiguus	SEN, S&M B	2	3	64

Status definitions:

SEN=Bureau Sensitive Oregon – manage so treatments do not trend species towards listing under ESA (BLM Manual 6840);

S&M B: Survey and Manage Category B – manage all known sites and minimize inadvertent loss of undiscovered species (USDA/USDI, 2001).

[1]**ORBIC List:** Oregon Biodiversity Information Center maintains extensive databases of Oregon biodiversity, concentrating on rare and endangered plants, animals, and ecosystems.

1 = taxa which are Threatened or Endangered throughout their range or which are presumed extinct.

2 = taxa which are Threatened, Endangered, or possibly extirpated from Oregon but are stable or more common elsewhere.

3 = taxa for which more information is needed before status can be determined, but which may be Threatened or Endangered in Oregon or throughout their range.

4 = taxa which are very rare but are currently secure, as well as taxa which are declining in numbers or habitat but are still too common to be proposed as Threatened or Endangered.

[2]**BLM Database**: Geographic Biological Observations (GeoBOB).

3. Environmental Consequences

This section discusses the direct and indirect effects of implementing either Alternative 1 (No Action) or Alternative 2 (Proposed Action) and the impacts those actions would have on botanical resources. This section also discusses any potential cumulative effects of implementing other actions that are currently happening or will be happening in the foreseeable future in addition to the proposed actions.

a. Alternative 1 - No Action Alternative

Under Alternative 1 (No Action Alternative) the BLM would not implement any new management actions. Ongoing activities that would likely continue to occur in the Project Area include road maintenance, range improvements (fixing fences, cattleguards and gates), hazard tree removal, hydrologic improvements, and weed inventory and control treatments.

Because no ground disturbance or changes in canopy cover or environmental conditions is proposed under this alternative, implementing Alternative 1 would result in no direct or indirect impacts to T&E, BSS or S&M vascular or nonvascular plants or fungi. As there are no anticipated effects, there is no potential for cumulative effects to T&E, BSS, or S&M plants or fungi.

b. Alternative 2 – Proposed Action

Under Alternative 2 (Proposed Action), timber harvesting activities, tree planting, log haul, and transportation management activities, including temporary road construction, road decommissioning, and road renovation are proposed in the Planning Area.

BSS and S&M species most likely to occur in the watershed grow in vernally wet meadows or open areas (*Limnanthes flocossa* ssp. *bellingeriana*, *Nemacladus capillaris*). The proposed action does not disturb any meadow or open habitat. There are no known occurrences of BSS or S&M vascular or non-vascular plants in the proposed treatment units, and no expected disturbance to areas outside project units, therefore, there would be no effect on these species. The Project Area is outside the range of any Federally-listed T&E plant species. Therefore, there would be no effect on these species as a result of implementing this alternative.

Since no *Limnanthes floccosa* spp. *bellingeriana* sites nor habitat exist in the Project Area, they would not be harmed by implementation of weed control efforts – spraying or otherwise.

Fungi

Timber harvest can have varying degrees of adverse effects on fungi, depending on the level of tree removal and ground disturbance. Activities that remove, disturb, or compact the top layer of organic material and mineral soil negatively impact fungi. The main and most extensive part of a fungus consists of a mycelial network that resides in the top few inches of mineral soil. In one study, mycelial networks ranged in size from 1.5 to 27 square meters (16 to 291 square feet) (Dahlberg and Stenlid 1995). During timber harvest, tractors and yarding equipment disturb and compact soil, which could damage fungal mycelia.

Removing conifers during timber harvest could indirectly affect fungi over the short-term because it could break mycorrhizal connections between the trees and fungal mycelia. Mycorrhizal associations could reestablish as new conifers grow if the fungal hyphae persists through the period of stress caused from disruption of the mycorrhizal connections and changes in environmental conditions. Mycelial networks are able to persist where conifer patches are retained; however, the value of that habitat declines with declining patch size and increasing distance from other conifer patches or stands.

Construction of 0.6 miles of temporary roads would impact an estimated 3 acres, or less than 0.12 percent of the Analysis Area, providing reasonable assurance that fungi species affected by road construction will persist within the Analysis Area. Decommissioning old roads would not impact fungi as old compacted roads do not provide suitable habitat for BSS or S&M fungi.

Late-successional forest lands nearby not proposed for harvest or planting treatments could provide refugia and sources for mycelia and mycorrhizal fungi that could spread to treated areas after harvest and temporary road building activities thus restoring fungal communities.

The BLM assumes that conducting surveys for BSS and S&M fungi in 180-plus year old stands, protecting known and future found populations, and the presence of late-successional forest stands in reserves (Riparian Reserves, Late-Successional Reserves, RA32 habitat, NSO nest patches and other special management areas) across the landscape would prevent BSS species from trending toward listing and would provide for S&M species' persistence (USDI 2004, p. 5-2). Reserves with late-successional habitat characteristics contain abundant fungi habitat and provide a strong likelihood of fungi protection. Outside of reserves, surveys and protection of fungi sites during projects further increase the probability that rare fungi species will persist.

Cumulative Effects: Proposed Action

Past, present, and reasonably foreseeable future activities in the Project Area include Emergency Stabilization and Rehabilitation (ESR) activities on the Medford District (seeding with natives, mulching, infrastructure repairs), forest management projects, road maintenance, livestock use, weed control and dispersed recreational use.

In response to public scoping comments, it is worth noting that the Klamath Falls Resource Area (BLM) is protecting *Limnanthes flocossa* ssp. *bellingeriana* by implementing the following PDFs on their salvage project (Terry Austin, pers. comm. 2015):

- No salvage harvest or tree planting would occur within known populations of Bellinger's meadow-foam or Klamath Basin milkvetch.
- Imazapic application on medusahead infestations would not occur within 15 feet of known sites of Bellinger's meadow-foam and Klamath Basin milkvetch.
- Due to the high fire severity, cattle grazing will not be authorized in burned area for two full year (2015 and 2016) and may be authorized in the unburned area in 2016 if the vegetation has recovered to levels adequate to support and protect upland function. Otherwise the rest period will be extended until the vegetation has recovered.

Since the Project Area has no known T&E, BSS, or S&M plant present, there would be no cumulative effects on these species as a result of implementing the Proposed Action, ESR activities, road maintenance, grazing, dispersed recreational use, or other incidental activities in the Project Area.

