NEDSBAR FOREST MANAGEMENT PROJECT

FINAL ENVIRONMENTAL ASSESSMENT

BLM

Medford District - *Ashland Resource Area*

August 2016

DOI-BLM-ORWA-M060-2016-0004-EA

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Medford District Office
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Medford, Oregon 97504
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1792(ORM060)
# DOI-BLM-OR-M060-2016-0004-EA

AUG 31 2016

Dear Interested Party:

The Final Environmental Assessment (EA), Decision Record (DR), and Finding of No Significant Impact (FONSI) for the Nedsbar Forest Management Project are available on the Bureau of Land Management's (BLM's) ePlanning website at:

https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=55341&dctmId=0b0003e880a55436.

Based on internal and external review of the Environmental Assessment (including public comments), I have decided to release a Final EA for this project along with the Decision Record to respond to comments received in response to the to July 2, 2016 EA to clarify portions of the analysis and to make corrections to the EA.

The DR for the Nedsbar Forest Management Project authorizes commercial forest thinning/timber harvest on approximately 1,112 acres using a variety of silvicultural prescriptions and harvest methods. Additionally, non-commercial treatments for thinning understories and/or fuels reduction would be implemented on 1,027 acres. Approximately 1.33 miles of temporary road (to be decommissioned after use) and 0.42 miles of permanent road will be constructed to facilitate access to timber harvest units. Twelve helicopter landings (5 existing and 7 new constructions) and four designated skid trails outside of existing units will facilitate access to harvest units. About 61miles of existing roads will be used as haul routes and maintained, improved, or renovated. Also authorized is 9.63 miles of road decommissioning (1.88 miles will be passively decommissioned) and 7.34 miles will be placed in long-term closure status.

The activities of the project are analyzed under the Nedsbar Forest Management Project Environmental Assessment (DOI-BLM-OR-M060-2016-0004-EA). The EA was made available for public comment from July 2, 2016 for a 30-day comment period and was extended an additional 7 days through August 8, 2016. 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 that they will be adversely affected by this decision. A protest may be filed within 15 days of the publication of a Notice of Decision or Notice of Sale in the Medford's *Mail*

Tribune and Grants Pass' *Daily Courier* newspaper.

When timber is offered for sale, a Notice of Sale will be published in the Medford *Mail Tribune* and Grants Pass *Daily Courier*. Publication of the first notice of sale establishes the effective date of the decision for those portions of this Decision Record to be implemented through a timber sale. The protest of the timber sale must be made within 15 days of the publication of the Notice of Sale.

In accordance with the BLM Forest Management Regulations 43 CFR §5003.2 (a and c), the effective date of this decision, as it pertains to actions which are *not* part of an advertised timber sale is the date of publication of a Notice of Decision in Medford's *Mail Tribune.* Any protest must be made within 15 days of the publication of Notice of Decision in Medford's *Mail Tribune*. Any contest of this decision should state specifically which portion or element of the decision is being protested and cite the applicable regulations.

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 delivered to the Medford District Office will be accepted.** The Medford District Office is located at 3040 Biddle Road, Medford, Oregon.

43 CFR § 5003.3 subsection (c) states: "Protests received more than 15 days after the publication of the notice of decision or the notice of sale are not timely filed and shall not be considered." Upon timely filing of a protest, the Authorized Officer shall reconsider the project decision to be implemented in light of the statement of reasons for the protest and other pertinent information available to her. The Authorized Officer shall, at the conclusion of the review, serve the protest decision in writing to the protesting party(ies). Upon denial of a protest, the Authorized Officer may proceed with the implementation of the decision as permitted by regulations at 5003.3(f).

If no protest is received by the close of business (4:30 p.m.) within 15 days after publication of the Notice of Decision or Notice of Sale, the decision will become final. If a timely protest is received, the project decision will be reconsidered in light of the statement of reasons for the protest and other pertinent information available, and the Ashland Resource Area will issue a protest decision.

For additional information contact me at (541) 618-2438. Hardcopies of the Final EA, DR and FONSI are also available at the Medford Interagency Office. Office hours are Monday through Friday, 7:45 A.M. to 4:30 P.M., closed on holidays.

Sincerely,

Kristi J. Mastrofini
Field Manager
Ashland Resource Area

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

EA COVER SHEET

RESOURCE AREA: Ashland

ACTION/TITLE: Nedsbar Forest Management Project

EA NUMBER: DOI-BLM-ORWA-M060-2016-0004-EA

LOCATION: T. 39 S., R. 01 W., Sections 17-22 and 28-30; T. 39 S., R. 02 W., Sections 19 and 25-36; and T. 39 S., R. 03 W., Sections 10, 14, 15, 23-28, and 33-36; Willamette Meridian; Jackson County, Oregon.

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CHAPTER 1 - PURPOSE AND NEED

A. INTRODUCTION

This Environmental Assessment (EA) documents the environmental analysis the Bureau of Land Management (BLM) conducted to estimate the potential site-specific effects on the human environment that may result from the implementation of this project. The analysis documented in this EA will provide the BLM's authorized officer, the Ashland Resource Area Field Manager, with current information to aid in the decision-making process. It will also determine if there are significant impacts not already analyzed in the environmental impact statement (EIS) for the Medford District's 1995 Resource Management Plan (RMP) and whether a supplement to that EIS is needed or if a Finding of No Significant Impact is appropriate. This 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?

This section provides a brief summary of BLM's proposal for forest management and associated transportation management activities. A more detailed description of BLM's Alternative 4 and other alternatives considered is included in Chapter 2, *Alternatives*.

The BLM, Ashland Resource Area, is proposing forest management actions, including timber harvest on approximately 2,378 acres (Alternative 4) of forest lands in the Nedsbar Planning Area. Silviculture prescriptions include density management, selective thinning, regeneration harvest, small diameter thinning, and understory reduction. The prescriptions are tailored to the various site conditions (i.e. elevation, aspect, soil conditions, stand health, etc.) found throughout the Planning Area, to meet the needs described below. Fuel loads resulting from harvest would be reduced by lopping and scattering, piling and burning, where activity slash exceeds 3 tons per acre post-harvest. Forest management would be accomplished through a combination of commercial timber sale contract(s), stewardship contract(s), and service contracts.

Transportation management activities proposed include permanent road construction (3.24 miles), temporary route construction (1.28 miles), and reconstruction (1.01 miles), full road decommissioning (1.88 miles) and long-term closure of existing roads (7.34 miles). An estimated 61 miles of haul routes would be used and maintained as needed for use, resource protection, and public and worker safety. Select roads were identified for wet season haul (17.43 miles), depending on road surface type, connectivity to fish-bearing streams, and their current condition. Additional roads may be available for wet season haul if adequate rock is added to the roadbed and they are not connected to fish-bearing streams.

C. WHERE IS THE PROJECT LOCATED?

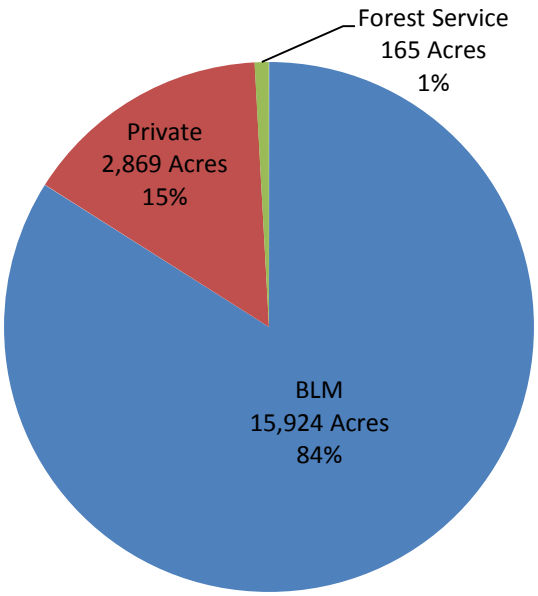
The Nedsbar Forest Management Project is located in southwest Oregon northwest of Medford near Ruch (Map 1-1). The 18,958-acre Nedsbar Planning Area is located within the 52,255-acre Upper Applegate and 72,245-acre Little Applegate Watersheds. The Little Applegate and Upper Applegate Watersheds are two of the seven 5th field watersheds within the Applegate Subbasin. One proposed helicopter landing and a short segment of an associated potential haul route is located within the Bear Creek Watershed (T. 39 S., R. 1 W., Sections 21-22 (Map 1-2).

The Public Land Survey System (PLSS) description of the Nedsbar Forest Management Project is as follows:

- T. 39 S., R. 01 W., Sections 17-22 and 28-30;
- T. 39 S., R. 02 W., Sections 19 and 25-36;
- T. 39 S., R. 03 W., Sections 10, 14-15, 23-28, and 33-36; Willamette Meridian; Jackson County, Oregon (Map 1-2).

Ownership in the Project Area is a mix of BLM-administered, private, and Forest Service lands (Figure 1-1). BLM-administered lands comprise 84 percent (15,924 acres) of the Nedsbar Planning Area (Figure 1-1). The Nedsbar Forest Management Project proposals only apply to public lands within the Planning Area managed by the Ashland Resource Area, Medford District Bureau of Land Management. Within the BLM ownership, Revested Oregon and California Railroad (O&C) lands comprise 99 percent of the Planning Area with Public Domain (PD) lands at 1 percent.

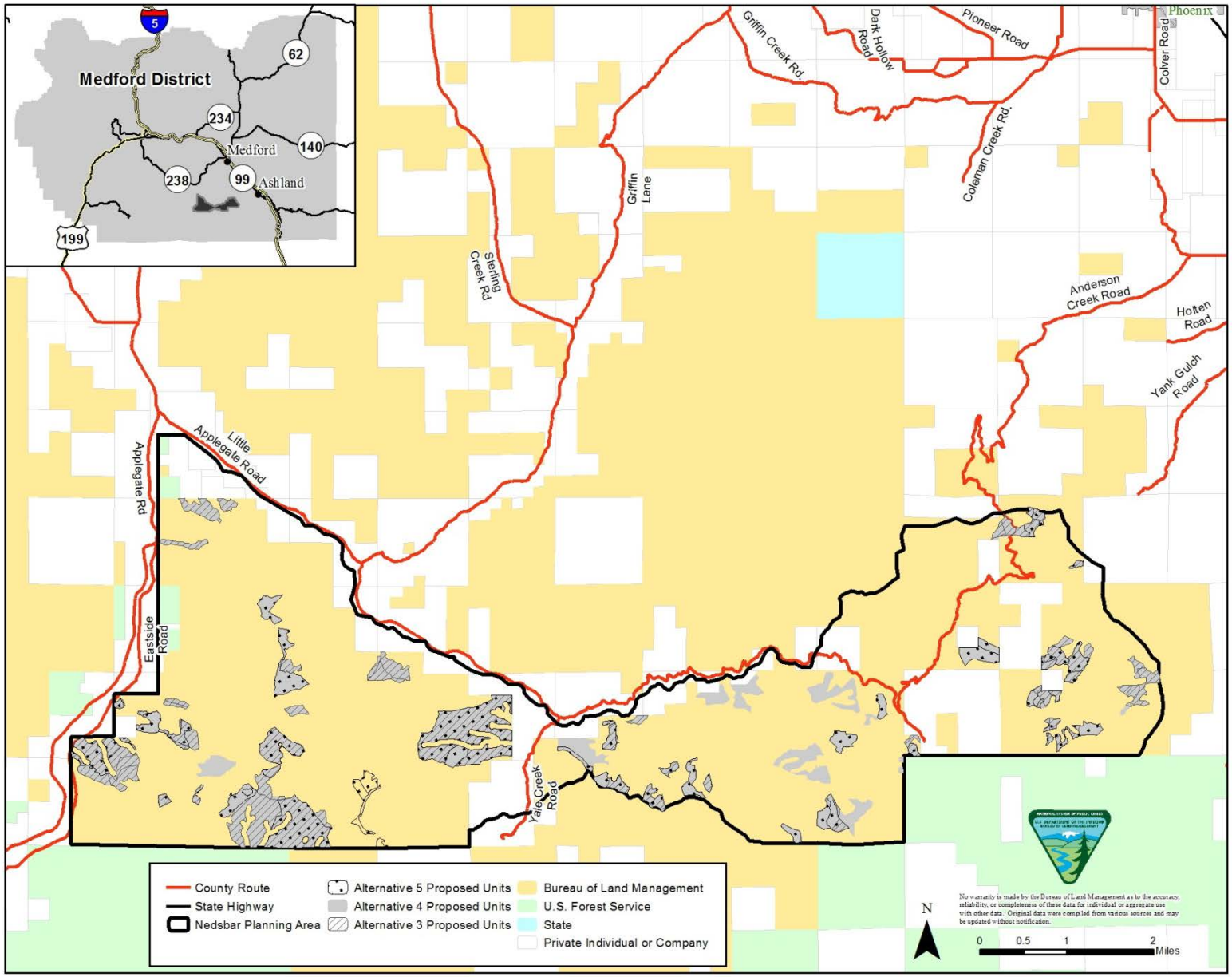
Figure 1-1. Land ownership in the Nedsbar Planning Area.



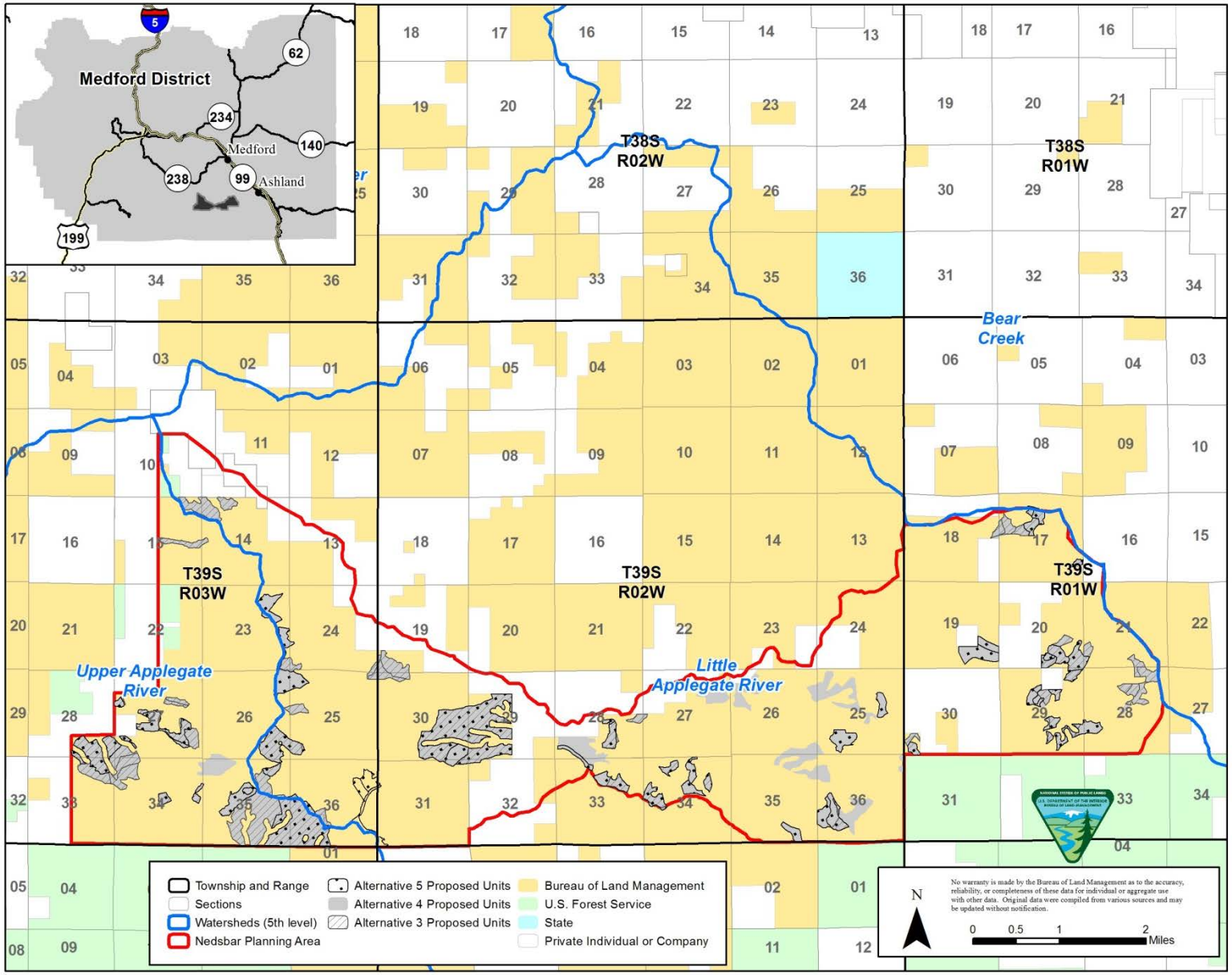
All BLM-administered lands in the Planning Area are designated as Adaptive Management Area (AMA) land use allocation. AMA is one of seven land use allocations designated in the Northwest Forest Plan (NWFP) (USDA FS and USDI BLM 1994) and the Medford District RMP (USDI BLM 1995). AMAs are "designed to develop and test new management approaches to integrate and achieve ecological, economic, and other social and community objectives. The … BLM will work with other organizations, government entities and private landowners in accomplishing those objectives." (NWFP, p. 6). A portion of the allowable timber harvest is anticipated to come from AMAs. The Nedsbar Forest Management Project is located entirely on BLM-administered lands within the Applegate Adaptive Management Area land allocation as defined by the NWFP (USDA FS and USDI BLM 1994) and the Medford District RMP.

The Nedsbar project proposals only apply to public lands within the Planning Area managed by the Ashland Resource Area, Medford District BLM.

Map 1-1. Nedsbar Forest Management Project Vicinity Map



Map 1-2. Nedsbar Forest Management Project.



D. WHY IS THE BLM PROPOSING THIS PROJECT?

The Nedsbar Forest Management Project is designed to implement management actions consistent with the BLM's 1995 RMP in the Nedsbar Planning Area. This project proposal is designed to move the current conditions found in the Nedsbar Planning Area toward the desired forest stand conditions and management objectives identified for lands allocated to planned, sustainable harvest.

Specifically, this forest management proposal is designed to:

- Manage forest stands to promote tree survival and growth and to improve stand vigor, resiliency, and stability necessary to meet land use allocation objectives (USDI BLM 1995, pp. 62 and 72);
- Protect and conserve federally listed and proposed species, and manage their habitats to contribute toward their recovery in compliance with the Endangered Species Act (ESA), approved recovery plans, and Bureau Special Status Species policies (USDI BLM 1995, pp. 17-18, 50-51);
- Produce a sustained yield of products to support local and regional economic activity (USDI BLM 1995, pp. 38, 72, 73, and 81);
- Reduce the risk of wildfire that may result from the fuels (e.g., limbs, branches, twigs) produced during harvest activities (USDI BLM 1995, p. 91) and other vegetation conditions contributing to fire hazard and risk; and
- Maintain a transportation system within the Planning Area that serves resource management needs in an environmentally sound manner (USDI BLM 1995, pp. 84-86).

1. Need for the Nedsbar Project

The following discussion provides more detail concerning the need for forest and road management based on the 1995 RMP direction that applies to the Timber Management (AMA) land allocation, current forest and road conditions, and their desired future conditions:

There is a need to promote tree survival and growth and to improve the vigor, resiliency, and stability of forest stands in the Nedsbar Planning Area (USDI BLM 1995, pp. 62 and 72).

Forest stands selected for treatment in the Nedsbar Planning Area are overstocked and are experiencing declining growth rates due to high levels of density-related competition. As trees compete for limited water, nutrients, and growing space they become stressed and more susceptible to mortality from insects, forest pathogens, and drought.

The 1995 Medford District RMP adopted a set of silvicultural treatments for managing conifer forests on BLM-administered lands (USDI BLM 1995, Appendix E, pp. 179-196). The Nedsbar Forest Management Project proposes forest thinning and limited regeneration harvest prescriptions designed to direct future stand growth, reduce stand densities to natural carrying capacities, create favorable conditions to improve individual tree health (vigor) for desirable species and to promote the growth and establishment of tree species that are well adapted or most resilient to environmental conditions and natural disturbance regimes (USDI BLM 1995, pp. 62 and 186).

Forest thinning treatments are needed to accelerate the development of forest stand conditions that meet long-term management objectives for northern spotted owl (NSO) habitat and shift stand trajectories to encourage key habitat components for the future. Desired future conditions for NSO habitat include encouraging tree growth; promoting species diversity; increasing heterogeneity; enhancing and creating horizontal and vertical structure; and reducing the risk of habitat loss from wildfire, disease and insects (USDI FWS 2011, p. III-33 to III-34).

A summary of silvicultural prescriptions by forest stand type (e.g., Douglas-fir, Ponderosa pine, mixed-conifer, white oak, etc.) and treatment objective (thinning, regeneration, and disease control) for the action alternative is included in Chapter 2, Section C.2.a.

There is a need to protect and conserve federally listed and proposed species, and manage their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, the Medford District Resource Management Plan (USDI BLM 1995, pp. 50-51), and Bureau Special Status Species policies.

The Endangered Species Act (ESA) directs the Secretary and all federal agencies to utilize their authorities to carry out programs for the conservation and recovery of listed species. One of the purposes of the ESA is the preservation of ecosystems upon which endangered and threatened species depend and would minimize the need to list species under the ESA. Lands administered under the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act of 1937 (O&C Lands Act) must be managed in accordance with other environmental laws, such as the Endangered Species Act (ESA) and the Clean Water Act. Some provisions of these laws take precedence over the O&C Act. For instance, the ESA requires that the Secretary [of the Interior] to ensure that management of O&C lands will not likely result in jeopardy to listed species or destruction or adverse modification of critical habitat (USDI BLM 1995, pp. 17-18).