Surveys for and protection of BSS and S&M fungi species will ensure the likelihood of fungi protections. The presence of late-successional forest stands in reserves across the landscape will prevent BSS species from trending toward listing and will provide for their persistence.

K. NOXIOUS WEEDS AND INTRODUCED PLANTS

Issues related to noxious weeds and introduced plants associated with the Oregon Gulch Fire Salvage Recovery Project have been identified through public scoping or ID team specialists' input, and will be addressed in this document. These relevant issues are:

- Ground disturbance and road building provide vectors for expansion of invasive plant populations.
- There is the potential to spread highly flammable exotic plants.
- Cattle grazing in the fire area: livestock disturbance to soils, as vectors for spreading weeds, and reducing competitive and reproductive capacities of native plants.

For the purpose of this analysis, this section will hereafter refer to two reference scales: the Project Area, and the Analysis Area.

Analysis area: the area of the Oregon Gulch Fire within the BLM Medford District, also known as the Planning Area.

Project Area: describes where the action is proposed, such as units where salvage harvest, temporary road construction, road renovation, and road maintenance is proposed.

Noxious weeds are generally non-native plants that cause or are likely to cause economic or environmental harm or harm to human health. Introduced plants are species that are non-native to the ecosystem under consideration. Introduced plants may adversely affect the proper functioning condition of the ecosystem. "Noxious Weed" describes any plant classified by the Oregon State Weed Board that is

injurious to public health, agriculture, recreation, wildlife, or any public or private property (ODA 2012, p.4). The Oregon Department of Agriculture designates and classifies noxious weeds according to their detrimental effects, reproductive strategies, distribution, and difficulty of control**.**

PDFs included in the Oregon Gulch Fire Salvage Recovery Project to control noxious weeds are consistent with the:

- *Medford District BLM Resource Management Plan (USDI BLM, 1995, p. 92);*
- *Medford District BLM Integrated Weed Management Plan and Environmental Assessment (USDI 1998);*
- *BLM Vegetation Treatments Using Herbicides Final Programmatic EIS Record of Decision (USDI 2007);*
- *Record of Decision (BLM): Vegetation Treatments Using Herbicides on BLM Lands in Oregon (USDI 2010).*

1. Affected Environment

a. Noxious Weeds (Class A and B)

Over the last 150 years activities such as motor vehicle traffic, recreational use, rural and urban development, timber harvest, road construction, grazing, and natural processes have introduced and transported noxious weeds and introduced plants into and adjacent to the fire area and the Project Area.

The Oregon Gulch Fire burned 2,425 acres of BLM-administered lands and approximately 6,333 acres of intermixed private lands within the Medford District boundary. Suppression activities that occurred included fireline construction, vehicular use, water/retardant drops, and clearing vegetation for staging areas or safety zones. Weed wash stations were not used during suppression to clean vehicles prior to entry into the fire area.

Weeds spread via seeds, which are carried from one location to another by air, water, animals, humans, or vehicles. Some weeds also spread when roots or other plant parts break off and re-sprout to create new plants. Most weeds have reproductive and life cycle characteristics that give them an advantage over native plants in establishing quickly. These characteristics include high seed production, good dispersal mechanisms, fall germination and rosette development, production of long taproots that capture water at different levels in the soil profile, and early or late season growth and bloom times to avoid competition with native species. Noxious weeds also have an advantage over natives because they occupy hostile sites with exposed, bare ground, tolerate drought; and form persistent seed banks that lie dormant until the next disturbance event provides new openings in which to become established. Because they originated from other countries, noxious weeds lack the predators that keep them under control in their native habitats and ecological areas.

Newly disturbed areas such as moderate to high severity burn areas, firelines, and areas of high vehicular traffic are highly vulnerable to noxious weed establishment and spread. Retardant dropped in the fire area may act as fertilizer potentially aiding the growth of vegetation including noxious weeds and introduced plants. Soil disturbance creates favorable conditions for the establishment of noxious weeds by removing competing vegetation. Weed seeds that have been suppressed in the soil have an opportunity to germinate and develop before native species are able to become re-established. The disturbed soil is also a ready seed bed if weed seeds or other plant parts are transported into the area by natural processes or human activities.

Roads are common avenues of invasion, as seeds lodge in tire treads or undercarriages and can be carried from infested areas into newly disturbed unoccupied areas. Human activities that introduce or spread noxious weeds include road construction, timber harvest, farming, over-grazing, recreation, and

residential development. Natural processes, such as wind, seasonal flooding, and migration patterns of birds or animals also contribute to the spread of noxious weeds.

Table 3-8: Factors Affecting the Spread of Noxious Weeds and Introduced Plants

Private Land	Private lands host a perpetual source for noxious weed seed, which can be dispersed when seeds attach to tires, feet, fur, feathers or feces, or when natural processes such as wind and/or flooding events transport the seed from its source to another geographical vicinity.
Logging on Private Lands	Logging activity presents a key dispersal opportunity for noxious weed seeds per 1) attachment to tires/tracks of mechanized logging equipment, tires of log trucks, and various other logging-related substrates which subsequently transport the seed from its source to another geographic vicinity, 2) creation of openings for potential noxious weeds colonization and 3) a lack of PDFs – such as equipment/vehicle washing, etc. - which attempt to reduce the activity's spread of noxious weed seeds.
Motor Vehicle Traffic (including Log Trucks)	Private landowners use public roads to haul logs, undertake recreational pursuits, and/or access their properties. This transportation often occurs along BLM-administered roads, which are situated within a checkerboarded ownership arrangement. How or when seed detachment occurs is a random event that could take place within feet or miles from the work site/seed source, presenting a possibility of detachment on public lands
Recreational Use	The public often recreates on BLM-managed public lands, and can spread seed from their residences to public land in a variety of ways such as attachment to vehicle tires, hikers' socks, shoes, or other clothing, the fur of domesticated animals, etc.
Rural and Urban Development	Rural development occurring within the checkerboard land arrangement often requires public landowners to acquire a Right-of-Way (ROW) from the BLM to legally access their parcel(s). These ROWs, or use of BLM-administered roads is often granted. Road-building and vehicle traffic can introduce weeds and facilitate spread. Construction equipment can introduce and/or spread weeds.
Natural Processes	Wind, seasonal flooding, and migration patterns of birds/animals are a few natural processes that potentially spread noxious weeds. Wind carries seeds, and deposits them at random intervals. High water caused by flooding reaches vegetation (often harboring a noxious weed component) growing on the banks of rivers/creeks/streams, and deposits seeds downstream.
Livestock grazing	Disturbs soil creating receptive seed bed for weeds to establish. Existing weed seeds/plant parts can be transported via livestock hooves and fur.