The northern spotted owl is currently listed as a threatened species under the Endangered Species Act. The northern spotted owl has been petitioned for uplisting to endangered. Based on information in the petition to list the NSO as endangered, the USFWS determined the petition action *may* be warranted. The USFWS is currently working to determine if a change in listing status is warranted.

The BLM needs to retain sufficient nesting, roosting, and foraging habitat within the provincial home range of known northern spotted owl sites to support breeding, feeding, and sheltering. The BLM needs to conserve the older, high quality, and occupied forest habitat as necessary to meet the northern spotted owl recovery goals. Science-based, active forest management is needed to restore forest health, especially in drier forests in the eastern and southern portions of the owl's range. The 2011 Northern Spotted Owl Revised Recovery Plan recommends maintaining and restoring "older and more structurally complex multi-layered conifer forests on Federal and non-Federal lands across [the northern spotted owl's] range… while allowing for other threats, such as fire and insects, to be addressed by restoration management actions" (USDI FWS 2011, p. III-67).

There is a need to produce a sustained yield of products to support local and regional economic activity.

One of the applicable laws governing the major portion (99 percent) of BLM-administered lands in the Nedsbar Planning 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.

Lands within the Nedsbar Planning Area are intended to contribute to 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 BLM 1995, pp. 36 and 72). 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 BLM 1995, pp. 17, 72-73).

There is a need to reduce the potential risk of wildfire that may result from the fuels (e.g., limbs, branches, twigs) produced during harvest activities, and other vegetation conditions contributing to fire hazard and risk.

Forest management activities produce fuels that could remain a fire hazard for 10 to 20 years, if left untreated, until natural decomposition occurs. The ROD/RMP direction is to reduce activity-based fuel hazards (USDI BLM 1995, p. 91).

The Medford District RMP also directs the agency to modify fuel profiles to lower the potential of fire ignition and rate of fire spread and to protect and support land use objectives by lowering the risk of high intensity (large

scale) wildfires (USDI BLM 1995, p. 91).

Within the Nedsbar Planning Area, there is a need to develop and maintain a transportation system that serves the needs of users in an environmentally sound manner (USDI BLM 1995, p. 83).

The existing transportation system for the Nedsbar Planning Area is insufficient to provide economically feasible operational access to BLM-administered lands in need of forest management. On the other hand, some roads are no longer serving resource program needs, some of which are located within Riparian Reserves, paralleling or crossing streams and contributing to sedimentation and riparian habitat fragmentation.

Throughout the Planning Area, roads have also been identified that need maintenance to restore, repair, or improve road surfaces, culverts, and roadside drainage ditches in order to reduce road-related erosion and sedimentation to stream courses.

Road construction, decommissioning and renovation is designed for Nedsbar Project to improve road access to areas in need of forest management, reduce road densities in areas where the road system no longer serves resource program needs, and to maintain roads to reduce road-related erosion and sedimentation to stream courses.

The Little Applegate River and Beaver Creek were identified as Tier 1 Key Watershed in the NWFP (USDA FS and USDI BLM 1994) and the Medford District RMP (USDI BLM 1995). Tier 1 Key Watersheds contribute directly to the conservation of at-risk salmonids and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. Key Watershed objectives require that there will be no net increase in roads within Key Watersheds (USDI BLM 1995, pp. 23 and 87).

E. DECISION FRAMEWORK

This Environmental Assessment 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 Nedsbar Forest Management Project. The Ashland Resource Area Field Manager must decide whether to implement one of the action alternatives, select the No Action alternative, or choose a combination of components found within those alternatives analyzed.

In choosing the alternative that best meets the project purpose and needs, the Field Manager will consider the extent to which each alternative responds to the decision factors listed below. The forthcoming Decision Record will document the Authorized Officer's rationale for selecting a course of action based on the effects documented in the EA, and the extent to which each alternative:

1. Reduces competition-related mortality and wildfire risk, and increases tree vigor and growth, and stand resiliency;
2. Provides for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris;
3. Maintains or improves existing suitable northern spotted owl habitat within the provincial home range (1.2 mile radius) of known active northern spotted owl sites and all or substantially all of the older and more structurally complex, multi-layered conifer forests;
4. Captures opportunities to implement improvements in the transportation system to provide for public safety and protect water quality;
5. Addresses the interests of Applegate Valley residents, southwest Oregon communities, and stakeholders consistent with RMP direction;
6. Contributes to the District's Allowable Sale Quantity as directed by the Medford District RMP; and
7. Reduces the short-term and long-term costs of managing BLM-administered lands in the Project Area.

The decision will also include a determination whether or not the impacts of the actions are significant to the human environment. If the impacts are determined to be within the range analyzed in the Medford District Resource Management Plan Environmental Impact Statement (EIS) (USDI BLM 1994) and the Northwest

Forest Plan Supplemental Final EIS (USDA FS and USDI BLM 1994), 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 and the Northwest Forest Plan, then a project-specific EIS must be prepared.

F. LAND USE CONFORMANCE AND LEGAL REQUIREMENTS

1. Conformance with Land Use Plans

The Ashland Resource Area of the Medford District BLM designed this project to be in conformance with the objectives, land use allocations, and management direction in the *Medford District Record of Decision and Resource Management Plan* (ROD/RMP) (USDI BLM 1995). 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 FS and USDI BLM 1994).

The Nedsbar Forest Management Project is consistent with the Medford District RMP 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 BLM 2007); Record of Decision (BLM): Vegetation Treatments Using Herbicides on BLM Lands in Oregon (USDI BLM 2010); *Medford District Integrated Weed Management Plan Environmental Assessment* (USDI BLM 1998) and tiered to the *Northwest Area Noxious Weed Control Program* (USDI BLM 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. For the red tree vole, the Ninth Circuit Court of Appeals vacated the category changes and removal of the red tree vole in the mesic zone, and returned the red tree vole to its status as existed in the 2001 ROD Standards and Guidelines, which make the species Category C throughout its range.

2. Special Status Species

The Nedsbar Forest Management Project is consistent with BLM Manual 6840 (USDI BLM 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, 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 BLM 2008, Section .02).

3. Statutes and Regulations

The action alternatives are designed to be in conformance with the direction given for the management of public lands in the Medford District and the following:

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

- **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 the BLM's organization and provides the basic policy guidance for the 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.

- **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.

- **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.

- **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.

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

G. RELEVANT ASSESSMENTS AND PLANS

The following documents contain information related to existing conditions and management practices in the Upper and Little Applegate areas. These documents are incorporated by reference into the project documentation.

Watershed Analyses: Little Applegate River Watershed Analysis (USDI BLM and USDA FS 1995), Beaver Palmer Watershed Analysis (USDA FS 1994), and Applegate-Star/Boaz Watershed Analysis (USDI BLM 1998)

Watershed Analysis (WA) is a procedure used to characterize conditions, processes and functions related to human, aquatic, riparian and terrestrial features within a watershed. Watershed Analysis is issue driven. Analysis teams of resource specialists identify and describe ecological processes of greatest concern in a particular "5th field" watershed (also referred to as 5th Field Hydrologic Unit Codes, or HUC5s), and recommend restoration activities and conditions under which other management activities should occur. Watershed Analysis is not a decision making process. The resulting WA 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 analysis provides information and non-binding recommendations for agencies to establish the context for subsequent planning, project development, regulatory compliance and agency decisions (REIC 1995, p. 1).

The Nedsbar Planning Area falls within areas addressed in three separate watershed analyses: Beaver Palmer, Little Applegate River, and Applegate-Star/Boaz. The watershed analyses focused on the use of existing

information available at the time the analyses were conducted, and provide baseline information. Additional information, determined to be necessary for completing an analysis of the Nedsbar Project, has been collected and is considered, along with existing information provided by the aforementioned three analyses. Management objectives and recommendations provided by the watershed analyses were considered and addressed as they applied to the Nedsbar proposal.

Water Quality Restoration Plan for Federal Lands in the Applegate Subbasin (USDI BLM and USDA FS 2005)

The BLM is recognized by Oregon Department of Environmental (DEQ) as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. The BLM has signed a Memorandum of Agreement (MOA) with the DEQ that defines the process by which the BLM will cooperatively meet state and federal water quality rules and regulations.

To comply with the BLM-DEQ Memorandum of Agreement, the BLM participated in completing the *Water Quality Restoration Plan for Federal Lands in the Applegate Subbasin*. This document describes how the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM) will implement and achieve the Oregon Department of Environmental Quality's (DEQ's) *Applegate Subbasin Total Maximum Daily Load (TMDL)* for 303(d) listed streams on federal lands. Its organization is designed to be consistent with the DEQ's *Applegate Subbasin Water Quality Management Plan (WQMP)* (ODEQ 2003). The area covered by this Water Quality Restoration Plan (WQRP) includes all lands managed by the USFS Rogue River-Siskiyou National Forest and the Medford District BLM within the Applegate Subbasin.

A WQMP is developed to describe a strategy for reducing water pollution to the level of the load allocations and waste load allocations prescribed in the TMDL. The approach is designed to restore the water quality and result in compliance with the water quality standards, thus protecting the designated beneficial uses of waters of the state. Through implementation of the RMP, Aquatic Conservation Strategy, and Best Management Practices, the proposed action and alternatives are designed to attain the recovery goals for listed streams on federal lands in the Applegate Subbasin. Recovery goals are identified in the *Water Quality Restoration Plan for Federal Lands in the Applegate Subbasin* (USDA FS and USDI BLM 2005, pp. 45-47). The proposed action and alternatives draw upon the passive and active restoration management actions recommended for achieving federal recovery goals. Following the WQRP for the Upper Applegate and Little Applegate Watersheds assures that BLM's management will not violate the Clean Water Act.

Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011)

In June 2011, the USFWS (U.S. Fish and Wildlife Service) finalized the *Revised Recovery Plan for the Northern Spotted Owl*, which contains 33 Recovery Actions. Recovery Actions are recommendations to guide activities needed to accomplish the recovery objectives and ultimately lead to delisting of the species. Specifically, Recovery Action 32 (RA 32) in the Recovery Plan recommends "maintaining and restoring the older and more structurally complex multi-layered conifer forests (USDI FWS 2011, III-67)." The intent of RA 32 is to maintain substantially all of the older and more structurally complex multi-layered conifer forests on federal lands in order not to further exacerbate the competitive interactions between spotted owls and barred owls.

Also included in the Revised Recovery Plan is Recovery Action 10 (RA 10) which recommends "Conserving spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl population (USDI FWS 2011, III-43)." Within the administrative units of the Rogue River-Siskiyou National Forest (FS) and the Medford District Bureau of Land Management (BLM), an interagency, interdisciplinary team was created to develop interim guidance for incorporating Recovery Action 10 (RA 10) when planning and implementing management activities on federal lands in southwest Oregon (USDA FS, USDI BLM, and USDI FWS 2013). As part of the proposal development process for the Nedsbar Project, a core team of specialists worked to incorporate this interim guidance. Refer to Chapter 2, Section B., *Development of the Project*, for more details.

The Nedsbar Project defers proposed treatment in RA 32 stands identified by interagency survey guidance (USDA FS and USDI BLM 2010), follows principles in the SW Oregon Recovery Action 10 Guidance Document (USDA FS, USDI BLM, and USDI FWS 2013), and is consistent with consultation requirements with the U.S. Fish and Wildlife Service; therefore, the Nedsbar Project is consistent with the *Revised Recovery Plan for the Northern Spotted Owl* (USDI FWS 2011).

Applegate Adaptive Management Area Ecosystem Health Assessment (USDI BLM and USDA FS 1994)

The Applegate AMA Ecosystem Health Assessment was an initial evaluation of the conditions in the Applegate Watershed following is designation as an AMA. The assessment was based on current information at the time and primarily addressed the terrestrial components of the ecosystem. The assessment identified several ecological concerns and provided recommendations, to help restore ecosystem health, although it is not a decision document under NEPA. It recognized that evaluation of the ecosystem is an iterative process and that as future analyses, assessments and monitoring occur, understanding of the area would be enhance.

Applegate Adaptive Management Area Guide (USDA FS and USDI BLM 1998)

The Applegate AMA Guide was developed as a working document that both summarized known information about the AMA and the Applegate River watershed, and to outline key questions, strategies, and actions giving direction for the Forest Service and the BLM. The AMA Guide was not developed to be a vehicle for documenting in-place management decisions. No change in land allocations or in land management standards and guidelines was made with the development of the guide, and therefore, it is not a decision-making document.

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

The Western Oregon Transportation Management Plan provides goals, objectives, and guidelines for managing BLM's road and trail transportation system throughout western Oregon. This transportation management plan is not a decision document; rather, it provides guidance for implementing applicable decisions of the Medford District 1995 RMP (which incorporated the NWFP).

Southwest Oregon Fire Management Plan (ODF 2014)

The Southwest Oregon Fire Management Plan (FMP) provides Southwest Oregon with an integrated concept for coordinated wildland fire planning and protection among federal, state, local government entities and citizen initiatives. The FMP is not a decision document.

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.

Applegate Communities' Collaborative Fire Protection Strategy (Applegate Fire Plan) (2002)

The Applegate Fire Plan is a collaborative effort between citizens of the Applegate Valley, county, state, and federal agencies to develop a strategy for addressing the high fire danger throughout the Applegate Valley. The main components of the plan include fire protection and suppression, fuel hazard reduction, and emergency communications. The plan is based on a foundation of neighbors cooperating with neighbors. The Applegate Fire Plan developed recommendations for nineteen strategic planning areas across the Applegate Watershed.

H. PUBLIC INVOLVEMENT AND RELEVANT ISSUES

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

scoping proposal; and (4) potential environmental impacts of the scoping proposal. Scoping is performed not to build consensus or get agreement on a project proposal, but rather to solicit relevant site-specific comments that could aid in the analysis and final design of the proposal.

Scoping has occurred for the Nedsbar Forest Management Project. The Nedsbar Project appeared in the Ashland Resource Area's Schedule of Proposed Actions published in the spring 2014 edition of *Medford's Messenger* (the BLM's quarterly newsletter). A letter briefly describing the Nedsbar proposal and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on May 14, 2014. Sixteen comment letters and numerous Interest Response Forms were received in response to the scoping notice and subsequent public forums in which public input was sought. A summary of the comments received during scoping is provided in Appendix A, *Scoping Summary*.

Numerous articles were submitted for BLM review during the scoping process. The BLM reviewed these documents, and considered the information in developing the alternatives. A list of the literature submitted can be found in the *References* section of this EA.

1. Public Meetings and Events

On May 13, 2014, representatives from both the BLM and the Applegate Neighborhood Network (ANN) met. The intent of the meeting was to introduce the Nedsbar Project to the community and to begin the process for the development of an action alternative by the members of the local community for inclusion in analysis contained in this document.

On July 22, 2014, the Medford District hosted an Open House at the Jacksonville Library, meant to provide an open venue for information-sharing and discussion between members of the public and members of the Interdisciplinary Team (IDT). Approximately 70 members of the public attended this event.

On November 19, 2015, the BLM hosted a field trip to portions of the Nedsbar Forest Management Project. The intent of the field trip was to visit several of the areas proposed for commercial timber harvest activity. Approximately 50 members of the public attended the field trip.

2. Ongoing Dialogue with Community

Following the initial meeting between the BLM and ANN, the process to develop a "community alternative" evolved over time. A core group of dedicated members of the community, known as the Community Alternative Working Group (CAWG) presented their action alternative to the BLM on February 13, 2015 and subsequently submitted unit selections, prescriptions, deferred units, and a map on March 6, 2015. Throughout the community alternative development process, the BLM collaborated with the CAWG through sharing of data, field trips, and meetings to discuss the Nedsbar Project. The alternative submitted by the CAWG is considered and analyzed in detail in this EA as Alternative 5 (Chapter 2, Section 2.C.3.).

3. Nedsbar Project Website

A website for the Nedsbar Forest Management Project was launched in July 2014 to inform the public about the Nedsbar Project. The website provided background information and maps, lists upcoming events, and contained regular updates. Information such as the applicable watershed analyses, the project scoping letter, and other applicable NEPA documents were also posted.

In November 2015, the BLM transferred relevant documents and data from the old website to BLM's new ePlanning website. The website for the Nedsbar Forest Management Project can be accessed at:

https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=55341&dctmId=0b0003e880a55436

4. Relevant Issues

Issues were identified through specialist review and public input received during scoping, public meetings and field trips. 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.

Some issues were determined to be outside of the scope of analysis for the Nedsbar Project; those issues are discussed below in Section H.4.b., *Issues Considered but not Further Analyzed*. 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.

a. Issues Analyzed in Detail

Issues identified during internal (BLM) and external (public) scoping were used to guide the effects analysis in Chapter 3. Not all issues are analyzed to the same level of detail in this EA. To warrant detailed analysis, an issue must be within the scope of analysis; not already decided by law, regulation or previous decision; open to scientific analysis; analysis is necessary for making a reasoned choice from among the alternatives (e.g., is there a measurable difference between the alternatives with respect to the issues); and public interest dictates that effects should be displayed in more detail. The following issues were identified for detailed analysis under the Nedsbar Forest Management EA, the issues are posed as questions:

Issue 1: Vegetation Conditions - Forest Health and Fire Resiliency:

- How would forest management prescriptions promote the growth and vigor of overstocked forest stands?
- What are the effects of forest management prescriptions on the fire resiliency of the forest?
- What are the effects of forest management prescriptions on fire hazard?
- What are the effects of forest management on the fire environment and wildfire behavior?
  - Will increasing the spacing between the canopies of trees alter microclimates (e.g. increased wind speeds, light, and temperatures)?
  - Will increased light lead to increased shrub and forb growth, drying of vegetation, and altered wildfire behavior?
- What are the effects of timber harvest on forest structure (including the number of trees in the 20-30 inch diameter at breast height (DBH) class and those greater than 30 inches DBH that are proposed for removal)?
- What are the effects of timber harvest on the spread of dwarf mistletoe?
- What are the effects of road renovation and construction on the spread of insects and disease (Gypsy moth and tent caterpillars)?

Issue 2: Listed or Candidate Wildlife Species

- What are the effects of the Nedsbar Forest Management Project (timber harvest; mistletoe management; tractor, cable and helicopter yarding; and new road construction) on northern spotted owl, their prey, and their critical habitat?

Issue 3: Other Terrestrial Wildlife

- What are the effects of the Nedsbar Forest Management Project (including timber harvest, road renovation and construction) on wildlife habitats, including late-successional habitat?
- What are the effects of timber harvest, road renovation, and construction on Pacific fisher and their habitat?
- What are the effects of timber harvest, road renovation and construction on other sensitive wildlife species, including bats, black salamander, and Johnson's hairstreak butterfly?
- What are the effects of the Nedsbar Forest Management Project on neo-tropical migratory birds?
- Manzanita provides food for a variety of animals year round; what are the effects of fuels reduction on manzanita species?
- What is the potential for the incremental effects of the Nedbar Forest Management Project (timber harvest, road construction, skid trails and corridors, and landings) to contribute adverse cumulative effects to wildlife and their habitats) when considered with other past and on-going timber harvest, existing high road densities, and existing OHV routes?

Issue 4: Water Resources and Aquatic Habitat

- How would the disturbance associated with combination of new road construction, road renovation, and log hauling activities affect water quality from the potential short-term increased sediment produced?
- The mainstem of the Applegate River, Grouse Creek, Yale Creek, and the Little Applegate River are within the Analysis Area and are listed as 303(d) streams for varying reasons. Would the non-point source pollution (sedimentation) from management activities have the potential to degrade the aquatic ecosystem (e.g., reduced water quality for salmon, steelhead, and trout)?
- How would forest thinning (and associated canopy reduction), logging (particularly tractor yarding) and road construction affect hydrologic flow, peak flow and low flow, leading to increased erosion, stream channel downcutting, or the potential to increase the adverse effects of flooding?
- What is the potential for adverse cumulative effects on water quality and hydrologic function within the Little Applegate and Upper Applegate Watersheds from road building, timber harvest activities, grazing, OHV use, and fire suppression on BLM, Forest Service, and private lands?
- What is the potential for effects to aquatic habitats and associated organisms, including native salmonids and other fishes, from timber harvest and road construction, maintenance, and hauling activities?
- How does the proposed commercial timber harvest and road construction affect riparian canopy cover and the potential for large wood recruitment to streams?
- What is the potential for adverse cumulative effects on aquatic habitat and associated organisms from timber harvest and road construction?
- How would timber harvest, road work, and fuels treatments affect attainment of Aquatic Conservation Strategy (ACS) objectives?

Issue 5: Soil Productivity and Stability

- How would proposed gound-based and cable yarding, and associated road construction affect soil productivity (compaction, displacement, and change in organic matter and soil chemistry)?
- What are the effects of forest and fuels management activities on fragile soils?

- Would proposed project activities increase soil surface temperatures and dry out the soil?

Issue 6: Economics

- How would the removal of forest products contribute towards the local and regional economies?

Issue 7: Human Dimensions

- What are the effects of the Nedsbar Forest Management Project on the proposed Dakubetede Lands with Wilderness Characteristics (LWC)?
- How does the Nedsbar Forest Management Project affect unroaded areas important to the local community?
- How do the proposed timber harvest, fuels treatments, and road activities affect dispersed recreational activity in the Planning Area?
- What are the potential affects to the visual quality of the landscape from the Nedsbar Forest Management Project?
- How will the BLM address concerns of increased off-road vehicles, increased dumping, increased trespass and shooting that may occur as a result of road renovation, road construction, and forest thinning?

b. Issues Considered but Not Analyzed in Detail

In addition to the issues listed above, there were other issues raised by the public or the interdisciplinary (ID) team during the development of the project that were considered but not analyzed in detail, often because the project's design or implementation of Project Design Features (PDFs) would eliminate or reduce effects on the resource. The PDFs are described in Chapter 2, Section 2.C.4., *Project Design Features*. In some cases, issues raised by the public or the ID team were not considered in detail as they were determined to be 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 in Appendix B, *Issues Considered but Eliminated from Detailed Analysis*. Also see Chapter 2, Section 2.D., *Actions and Alternatives Considered but Eliminated from Detailed Analysis* for options and alternatives considered but not further analyzed.