The Medford District ROD/RMP states the objectives for noxious weeds are to continue to survey for, avoid introducing or spreading, and contain or reduce infestations on BLM-administered land (USDI 1995, p. 92-93).

Noxious weed populations are treated on BLM-administered lands under the authority of the *Medford District Integrated Weed Management Plan and Environmental Assessment* (EA #OR-110-98-14) (USDI 1998). The Medford District BLM Noxious Weed list is a subset of the State list. It contains Category A, B and T species that occur in the District and are targeted for detection and control (USDI 1998, p. 1-2). The BLM also treats all categories of weed species located within high priority sites, such as Special Status plant sites, special areas (Cascade Siskiyou National Monument, Soda Mountain Wilderness, Areas of Critical Environmental Concern [ACECs]), contiguous blocks of BLM-administered land, Riparian Reserves and within Project Areas that pose a risk of spreading weeds during project implementation. Depending on the species and what has been determined to be an effective treatment method, the BLM treats weeds by manual, chemical, mechanical or biological means. Over the last decade, approximately

500 to 1,000 acres per year of Ashland Resource Area BLM-administered lands have been treated for noxious weeds via herbicide spraying and hand-pulling.

Surveys for all species on the Medford Weed list were conducted on 156 acres of the Project Area in 2009. Additionally, road systems in and near the Project Area were inspected for the occurrence of noxious weeds or introduced species. No known infestations of state-listed noxious weeds were detected in the Project Area during these surveys. It may be that the high intensity of the wildfire precluded weed detection at this time. Yellow starthistle is known to occur along the west edge of the fire at the Box O Ranch. Control treatments have occurred over the last five years at the Box O Ranch. While the amount of Yellow starthistle is much less than prior to control efforts, extensive patches still exist in the Box O Ranch historic pasture area.

Adjacent private lands in the Analysis Area are likely to harbor infestations of various noxious weeds and/or introduced non-native species. The BLM is not authorized to survey private lands, and as a consequence, the extent of these populations and infestations is currently unknown. It is suspected that Spotted knapweed, Dyer's woad and Medusahead rye may occur on nearby BLM-administered and private lands.

The Oregon Gulch Fire Emergency Stabilization and Rehabilitation (ESR) Plan includes funding for noxious weed inventory, control and monitoring (for the next three years) to stop the spread and potentially eliminate discreet patches of noxious weeds from the Analysis Area.

b. Introduced Plants (Non-Native, Class C)

Introduced plants are species that are non-native to the ecosystem under consideration. Introduced plants may adversely affect the proper functioning condition of the ecosystem. Although not listed on the ODA Noxious Weed list, introduced species may pose a threat to natural plant communities in portions of the Analysis Area.

Non-native invasive introduced annual plants including downy brome (*Bromus tectorum*), bulbous bluegrass (*Poa bulbosa*), and common hedge-parley (*Torilis arvensis*) likely occur in or near some of the proposed treatment units, primarily along existing roads. Exact locations are not known at this time.

2. Environmental Consequences

a. Alternative 1- No Action Alternative

Under Alternative 1 (No Action Alternative) the BLM would not implement any new management actions. Ongoing activities that would likely continue to occur in the Project Area include road maintenance, range improvements (fixing fences, cattleguards and gates), cattle grazing following two years of rest in the burned portion and following one year of rest in unburned portions of the Dixie Allotment, hazard tree removal, hydrologic improvements, and weed inventory and control treatments. Natural processes would continue that could lead to weed spread or establishment. The abovementioned activities (except ESR weed control) and natural processes would contribute to noxious weed spread, which could degrade some elements of the environment. To predict the rate of this degradation would be highly speculative, as the extent of weed expansion is dependent on so many factors that it is considered impossible to quantify (see table 3-8: factors affecting noxious weed spread). The Analysis Area would remain a priority for weed control since funding has already been secured. Treatments are prioritized (special areas, special habitats, ground-disturbing activities) and occur based on the potential of the weed population to cause economic or environmental harm, or harm to human health.

Selection of Alternative 1 would result in no quantifiable direct or indirect impacts relative to the establishment or spread of noxious weeds or introduced plants.

Past, present, and reasonably foreseeable future activities in the Analysis area include forest management projects, ongoing ESR activities (road maintenance, range improvements, hazard tree removal, and weed control), livestock use, and recreational use. These human-caused activities and natural processes would continue to present a risk of introducing new noxious weeds and spreading existing infestations. However, as no actions are proposed under Alternative 1, there is no potential for cumulative effects to occur.

b. Alternative 2 – Proposed Action

In the short-term (1 to 5 years), timber harvest and the associated road work could introduce or spread noxious weeds within the Analysis Area. Management activities which disturb the soil and remove existing vegetation leave areas open for possible invasion by noxious weeds.

Noxious weed seeds or plant parts could be transported from infested areas outside the Project Area to non-infested areas within the Analysis Area along the approximately 20 miles of haul routes on equipment or vehicles used for timber harvest or road work. Implementing vehicle washing prior to deployment of equipment would mitigate this risk (see PDFs in Chapter 2).

It is expected that implementing PDFs (equipment washing, revegetating with native plant materials), weed inventories, weed treatments and monitoring would mitigate the risk of weed spread. The class C weeds (introduced plants) shall be monitored by inspecting high disturbance areas such as temporary road construction, landings, yarding corridors and haul routes. If inspections show initial spread of these species, actions will be taken to control such infestations.

New temporary roads and landings are high disturbance areas at risk for the spread of existing weed populations or new infestations. Implementation of PDFs (seeding and mulching) and inventories/control efforts would ensure that these areas would be monitored for weeds and that appropriate actions are taken (i.e weed control, re-vegetation with native plants).

The rate at which weeds could potentially spread as a result of these activities cannot be predicted due to the indistinguishable causal effect of other activities and factors, both natural and human-caused. Alternative 2, including the implementation of PDFs and weed control, would result in no distinguishable impacts relative to the establishment or spread of noxious weeds or introduced plants.