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CHAPTER 2 - ALTERNATIVES

A. INTRODUCTION

This chapter describes how the project was developed, what is being proposed in detail, and presents the alternatives developed by the BLM (Alternatives 3 and 4) and the alternative developed by the community (Alternative 5) to achieve the objectives identified in the Purpose and Need statements in Chapter 1. A "No Action" Alternative is presented to form a baseline for analysis (Alternative 1). Project Design Features (PDFs), which apply the Best Management Practices as described in Appendix D of the RMP (and modified by Resource Management Plan Maintenance dated July 12, 2012), are integral to the design of the action alternatives (Alternatives 3, 4 and 5). The PDFs are incorporated into the analysis of anticipated environmental impacts described in Chapter 3.

B. DEVELOPMENT OF THE PROJECT

1. Treatment Area Selection

The Nedsbar Forest Management Project was designed to conform to the 1995 Medford District Resource Management Plan (USDI BLM 1995) and to meet the purpose and need identified in Chapter 1. The Nedsbar Project is in the Applegate Adaptive Management Area land use allocation (LUA), which includes federal lands managed by the BLM and Forest Service (USDI BLM 1995, p. 36). Objectives for AMA include "provision of well distributed late-successional habitat outside reserves, retention of key structural elements of late-successional forests on lands subjected to regeneration harvest, restoration and protection of riparian zones, and provision of a stable timber supply." (USDI BLM 1995, p. 36). Specific emphasis for the Applegate AMA includes "development and testing of forest management practices, including partial cutting, prescribed burning, and low impact approaches to harvest (e.g., aerial systems) that provide for a broad range of forest values, including late-successional forest and high quality riparian habitat. Activities designed to improve or maintain forest condition (health) are expected to be prevalent." (USDI BLM 1995, p. 195). The Nedsbar Project was considered for treatment at this time as a result of a previous review that identified dense forested stands within the Planning Area that need to be treated to create more favorable growing conditions to improve tree health (vigor), reduce tree mortality and promote forest resiliency. The 18,958-acre Nedsbar Planning Area is located within the Little Applegate and Upper Applegate 5th field watersheds within the Applegate Subbasin.

The Medford District's 2012 Integrated Vegetation Management analysis of the current conditions of watersheds within the Medford District evaluated all 5th field watersheds based on the specific timber, fuels, silviculture, and northern spotted owl needs. Seven categories with separate measurements were used to score and rank the watersheds: (1) percent of BLM-administered lands within the watershed; (2) amount of dry forest and young stands (less than 80 years old) within the watershed; (3) amount of 10-30 inch diameter at breast height (DBH) class available for harvest; (4) amount of high fuel hazard and fire regime condition class (FRCC) within the wildland urban interface (WUI) in the watershed; (5) opportunities for enhancement or conservation of owl sites; (6) percentages of matrix and Adaptive Management Area (AMA) within the watershed; and (7) amount of existing roads within the watershed. The majority of the Nedsbar Project is located in two 5th field watersheds that ranked as medium in the watershed prioritization (Little Applegate and Upper Applegate). A helicopter landing and a small portion of a unit are located in the adjacent Bear Creek 5th field watershed, which also ranked as medium. Projects in Ashland Resource Area's one high ranking 5th field watershed, Middle Applegate River, have been implemented in the past few years, so it was feasible to treat watersheds ranking in the medium priority category.

Once the Project Area was established, an interdisciplinary team (IDT) of resource specialists was brought together to begin evaluating the area for potential treatments. The IDT filtered the Planning Area through a series of screens before developing treatment proposals. The screening process was intended to ensure the proposal meets RMP guidelines and conservation and recovery actions for federally listed species. The screening process described below helped to distill feasible treatment areas from the larger Planning Area.

The first step in the screening process was to identify ownership within the Planning Area (Chapter 1, Figure 1-1). The following screens were then applied to BLM-administered lands within the Project Area. They are broken out into four categories to better understand the overarching reason for elimination.

a. Policy – Resource Management Plan Level

Timber Production Capability Classification Withdrawn

Timber Production Capability Classification (TPCC) Withdrawn is the process for partitioning forestland into major classes indicating relative suitability to produce timber on a sustained yield basis. TPCC withdrawn lands are lands identified as unavailable for planned forest management based on site-specific information. There are exceptions to this rule (USDI 1995, p.72); however, for this project, forest management activities on TPCC withdrawn lands (102 acres) were screened from consideration.

Known Spotted Owl Activity Centers

Known Spotted Owl Activity Centers (KSOACs) are the best 100 acres of NSO habitat around the nest site or owl activity center, for all documented sites as of January 1, 1994 in Matrix and Adaptive Management Area land allocations (USDA and USDI 1994a). KSOACs are managed as Late-Successional Reserves intended to preserve an intensively used portion of the breeding season home range close to a nest site or center of activity (USDI 1995). Because these areas are important to meeting objectives for species other than NSOs, these areas are to be maintained even if they become no longer occupied by NSOs (USDA and USDI 1994a). There are approximately 600 acres of KSOACs overlapping the Planning Area and no proposed treatment would occur in the activity centers.

Great Gray Owl Core and Buffers

Great Gray Owl (GGO) Core or Meadow Buffer: As per the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (USDA and USDI 2001, p. 39), a no-harvest buffer of 300 feet around meadows and natural openings adjacent to potential GGO habitat and a ¼ mile protection zone around known nest sites has been provided.

Riparian Reserves

Northwest Forest Plan (NWFP) Riparian Reserves, as incorporated by the Medford District RMP, are located on federal lands throughout the Planning Area. A BLM stream survey crew conducted an inventory within the Nedsbar Planning Area in order to ensure that all areas needing Riparian Reserve protection were identified. The survey crew 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 commercial timber harvest, except where specific silvicultural treatments are applied to control stocking, reestablish and manage stands, and acquire desired vegetative characteristics needed to attain Aquatic Conservation Strategy and Riparian Reserve objectives (USDI 1995, p. 27 and Appendix E, p. 195). Riparian Reserves are excluded from commercial treatment units by clearly marking unit boundaries on the ground.

Riparian Reserve widths were determined using the NWFP Standards and Guidelines (USDA and USDI 1994, pp. C-30-31), the *Little Applegate River Watershed Analysis* (USDA and USDI BLM 1995), the *Beaver Palmer Watershed Analysis* (USDA 1994) and the *Applegate Star/Boaz Watershed Analysis* (USDI 1995) and are based on a site potential tree height of 155 feet within both the Little Applegate and Upper Applegate Watersheds. Site-specific widths for each Riparian Reserve have been mapped in GIS and would be implemented under the three action alternatives.

Riparian Reserve widths in the Nedsbar Planning Area are as follows:

(1) Fish streams: 310-foot slope distance on each side of the stream.

(2) Perennial non-fish-bearing streams: 155-foot slope distance on each side of the stream.

(3) Intermittent non-fish-bearing streams: 155-foot 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.

(4) Unstable and potentially unstable ground: the extent of the unstable and potentially unstable ground.

(5) Springs, seeps, and other non-stream wetlands less than one acre in size: the wetland and the area from the edges of the wetland to 155-foot slope distance.

(6) Constructed ponds and reservoirs, wetlands greater than one acre in size: Riparian Reserves 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 the maximum pool elevation of constructed ponds and reservoirs, whichever is the greatest.

b. Policy – Project Level

Northern Spotted Owl Recovery Plan Recommendations

In 2011, the U.S. Fish and Wildlife Service issued a Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. The BLM worked with the USFWS to incorporate the Recovery Goals and Actions in the Recovery Plan consistent with BLM laws and regulations. The effects to NSOs and their critical habitat were considered while planning this project. The following strategies were implemented in order to meet the project objectives and reduce effects to NSOs and their critical habitat. To the extent practicable, the Relative Habitat Suitability (MaxEnt) model described in the 2011 Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011), the Medford District known owl sites layer, and recent NSO survey results were used to determine treatment options in order to reduce effects to known NSO sites. Refer to the Wildlife Issues section in Chapter 3 for more information (e.g., methodology, description of habitat types, etc.).

- Critical Habitat: Critical habitat for the northern spotted owl was first designated in 1992 in Federal Register 57 (USDI 1992), and includes the primary constituent elements that support nesting, roosting, foraging (NRF) and dispersal. Designated critical habitat also includes forest land that is currently unsuitable, but has the capability of becoming NRF habitat in the future (57 FR 10:1796-1837). Critical habitat was revised for the northern spotted owl and the final designation was published by the USFWS in the Federal Register (signed on August 12, 2008, 73 Federal Register 157:47326) and became effective on September 12, 2008. The 2008 USFWS's Critical Habitat delineations were challenged in court and the 2008 designation of northern spotted owl CHU was remanded. The USFWS was ordered to revise the CHU designation. On February 28, 2012, the Service released the proposed critical habitat in the form of maps and the draft form of the Federal Register publication. The proposed rule was published in the *Federal Register* on March 8, 2012 (77 Federal Register 46:14062-14165). The final Critical Habitat Rule was published in the *Federal Register* on December 4, 2012 (77 Federal Register 233:71876-72068) and became effective January 3, 2013.

  The 2012 Final Critical Habitat Rule and principles in the 2011 Revised Recovery Plan were used to inform specific prescriptions when treatment units were located within the 2012 Designated Critical

Habitat. Adverse effects were avoided in occupied sites within critical habitat. Adverse effects in critical habitat located outside of the home ranges of known owl sites were only proposed in areas where the habitat could be improved in the long-term (i.e., proposed treatments in capable, dispersal, or roosting/foraging habitat within high habitat suitability according to the relative habitat suitability model); treatments would improve stand resiliency; or where ecological needs of the stand outweighed the owl habitat needs. For example, pine restoration on a ridge that is in low habitat suitability according to the relative habitat suitability model. NRF and Roosting/Foraging habitat are not proposed for removal within critical habitat through vegetation treatments. In limited cases, where road construction was necessary to access the proposed treatment areas and no other road was available, small amounts of Roosting/Foraging and Dispersal habitat removal would occur in the Planning Area. The removal of small amounts of habitat from road and landing construction were considered in areas that would allow access to treatments that would have long-term benefits to spotted owl habitat.

- RA10 Important Habitat/Historical High Priority Site: In 2011, the USFWS issued the Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. Recovery Action 10 (RA 10) recommends conserving NSO sites and high value NSO habitat to provide additional demographic support to the NSO population. Within the administrative units of the Rogue River-Siskiyou National Forest (FS) and the Medford District BLM, an interagency, interdisciplinary team was created to develop interim guidance for incorporating RA 10 when planning and implementing management activities on federal lands in southwest Oregon. The southwest Oregon plan established two primary objectives as described in the plan; 1) prioritize known and historic spotted owl sites and 2) identify vegetation management that would enhance spotted owl habitat.

  The Nedsbar IDT worked to meet the intent of RA 10 as one purpose of the project is to protect and conserve federally listed species and their habitat, including the NSO. To the extent practicable, the BLM followed principles in the SW Oregon Recovery Action 10 Guidance Document (USDA and USDI 2013) to reduce impacts to sites with resident singles, recent pairs and/or reproduction activity within the Planning Area. NSO sites within the Planning Area were prioritized in high and low categories based on occupancy and reproductive success data. The objective at the high priority sites was to avoid adverse effects by not removing or downgrading nesting, roosting, and foraging (NRF) habitat within the home range. The objectives at the low priority sites are to accelerate the growth of NSO habitat or treat stands for ecological benefits as described in the Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011). These objectives would result in short-term adverse effects, for long-term benefits. Approximately 418 acres were removed from consideration for timber harvest and detailed analysis.

- NSO Nest Patch: The nest patch is the 300-meter radius (70 acres) area around a known NSO nest tree or center of activity that is important to owls. It is one of three scales developed in 2008 by a regional interagency team to analyze effects to NSOs. The other two scales are the home range and 0.5 mile core area. Nest area arrangement and nest patch size have been shown to be an important attribute for site selection by spotted owls (Swindle et al. 1997; Perkins et al. 2000; Miller et al. 1989; and Meyer et al. 1998). The nest patch size also represents key areas used by juveniles prior to dispersal. Miller et al. (1989) found that on average, the extent of forested area used by juvenile owls prior to dispersal averaged approximately 70 acres.

- RA 32 Deferred Stands: In 2011, the USFWS issued a Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. Recovery Action 32 (RA 32) recommends that agencies work with the USFWS to "*maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large*

snags, and fallen trees (USFWS 2011, p. III-67)." The purpose of Recovery Action 32 is to provide refugia for NSOs as they adapt to competitive pressures from an increasing population of barred owls.

The BLM decided to defer forest management in stands identified as RA 32 within the Project Area at this time. Using the 2010 Draft RA 32 Habitat Evaluation Methodology (version 1.3) developed jointly by the Medford BLM, Rogue River-Siskiyou National Forest, and the Roseburg Office of the USFWS, BLM wildlife biologists identified areas within the Nedsbar Forest Management Project that met the intent of Recovery Action 32. Stands identified as RA 32 forest stands (20 acres) were removed from consideration for timber harvest and detailed analysis.

c. Suitability of Stands

The timber sale planner and silviculturist assessed the timber harvest potential on BLM-administered lands within the Project Area using the Forest Operations Inventory (FOI) layer and other GIS layers. Identified treatment needs were based on the Medford District Resource Management Plan (RMP) silvicultural management systems for those lands (*South General Forest Management Area* (SGFMA). The following criteria were used to eliminate stands from treatment consideration:

- Vegetative Condition – grasslands, shrublands, hardwood/woodlands.
- Young stands from previous regeneration harvest – not ready for treatment.
- Young stands regenerated from fire – too small for harvest.
- Stands below relative density thresholds – no treatment needed at this time.

d. Feasibility

Potential treatment units were screened by members of the IDT (timber sale planner, engineer and logging systems specialist) for economic and logistical feasibility for treatment. For example, a potential treatment unit where the only logistically feasible harvest method would be helicopter yarding due to difficult access may have been eliminated from consideration as uneconomical for a variety of reasons including low volume, harvest volume too scattered to achieve appropriate payloads, distance from helicopter landing, adverse haul to helicopter landing, etc. Another example where a potential harvest unit may have been deemed uneconomical may have occurred when the harvest volume per acre resulting from the application of canopy cover retention prescriptions to treat and maintain habitat for owls dropped to a level that was too low to be economically feasible.

Resource specialists determined other applicable soils, hydrologic, wildlife, and other RMP management guidelines to minimize impacts to resources. Concerns and issues raised by the public were incorporated into the design of the action alternatives.

2. Transportation Management and Inventory Assessment

An interdisciplinary transportation working group comprised of BLM resource specialists (road engineer, hydrologist, fisheries biologist, wildlife biologist, soils specialist, fuels specialist, forester, and outdoor recreation planner) was established to review the transportation system in the Nedsbar Planning Area and make recommendations for roads that could be analyzed.

An inventory and review of the existing transportation network was conducted to aid in the assessment of the current condition, to evaluate the transportation system for an appropriate level of management, as well as to identify opportunities to reduce road densities. Roads within the Planning Area vary from primitive, four-wheel drive roads (non-system roads) to engineer-designed roads with culverts, drainage features, and crushed rock surfacing or bituminous surfacing that receive regular maintenance by BLM (system roads). The inventory process specifically identified:

1. Roads that need maintenance to restore, repair, or improve road surfaces, culverts, and roadside drainage ditches in order to reduce road-related erosion and sedimentation to stream courses;

2. Roads that are no longer serving resource programs needs and whether they are contributing to sedimentation and riparian habitat fragmentation;
3. Roads needed to provide access for forest management that are in need of maintenance or repair;
4. Existing closure status of roads; and
5. Roads under existing agreements for private land access and reciprocal right-of-ways.

C. ALTERNATIVES ANALYZED IN DETAIL

This section describes the four alternatives considered in detail. A narrative summary is provided for each of the alternatives.

1. Alternative 1 – No Action

The No Action Alternative describes a baseline against which the environmental effects of the action alternatives can be compared. The No Action Alternative discusses the consequences of not taking action. The No Action Alternative assumes the current resource trends will continue into the future. Under the No Action Alternative, no vegetation management would be implemented; there would be no commercial cutting of trees and there would be no density management, understory reduction or fuels reduction treatments. Normal programmed road maintenance would be performed. Other activities authorized by separate NEPA analyses could happen. The analysis of the No Action Alternative answers the question: What would occur to the resources of concern if no proposed treatments take place?

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 action alternatives would simply be dropped and the NEPA process ended. Future harvesting, young stand forest development work, fuels reduction treatments, other connected actions, and road management in this area would not be precluded and could be analyzed under a subsequent NEPA document.

2. Alternatives 3 and 4

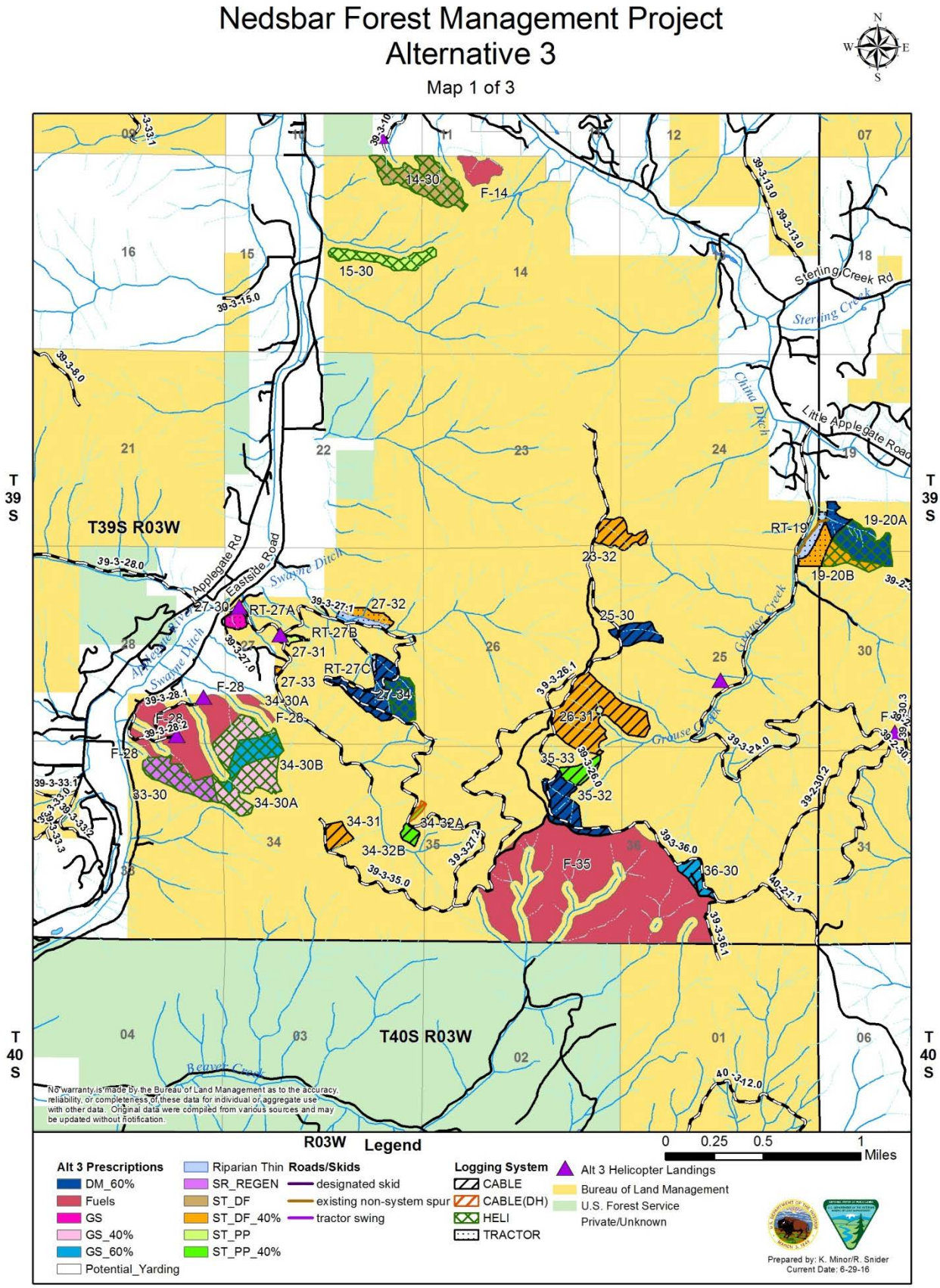
The interdisciplinary team for the Nedsbar Project developed two action alternatives for meeting the multiple project purposes (see Chapter 1). Alternative 3 applies forest management actions that would provide economic return and benefit stand health, resiliency, and stability. It minimizes the impacts to northern spotted owls and other special status species within stands in the Planning Area and achieves a higher level of protection for NSOs by reducing the amount of acres treated within NSO home ranges and reducing the amount of habitat downgrade. Alternative 3 does not include regeneration harvest or new road construction (Maps 2-1 to 2-3).

Alternative 4 applies forest management actions that would provide economic return and benefit stand health, resiliency, and stability while minimizing the impacts to northern spotted owls and other special status species within stands in the Planning Area (Maps 2-4 to 2-6). These two action alternatives vary in response to the issues identified in Chapter 1.