Cumulative Effects: Proposed Action

Past, present, and reasonably foreseeable future activities in the Analysis area include forest management projects, ongoing ESR activities (road maintenance, range improvements, hazard tree removal, and weed control), livestock use, and recreational use. These human-caused activities and natural processes would continue to present a risk of introducing new noxious weeds and spreading existing infestations.

Added to these past, current, and reasonably foreseeable future activities, the proposed timber harvest and related road work has the potential to cumulatively affect noxious weed spread in the Analysis Area. The rate at which weeds could potentially spread as a result of these activities cannot be precisely predicted due to the indistinguishable causal effect of other activities and factors, both natural and human-caused. However, the risk of introducing or spreading class A and B noxious weeds as a result of activities proposed in Alternative 2 is low because inventory, monitoring, and treatments have been funded via the ESR Plan, and the proper implementation of PDFs would reduce the risks of adding any incremental cumulative effects to noxious weeds in the Analysis Area.

It is anticipated that ongoing activities on private lands and activities over which the BLM does not have control would continue to facilitate the introduction and spread of noxious weeds and introduced non-native species. Ongoing treatments and monitoring by the BLM and continued collaboration with outside groups, such as the Klamath Falls Resource Area (BLM), private industrial forest owners, and concerned citizens increase the chances of containing or reducing noxious weed populations on BLM lands in the

Project and Planning Area. For these reasons, there would be little to no potential for cumulative effects as a result of implementing this project.

3. Weed Risk Assessment (from Survey Results: 2009, 2014)

Per BLM Manual 9015 (Section 9015.2.23) direction, the ground-disturbing activity proposed under the Oregon Gulch Fire Salvage Recovery Project was assessed to determine the risk of introducing noxious weeds. Under this direction, projects that are determined to have a moderate or high risk of weed introduction or spread, the BLM is to "provide positive management measures as indicated in the Risk Assessment" (USDI, 1992). The analysis of the Oregon Gulch Fire Salvage Recovery Project proposed activities resulted in a Low to Moderate (due to Class C weeds) Weed Risk Rating; appropriate PDFs are included in Chapter 2 of this document to mitigate for the determined risk.

Class A Weeds: Those noxious weeds that are exotic (not native) to the State or area, and are of limited distribution or are unrecorded in the State or area and pose a serious threat to agricultural crops and rangelands in the State. Class A weeds receive highest priority. Management emphasis is complete control. These weeds approximate the Oregon Department of Agriculture List A weeds. A records check and surveys of areas that may be affected by the proposed project resulted in detection of **zero sites** (the Yellow starthistle infestation is 1 air mile from the Project Area) of Class A weeds.

Class B Weeds: Those noxious weeds that are non-native (exotic) plant species of limited distribution or unrecorded in a region of the State but are common in other regions of the State and have been identified by the BLM or State as potentially harmful. Class B weeds receive second highest priority. Management emphasis is to control the spread, decrease population size, and eventually eliminate the weed population when cost-effective technology is available. These weeds approximate the Oregon Department of Agriculture List B weeds. A records check and surveys of areas that may be affected by the proposed project resulted in detection of **zero sites** of Class B weeds.

Class C Weeds: Those noxious weed species (exotic or native) or undesirable plants not categorized in the previous categories. This classification receives the lowest priority. Management emphasis is to contain spread to present population size, or decrease population to a manageable size. These species are exotic, have a moderate frequency from recent survey lists in nearby stands, and have the potential to cause ecological damage. Class C species are not typically managed for control, due to widespread occurrences and unmanageable population sizes. A records check and surveys of areas that may be affected by the proposed project resulted in detection of **zero sites** of Class C weeds. However, it is suspected that introduced plants (J.1.b above) likely occur in the Analysis Area. This "weed risk assessment" will assume that at least small infestations of these class C weeds occur in the Project Area.

The likelihood of noxious weed (classes A and B) establishment in the Project Area is **low**. Class C weeds (likely) in Analysis Area=5; possible adverse effects on site and possible expansion of infestation within Analysis Area=5. Therefore, the risk of establishment and/or spread of introduced non-native plants (not "noxious" weeds) is **moderate**. The introduced species occurrence(s) in the Analysis Area likely vary by species and are primarily located along existing roads. These species are competitive when exposed to an open canopy (i.e. roadsides or disturbed, open gaps in canopy). Seeding with native species, spreading mulch in highly disturbed areas, and continued inventory and treatment of weeds/introduced plants in the Analysis Area would prevent the spread of these species. Unrelated activities could transport weed seed (e.g. wind, water, wildlife, wildfire, grazing, hiking, OHV, etc.) into any newly disturbed areas.

The Medford District BLM 1995 Resource Management Plan directs the use of integrated pest management actions to contain and reduce noxious weed infestations. The Oregon Gulch Fire Salvage Recovery Project incorporates PDFs as part of the proposed action intended to control noxious weeds and avoid new infestations. The PDFs include both preventive features and active control methods. The PDFs represent the most current and widely employed methodology for weed control and prevention currently available to the BLM. The Final EA analyzes effects to resources in the context of a project

design that incorporates PDFs prescribed for the Oregon Gulch Fire Salvage Recovery Project. Thus, the effects of PDF implementation have been incorporated into the analysis of the proposed action. While ground disturbance associated with this project would create site conditions initially more favorable for noxious weeds and introduced plants, with the implementation of PDFs and ESR control activities, the potential for weed spread would be minimized and roadside weed populations would be controlled and reduced.

L. Other Effects

1. Cultural Resources

Cultural and paleontological resources are recognized as fragile, irreplaceable resources with potential public and scientific uses, representing an important and integral part of our Nation's heritage. The BLM manages cultural resources under its jurisdiction or control according to their relative importance, protecting against impairment, destruction, and inadvertent loss, and encouraging and accommodating the uses determined appropriate through planning and public participation (BLM Manual Section 8100.06A:2004).

In accordance with the Protocol for Managing Cultural Resources on Lands Administered by the BLM and the National Historic Preservation Act of 1966 (specifically, section 106), as amended, a literature review and archaeological reconnaissance was conducted for the Oregon Gulch Fire Salvage Recovery Project Area. The Oregon Gulch Fire Salvage Recovery Project was reviewed for the potential for adverse impacts to cultural resources.