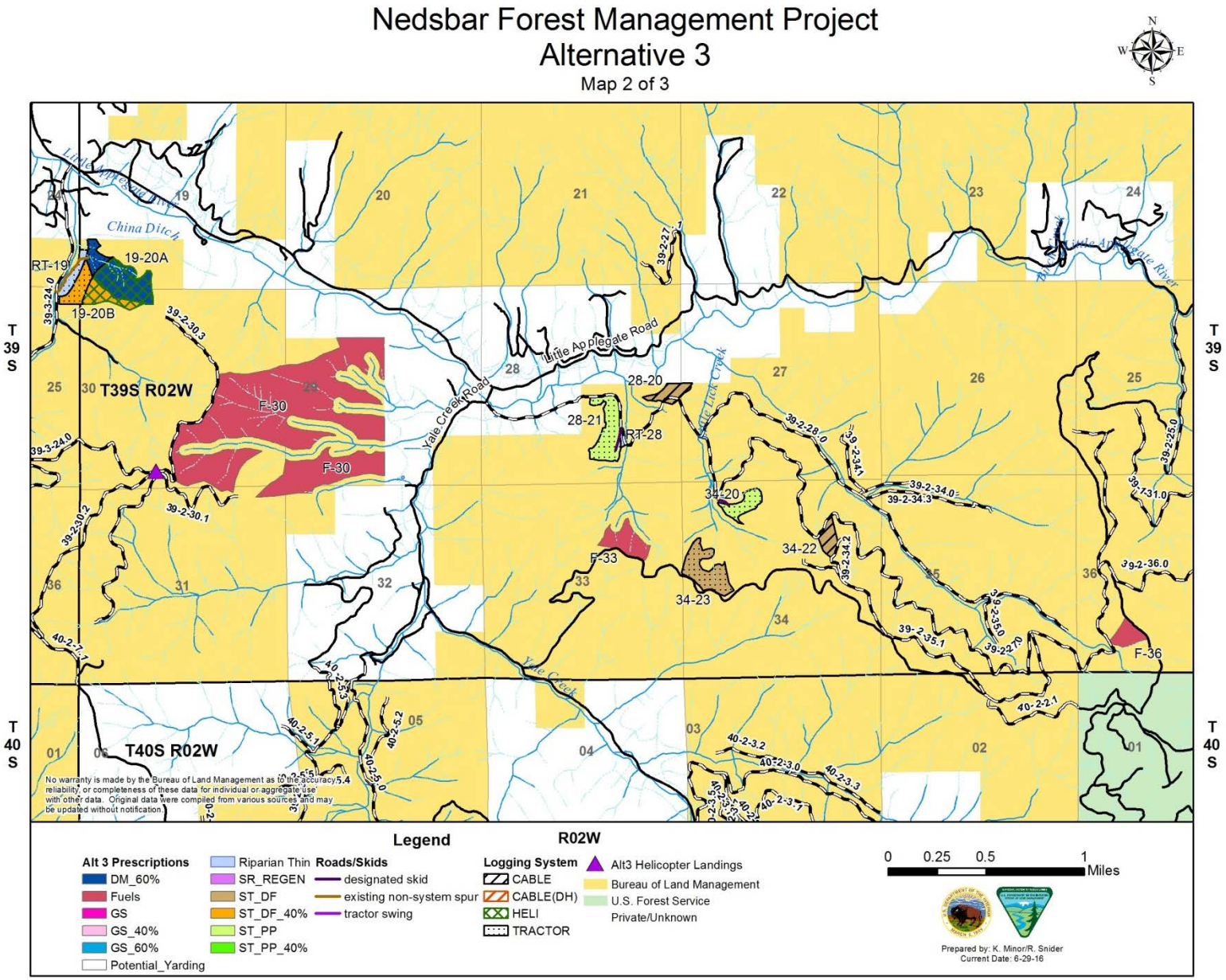
Under Alternative 3, approximately 1,541 acres would be treated using various commercial and non-commercial silvicultural prescriptions as described below. Approximately 789 acres are proposed for commercial or stewardship harvest treatments and about 752 acres are proposed for fuels treatments (Table 2-1 below and Tables C-1 and C-2 in Appendix C).

Under Alternative 4, approximately 2,378 acres would be treated using various commercial and non-commercial silvicultural prescriptions as described below. Approximately 1,498 acres are proposed for commercial or

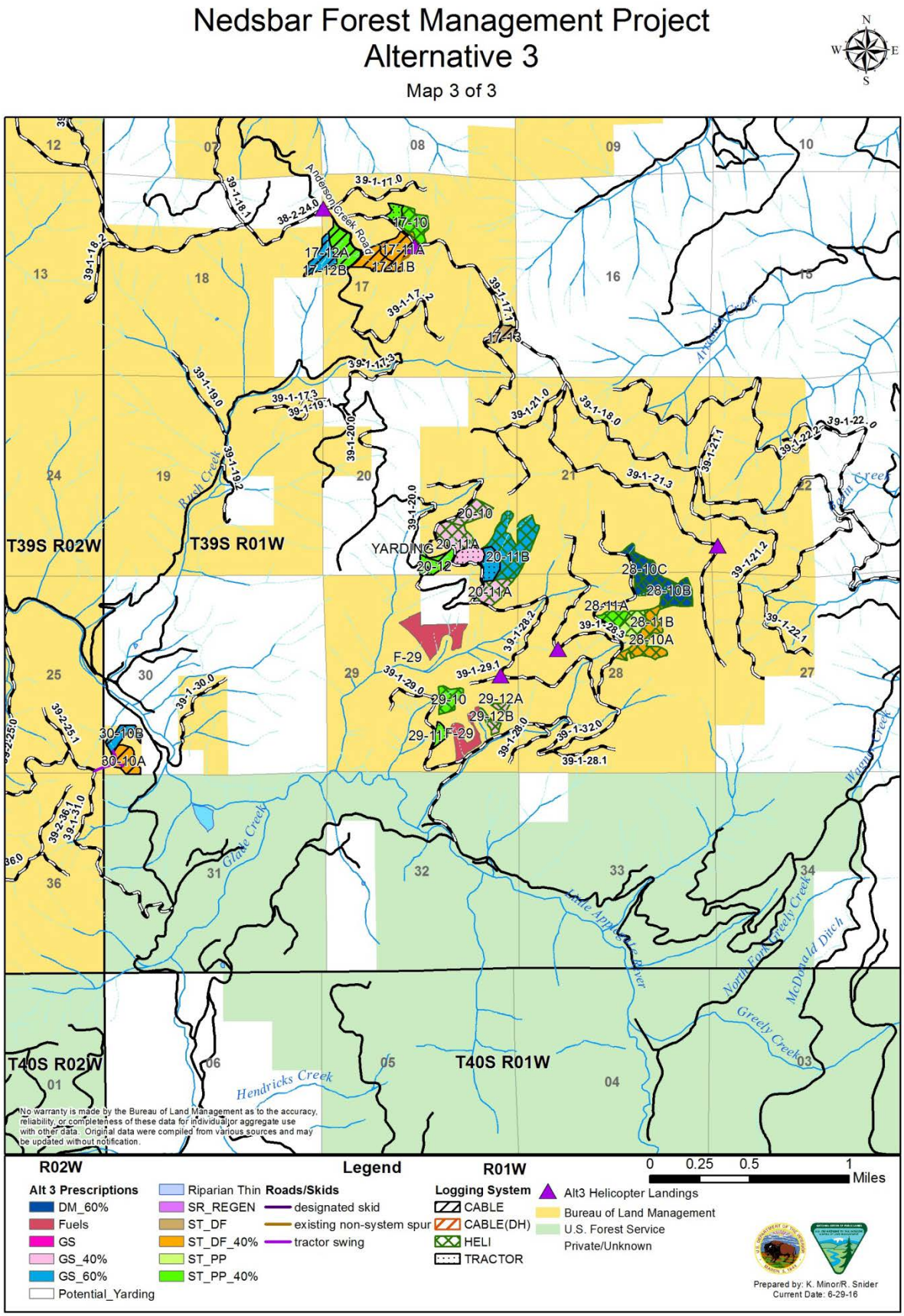
Map 2-1. Nedsbar Forest Management Project – Alternative 3



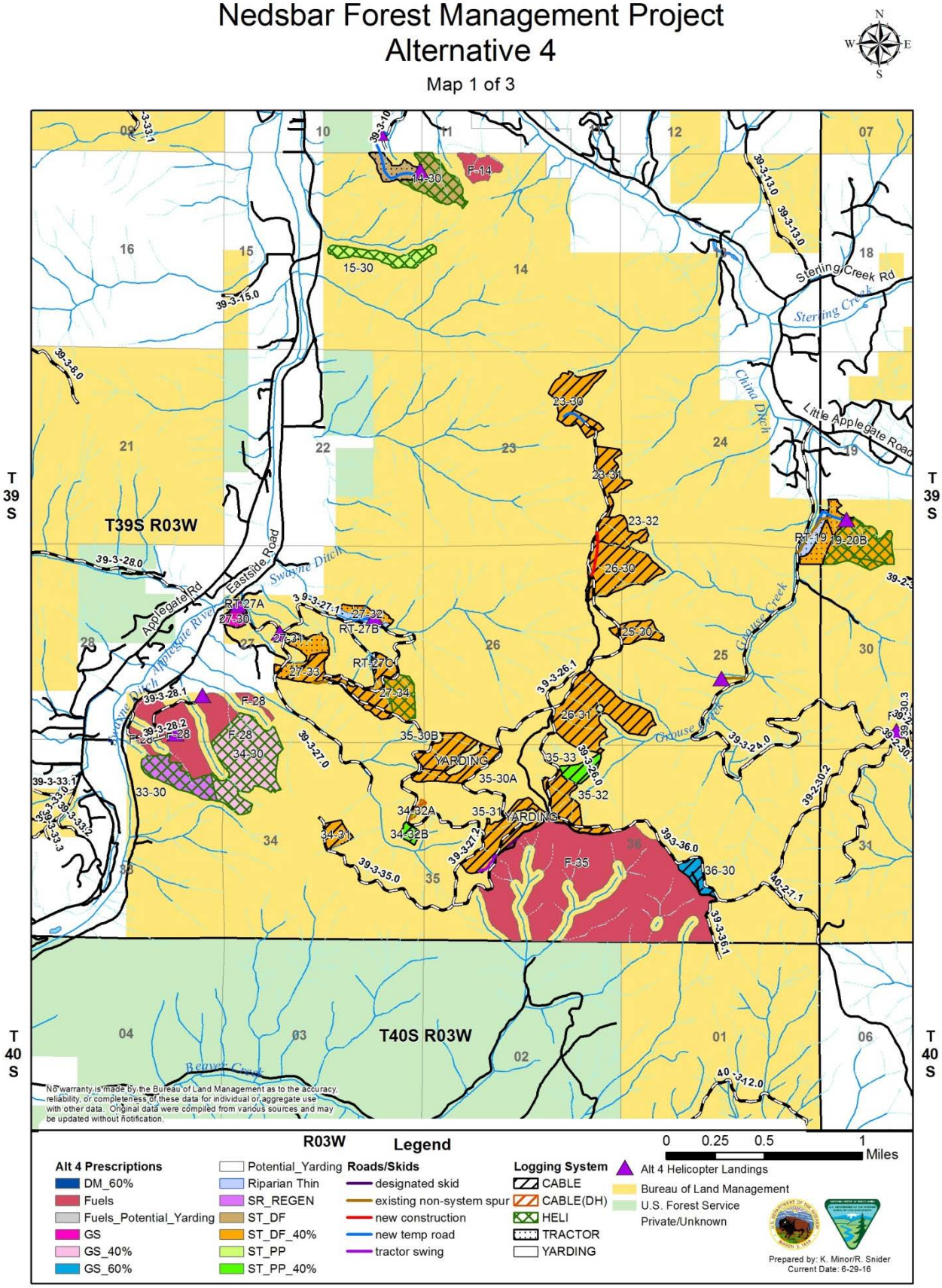
Map 2-2. Nedsbar Forest Management Project – Alternative 3



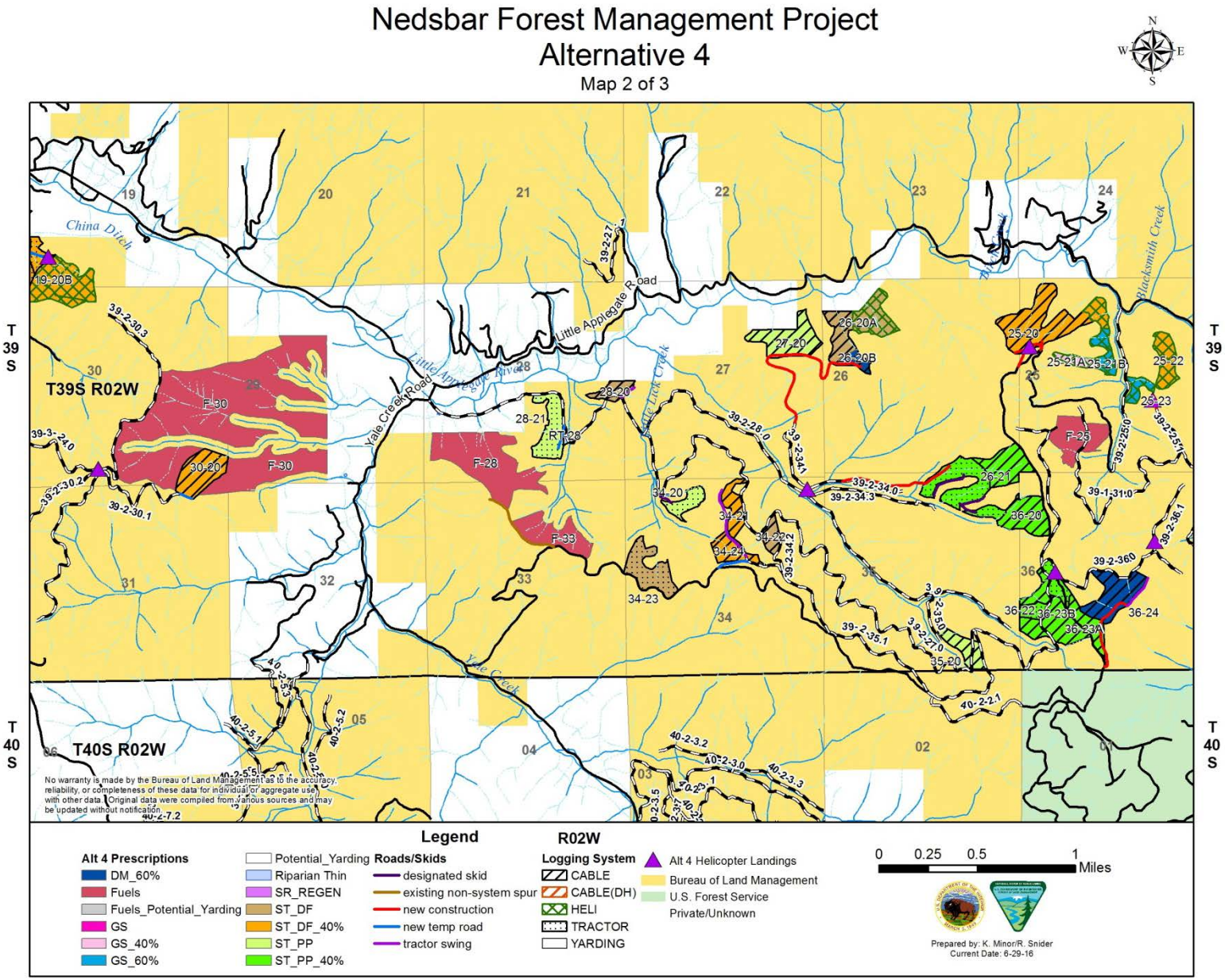
Map 2-3. Nedsbar Forest Management Project – Alternative 3



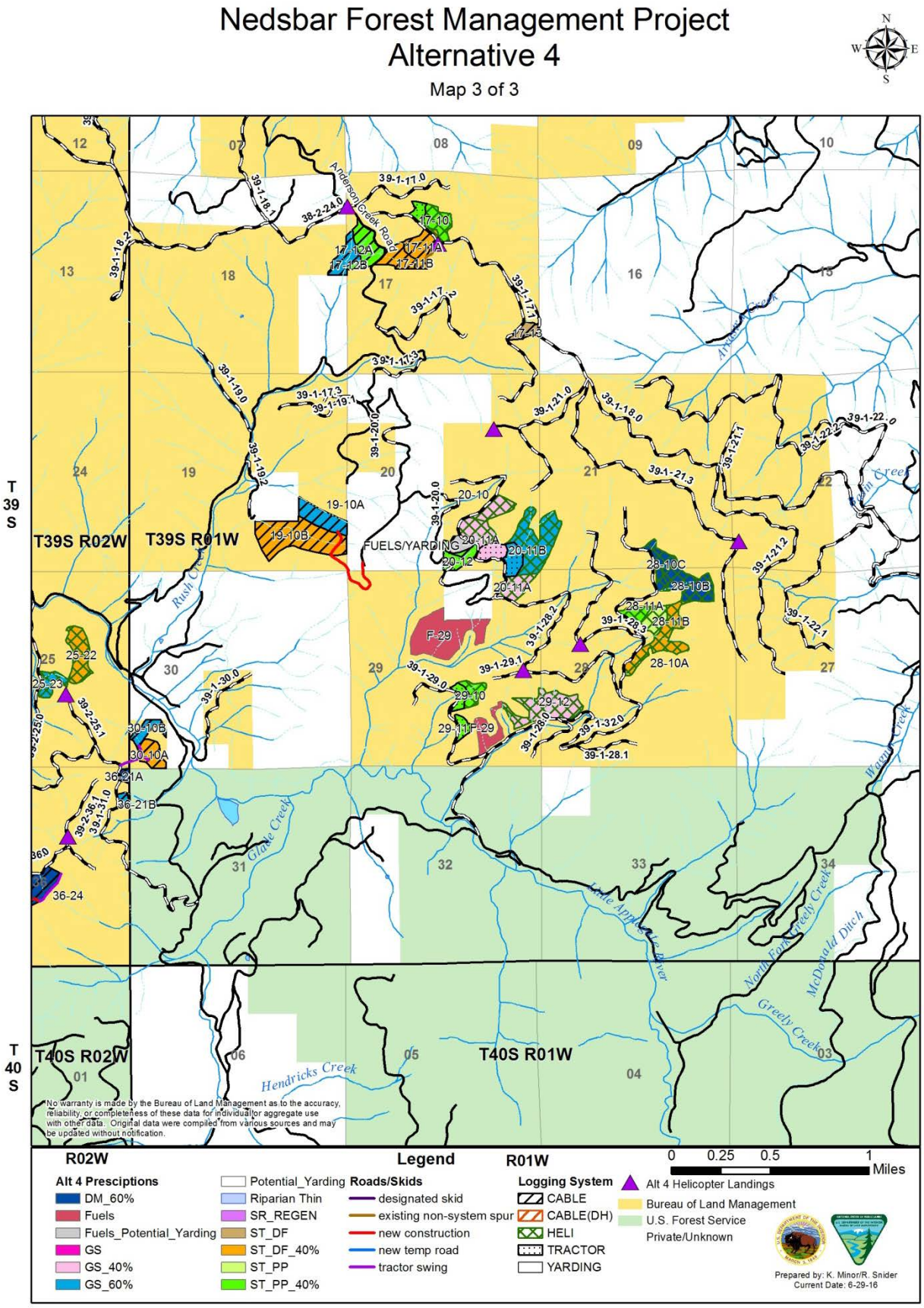
Map 2-4. Nedsbar Forest Management Project – Alternative 4



Map 2-5. Nedsbar Forest Management Project – Alternative 4



Map 2-6. Nedsbar Forest Management Project – Alternative 4



stewardship harvest treatments and about 880 acres are proposed for fuels treatments (Table 2-1 below and Tables C-3 and C-4 in Appendix C).

The cutting and removal of trees is accomplished in commercial conifer forests by a timber sale contract which sells material over 8 inches DBH. Trees to be retained or removed are designated in accordance with the marking guidelines developed for the project. Depending on stand conditions, individual trees are marked for retention (leave tree marking) or for harvest (cut tree marking). Non-commercial vegetation (material less than 8 inches DBH) would be removed through contracts that hire out cutting and piling of material. Tops and limbs of trees cut would be treated to reduce fire risk by piling and burning the material in a controlled manner. The BLM would burn the piles during wet weather conditions. Some material could be made available for firewood, pulp or woody biomass depending on market conditions and demand.

Table 2-1 summarizes the project by silvicultural treatment prescriptions and timber harvest methods. Unit specific information is displayed in Tables C-1 to C-4 (Appendix C) and Maps 2-1 to 2-6.

Table 2-1. Alternatives 3 and 4: Summary of acres by silvicultural prescription and harvest method.

Forest Management	Alternative 3	Alternative 4
Commercial Prescriptions	Estimated Acres	Estimated Acres
Selective Thinning Douglas-fir 40% Canopy Cover (ST-DF-40%)	175	667
Selective Thinning Douglas-fir (ST-DF)	87	129
Selective Thinning Ponderosa Pine 40% Canopy Cover (ST-PP-40%)	74	229
Selective Thinning Ponderosa Pine (ST-PP)	65	109
Group Selection 40% Canopy Cover (GS-40%)	98	148
Group Selection (GS)	6	6
Group Selection 60% Canopy Cover (GS-60%)	88	100
Density Management 60% Canopy Cover (DM-60%)	153	67
Structural Retention (SR-REGEN)	26	26
Riparian Thin (RT)	17	17
Total	789	1,498
Non-Commercial Prescriptions	Estimated Acres	Estimated Acres
Understory Reduction (Understory Thinning and Fuels Treatments)	752	880
Activity Fuels*	789	1498
Total	1,541	2,378
Timber Harvest Method	Estimated Acres	Estimated Acres
Ground-based (Tractor) Yarding	134	225
Skyline (Cable) Yarding	283	826
Helicopter Yarding	372	447
Total	789	1,498

* This is the maximum amount of acres that may be treated; actual acres treated could be less depending on post-harvest assessment.

a. Forest Management

Proposed treatments would apply silvicultural prescriptions to achieve management goals by putting stands on trajectories towards the development of structural complexity, age and size variability, increased vigor, and resiliency to disturbances (USDI BLM 1995, p.62). The prescriptions take into account changes in the potential vegetation based on factors such as aspect, slope, available moisture, and soil type, in addition to species composition, stem density, and habitat considerations for late-successional dependent species, particularly the

NSO. For some stands, silvicultural objectives were superseded by NSO habitat considerations and thus do not fully address forest health objectives. The silvicultural prescriptions that would be used to accomplish the goals and objectives for Alternatives 3 and 4 are described in the following sections.