Sites within the Projects Area of Potential Effect (APE) would be protected during project implementation unless determined to be not eligible to the National Register of Historic Places with concurrence from the State Historic Preservation Office (SHPO). Proposed management direction includes protecting and managing the integrity of all historic/prehistoric sites identified in the cultural survey. The minimum level of protection for sites is avoidance. This includes timber removal, tree planting, and road work.

2. Recreation

Currently there are no developed BLM recreation sites on public lands in the Oregon Gulch Fire Salvage Recovery Project Planning Area. Recreation activities in the Planning Area included driving for pleasure, hiking, camping, hunting, off-highway vehicle use, horseback riding, and bicycling. While there might be increased logging truck traffic during the operational months, this type of activity is typical for the area because of harvesting on private and other government owned lands.

3. Visual Resource Management

Proposed activities are located in VRM (Visual Resource Management) Class III and IV category lands under the 1995 Medford RMP. These VRM categories allow for varying amounts of modifications to the existing character of the landscape (p.70). The Proposed Action is consistent with these visual resource management objectives as stated in the 1995 Medford District Resource Management Plans.

CHAPTER 4 - PUBLIC PARTICIPATION

A letter briefly describing the Proposed Action and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on October 10, 2014. The scoping letter requested that people contact the BLM using an attached Interest Response Form, or by sending a comment letter if they wanted to be updated as the project progressed.

During the public scoping process the BLM received four written comment letters regarding the proposed project. As described in Chapter 1 of the EA, the BLM interdisciplinary team of resource specialists reviewed public input received, and identified relevant issues to be addressed during the environmental analysis. Some issues identified as relevant to this project proposal were analyzed in association with broader level environmental analyses. Where appropriate, this EA incorporates by reference the analysis from broader level NEPA documents (40 CFR § 1508.28), to be considered along with project specific analysis. Chapter 2 of the EA explains how the BLM considered public input for alternative development.

On October 29, 2014, the BLM held a public field trip to the Project Area to review the project proposal, visit sample units, and to provide an understanding of the overall magnitude of the wildfire. Five members of the public attended the field trip.

The Oregon Gulch Fire Salvage Recovery Project EA was made available online, through publication of a legal notice in the Medford Mail Tribune newspaper, and at the Medford District BLM office to all individuals on January 23, 2015 for a 30-day public comment period. Paper copies were sent to those parties who submitted an Interest Response Form or provided scoping comments, and to the Organizations and Agencies listed below.

Organizations and Agencies

American Forest Resource Council
Timber Products Company
Bureau of Land Management: Klamath Falls Field Office
Klamath Siskiyou Wildlands Center
Cascadia Wildlands Project
Oregon Wild
Center for Biological Diversity
Soda Mountain Wilderness Council

Five comment letters were received. In response to internal and external review of the environmental assessment (including public comments), the Ashland Resource Area Field Manager decided to release a final environmental assessment (EA) for the Oregon Gulch Fire Salvage Recovery Project. This Final EA includes minor modifications and clarifications based on public comment.

APPENDIX A – SURVEY AND MANAGE COMPLIANCE

Survey & Manage Tracking Form:
Wildlife Species Survey and Site Management Summary

Medford District–Ashland Resource Area

Project Name: Oregon Gulch Fire Salvage Recovery **Prepared By:** Jeff Stephens
Project Type: Fire salvage recovery **Date:** January 6, 2015
Location: T.40S., R.04E., Sections 25 and 35;
T.41S., R.04E., Section 1; Willamette Meridian, Jackson County, Oregon

S&M List Date: 2001 and 2003 Annual Species Reviews

Table A: Survey & Manage Wildlife Species
The Medford BLM District compiled the species listed below from the 2011 Settlement Agreement Attachment 1. The list includes those vertebrate and invertebrate species with pre-disturbance survey requirements (Category A, B, or C species), who's known or suspected range includes the Medford BLM according to:

- *Survey protocol for the Great Grey Owl within the Range of the Northwest Forest Plan v3.0* (Jan. 2004)
- *Survey Protocols for Amphibians under the Survey & Manage Provision of the Northwest Forest Plan v3.0* (Oct. 1999)
- *Survey Protocol for the Red Tree Vole v2.1* (Oct. 2002)
- *Survey Protocol for S&M Terrestrial Mollusk Species v3.0* (Feb. 2003)

This list also includes any Category D, E, or F species with known sites located within the Oregon Gulch Fire Salvage Recovery Project area (None).

TABLE A.

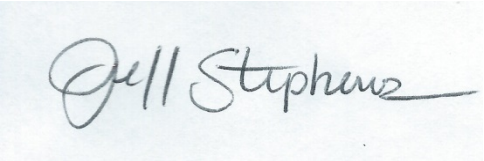
Species	S&M Category	Survey Triggers			Survey Results			Site Management
		Within Range of the Species?	Contains Suitable habitat?	Habitat Disturbing*?	Surveys Required?	Survey Date (M/Y)	Sites Known or Found?	
Vertebrates								
Siskiyou Mountains salamander (*Plethodon stormi*, north range)	Off[1]	No	N/A	N/A	No[2]	N/A	N/A	N/A
Great Gray Owl (*Strix nebulosa*)	C	Yes	No	No	No[3]	N/A	N/A	N/A
Red Tree Vole (*Arborimus longicaudus*)	C	No	No	N/A	No[2]	N/A	N/A	N/A

Species	S&M Category	Survey Triggers			Survey Results			Site Management
		Within Range of the Species?	Contains Suitable habitat?	Habitat Disturbing*?	Surveys Required?	Survey Date (M/Y)	Sites Known or Found?	
Mollusks								
Chase Sideband (*Monadenia chaceana*)	B	Yes	No	No	No[3]	N/A	N/A	N/A
Evening Fieldslug (Deroceras hesperium)	B	Yes	No	No	No[3]	N/A	N/A	N/A
Oregon shoulderband (*Helminthoglypta hertleini*)	B	Yes	No	No	No[3]	N/A	N/A	N/A
Crater Lake Tightcoil (*Pristiloma arcticum crateris*)	A	Yes	No	No	No[3]	N/A	N/A	N/A

* "Habitat disturbing" and thereby a trigger for surveys as defined in the 2001 ROD S&Gs (p. 22).
N/A = Not Applicable
[1]This species is covered by a Conservation Strategy in the northern part of the species range. According to mitigation described in the 2011 Settlement Agreement Species List, Survey and Manage no longer applies to this species in the northern part of the range.
[2] Pre-disturbance surveys for these species are not required because the project area is outside their known range.
[3] Pre-disturbance surveys were not required for these species either because there is no longer suitable habitat post-fire or the Proposed Action will not be habitat disturbing.