Silvicultural Treatments

Selective Thinning

There are two types of selective thinning prescriptions proposed in the Nedsbar Forest Management Project based on the vegetation type. The general silvicultural objectives for all selective thinning prescriptions include:

1) Reduce stand density to increase tree growth, quality, and vigor of the remaining trees;
2) Create diversified stand structure (height, age, and diameter classes);
3) Develop spatial heterogeneity within stands (e.g., fine-scale structural mosaic);
4) Increase resilience/resistance of forest stands to wildfire, drought, insects, disease, etc. by reducing stand density and ladder fuels;
5) Increase growing space and decrease competition for large and/or legacy pine, oak, and cedar.

Selective Thinning (ST) will be a combination of thinning with groups or openings to the extent or amount recommended by vegetation type and/or plant series that currently exists. These stand treatments would generally target low vigor trees over healthy trees (proportional thinning and low thinning) to reduce stand density and improve stand resiliency and individual tree health.

This prescription would be used to accelerate the growth of remaining trees while promoting desired species that are best adapted to site conditions. Spatial distribution of leave (retention) trees should be based on tree condition (live crown ratio and crown form), as opposed to leaving trees based on a distance grid. Trees would be removed singly or in groups (openings) and stands would have a wide range of basal area or tree spacing targets based on stand types and conditions. The amount and size of openings created will depend on vegetation types (ponderosa pine (PP), Douglas-fir (DF)) and current stand development stages. Opening size would range from 0.10-0.25 acre where fire resilient and drought tolerant species need release to reduce competition. Opening size would range from 0.25-0.50 acre where regeneration would be encouraged or where poor crown conditions exist (weakened and suppressed trees). The extent or amount of openings permitted would range from 5-15 percent of the total treatment unit area. Openings should be no closer than 100 feet to the next opening. Trees may be marked in patches (e.g., groups of trees with poor crowns) and left in clumps (e.g., groups of old trees) where necessary. Unique stand features such as snags, coarse woody debris (CWD), large hardwoods, and trees exhibiting older characteristics would be retained to maintain desired structural components for wildlife. Components with these characteristics that would need to be felled for operational or safety purposes would be left on site where feasible to meet CWD requirements. In addition to such stand features, rock outcrops, special status species sites, and seeps/wet areas would be protected. See Appendix D for more information.

The following target conditions would be applied to Selective Thinning units for Alternatives 3 and 4 based on their vegetation composition.

Selective Thinning – Douglas-fir (ST-DF-40%)

Stands that are predominantly Douglas-fir and have low-moderate productive site conditions would be treated to a relative density range of 0.30-0.40. Stands would be harvested to a range of 40-50 percent canopy cover and would be thinned using guidelines to reduce basal area between 100 and 140 ft^2 per acre. These stands are lacking suitable natural regeneration of drought tolerant and fire resilient species in the understory, while the overstory is greater than 90 percent Douglas-fir with scattered legacy ponderosa pine, incense cedar, and black oak.

Selective Thinning – Douglas-fir (ST-DF)

Units 14-30, 28-20, and 26-20A are outside of any known NSO sites and outside of the NSO Critical Habitat Unit (CHU) and do not require an average canopy cover retention of 40 percent. The goal of this prescription is similar to ST-DF-40%, but allows for an increased ability to create openings around healthy, drought-tolerant species without being confined to average canopy cover retention of at least 40 percent.

Selective Thinning – Ponderosa Pine (ST-PP-40%)

Stands that are predominantly composed of ponderosa pine or have the lowest productive site conditions would be treated to a relative density range of 0.25-0.35. Stands would be harvested to a range of 35-45 percent canopy cover and would be thinned using guidelines to reduce basal area between 80 and 120 ft^2 per acre. These sites may have suitable natural regeneration of drought tolerant and fire resilient species in the understory; however, more shade tolerant species (Douglas-fir) have restricted growth in the overstory (dominant and co-dominant trees).

Selective Thinning – Ponderosa pine (ST-PP)

Units 15-30, 27-31, 28-21, 34-20, and 27-20 are outside of any known NSO sites and outside of the NSO CHU and do not require an average canopy cover retention of 40 percent. Unit 28-11B is typed as capable NSO habitat and does not require average canopy cover retention of 40 percent. The goal of this prescription is similar to ST-PP-40%, but allows for an increased ability to create openings around healthy, drought-tolerant species without being confined to average canopy cover retention of at least 40 percent.

<u>Group Selection</u>

The principal purpose for a group selection (GS) treatment is to create structural diversity among stands that are homogenous in appearance, or have a single-layer overstory. Promoting shade intolerant species such as pine and oak which have been encroached by more shade tolerant species, such as Douglas-fir, is another principal purpose. Residual trees would show improved health, vigor, and growth from the added growing space, water, and nutrients that they receive. Group selection would create small openings, allowing regeneration establishment and release, would preserve most legacy trees within the stand, and would remove trees of low vigor. There are three types of retention levels for group selection listed below to increase spatial heterogeneity.

Group Selection Greater than 40 Percent Canopy Cover (GS-40%)

Stands would be harvested to a range of 40-50 percent canopy cover and would be treated using guidelines to reduce basal area between 100 and 140 ft^2 at the stand level. The size of patches or openings should be no greater than 0.50 acre and should not exceed 25 percent of the total treatment unit area. Opening size would range from 0.10-0.25 acre where fire-resilient and drought-tolerant species need release to reduce competition. Opening size would range from .25-.50 acre where regeneration is encouraged or where poor crown conditions currently exist (weakened and suppressed trees). Openings should be no closer than 100 feet to the next opening.

Group Selection (GS)

Unit 27-30 is typed as capable NSO habitat and does not require an average canopy cover retention range of 40 percent. The goal of this prescription is similar to GS-40%, but allows for an increased ability to target pockets of disease and/or low vigor trees for removal, and to create openings around healthy, drought-tolerant species without being confined to average canopy cover retention of at least 40 percent.

Group Selection Greater than 60 Percent (GS-60%)

Stands would be harvested to a range of 60-70 percent canopy cover and would be treated using guidelines to reduce basal area between 160 and 180 ft^2 at the stand level. The size of patches or openings should be no greater than 0.25 acre and should not exceed 20 percent of the total treatment unit area. Opening size would range from 0.10-0.25 acre where fire-resilient and drought-tolerant species need release to reduce competition. Opening size would be no larger than 0.25 acre where regeneration is encouraged or where poor crown

conditions currently exist (weakened and suppressed trees). Openings should be no closer than 100 feet to the next opening.

Density Management (DM-60%)

The primary objective of the density management prescription is to reduce stand density in order to promote the growth and structural development of the remaining stand. Density management is prescribed in stands that are currently providing NSO roosting and foraging habitat. Based on the unit location (within priority NSO sites), the objective for spotted owl management would be to treat and maintain the habitat. Spacing of the residual (leave) trees will involve crown spacing of the healthiest dominant and co-dominant trees to achieve a canopy cover of 60 percent or greater at the stand level. Stands would be treated to a relative density range of 0.50-0.60 as a result and would be thinned using guidelines to reduce basal area to between 160 and 180 ft^2 per acre. Unique stand features such as snags, CWD, large hardwoods, and trees exhibiting older characteristics would be retained to maintain desired structural components for wildlife. Components with these characteristics that need to be felled for operational or safety purposes would be left on site where feasible to meet CWD requirements.

Smaller trees would be targeted for removal over larger trees. Trees targeted for removal would include those exhibiting crown decline, narrow crown widths, and those that contribute the least to the canopy layer or structural components. Trees that demonstrate these characteristics would be individually selected for removal, unless it compromises the required minimum canopy cover of 60 percent. Trees may be marked in small patches (i.e., groups of trees with poor crowns) and left in clumps (i.e., groups of old trees) to create hiding cover for wildlife species and increase spatial heterogeneity. The size of patches or openings should be no greater than 0.20 acre and should not exceed 5 percent of the total treatment unit area.

Structural Retention (SR) – Regeneration Harvest

Regeneration harvest is proposed in stands with declining growth rates or experiencing deterioration from high stand density levels, insects, disease, or other factors. The silvicultural objectives for these stands are as follows:

1) Create growing space for a new cohort of trees and/or increase the growth of existing understory trees.
2) Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long term survivability.
3) Create regeneration opportunities for species that are shade intolerant and provide long-term success or survival of less prominent species (i.e., sugar pine).

This prescription applies to stands primarily dominated by mature Douglas-fir, have poor annual stand growth, and/or have limited conifer regeneration. Thinning these stands would not provide the desired growth and increase in productivity. As directed by the Medford District RMP, structural retention as proposed under this project would leave at least 16 to 25 large green conifer trees per acre, provided structural objectives are met (USDI BLM 1995, p.193). Large green conifer trees are described as those greater than 20 inches DBH. Stands would be harvested to a canopy cover range of 30-40 percent.

Riparian Thinning (RT)

The objectives of riparian thinning treatments are similar to the objectives of density management (DM), primarily to enhance and accelerate the production of healthy trees in riparian areas. This prescription is used to implement management within specified Riparian Reserves consistent with Aquatic Conservation Strategy (ACS) objectives, while meeting site-specific silvicultural objectives.

Treatments would be designed to maintain or improve aquatic systems, achieving consistency with short and long term ACS objectives. The proposed treatment areas are overstocked, even-aged stands lacking structural complexity and stagnant in growth. These vegetation treatments would increase species diversity and tree vigor within dry Douglas-fir and ponderosa pine stands that exhibit uncharacteristic stand structure and species composition. Trees would primarily be thinned from below to remove the suppressed component of the stand, followed by the thinning of the main canopy to reduce density and to remove trees infected by disease or insects

or otherwise declining (based on crown ratio and form). The healthiest Douglas-fir, ponderosa pine, and sugar pine trees would be retained. Stands would be treated to a relative density range of 0.35-0.50 as a result and would be thinned using guidelines to reduce basal area between 120 and 160 ft^2 per acre. Stands would be thinned to a canopy cover range of 50-60 percent. This would remove fuel accumulations in patches while thinning lower and middle tree layers to accelerate development of a mature multi-layered stand structure. Vegetation would be treated in designated Riparian Reserves outside of a no treatment buffer (50 feet).

Small Diameter Thin (SDT) – Stewardship

The objectives of the small diameter thinning treatments combine the objectives of selective thinning (a commercial treatment), and understory reduction (a non-commercial treatment). This prescription is likely to be implemented with the tool of stewardship (goods for services), where the goods (merchantable material) help offset the services of understory reduction. Stewardship contracting is a treatment tool that provides a means to treat stands that may otherwise go untreated due to marginal economic feasibility. Refer to the objectives of selective thinning and understory reduction.

Dry Douglas-fir stands would be treated to a relative density range of 0.30-0.40 as a result and would be thinned using guidelines to reduce basal area between 100 and 140 ft^2 per acre. Ponderosa pine stands would be treated to a relative density range of 0.25-0.35 as a result and would be thinned using guidelines to reduce basal area between 80 and 120 ft^2 per acre. Stands would be thinned to a canopy cover range of 35-50 percent. Understory reduction consists of cutting small trees (generally less than 8 inches DBH for conifers and less than 12 inches DBH for hardwoods) and vegetation with chainsaws and disposing of the material by hand-piling and burning or use of a lop and scatter method in lighter fuels. Small diameter thinning would increase tree growth rates and promote horizontal and vertical structural heterogeneity in stands. Small diameter thinning is also used in stands where pines and shade-intolerant hardwood species are diminishing in vigor and numbers due to overcrowded stand density conditions.

Understory Reduction (Fuels)

The silvicultural objectives for understory reduction are as follows:

1) Reduce stand density to increase tree growth, quality, and vigor of existing understory trees.
2) Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long term survivability.

Understory reduction is used to accomplish pre-commercial thinning and fuels reduction treatments for even and uneven-aged conifer stands. Understory reduction consists of cutting small trees (generally less than 8 inches DBH for conifers and less than 12 inches DBH for hardwoods) and vegetation with chainsaws and disposing of the material by hand-piling and burning or use of a lop and scatter method in lighter fuels. Understory reduction would increase tree growth rates and promote horizontal and vertical structural diversity in stands. Understory reduction is also used in stands where pines and shade-intolerant hardwood species are diminishing in vigor and numbers because of overcrowded stand density conditions. This prescription may be applied to understories and/or areas of high stocking of small trees in commercial stands proposed for harvest.

Commercial Harvest Yarding Methods

Ground-Based Yarding

In ground-based yarding, a moving vehicle (skidder) travels to the logs and pulls (i.e., skids) them to the landing. The machines used for skidding are diverse and can be wheeled or tracked. Trees and logs are removed from the woods and yarded to the landing by lifting the front end of the logs off the ground. Skidders travel on skid trails that are approved by the BLM.

A feller-buncher fells and bunches trees mechanically. The typical feller-buncher is track mounted. Some must move from tree-to-tree for felling, while others use a boom to fell multiple trees from a single position. The feller-buncher bundles trees for a skidder to pick up and move to a landing.

A forwarder is a rubber-tired machine that typically works with a harvester. Harvesters move through the stand felling, delimbing, bucking, and bunching trees selected for harvest. Forwarders travel into the woods on slash created by the harvester. They load the logs piled by the harvester and carry them to the road where they are off-loaded. The logs carried by a forwarder do not touch the ground during travel. Ground-based yarding is generally limited to slopes of 35 percent or less.

Bull-lining is a ground-based yarding method where a cable is dragged from the skidder to the log and the log is dragged along the ground to a skid trail, road or landing.

Skyline (Cable) Yarding

Skyline or cable yarding is a cable system that pulls the logs to the landing using steel cables. A stationary machine, or yarder, would be located on the road and would pull logs up to the landing with one-end of the log suspended. Skyline (cable) yarding is typically used where the ground is too steep for ground-based yarding.

Helicopter Yarding

This harvest method lifts trees with a helicopter bunched together by a cable, moving the trees from the treatment unit to a landing area near a road. Helicopter yarding allows for full suspension of the trees from the treatment unit to the landing area and does not create skid trails or corridors. Trees posing safety hazards would be removed when operationally required.

Pre-Designated Skid Trails, Tractor Swing, and Landings

Pre-designated skid trails are skid trail routes specifically selected by the BLM to facilitate yarding operations. The skid trail can be an existing skid trail or newly located and is intended to be used by the skidder operator. Skid trails are generally about 12 feet wide and vary in length.

Tractor swinging (or shuttle skidding) occurs when one or more skidders accumulate loads to a designated location and the accumulated loads are then skidded along a single pre-designated skid trail for the run to the landing.

New landings would typically be 0.5 acre or less and would be located on stable locations, such as ridgetops, stable benches, or flat areas outside of Riparian Reserves and 100-acre northern spotted owl cores, and would adhere to associated Project Design Features (see Section 2.C.4.).

Fuels Reduction and Activity Slash Treatment Methods

The BLM would conduct a fuels assessment within each unit following harvest activity. This assessment would determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit. Fuels treatments could include lop and scatter, pile and burn, underburning. Most fuels treatments would begin within 90 days after completion of harvest activities.

Lop and Scatter

When the slash (live and dead material 9 inches or less in diameter) remaining in the units after harvest is less than 11 tons per acre, all stems and branches would be cut from the tree trunk and scattered. Trunks 7 inches in diameter and less would be cut to 3-foot lengths and left on the ground. The depth of the slash would not exceed 18 inches.

Slash Piling and Pile Burning

Hand piling and hand pile burning would occur when the slash remaining in the units after harvest is greater than 11 tons per acre. Material between 1 and 7 inches in diameter and longer than 2 feet would be piled by hand. The piles would be a minimum of 4 feet high and 6 feet in diameter. Piles would be burned in the fall, winter, or spring, and would occur within one year or less of being piled.

Mechanical piling and pile burning could occur on roads and landings. Mechanical equipment would pick up material and walk it to the pile. Material would not be pushed into a pile. If machine piled, material between 2 and 12 inches in diameter and 2 feet long would be piled. The piles would be a minimum of 8 feet high and 10 feet in diameter. Piles would be burned in the fall to winter and would occur within one year or less of being piled.

Underburning

Underburning is proposed in timber sale units to treat residual slash and reduce fire hazard. In proposed timber sale units, underburning would be used to remove at least 60 percent of slash less than 3 inches in diameter and a lesser amount of larger fuel size classes. Underburning would be implemented in the spring or fall. Timber sale units are analyzed for possible underburning based on the anticipated amount of residual slash, resource objectives, strategic and logistical concerns (e.g., aspect, ridges, roads, proximity to other fuels treatments, values at risk, etc.). BLM fire and fuels management personnel would conduct post-treatment evaluations to determine the need for burning.

b. Transportation Management

Permanent Road Construction

Alternative 3 does not propose any new permanent road construction. Alternative 4 proposes to construct 3.24 miles of road to access commercial harvest units (Table 2-2). Permanent road construction is proposed to access treatment units where there would also be a need of forest future management; the new roads would be permanently added to the road system. All road construction would adhere to the associated PDFs identified in Section 2.C.4. below.

Following use, all newly constructed permanent roads would be surfaced with adequate rock or closed with a gate or blocked and winterized prior to the wet season. Blockage at the entrance shall consist of constructing an earthen trench barrier to prevent motorized vehicle use for an extended/indefinite period. Prior to closure the road will be left in an erosion-resistant condition.

Table 2-2. Permanent road construction proposed under Alternative 4.

Unit(s) Accessed	New Construction (miles)
26-20A, 26-20B, 27-20	1.08
25-20	0.30
Helicopter Landing for 25-20, 25-21A, 25-21B, 25-22, 25-23	0.07
36-23A, 36-24	0.42
26-21, 36-20	0.58
23-30, 23-31, 23-32, 26-30	0.22
19-10A, 19-10B	0.57
Total	3.24

Temporary Road Construction

Alternative 3 does not propose any temporary road construction. Alternative 4 proposes 1.28 miles of temporary road construction (Table 2-3). Temporary roads would allow operators temporary access to treatment units. Temporary road construction would occur where no previous routes exist. Temporary roads would typically be located on stable areas such as ridges or gentle side slopes. Construction would include clearing, grubbing, removing, and disposing of vegetation and debris from within established clearing limits. Work also includes the construction of a minimum-width subgrade by excavating, leveling, grading, and outsloping.

Temporary roads constructed would be fully decommissioned or obliterated at the completion of harvest activities. Fully decommissioning would include decompacting the surface to a depth of 12 to 18 inches or to a point where 10 inches diameter stones are the dominant substrate (whichever is shallower). Where it is

determined by the Authorized Officer that decompacting temporary roads would cause unacceptable damage to the root systems of residual trees along a majority of the temporary road, such as where new temporary roads are constructed within the dripline of 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. Slash, boulders, and other debris would be placed along the road's 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, earthen berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle use is precluded. Seeding with approved native seed species and mulching with weed-free straw or approved native materials would occur within 100 feet of the roads entrance. Obliterated roads would be treated similar to fully decommissioning; however, where fill occurs, recontouring and outsloping the travelway to disperse runoff would occur. Treatments described may be modified by the Authorized Officer in consultation with appropriate earth scientists or aquatic specialists.

Table 2-3. Temporary road construction proposed under Alternative 4.

Road Number	Approximate Length (miles)	Surface
T39 R3W Spur 24-1	0.22	NAT
T39 R3W Spur 23-1	0.12	NAT
T39 R2W Spur 31-1	0.07	NAT
T39 R2W Spur 34-1	0.15	NAT
T39 R2W Spur 28-1	0.12	NAT
T39 R3W Spur 27-1	0.11	NAT
T39 R3W Spur 10-1	0.49	NAT
Total	1.28	

* Surface: NAT=Natural

Timber Hauling and Road Renovation

An estimated 48 miles of existing roads would be used as haul routes under Alternative 3 and about 61 miles under Alternative 4. Haul routes would be improved as needed prior to forest management activities to meet BLM standards (Tables C-5 and C-6, Appendix C).

Road improvements may include surfacing or spot rocking if needed; ditches would be cleaned where needed; catch basins would be cleaned or enlarged as needed; brush growing near culvert inlets or outlets would be removed; culvert inlets and outlets would be cleaned; and brush, limbs, and trees would be removed along roadways as needed to improve sight distance and allow for proper road maintenance.

Road surfacing is placing rock the full width and desired length of the road. Surfacing is done by grading and reshaping the road subgrade, then hauling, placing, and compacting the new surfacing material on the prepared subgrade.

Spot rocking involves placing rock on the road in areas as needed to help control erosion and maintain the road surface. This restores the road surface and road condition making it suitable for driving and hauling. Crushed aggregate rock would be placed on sections of inadequately surfaced roads that would be used for hauling timber.

Decommissioning and Long-Term Road Closures

As a result of the Transportation Management and Inventory Assessment (TMIA) described in Section 2.B.2., numerous road segments were identified within the Upper and Little Applegate Watersheds and recommended for decommissioning, of which 9.63 miles of roads are proposed for full decommissioning (Table 2-4) and another 7.34 miles are proposed for long-term closure (Table 2-5) under the Nedsbar Project.

Table 2-4. Road proposed for decommissioning under action alternatives.

Road Number	Road Name	Approximate Length (miles)	Surface
39-1-19.0[1]	Goat Cabin Sp	0.49	Natural
39-2-25.0[1]	Carnegie Gu	0.89	Natural
39-2-34.3[1]	Lick Gulch Spur	0.31	Natural
39-3-27.1[1]	Neds Gulch	0.18	Natural
39-1-19.2	Bull Pine Gap	0.13	Natural
39-2-2.0	Upper Grubb Gu	0.65	Natural
39-2-3.0	Grubb Gu A Sp	1.05	Natural
39-3-24.0	Grouse Crk	1.09	Natural
39-3-27.0	Boaz Gulch	0.97	Aggregate
40-2-2.0	Shump Gu Sp	0.45	Natural
40-2-3.3	Quartz Gulch Spur	0.53	Natural
40-2-5.4	Victors Waters Sp	0.19	Aggregate
40-2-5.5	Felix Gulch	0.21	Aggregate
40-2-6.1	Headwaters Sp	0.27	Aggregate
		2.23	Unknown
	Total	9.63	

[1]Funding to decommission these roads is identified.

Table 2-5. Road proposed for long-term closure under action alternatives.

Road Number	Road Name	Approximate Length (miles)	Surface
39-1-17.2	Lower Rush Ck Sp	0.76	Natural Improved
39-1-17.3	Rush Ck Spur	0.53	Natural Improved
39-1-19.1	Rush Creek Spur	0.11	Natural Improved
39-1-28.0	Brickpile Ranch A	0.36	Natural Improved
39-1-30.0	Rush Crk	0.33	Natural Improved
39-2-15.1	Wolf Gap	0.34	Aggregate
39-2-17.1	Armstrong Gu Sp	0.53	Natural Improved
39-2-25.1	Lower Ridge Spur	0.27	Natural Improved
39-2-27.1	Cantral Fire Rd	0.82	Natural Improved
39-2-3.2	Grubb Gu C Sp	0.63	Aggregate
39-2-30.1		0.69	Natural Improved
39-2-34.0	Lick Gulch A	0.69	Natural Improved
39-2-34.1	Lick Gulch Spur	0.40	Natural Improved
39-2-36.1	Lower Upper Carnegie	0.41	Natural Improved
39-2-5.1		0.05	Natural Improved
40-2-3.2	Quartz Gulch Sp B	0.42	Natural Improved
	Total	7.34	

Full decommissioning would entail mechanically treating the road, or if there is currently an effective closure in place and the drainage is stabilized, the road would not be physically treated but fully decommissioned by removing it from the transportation system (i.e., natural decommissioning). For the 7.34 miles of roads proposed for long-term closure under this alternative, treatment may entail stabilizing drainage, including removing culverts as necessary and installing features to restrict vehicle use.

Of the miles proposed for full decommissioning, 1.88 miles of road has funding identified, while the remaining 7.75 miles of road would be decommissioned as funding becomes available. The roads where funding identified, 39S-1-19.0, 39S-3-27.1B, 39-2-25.0, and 39-2W-34.3, are currently designated as year-round closures. These four roads are in various states of natural decommissioning, the 39S-1-19.0and 39-2-25.0 roads being the most recovered with vegetation. Permanently decommissioning these four roads would ensure the vegetative and hydrologic recovery of 7.1 acres of Riparian Reserve.

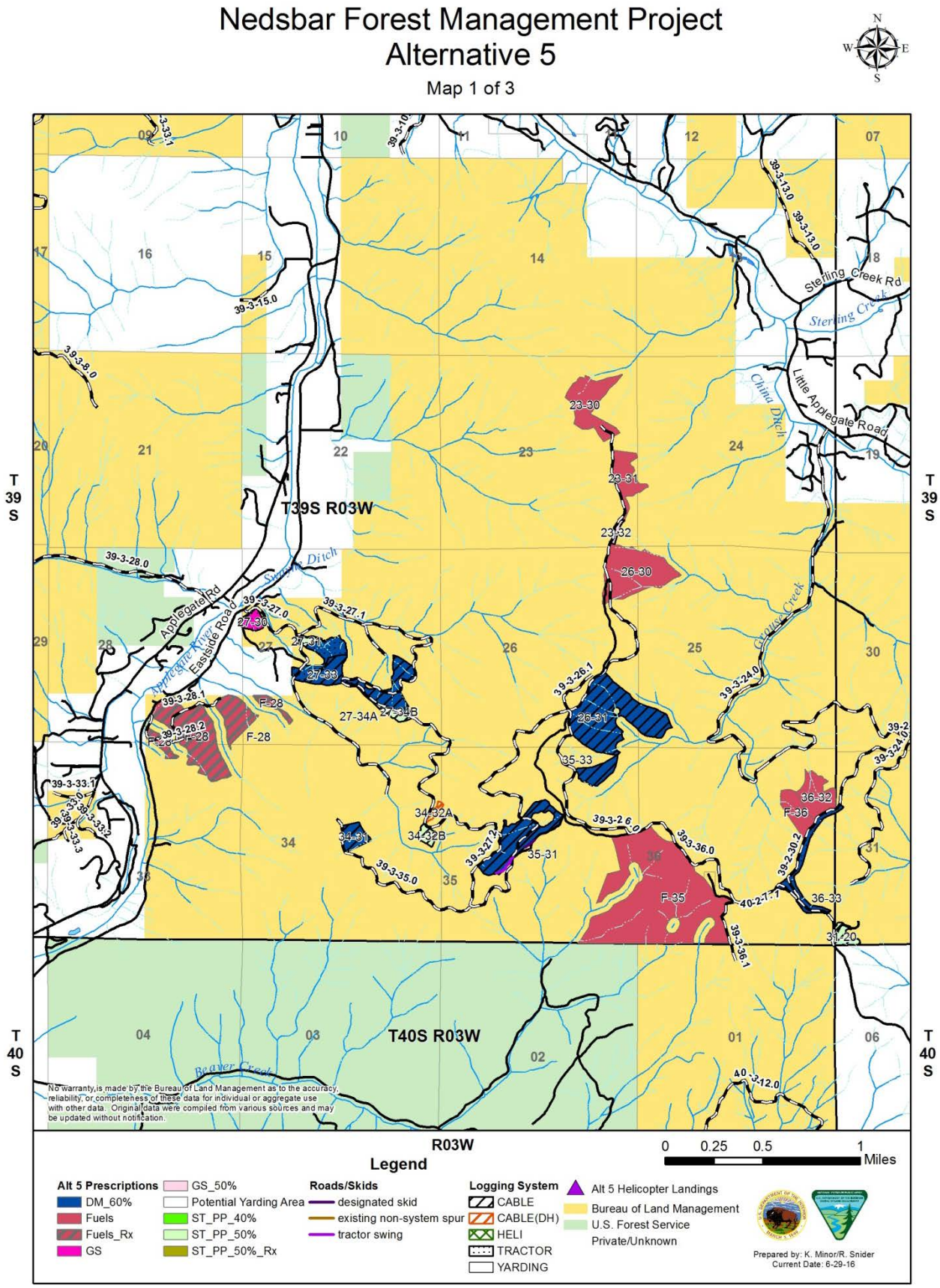
3. Alternative 5

Alternative 5 is a community-developed alternative submitted for full consideration in this EA alongside other alternatives considered for the Nedsbar Forest Management Project. In the spirit of the Applegate AMA's management direct to, "Seek innovative approaches to achieve technical and social objects" and "Develop localized idiosyncratic methods that will best reflect the needs of the land and communities" (USDI BLM 1995, p. 36), the Ashland Field Manager asked a representative group of citizens living in the area to submit a "community alternative" for the Nedsbar Project that would meet the purpose and needs identified in Chapter 1.

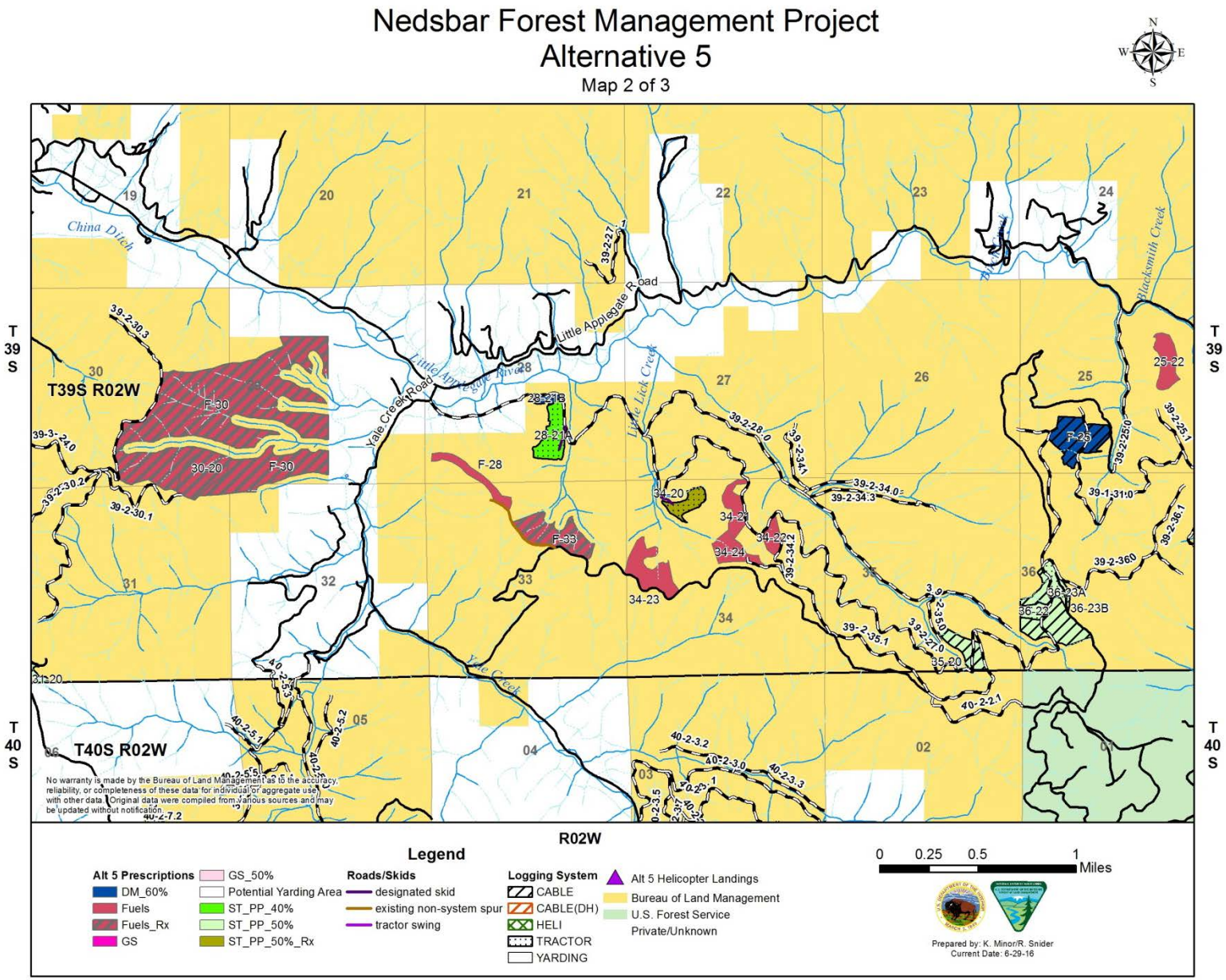
A core group of dedicated members of the community, known as the Community Alternative Working Group (CAWG) presented their action alternative to the BLM on February 13, 2015 and subsequently submitted unit selections, prescriptions, deferred units, and a map on March 6, 2015. Throughout the community alternative development process, the BLM collaborated with the CAWG through sharing of data, field trips, and meetings to discuss the Nedsbar Project. The community alternative, as originally submitted (Appendix E), has been refined by the CAWG and the BLM to provide a comparative summary, correct existing information, and incorporate additional information from field inventories and further data analysis and is presented here as Alternative 5.

Alternative 5 applies forest management actions that would provide economic return and benefit stand health, resiliency, and stability. It minimizes the impacts to northern spotted owls and other special status species within stands in the Planning Area and achieves a higher level of protection for NSOs by reducing the amount of acres treated within NSO home ranges and reducing the amount of habitat downgrade. Alternative 5 does not include regeneration harvest, riparian thinning or new road construction. It addresses social values identified by the CAWG as important to the local community (Maps 2-7 to 2-9).

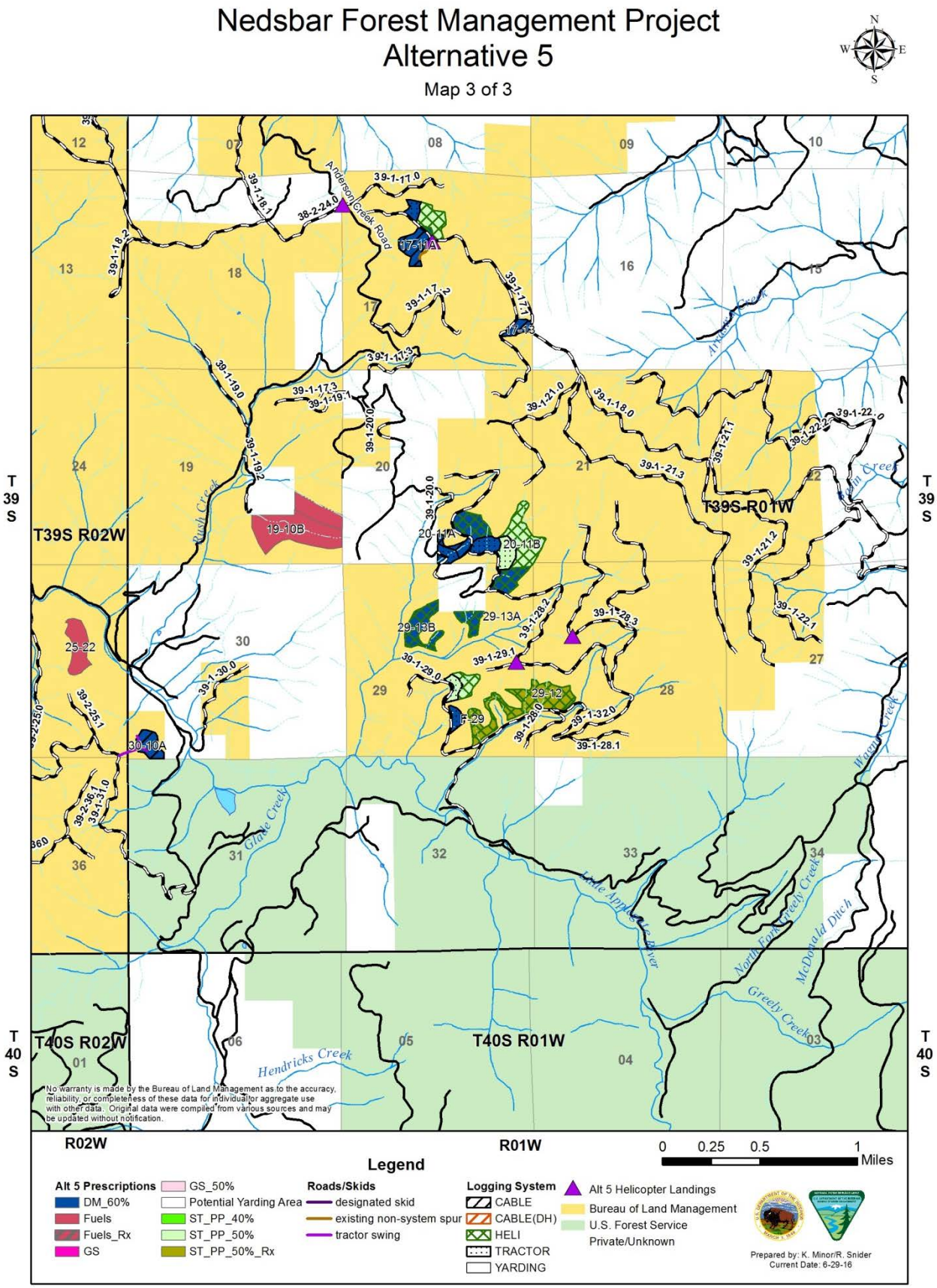
Map 2-7. Nedsbar Forest Management Project – Alternative 5



Map 2-8. Nedsbar Forest Management Project – Alternative 5



Map 2-9. Nedsbar Forest Management Project – Alternative 5



Under Alternative 5, approximately 1,412 acres would be treated using various commercial and non-commercial silvicultural prescriptions as described below. Approximately 536 acres are proposed for commercial or stewardship harvest treatments and about 876 acres are proposed for fuels treatments (Table 2-6 below and Tables C-7 and C-8 in Appendix C).

Table 2-6. Alternative 5: Summary of acres by silvicultural prescription and harvest method.

Forest Management	Alternative 5
Commercial Prescriptions	Estimated Acres
Selective Thinning Ponderosa Pine 40% Canopy Cover (ST-PP-40%)	20
Selective Thinning Ponderosa Pine 50% (ST-PP-50%)	140
Selective Thinning Ponderosa Pine 50%/Follow-up Underburning (ST-PP-50%-Rx)	47
Group Selection 50% Canopy Cover (GS-50%)	2
Group Selection (GS)	6
Density Management 60% Canopy Cover (DM-60%)	321
Total	536
Non-Commercial Prescriptions	Estimated Acres
Understory Reduction (Understory Thinning and Fuels Treatments)	445
Understory Reduction /Follow-up Underburing (Understory Thinning and Fuels Treatments/Future Underburning)	431
Activity Fuels*	536
Total	1,412
Timber Harvest Method	Estimated Acres
Ground-based (Tractor) Yarding	124
Skyline (Cable) Yarding	289
Helicopter Yarding	123
Total	536

*All commercial units would be treated for non-commercial fuels after logging and before slash removal.

a. Forest Management

Proposed treatments would apply silvicultural prescriptions to achieve management goals (as revised by the CAWG, Appendix E) by putting stands on trajectories towards the development of structural complexity, age and size variability, increased vigor, and resiliency to disturbances. The prescriptions take into account changes in the potential vegetation based on factors such as aspect, slope, available moisture, and soil type, in addition to species composition, stem density, and habitat considerations for late-successional dependent species, particularly the NSO. The prescriptions also consider some specific goals of local community as represented by the CAWG, including supporting the growing local economy associated with " agriculture, horticulture, vineyards, tourism, recreation and visitor amenities;" preserving a clean water supply; preserving mature fire-resistant trees and species diversity (both conifers and hardwoods); preserving existing community-defined unroaded areas; deferring construction of new roads; and meeting the intent of the Applegate AMA Guide (USDI BLM and USDA FS 1998).

The silvicultural prescriptions that would be used to accomplish the goals and objectives for Alternatives 5 are described in the following sections. Alternative 5 generally proposes higher canopy cover retention levels as compared to prescriptions for Alternatives 3 and 4, as well as "flexible diameter limit" that in general limits commercial harvest to trees under 20 inches DBH, but allows for the diameter limit to be adjusted down based on site conditions and treatment objectives.

Silvicultural Treatments

Selective Thinning

The objectives for selective thinning under Alternative 5 are similar to those described for Alternatives 3 and 4 (Section 2.C.2.a.). The following target conditions would be applied to Selective Thinning units for Alternative 5 based on their vegetation composition.

Selective Thinning – Ponderosa Pine (ST-PP-40%)

Unit 28-21A is outside of any known NSO sites and outside of the NSO CHU. The goal of this prescription is to retain the groupings or clumps of the dominant trees. These groupings of pine would be retained and encouraged by thinning out competing Douglas-firs up to 18 inches DBH, particularly those within one crown radius of the drip line of pines or groupings. Ponderosa pines over 16 inches DBH would not be thinned. Canopy cover would be maintained at 40-50 percent. Prescribed fire would be utilized to maintain stand conditions 3-5 years following implementation.

Selective Thinning – Ponderosa Pine (ST-PP-50%)

The goal of this prescription is similar to ST-PP-40% under Alternatives 3 and 4, but with higher canopy cover retention of 50-60 percent. Treatments generally favor pine and hardwoods and impose flexible diameter limits of 18 to 20 inches DBH with one unit (Unit 27-31) limiting thinning of pines to those less than 14 inches DBH.

Selective Thinning – Ponderosa Pine Followed with Prescribed Fire (ST-PP-50%-Rx)

The goal of this prescription is similar to ST-PP-40% under Alternatives 3 and 4, but with higher canopy cover retention of 50 percent. Treatments generally favor pine and hardwoods and impose flexible diameter limit of 20 inches DBH with one unit (Unit 34-20) limiting thinning of pines to those less than 12 inches DBH. Prescribed fire would be utilized to maintain stand conditions 3-5 years following implementation.

Group Selection

The objectives for group selection under Alternative 5 are similar to those described for Alternatives 3 and 4 (Section 2.C.2.a.), promoting shade intolerant species such as pine and oak which have been encroached by more shade tolerant species, such as Douglas-fir. The following target conditions would be applied to Group Selection units for Alternative 5 based on their vegetation composition.

Group Selection Greater than 50 Percent Canopy Cover (GS-50%)

Unit 23-32 is an east-facing Douglas-fir stand on Cinnabar Ridge. The stand has high levels of Douglas-fir mortality. The prescription for this unit would include mortality salvage of the Douglas-fir snags within 100 feet of the road prism. Larger snags (up to 6-10 per acre) would be retained. All live tree over 14 inches DBH would be retained and canopy cover should be maintain at about 50 percent.

Group Selection (GS)

Unit 27-30 is typed as capable NSO habitat and does not require an average canopy cover retention range of 40 percent. The goal of this prescription is similar to GS-40 under Alternatives 3 and 4, but allows for an increased ability to target pockets of disease and/or low vigor trees for removal, and to create openings around healthy, drought-tolerant species without being confined to average canopy cover retention of at least 40 percent. All pines would be retained, except those young, skinny, low vigor ones less than 8 inches DBH. All healthy trees in the overstory canopy would be retained even those less than 20 inches DBH.