Statement of Compliance. The Medford BLM, Ashland Resource Area applied the 2011 Settlement Agreement Species List to the Sterling Sweeper project, completing pre-disturbance surveys and management of known sites (Table A) required by Survey Protocols and Management Recommendations to comply with the *2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (2001 ROD S&Gs).*

Summary of Survey Results:
No pre-disturbance surveys were required



_____ January 6, 2015
Jeff Stephens, Biological Science Technician Date
Medford BLM District, Ashland Resource Area

Survey & Manage Tracking Form:
Botany Species Survey and Site Management Summary

Medford District—Ashland Resource Area

Project Name: Oregon Gulch Fire Salvage Recovery **Prepared By:** Armand Rebischke
Project Type: Fire salvage recovery **Date:** January 7, 2015
Location: T.40S., R.04E., Sections 25 and 35;
T.41S., R.04E., Section 1; Willamette Meridian, Jackson County, Oregon

S&M List Date: 2001 and 2003 Annual Species Reviews

Table A: Survey & Manage Botany Species
No Survey and Manage species were detected during surveys in the Project Area. No known Survey and Manage species sites from historic surveys exist in the Project Area.

Statement of Compliance. The Medford District BLM applied the *2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines* species list with 2003 annual species reviews list to the Oregon Gulch Fire Salvage Recovery project. Only one species of lichen documented on the Medford District BLM was removed from the list by annual species reviews – *Ramalina thrausta*. The nearest site of this species occurs 30 miles to the northwest. Since none of the detailed species lists from surveys of non-vascular plants in the project area or surrounding area included *Ramalina thrausta* it is assumed not to be present in the proposed units. Therefore, the Oregon Gulch Fire Salvage Recovery project meets the conditions of the current SM directive – the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards* with 2003 annual species.

s:/ Armand Rebischke 1/7/15
Armand Rebischke, Botanist Date
Medford BLM District, Ashland Resource Area

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APPENDIX C – ACRONYMS & GLOSSARY

ACS – Aquatic Conservation Strategy
ARPA – Archaeological Resources Protection Act
ASQ – Allowable Sale Quantity
AUM – Animal Unit Month
BA – Biological Assessment
BAFH – Biological Assessment of Forest Habitat
BCC – Bird Species of Conservation Concern
BCR – Bird Conservation Region
BLM – Bureau of Land Management
BMP – Best Management Practice
CAA – Clean Air Act
CAP – capable habitat
CC – canopy cover
CCH – Coho Critical Habitat
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
CHU – critical habitat unit
COE – US Army Corps of Engineers
CWA – Clean Water Act
CWD – coarse woody debris
DBH – diameter at breast height
DEQ – Department of Environmental Quality
DOT – Department of Transportation
DSP – dispersal habitat
EA – Environmental Assessment
EFH – essential fish habitat
EIS – environmental impact statement
EP Act – Energy Policy Act
ESA – Endangered Species Act
ESU – evolutionarily significant unit
EO – Executive Order
FEIS – Final Environmental Impact Statement
FLPMA – Federal Land Policy Management Act
FMP – Fire Management Plan
FOI – Forest Operations Inventory
FONSI – Finding of No Significant Impact
GBBDC – Game Birds Below Desired Condition
GFMA – General Forest Management Area
GIS – Geographic Information System
GGO – great gray owl
GTRN – Ground Transportation Network
HUC – hydrologic unit code
IDT/ ID Team – interdisciplinary team
IM – instructional memorandum
KLE – Klamath East Critical Habitat Unit
KOP – known observation point
KSA – Klamath Study Area
KSOAC – Known Spotted Owl Activity Center
LSR – Late Successional Reserve
mbf – thousand board feet
MOA – memorandum of agreement
MOU – memorandum of understanding
NAAQS – National Ambient Air Quality Standards
NEPA – National Environmental Policy Act
NH – nesting habitat
NLAA – not likely to adversely affect
NMFS – National Marine Fisheries Service
NRCS – National Resource Conservation Service
NRF – nesting, roosting, and foraging habitat
NSO – northern spotted owl
NWFP – Northwest Forest Plan
O&C – Oregon and California Act, 1938
ODA – Oregon Department of Agriculture
ODEQ – Oregon Department of Environmental Quality
ODF – Oregon Department of Forestry
ODFW – Oregon Department of Fish and Wildlife
OHV – off-highway vehicle
OSHA – Occupational Safety and Health Administration
OSMP – Oregon Smoke Management Plan
PCE – primary constituent element
PCT – pre-commercial thinning
PDF – Project Design Features
PDO – Pacific Decadal Oscillation
PM – particulate matter
PM 2.5 – particulate matter smaller than 2.5 microns
PM 10 – particulate matter smaller than 10 microns
PNW – Pacific Northwest
QMD – quadratic mean diameter
RA-32 – Recovery Action 32
RAWS – Remote Automated Weather Station
RDI – relative density index
RMP – Resource Management Plan
ROD – Record of Decision
ROW – right-of-way
RR – Riparian Reserve
S&M – Survey and Manage
SDWA – Safe Water Drinking Act
SEIS – Supplemental Environmental Impact Statement
SONCC – Southern Oregon/Northern California Coastal
SSP – Special Status Plants
SSRA – Smoke Sensitive Receptor Area
SSS – Special Status Species

T&E – Threatened and Endangered
TMDL – total maximum daily load
TPA – trees per acre
TPCC – timber production capability class
TSZ – transient snow zone
USDA – United States Department of Agriculture
USDI – United States Department of the Interior
USFS – United States Forest Service
USFWS – United States Fish and Wildlife Service
VRM – visual resource management
WA – Watershed Analysis
WOPR – Western Oregon Plan Revision
WQMP – Water Quality Management Plan
WUI – Wildland Urban Interface
WQRP – Water Quality Restoration Plan

Glossary of Terms

A

Abiotic: Non-living elements of an environment.