Density Management (DM-60%)

The objectives for density management under Alternative 5 are to reduce stand density in order to promote the growth and structural development of the remaining stand. Smaller trees would be targeted over larger trees. Trees targeted for removal would include those that exhibit crown decline, narrow crown widths and those that contribute the least to the canopy layer or structural components. Groupings of overstory conifers would be

retained and competition around the groups should be reduced by thinning the younger, smaller trees. Canopy cover would be maintained at 60-70 percent. Flexible diameter limits range from 16 to 20 inches DBH. Structural components of the stand (e.g., snags, CWD) should be maintained to the extent possible.

Understory Reduction (Fuels and Fuels-Rx)

The objectives for understory reduction under Alternative 5 are similar to those described for Alternatives 3 and 4 (Section 2.C.2.a.). The main difference between fuels reduction treatments (Fuels) and fuels reduction with follow-up underburning (Fuels-Rx) is that the latter recommends the use of prescribed fire to maintain stand conditions within 3-5 years of the initial treatment.

Commercial Harvest Yarding Methods

Commercial harvest yarding methods for Alternative 5 are identical to those described for Alternatives 3 and 4 in Section 2.C.2.a.

Fuels Reduction and Activity Slash Treatment Methods

Fuels reduction and activity slash treatment methods (i.e., lop and scatter, slash piling, and underburning) are the same as those described for Alternatives 3 and 4 in Section 2.C.2.a., except as follows:

- Alternative 5 proposes fuels treatments within commercial units before the harvest; whereas, under Alternatives 3 and 4, the BLM would conduct a fuels assessment within each unit following harvest activity to determine fuel treatment needs.
- Clean-burn Kraft paper would be used instead of black plastic for covering burn piles.
- All activity slash would be burned within two years of pile creation. Small, isolated islands of shrubby or young vegetation would be retained for wildlife rather than leaving hand piles unburned.
- All commercial harvest units would be treated for non-commercial fuels after logging and before slash removal.
- Whole tree logging would be discouraged to avoid creation of overly large piles created adjacent to roadsides and landing areas.
- Activity slash should be burned in dispersed hand piles.
- In prescribed fire units, maintain a maximum fuel profile of 3.2 tons per acre in the 0-3 inch size class before burning to produce low severity fires.
- Utilize burn windows with relative humidity readings of 30-60 percent and 50-80 percent duff moisture when conducting prescribed fires.

b. Transportation Management

Alternative 5 does not propose any new permanent or temporary road construction.

Timber Haul and Road Renovation

An estimated 39 miles of existing roads would be used as haul routes under Alternative 5. Haul routes would be improved as needed prior to forest management activities to meet BLM standards (Table C-9, Appendix C).

Road improvements may include surfacing or spot rocking if needed; ditches would be cleaned where needed; catch basins would be cleaned or enlarged as needed; brush growing near culvert inlets or outlets would be removed; culvert inlets and outlets would be cleaned; and brush, limbs, and trees would be removed along roadways as needed to improve sight distance and allow for proper road maintenance.

Road surfacing is placing rock the full width and desired length of the road. Surfacing is done by grading and reshaping the road subgrade, then hauling, placing, and compacting the new surfacing material on the prepared subgrade.

Spot rocking involves placing rock on the road in areas as needed to help control erosion and maintain the road surface. This restores the road surface and road condition making it suitable for driving and hauling. Crushed aggregate rock would be placed on sections of inadequately surfaced roads that would be used for hauling timber.

4. Project Design Features

Project Design Features (PDFs) are an integral part of the action alternatives (Alternatives 3, 4 and 5) and are considered in the analysis of project impacts in Chapter 3. They are developed to avoid or reduce the potential for adverse impacts to resources. PDFs include seasonal restrictions on many activities that help 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. Where applicable, PDFs reflect Best Management Practices and standard operating procedures.

The PDFs listed below would be 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.

Best Management Practices (BMPs) are designed to reduce nonpoint source pollution to the maximum extent practicable and are considered the primary mechanisms to achieve Oregon Water Quality standards. PDF implementation, in addition to establishment of Riparian Reserves, would equal or exceed Oregon State Forest Practices 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). BMPs would be monitored and, where necessary, modified to ensure compliance with Oregon Water Quality Standards.

a. Timber Harvest and Yarding

Objective 1: Protect Riparian Reserves.

- Do not cut vegetation within two site-potential trees (310 feet) of fish-bearing streams and within one site-potential tree (155 feet) of non-fish-bearing, perennial, and intermittent streams, except as described below for limited Riparian Reserve thinning.
- No harvest within Riparian Reserves except for forest thinning proposed in Units RT-19, RT-27A, RT-27B, RT-27C, and RT-28, designed to meet Aquatic Conservation Strategy Objectives; no harvest or vegetation cutting would occur within 50 feet of a stream channel.
- Trees would be directionally felled away from Riparian Reserves, except for units RT-19, RT-27A, RT-27B, RT-27C, and RT-28 identified for riparian thinning where trees will be felled toward the lead.
- No use of skid trails in Riparian Reserves except as described in the alternatives (Sections 2.C.2. and Maps 2-1 to 2-6) to access units RT-19, RT-27A, RT-27B, RT-27C, RT-28, 34-20, and 27-32.
- No logging slash would be hand piled within 50 feet of the stream channel. Slash from harvesting in units identified for riparian thinning will be lopped and scattered within 50 feet of the stream channel and may be hand piled in the remainder of the Riparian Reserves.

Objective 2: Prevent off-site soil erosion and soil productivity loss.

- 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 in order to protect the soil surface and maintain soil productivity.
- Wherever trees are cut to be removed, directional felling away from dry draws and developed waterways would be practiced. Trees would be felled to the lead in relation to skid trails. Developed waterways in the Project Area would be protected from damage and kept free of slash.
- All tractor skid trail locations would be approved by the BLM Contract Administrator prior to construction. Maximum area in skid trails used would be less than 12 percent of the harvest unit. Existing skid trails would be utilized when possible. Maintain 150-foot spacing between designated skid trails.
- Tractors would be equipped with integral arches to obtain one-end log suspension during log skidding and equipped with 75 feet of skidding line. Avoid tractor operations and skid trail locations on ground with slopes over 35 percent and areas with high water tables. 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.
- Skid trails are to be located by operators and approved by a BLM Contract Administrator prior to falling timber tributary to the skid trails. 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.
- Tractor yarding on designated skid trails would occur from 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 30 percent or less to ensure that soil rutting or displacement beyond the trail does not occur.
- In order to restrict the amount of detrimentally compacted soil to less than 12 percent in a timber harvest unit, designated skid trails must be spaced 150 feet apart on average. Equipment use off of these designated skids trails may be acceptable under either of the following conditions:
  - Allow mechanized equipment capable of creating and walking on slash (such as a cut-to-length system) to work off designated skid trails for one or two passes on at least 8 inches of slash and under dry soil conditions (less than 20 percent soil moisture content). Equipment must be 8 psi or less. Limit secondary trails to a minimum of 50-foot spacing off designated skid trails. All other use of ground-based equipment will be restricted to designated skid trails.

  and/or,

  - Allow mechanized equipment (feller-buncher systems) to work off designated skids tails when soil moisture content is less than 15 percent for 1 or 2 passes only (one round-trip). These 1 to 2 pass secondary trails must be spaced a minimum of 50 feet apart off of designated skid trails. All other use of ground-based equipment will be restricted to designated skid trails.

  If indications of detrimental soil compaction are observed (e.g., loss of soil structure, platiness) off of designated skid trails, the activity shall be suspended until the soil strength is sufficient to resist detrimental compactive forces.

- When measuring soil moisture, require a minimum of four gravimetric water content samples using the oven dry method. Soil samples must be collected between depths of 4-6 inches. Collect samples in the areas likely to have the highest water content.
- Restrict all other use of ground-based equipment to designated skid trails.

- All skid trails would be waterbarred according to BLM standards. 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 camouflaged and blocked by scattering slash and other debris. Also, where material such as logs and other organic debris exists, this material would be placed along the length of skid trails as determined by the Contract Administrator. The intent is to minimize erosion and routing of overland flow to streams by decreasing disturbance (e.g., unauthorized use by OHVs).
- Tractor yarding or other mechanized operations would be allowed over the snow when the snow pack is sufficient to protect the soil. Logging on snow would be allowed when snow depth is 18 inches or greater, and negligible ground surface exposure would occur during operations (USDI BLM 1995, p. 166). If snow depth is less than 18 inches, yarding may be allowed on designated skid trails if soil moisture content is less than 30 percent. Skid trail spacing and soil moisture requirements would be waived if ground-based operations occur over sufficient snow pack (as described above). The intent is to minimize compaction and off-site erosion and sedimentation to local waterways.
- For all cable (skyline) yarding, maximum operational suspension would be maintained on slopes greater than 50 percent. 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 in width) would be utilized to reduce soil productivity loss. Waterbars would be constructed manually on steeper slopes with higher erosion potential to direct water off the cable yarding corridors.
- Use full or partial suspension when cable yarding.
- Skyline and tractor yarding would be avoided up and down dry draws. The intent is to minimize the occurrence of erosion and compaction in existing areas of concentrated surface or substrate flow.
- Avoid downhill yarding (USDI BLM 1995, p. 166), except in Unit 34-32A.
- In helicopter units, avoid harvesting trees on potentially unstable ground (i.e. headwalls, sag ponds, or hummocky ground).
- 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.

b. Prescribed Fire

Objective 1: Protect Riparian Reserves.

- No mechanical piling allowed off of roads or landing areas. No mechanical piling would occur within Riparian Reserves.
- Pile burning would not occur within 50 feet of either side of the stream channel in Riparian Reserves for fish-bearing or perennial streams. Pile burning would not occur within 30 feet of either side of long-duration intermittent streams or in short-duration intermittent channels. No pile burning would occur within the draw bottom of dry draws.
- With underburns, no ignition would occur within 50 feet of either side of the stream channel in Riparian Reserves for fish-bearing or perennial streams or within 30 feet of either side of long-duration intermittent streams or in short-duration intermittent channels. Fire lines would be avoided in Riparian Reserves.
- Foam retardant would not be used in Riparian Reserves.

Objective 2: Prevent off-site soil erosion and soil productivity loss.

- Waterbars on tractor and hand fire lines would be constructed according to District guidelines (USDI BLM 1995, p.167).

- No pile burning would occur within the draw bottom of dry draws.
- Piles would be dispersed across treatment areas. Piles would be burned when soil and duff moisture are high enough to limit the consumption of adjacent duff and organic matter around the edges of the piles.
- No mechanical piling allowed off of roads or landing areas.
- Any containment lines constructed for fuels projects shall be sufficiently blocked to preclude use by OHVs. This would include such measures as placing logs and slash, falling trees less than 8 inches DBH (excluding Riparian Reserves) or other actions as necessary.

Objective 3: Conduct fuels reduction to minimize impacts to other resources.

- Provide an approved prescribed fire plan prior to ignition of all prescribed burn units in compliance with the 2014 Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484). The prescribed burn plan would contain measurable objectives, a predetermined prescription, and an escape fire plan to be implemented in the event of an escape.
- To prevent fire escapes and to minimize damage to residual vegetation and trees, schedule burning to occur when weather and fuel conditions allow for lower fire intensities (typically late fall through spring).
- Conduct prescribed burning in compliance with Oregon Department of Forestry's Smoke Management Plan. Smoke emission control could also include conducting mop-up as soon as possible after ignition is complete, covering hand piles to permit burning during the rainy season, and burning lighter fuels with lower fuel moistures to facilitate rapid and complete combustion, while burning larger fuels with higher moisture levels to minimize consumption.
- Disperse slash piles across the treatment areas. Burn slash piles when soil and duff moisture content is high.

c. Roads and Landings

Objective 1: Protect Riparian Reserves.

- New landings or expansion of old landings would be minimized in Riparian Reserves (USDI BLM 1995, p. 28).
- Existing landings within Riparian Reserves used during project implementation would be treated to reduce soil erosion. Treatment of the running surface would be dependent on site conditions and may include subsoiling to lift and fracture the compacted surface in place to a depth of 18 inches, roughing up the surface and mulching and seeding with native grasses or other approved material, ensuring proper drainage and disconnecting from the hydrologic system as determined by the authorized officer in consultation with aquatic and/or soils scientists. Where feasible, the landings shall then be blocked sufficiently to preclude vehicular use.

Objective 2: Prevent off-site soil erosion and soil productivity loss.

- Landing construction and road construction, renovation, and road maintenance would occur during the dry season (May 15th to October 15th). Variations in these dates would be permitted dependent upon weather and soil moisture conditions and with a specific erosion control plan (e.g., rocking, waterbarring, seeding, mulching, barricading) as determined by the Authorized Officer in consultation with aquatic and/or soils scientists. 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 that resource damage would not occur.

- All new permanent roads would receive adequate rock surfacing or would be closed and winterized prior to the wet season. Blockage at the entrance shall consist of constructing an earthen trench barrier to prevent motorized vehicle use for an extended/indefinite period. Prior to closure the road will be left in an erosion-resistant condition.
- Bare soil due to 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: the application of approved mulch and native seed; surface with durable rock material; or leave "as is" where natural rock occurs or where vegetation/topography prevents the movement of sediment.
- Fill slopes on all new landings and roads would be seeded with native or approved seed, and mulched, except where rock occurs.
- All helicopter landings and landings located along temporary roads or within Riparian Reserves would be treated as follows to reduce erosion and compacted area. Unless the landing is rocked or located within a quarry, the surface would be treated by decompacting the soil so that it is lifted and fractured in place leaving it loose and friable to a depth of 12-18 inches, or as determined adequate in consultation with watershed specialists. Slash, boulders and other debris would be placed as determined by availability 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 and vehicle access is precluded. Seeding with approved native seed species (20 lbs./acre) would occur. Mulching with weed-free straw or approved native materials would occur on landings within Riparian Reserves. Landings located on private property under the reciprocal right-of-way program would be treated as outlined above, including establishing riparian buffer widths equivalent to what is used on federal lands, unless the landowner objects to such treatment.
- Slash would be windrowed when available at the base of newly-constructed fill slopes to catch sediment.
- Temporary roads would be fully decommissioned at the completion of log haul and within the same season as constructed/opened unless needed for other purposes, such as access for firewood, etc. If this occurs, the road would be effectively blocked and winterized prior to onset of the wet season to prevent motorized use. These measures are designed to effectively discourage and prevent use by OHVs. Work would occur between May 15st and October 15th.
- All pre-existing features designed to limit mechanized/vehicle access such as previously decommissioned roads, earthen berms, logs, boulders, and other utilized materials shall be returned to pre-operational condition following harvest operations, as directed by the Authorized Officer.
- 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.
- Restrict the application of dust abatement materials, such as lignin, magnesium chloride, or approved petroleum-based dust abatement products, during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to a water body (typically not within 25 feet of a water body or stream channel).

Objective 3: Protect natural discharge patterns.

- Where possible, rolling grades and outsloping would be used on road grades that are less than 8 percent. These design features would be used to reduce concentration of flows and minimize accumulation of water from road drainage.

- Cross drain structures (culverts, water dips, waterbars) would be installed at intervals not greater than the spacing distances identified in the RMP (USDI BLM 1995, p. 177) for soil erosion class and road gradient.
- Armored splash pads (e.g., rock material) would serve as energy dissipaters at cross drain outlets or drain dips where water is discharged onto loose material or erodible soil.

d. Hauling

Objective 1: Prevent off-site soil erosion and soil productivity loss.

- No hauling would occur during the wet season (October 15th to May 15th) except on roads determined to have adequate surfacing as identified in the EA (Table C-10 Appendix C)[2]. Hauling during the shoulder season (October 15th to December 1st and April 1st to May 15th) on all other roads, including natural surface may be allowed during periods of prolonged dry conditions as approved by the Authorized Officer along with consultation with watershed specialists. Recognizing the difference between the shoulder season where prolonged dry periods sometimes occur and the middle portion of winter when precipitation is a common occurrence is important in preventing road related sediment from reaching stream channels.
- No hauling would occur on any roads during precipitation events when rutting is occurring or turbid runoff is likely to reach flowing streams or other surface water. This would protect the road from damage and decrease the potential for off-site sediment movement.
- Hauling on snow would be allowed by the Authorized Officer in consultation with an aquatic and/or earth science specialist on surfaced roads other than those identified in the EA when at least 4 inches of packed frozen snow is present.

Objective 2: Dust abatement.

- Dust abatement on BLM roads would include water or lignin and will be applied as necessary for safety, road condition, rights-of-way agreements.

e. Quarries

Objective 1: Minimize the spread of noxious weeds.

- There are no BLM quarries within the EA project area approved for use. Any rock needed for roads, helipads or drainage structures will have to be purchased from a private source. The private quarry would need to be inspected and approved by a BLM botanist to assure the rock material is weed free.

f. Oil, Hazardous Materials, and Emergency Response

Objective 1: Prevent and contain hazardous material spills.

- During operations described in the proposed action, 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

2 Wet season haul would be allowed on roads with durable rock surfacing and sufficient surface depth to resist rutting or development of sediment on road surfaces in accordance with the Medford District RMP plan maintenance BMPs (USDI BLM 2012).

accomplished in accordance with OAR 340-142, Oil and Hazardous Materials Emergency Response Requirements, contained in Oregon Department of Environmental Quality regulations.

- Store all hazardous materials and petroleum products in durable containers placed outside of Riparian Reserves. Locate so an accidental spill would be contained nor drain into any stream system.
- Refuel equipment at least 190 feet from streams, ponds, or other wet areas. Equipment would not be stored in a stream channel overnight. Hydraulic fluid and fuel lines would be in proper working condition in order to minimize leakage into streams.
- Check equipment for leaks prior to starting work. Do not allow equipment use until leaks are repaired or leaking equipment is replaced.

g. Silviculture

Objective 1: Protect residual leave trees.

- In group select units or pine site forests, where the single tree and group selection methods are used, logging slash should be hand piled outside of the driplines of individual reserve trees.
- Prescribed burns should be performed when moisture conditions are high enough and prescription windows are at a level that minimizes residual pine tree mortality during burning.

Objective 2: Create growing sites and reduce competing vegetation for natural and planted seedlings.

- Implement prescribed underburning when soil and duff moisture and weather conditions allow for low-intensity burning in order to minimize tree stress and adverse effects on tree roots and foliage.

h. Terrestrial Wildlife

Objective 1: Protect northern spotted owl.

- Seasonally restrict habitat modifying activities from March 1st to September 30th within 0.25 miles of known northern spotted owl nest sites. The seasonal restriction could be waived if the BLM Wildlife Biologist determines through protocol surveys that the site is not occupied, or the owls are not nesting. Table 2-7 lists the units with seasonal restrictions based on current NSO information. However, more units could be added if new NSO sites are located in the future.

Table 2-7. Units within 0.25 miles of NSO sites requiring seasonal restrictions.

Unit #	Township/Range/Section	Restriction Date
29-12	39S/01W/28	March 1st to September 30th
36-22	39S/02W/36	March 1st to September 30th
36-20	39S/02W/36	March 1st to September 30th
F-25	39S/02W/25	March 1st to September 30th
F-29	39S/03W/29	March 1st to September 30th
Landing Construction*	39S/03W/25	March 1st to September 30th

* In Section 25, the existing quarry would be modified to serve as a landing during logging operations. Because this location is within 0.10 mile (528 feet) of a nest site, logging activities in Table 2-1 will require noise buffers. A BLM wildlife biologist would determine if NSO are nesting or if the site is occupied.

Objective 2: Reduce disturbance (noise and habitat) impacts to northern spotted owl.

- Work activities that produce noise above ambient levels would **not** occur within specified distances (Table 2-8) of any nest site or activity center of known pairs and resident single between March 1st and June 30th (or until two weeks after the fledgling period) unless protocol surveys have determined the

activity center is not occupied, the NSO pair is not nesting or failed in their nesting attempt. The wildlife biologist has the authority to extend the seasonal restriction beyond June 30th if surveys indicate the NSO young have not developed sufficient mobility by June 30th.

Table 2-8. Noise disturbance distance buffers for northern spotted owl.

Type of Activity	Zone of Restricted Operation
Blast of more than 2 pounds of explosive	1 mile
Blast of 2 pounds or less of explosive	360 feet
Impact pile driver, jackhammer, or rock drill	195 feet
Helicopter or single-engine airplane	360 feet
Chainsaws	195 feet
Heavy Equipment	105 feet
Type 1 or 2 helicopter	0.25 miles*

*If less than 1,500 above ground level.

- No underburning would occur in roosting/foraging (RF) without a written review of a BLM wildlife biologist. Burning in a treat and maintain RF unit would be conducted in such a manner that it will not reduce the quality of the habitat. Residual trees will be protected during burn operations. Large down logs over 16 inches diameter would not be burned unless the average measure of tons per acre exceeds the Medford RMP guidelines.
- Prescribed burning during the nesting season (March 1st to Sept. 30th) within 0.25 miles of occupied habitat would be dependent upon resource area wildlife biologist review and concurrence. The USFWS would be notified of all such occurrences.
- Any fuel treatments in Unit F-30 would be designed and implemented in accordance with treat and maintain NRF habitat guidelines and protect Siskiyou Mountains salamander management sites.

Objective 3: Provide wildlife trees and habitat for cavity dependent species.

- Most non-hazardous snags would be retained in all harvest units. If it is necessary to fall snags for safety or operational reasons, they would be retained on site as coarse woody debris (CWD).
- Large, green broken-top trees and large snags with loose bark would not be marked for removal. These structures should be retained and protected where possible.
- CWD would be retained and protected from disturbance to the greatest extent possible during logging, burning and other project activities.
- Most trees damaged during felling operations that were not originally marked for removal or approved for removal for operational or safety reasons would be retained for future snag and cavity recruitment.
- All hardwoods would be retained unless they pose a safety hazard during logging operations.