Activity Fuel: The combustible material resulting from or altered by forestry practices such as timber harvest or thinning, as opposed to naturally created fuels.

Affected Environment: The area impacted by the proposed action.

Alternative: Other options to the proposed action by which the BLM can meet its purpose and need.

Animal Unit Month (AUM): The amount of forage required to sustain the equivalent of one cow and a calf for one month.

Anthropogenic: Of human origin or influence.

Aquatic: Living or growing in or near the water.

Available Water Capacity: That portion of soil water which plants can extract.

B

Basal Area: The cross-sectional area of a single stem including the bark, measured at breast height (4.5 ft. above the ground); the cross-sectional area of all stems of a species or all stems in a stand measured at breast height and expressed per unit of land area.

Baseline: The starting point for analysis of environmental consequences.

Best Management Practices (BMPs): State-of-the-art mitigation measures, generally considered benchmark standards.

Biotic: Living elements of an environment.

Brush: To remove shrubby undergrowth.

Bryophyte: A type of nonvascular plant including mosses, liverworts, and hornworts.

C

Canopy Cover: The percent of a fixed area covered by the crown of an individual plant species or delimited by the vertical projection of its outermost perimeter; small openings in the crown are included.

Cultural Resources: Those resources of historical and archaeological significance.

Cumulative Effects: Those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

D

Decommission: To remove those elements of a road that reroute hillslope drainage and present slope stability hazards. This usually involves removing the culverts, ripping the road prism, installing drainage facilities (i.e. waterbars, waterdips, etc.) and replanting the road surface with grasses, legumes, shrubs, and trees.

Dispersal: The movement of an individual from their origin to a new site.

Dispersal Habitat: Northern spotted owl habitat which is not suitable for nesting, roosting, or foraging, but has sufficient patchy cover to be used for travel between suitable stands, a minimum of 40% canopy cover, and an average tree diameter greater than 11 inches with flying space for owls in the understory.

Diversity: The aggregate of species assemblages (communities), individual species, the genetic variation within species, and the processes by which these components interact within and among themselves. The elements of diversity are 1) community diversity (habitat, ecosystem), 2) species diversity, and 3) genetic diversity within a species. All three change over time.

Dripline: The line extending vertically from the exterior edge of a tree's live crown to the ground.

Duff: The partially decomposed organic material of the forest floor beneath the litter of freshly fallen twigs, needles, and leaves.

E

Ecosystem: A system made up of a community of animals, plants, and micro-organisms and its interrelated physical and chemical environment.

Edge Effect: The modified environmental conditions or habitat along the margins of forest stands or patches.

Effects Analysis: Predicts the degree to which the environment will be affected by an action.

Endangered Species: Any animal or plant species in danger of extinction throughout all of a significant portion of its range. These species are listed by the US Fish and Wildlife Service.

Endemic: A species that is unique to a specific locality.

Environmental Assessment (EA): A concise, public document containing a federal agency's analysis of the significance of potential environmental consequences of a proposed action. The EA need not contain the level of analysis contained in an Environmental Impact Statement (EIS). An EA is used to determine whether an EIS is needed or a "finding of no significant impact" (FONSI) is warranted.

Environmental Impact Statement (EIS): A detailed statement of a federal project's environmental consequences, including adverse environmental effects that cannot be avoided, alternatives to the proposed action, the relationship between local short-term uses and long-term productivity, and any irreversible or irretrievable commitment of resources.

Ephemeral Stream: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

Erosion: The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

F

Fauna: The animals of a specified region or time.

Finding of No Significant Impact (FONSI): A finding that explains that an action will not have a significant effect on the environment and, therefore, an EIS will not be required.

Fire Regime: The characteristic frequency, extent, intensity, severity, and seasonality of fires within an ecosystem.

Flora: The plants of a specified region or time.

Fuel load: the oven-dry weight of fuel per unit area.

G

Ground Water: Water in the ground that is in the zone of saturation; water in the ground that exists at or below the water table.

GTRN (Ground Transportation): Roads over which the BLM has jurisdiction and maintenance responsibilities.

H

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Habitat Fragmentation: The breakup of extensive habitat into small, isolated patches which are too limited to maintain their species stocks into the indefinite future.

HUC5: Fifth field hydrologic unit code, or watershed.

HUC6: Sixth field hydrologic unit code, or subwatershed.

HUC7: Seventh field hydrologic unit code or tributary to a subwatershed.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

Hydrologically Connected: where drainage features are connected to stream channels via surface water flow routes, including headwater springs. This determination is made with project specific field verified stream surveys to identify where sediment has the potential to be carried to streams; where precipitation and subsurface flows on impermeable road surfaces may be intercepted, concentrated, and

carried to stream channels; and where ditchlines are increasing the stream network (for more information see Hydrologically-Connected Roads: An Indicator of the Influence of Roads on Chronic Sedimentation, Surface Water Hydrology, and Exposure to Toxic Chemicals by M. Furniss et al. (USDI, Forest Service Stream Systems Technology Center website at http://stream.fs.fed.us/news/streamnt/jul00/jul00_2.htm).

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.

Implementation Action: An action that implements land use plan decisions.

Indicators: Parameters of ecosystem function that are observed, assessed, measured, or monitored directly or indirectly to determine attainment of a standard(s).

Infiltration: The downward entry of water into the soil.

Infiltration Rate: The rate at which water enters the soil.

Intermittent Stream: Seasonal stream; a 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.

Invertebrate Species: Any animal without a backbone or spinal column.

K

Key Watershed: A watershed containing (1) habitat for potentially threatened species or stocks of anadromous salmonids or pother potentially threatened fish, or (2) greater than 6 square miles with high-quality water and fish habitat.

L

Landing: A cleared area in the forest to which logs are yarded or skidded for loading onto trucks for transport.

Late-successional Forest: Forest seral stages which include mature and old-growth age classes.

Lichen: A composite organism formed from the symbiotic association of a fungus and an alga.

M

Mass Movement: Soil and rock movement downslope (e.g. slumps, earth flows).

Matrix: BLM-managed lands designated by Congress under the Northwest Forest Plan where most timber harvest and other silvicultural activities would be conducted.

Mitigating Measures: Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact to environmental, socioeconomic, or other resource value from a proposed land use.

Mixed-Conifer Forest: A mix of tree species that include Douglas-fir, ponderosa pine, sugar pine, incense cedar, and white fir.

Monitoring: A process of collecting information to evaluate if objective and anticipated or assumed results of a management activity or plan are being realized, or if implementation is proceeding as planned.

Morphology: The study of the form and structure of organisms and their specific structure features, internal and external.

N

Nonpoint Source Pollution: Pollution that arises from an ill-defined and diffuse source, such as runoff from cultivated fields, agricultural lands, urban areas, or forests and wildlands.

Nonvascular: Plants with specialized methods of transporting water and nutrients without xylem or phloem (e.g. mosses, hornworts, liverworts, algae).

Noxious Plants: Those plants which are injurious to public health, agriculture, recreation, wildlife, or any public or private property.

O

O&C Lands: Public lands managed by the BLM under the O&C Act of 1937 for permanent forest production, in accord with the principle of sustained yield. Lands administered under the O&C Act must also be managed in accordance with other environmental laws.

Off-Highway Vehicles (OHV): Any motorized vehicle designed for or capable of cross-country travel over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Organic Matter: Plant and animal residues accumulated or deposited at the soil surface; the organic fraction of the soil that includes plant and animal residues at various stages of decomposition; cells and tissues of soil organisms, and the substances synthesized by the soil population.

P

Perennial Stream: A stream that flows continuously. Perennial streams are generally associated with the water table in the localities through which they flow.

Permeability: The ease with which gases, liquids, or plant roots penetrate or pass through bulk mass of soil or a layer of soil.

Planning Area: All of the lands within the BLM management boundary addressed in a BLM resource management plan; however, planning decisions only apply 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.

Point Source Pollution: Pollution that arises from a well-defined origin, such as discharge from an industrial plant or runoff from a feedlot.

Preferred Alternative: The alternative BLM believes would reasonably accomplish the purpose and need for the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. This alternative may or may not be the same as the proposed action.

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.

Proposed Action: A proposal for BLM to authorize, recommend, or implement an action to address a clear purpose and need.

Public Lands: Any lands administered by a public entity, including (but not limited to) the Bureau of Land Management and the US Forest Service.

Pyroclastic: Composed chiefly of fragments of volcanic origin.

R

Ravel: Loose rock material on a hillslope, usually of gravel or cobble size.

Record of Decision (ROD): The decision document associated with an environmental impact statement.

Refugia: Locations and habitats that support populations of organisms that are limited to small fragments of their previous geographic range.

Resource Management Plan (RMP): A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act (FLPMA).

Right-Of-Way (ROW): Federal land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a ROW authorization.

Riparian Area: An area containing an aquatic ecosystem and adjacent upland areas that directly affect it.

Riparian Habitat: The living space for plants, animals, and insects provided by the unique character of a riparian area.

Riparian Reserve (RR): A federally designated buffer around streams, springs, ponds, lakes, reservoirs, fens, wetlands, and areas prone to slumping, on federal lands only. The Northwest Forest Plan's Aquatic Conservation Strategy defines riparian reserve widths for the above water bodies.

S

Scope: The extent of an analysis in a NEPA document.

Scoping: The process by which BLM solicits internal and external input on the issues and effects that will be addressed in planning, as well as the degree to which those issues and effects will be analyzed in the NEPA document.

Sediment Yield: The quantity of soil, rock particles, organic matter, or other dissolved or suspended debris which is transported through a cross-section of stream during a given period.

Sensitive Species: Those species that (1) have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species or (2) are on an official state list, or (3) are recognized by a land management agency as needing special management to prevent their being placed on Federal or state lists.

Seral Stage: A temporal or intermediate stage in the process of succession.

Silviculture: The science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet diverse needs.

Silvicultural System: A planned sequence of treatments or prescriptions over the entire life of a forest stand needed to meet management objectives.

Skid: To drag a log from within a harvest unit to a collection point (landing).

Slash: The residual vegetation (e.g., treetops and branches) left on the ground after logging.

Soil Series: The lowest or most basic category of the U.S. system of soil classification.

Species: A group of related plants or animals that can interbreed to produce offspring.

Special Status Species (SSS) include:

Proposed species – species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the Federal Register.

Listed species – species officially listed as threatened or endangered by the Secretary of the Interior under the provisions of the ESA. A final rule for the listing has been published in the Federal Register.

Endangered species – any species which is in danger of extinction throughout all or a significant portion of its range.

Threatened species – any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate species – species designated as candidates for listing as threatened or endangered by the FWS and/or NMFS. A list has been published in the Federal Register.

State Listed species: Species listed by a state in a category implying but not limited to potential endangerment or extinction. Listing is either by legislation or regulation.

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.

Sustained Yield Forestry: The yield that a forest can produce continuously at a given intensity of management; the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources without impairment of the productivity of the land.

T

Tier 1 Key Watershed: areas that either provide, or are expected to provide, high-quality aquatic habitat. These watersheds are intended to serve as refugia for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species.

Tiering: Using the coverage of general matters in broader NEPA documents in subsequent, narrower NEPA documents, allowing the tiered NEPA document to narrow the range of alternatives and concentrate solely on the issues not already addressed.

Topography: The configuration of a surface area including its relief, or relative elevations, and position of its natural and anthropogenic features.

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.

Transient Snow Zone (TSZ): The area where a mixture of snow and rain occurs, sometimes referred to as the rain-on-snow zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Rain-on-snow events originate in the transient snow zone.

Turbidity: The cloudy condition caused by suspended solids, dissolved solids, natural or human-developed chemicals, algae, etc. in a liquid; a measurement of suspended solids in a liquid.

U

Understory: That portion of trees or other woody vegetation which forms the lower layer in a forest stand which consists of more than one distinct layer.

V

Vascular: Plants having phloem- and xylem-conducting elements that facilitate the moving of water and nutrients.

Vertebrate Species: Any animal with a backbone or spinal column.

W

Watershed: All land and water within the confines of a drainage divide.

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.

Wetlands: Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

Wildland-Urban Interface (WUI): The area where structures and other human development meet or intermingle with undeveloped wildland.

Windthrow: A tree or trees uprooted or felled by the wind.

Y

Yarding: The act or process of conveying logs or whole trees to a landing, particularly by cable, tractor, or helicopter.