Objective 4: Protect Special Status Species.

- Seasonally restrict disturbance activities from March 1st to July 15th within 0.25 miles of known and occupied nest sites of other raptors (e.g., goshawk, red-tailed hawk, Cooper's hawk, flammulated owl). No known nests exist within 0.25 miles of treatment units. This restriction would be implemented in the event of the discovery of such a nest prior to treatment activities.
- Seasonally restrict harvest activities up to 0.25 miles line of sight and 0.5 miles line of sight around active bald or golden eagle nest sites, respectively, from February 1st to August 15th. No known nests exist within 0.5 miles of treatment units. This restriction would be implemented in the event of the discovery of such a nest prior to treatment activities.
- Retain snags and large down wood (over 16 inches diameter) on site for fisher and NSO prey species.

- Debris piles associated with logging activity (slash and/or cull material piles) adjacent to roads or on landings would not be burned, chipped or made available for firewood cutting between February 1st and September 30th when the pile is mixed with various sized logs (multiple diameters) and there is some open space within the piled logs (not compact). Spring burning, chipping or firewood cutting could take place if a BLM wildlife biologist reviews the pile and determines it is not compatible with fisher denning/resting use.
- Known locations of Siskiyou Mountains salamander (PLST) occur in Unit 27-34 in a 5 acre patch of talus habitat. This unit would be treated through helicopter logging. To the extent feasible, protect the talus habitat from ground disturbing activities that have the potential to disrupt the well-developed moss and lichen layer growing on the talus. No post- harvest underburning would occur within this PLST location. No activities would take place during the wet season when PLST are active (November 1st through May 15th).
  - Canopy cover will be retained at a minimum of 40 percent within Unit 27-34 where the PLST site has been flagged and delineated through GPS by the BLM wildlife personnel.
  - No tractor yarding would occur within talus locations.
  - Trees would be directionally fell outward and away from talus locations where possible.
  - No more than 15 percent of talus habitat areas within units proposed for cable logging would be compacted from cable yarding with one-end suspension or fuels activity treatments.

Objective 5: Manage wildlife species protected as Survey and Manage species.

- Known great gray owl nests would be protected with a 100-acre management area and a 0.25 mile protection zone.
  - Within the 100-acre management area, management treatments are limited to protection or improvement of nesting habitat.
  - Within the 0.25 mile protection zone:
    - Provide a 300-foot buffer around natural openings greater than 10 acres that have nesting habitat associated with them. Within this 300-foot buffer, treatments are limited to protection or improvement of nesting habitat.
    - Prohibit disturbance from management activities within 300 feet of nesting habitat (1 mile radius for blasting) from March 1st through July 31st, or until fledging, whichever is later, unless surveys of the nesting habitat indicate no presence or no nesting. Table 2-9 lists the units with this seasonal restriction.

Table 2-9. Units requiring seasonal restrictions due to great gray owl nest locations.

Unit	TRS	Restriction Dates
19-20 B	T39S-2W-19, 30 T39S-3W-24, 25	March 1st to July 31st
RT-19	T39S-3W-19	March 1st to July 31st
Road Construction	T39S-2W-19	March 1st to July 31st
Landing Construction	T39S-2W-19	March 1st to July 31st

- Known locations of Survey and Manage and Bureau Sensitive snails, *Monadenia chaceana, Helminthoglypta hertleini*, *Monadenia fidelis celeuthia*, *Vespericola sierranus* and *Deroceras hersperium* (a slug), would be protected through the application of a no treatment buffer. Two known locations have been documented and buffers implemented.

Objective 6: Protect general wildlife habitat.

- Limit to the extent possible ground disturbing activities in areas with rock accumulations/talus. This includes designating skid roads and yarding corridors away from rock accumulations/talus wherever feasible.
- Leave approximately 10 percent of the hand piles created from hazardous fuels reduction treatments unburned across treatment areas to provide refugia for fisher, small mammals and other species (which provide a prey base for NSO), except as proposed under Alternative 5 which would burn all of the hand piles.
- In units proposed for regeneration harvest, leave a minimum of 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long. Decay class 1 and 2 logs will be credited toward the total. Where this management actions/direction cannot be met with existing course woody debris, merchantable material will be used to make up for the deficit (USDI BLM 1995, p. 39).

i. Botanical Resources

Objective 1: Minimize the spread of noxious weeds.

- Vehicle and equipment use off of existing roads in the Project Area is only permitted in the dry season.
- To reduce the risk of introducing and spreading noxious weeds all equipment will be pressure washed to ensure it is free of mud and vegetation debris prior to entering project area and subject to inspection by BLM personnel.
- Disturbed areas resulting in bare soil including landings, decommissioned roads, new road cuts and other such areas will be seeded with native seed and weed-free mulch as prescribed by the project botanist.
- Ensure hay, straw, and mulch are certified as free of prohibited noxious vegetative parts or seeds, per 75 FR 159:51102. Straw or hay must be obtained from the BLM or purchased from growers certified by the Oregon Department of Agriculture's Weed Free Forage and Mulch Program. If hay is used, it must be from native grasses only.
- Roadside noxious weed populations will be treated prior to project implementation and will be monitored and treated following the project as funding allows.
- Noxious weed sites in existing quarries and stockpiles will be treated prior to use.
- Nearly all roads in the project area have, or are adjacent to, known noxious weed populations which have been and will continue to be treated as funding allows but to minimize expansion and spread of these populations, road grading and ditch-pulling will not occur during periods of weed seed production and dissemination, approximately July 15th to September 1st; this period may begin earlier if plants mature sooner upon approval of the Authorized Officer in consultation with the botanist.

Objective 2: Protect Special Status, Survey and Manage, and Sensitive botanical species.

- All known Special Status, Survey and Manage (S&M), and Sensitive vascular plant, lichen, bryophyte, and fungi sites will be protected by one or more of the following: a) distance from project units and associated activities, b) seasonal restrictions, or c) a no-treatment buffer. Buffers would be determined based on species, proposed treatment, site-specific environmental conditions, and available management recommendations (Special Status Species Conservation Assessments and S&M Management Recommendations).
- Project associated activities such as thinning, fuels treatments and burn piles, tail hold trees, skidding or other activities that may cause disturbance, soil compaction or alteration of canopy will not occur in no-treatment buffers. Fuels piles must be at least 25 feet from Genter's fritillary (*Fritillaria gentneri*

(FRGE)) buffers and landing slash may not be burned within 100 feet of FRGE sites. Manual fuel reduction in FRGE buffers may only occur in the dormant season (June 15th to December 31st) and must retain 40 percent combined canopy coverage of trees and shrubs within the buffer. Broadcast burning is only permitted within FRGE sites during the dormant season (June 15th to December 31st).

- Trees will be directionally felled away from no-treatment buffers.
- No landings will be constructed or used within 100 feet of known BSS or S&M plants without approval of the Authorized Officer in consultation with a resource area botanist. Landings extending beyond project units in undisturbed habitat (e.g., outside existing road prism and unit boundaries) must have botany review prior to BLM approval of landing location. New landings may not be constructed with 300 feet of FRGE sites.
- The non-system road that forms the southern boundary of Unit 35-32 may be used as a skid trail. It passes through a plant buffer. The portion of the non-system road that passes through the buffer would be flagged on the ground. Within the flagged area the following PDFs would apply:
  - Shrubs between the flowering plant and the non-system road may be pruned but not uprooted.
  - The road may not be graded or widened.
  - Skidding must occur during the dormant season (June 15th – December 31st).
  - If whole-tree skidding occurs, and the branches are too wide to skid without disturbing vegetation outside the skid trail, trees must be limbed prior to skidding.

j. Rangeland Resources/Grazing

Objective 1: Protect rangeland improvements.

- During logging operations use of techniques such as directional falling will be used to prevent damage to fences, cattle guards, livestock watering troughs and other improvements.
- If damage to range improvements does occur, the BLM shall be notified and proper repair or replacement will occur within two 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 of structures such as stress or corner panels and gates requires pre-approval by BLM staff. Repair or cleaning of cattle guards damaged of filled with sediment by logging activities will require approval of BLM Road Engineering Staff for structural integrity and public safety compliance.

Objective 2: Prevent livestock trespass.

- During logging activities, operators will keep all gates closed and all livestock containment systems functional to keep livestock in authorized areas.

k. Cultural Resources

Objective 1: Protect known and newly identified cultural resources.

- Cultural sites located within the Area of Potential Effect would be buffered. Buffers would be established sufficient to protect the site features from adverse impacts of any proposed management activities. Buffers would be designed by BLM archeologists or cultural resource specialists. No treatments would occur within this buffer. No fire line construction, prescribed burning, or hand piling/burning would occur within the flagged boundaries of the recorded cultural resources. Timber that is to be removed next to a buffer would be directionally felled away from buffers for one site-potential tree length (155 feet).

- If, during project implementation, the contractor encounters or becomes aware of any objects or sites of cultural value on federal lands, such as historical or prehistorical ruins, graves, grave markers, fossils, or artifacts, the contractor would immediately suspend all operations in the vicinity of the cultural value and notify the Contracting Officer or Contract Officer Representative so the site can be evaluated by a BLM archaeologist.

5. Comparison of Alternatives

Table 2-10 compares the alternatives considered in detail for the Nedsbar Forest Management Project.

Table 2-10. Comparison of the alternatives.

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Forest Management	Approximate Area (acres)	Approximate Area (acres)	Approximate Area (acres)	Approximate Area (acres)
Proposed Commercial Treatment Total	N/A	789	1,498	536
• Selective Thinning	N/A	402	1,135	207
• Group Selection	N/A	191	253	7
• Density Management	N/A	153	67	322
• Regeneration Harvest – Structural Retention	N/A	26	26	0
• Riparian Thinning	N/A	17	17	0
Proposed Fuels Treatment Total	N/A	753	880	876
• Fuel Reduction	N/A	753	875	445
• Fuel Reduction/Yard Through	N/A	0	5	0
• Fuel Reduction/Prescribed Burning (3-5 years later)	N/A	0	0	431
Timber Harvest Method (Logging System)	Approximate Area (acres)	Approximate Area (acres)	Approximate Area (acres)	Approximate Area (acres)
Ground-Based (Tractor)	N/A	134	224	125
Cable	N/A	283	826	289
Helicopter	N/A	372	447	122

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Transportation Management	Approximate Length (miles)	Approximate Length (miles)	Approximate Length (miles)	Approximate Length (miles)
Proposed Permanent Road Construction	N/A	0	3.24	0
Proposed Temporary Road Construction	N/A	0	1.28	0
Existing Non-System Spur Roads	N/A	0.37	1.01	0.56
Designated Skid Trails	N/A	0.20	0.58	0.26
Tractor Swing	N/A	0.22	1.00	0.35
Proposed Decommissioning (Funding Identified)	N/A	1.88	1.88	1.88
Proposed Long-Term Closure	N/A	7.34	7.34	7.34
Proposed Haul Routes (BLM to County or State Roads)	N/A	48	61	39
Helicopter Landings	Quantity	Quantity	Quantity	Quantity
Potential Helicopter Landings Total	N/A	12	21	4
• Existing Helicopter Landings	N/A	7	9	4
• New Helicopter Landings	N/A	5	12	0
Fire Hazard, Risk and Resiliency				
Fuel Model Pre- and Post-Treatment (year 2 and 8) by Unit	see Chapter 3, Section 3.C., Fire and Fuels			

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Tons/Acre of Slash Pre- and Post-Treatment by Unit	see Chapter 3, Section 3.C., Fire and Fuels			
Crown Fire Potential Pre- and Post-Treatment (calibrated using stand exam data)	see Chapter 3, Section 3.C., Fire and Fuels			
Commercial Harvest that Include Areas of Small Diameter Fuels (acres)[1]	N/A	133	150	202
Areas Treated Identified as High Departure from the Natural Range of Variability (NRV) Based on Haugo, *et al.* (2015) and Barrett *et al*. (2010) – Fire Regime Condition Class (FRCC) (acres)	N/A	208	241	181
Area Treated in Each of the Classes of Relative Burn Probability (High, Medium, Low) (acres) • High • Moderate-High • Moderate • Moderate-Low • Low	N/A	• High - 504 • Moderate-High - 486 • Moderate - 414 • Moderate-Low - 144 • Low - 90	• High - 540 • Moderate-High - 612 • Moderate - 666 • Moderate-Low - 450 • Low - 162	• High - 360 • Moderate-High - 486 • Moderate - 378 • Moderate-Low - 198 • Low - 36
Fuels Treatments (Not Including Timber Harvest Units) within 1.5 Miles of Residential Structures or High Density Residential Areas (acres)	N/A	444	574	677

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Vegetation Structure/Northern Spotted Owl Habitat				
Number of Trees Over 20 Inches Diameter at Breast Height Harvested[2]	N/A	1,111	1,826	0
Areas of Treatment in Unmanaged Conifer Forest in Mid- to Late-Seral Stages (acres)	0	223	447	135
Habitat Targeted for Long-term Improvement - Treatment Designed to Accelerate Stand Development into Future NRF Habitat in areas with High Relative Habitat Suitability (acres)	0	258 acres NRF T&M and 142 acres Disp T&M in High RHS= 400 acres total	154 acres NRF Downgrade; 128 acres NRF T&M and 376 Disp T&M in High RHS = 698 acres total	26 acres NRF Downgrade; 66 NRF T&M; 322 Disp T&M in High RHS = 414 acres total
Post-Treatment Habitat Effects: • Acres Treated and Maintained (NRF/Dispersal) • Acres of NRF Habitat Downgraded • Acres of Habitat Removal (NRF/Dispersal)	79 acres NRF T&M and 148 acres Disp T&M; 22 acres NRF Downgrade; 0 acres removal of NRF/Disp.	289 acres NRF T&M and 461 acres Disp T&M; 0 NRF Downgrade; 33 acres removal of NRF and 122 acres removal of Disp.	214 acres NRF T&M and 935 acres Disp T&M; 269 acres of NRF Downgrade; 109 acres of removal of NRF and 141 acres of removal of Disp.	212 acres NRF T&M and 668 acres Disp T&M; 30 acres NRF Downgrade; 2 acres removal of NRF and 4 acres of removal of Disp.
Effects to NSO Sites (within 1.3 mi. of site/home range - RA 10 analysis): • NRF/Dispersal Acres Treated within High Priority NSO Sites • NRF/Dispersal Acres Treated within Low Priority NSO Sites	See Appendix F			

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
NSO NRF and Dispersal Habitat Not Treated with Analysis Area (acres)	11,856 acres NRF not Treated; 3 798 acres Dispersal not treated	11,514 acres NRF not treated; 3,215 acres Dispersal not treated	11,264 acres NRF not treated; 2,722 acres Dispersal not treated	11,611 NRF acres not treated; 3,125 acres Dispersal not treated
Water Quality/Aquatic Habitat				
Riparian Reserve Treatments (acres)	N/A	17	17	0
Number of Stream Crossings	31	82	106	79
Number of Stream Crossings on 303 (d) Water Quality Limited Streams	0	6	6	6
Road Density Post-Treatment	See Chapter 3, Section 3.E., Water Resources.			
Permanent Road Construction by Slope Position (miles) • Ridgetop • Mid-slope • Valley Bottom	N/A	0	Ridgetop - 1..48 Mid-Slope - 1.52 Valley Bottom - 0.24	0
Roads Reconstructed/Re-Opened (miles/previous status) • Blocked, minor work needed • Blocked, needs brushing/blading • Overgrown, renovation needed	N/A	Minor work - 0 Brush/Blade - 2.38 Renovation - 0.33	Minor work = 1.15 Brush/Blade - 3.26 Renovation - 0.36	Minor work - 0.6 Brush/Blade - 0.9 Renovation - 0
Potential Sediment Delivery to Streams from Timber Haul (yards^3)	0.18	2.11	0.92	0.69

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Roads Decommissioned with Timber Sale (Funding Identified) (miles)	N/A	1.88	1.88	1.88
Roads Decommissioned Separate from Timber Sale (miles)	N/A	7.75	7.75	7.75
Vegetation Stand Health				
Modeling of Example Stands that are in All Action Alternative by Prescription Type by Alternative: • Acres by Treatment Type • Live Crown Ratio for Trees Targeted for Retention • Tree Diversity (Height, Age, Diameter) • Stand Diversity (Mosaic Measure) • Pre- and Post-Treatment Basal Area • Pre- and Post-Treatment Species Diversity	See Appendix G: Example Stand Visualization System Modeling.			
"Wildness" Condition as Identified by the Community Alternative Working Group (CAWG)				
Roads Constructed in Unroaded Areas Identified by CAWG (miles)	N/A	0	Perm Const -2.25 Temp Const - 0.94	0
Harvest Treatments in Unroaded Areas Identified by CAWG (acres)	N/A	621	1,086	214
Area Not Treated in Unroaded Areas Identified by CAWG (acres)	22,212	20,881	20,331	21,195
Fuels Treatments in Unroaded Areas Identified by CAWG (acres)	N/A	710	795	803

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Roads Constructed in BLM Inventoried LWC (miles)	N/A	0	0	0
Timber Harvested in BLM Inventoried LWC (acres)	N/A	0	0	0
Fuel Treatments in BLM Inventoried LWC (acres)	N/A	0	0	0
Area Not Treated in BLM Inventoried LWC (acres)	5,099	5,099	5,099	5,099
Economics/Contribution to Medford District ASQ				
Timber Volume Offered (MBF)	N/A	2,714	6,020	936
New Road Construction to be Kept Open and Maintained (miles)	N/A	0	3.24 (long-term closure following use)	0
Road Reconstruction/Reopened (miles)	N/A	0.32	4.45	0.31
Cost Over Time to Maintain New Road Construction ($)	N/A	0	Not maintaining, long-term closure until needed for future management	0
Temporary Road Construction (miles)	N/A	0	1.28	0
Helicopter Yarding (acres)	N/A	372	448	122
Average Cost/MBF ($/MBF)	N/A	$213.36	$216.97	$514.07

NEDSBAR FOREST MANAGEMENT PROJECT COMPARISON OF ALTERNATIVES				
	Alternative 1 (No Action)	Alternative 3	Alternative 4	Alternative 5
Sensory Perception - Visual/Auditory/Health and Safety				
Viewshed Changes on the Landscape (Visual Resource Management (VRM) Analysis)	N/A	See Chapter 3, Section 3.I., VRM Analysis.		
Treated Areas Visible from Key Obseration Points (KOPs) on the Jack-Ash Proposed Trail (acres)	N/A	15	122	45
Acres of Helicopter Yarding	N/A	372	448	122
Number of Helicopter Units and Landings within 1/2 Mile of structures/residences	N/A	5	9	0
Number of Log Trucks Loads by Road System (estimate): • Applegate Tree Farm • Applegate • Little Applegate Road/Lick Gulch • Anderson Creek Road • Grouse Creek • Wagner Creek Road • Cinnabar	Lil Applegate/Lick- 99 Anderson - 5	Applegate Tree Farm - 61 Applegate - 179 Lil Applegate/Lick - 74 Anderson - 71 Grouse Creek - 61 Wagner - 184 Cinnabar - 14	Applegate Tree Farm - 61 Applegate - 425 Lil Applegate/Lick - 520 Anderson - 72 Grouse Creek - 132 Wagner - 199 Cinnabar - 14	Applegate - 85 Lil Applegate/Lick - 50 Anderson - 14 Wagner - 59 Cinnabar - 6

[1] Alternatives 3 and 4 will be assessed for fuels treatment needs post-harvest, whereas Alternative 5 is proposing fuels treatments within commercial units before harvest. The amount of fuels treatment acreage within commercial harvest units within Alternatives 3 and 4 are yet to be determined. Figures in the table for Alternatives 3 and 4 are proposed small diameter thinning or stewardship treatments.

[2] This is a comparison of different measurements, all of which are subject to change because the marking and cruising is not complete. The cut marked units have tree tallies for the diameter classes of trees harvested. The retention marked units have tree tallies for the diameter classes of trees retained, the cut trees have not been measured at this time. This estimation of the number of ≥20 inch cut trees is based off comparing the number of ≥20 inch trees per acre, expanded to the unit acreage with the amount of ≥20 inch retention trees tallied. The number of ≥20 inch trees harvested in group selection units have not been measured at this time.

6. Implementation Monitoring

Much of implementation monitoring is accomplished in the day to day work by BLM employees. Project supervisors, contract inspectors, and timber sale administrators review the work being done and assure compliance with the regulations and stipulations in the applicable administrative documents. The majority of actions described under the alternatives are implemented through a timber sale, service, or stewardship contract. In the case of contracts, implementation monitoring is accomplished through BLM's contract administration process. PDFs 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. If unacceptable work continues, suspension of contracts and/or monetary penalties can be applied.

The BLM would implement any monitoring required in the biological opinion issued by the USFWS. The BLM will monitor the extent of spotted owl habitat affected by the proposed Nedsbar Forest Management Project to ensure that those effects are consistent with description of the actions submitted during consultation. Implementation of ESA Section 7 consultation Project Design Criteria (PDC) is monitored through the BLM sale-contracting program in coordination with the resource area wildlife biologist. The BLM will conduct post-harvest monitoring according to the *Medford District Guide for Planning and Implementing Vegetation Management Projects* (USDI BLM 2015).

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 fully developed in detail (40 CFR 1502.14 (a)). In the development of the alternatives considered in this EA, the BLM planning team considered numerous ways to meet the purpose and need and best balance integration of resource conditions, resource potential, competing management objectives and expressed interest of various communities that have a stake in the project. Other alternatives or actions were discussed and eliminated from detailed study for the reasons given below.

1. BLM's Scoping Proposal

When the BLM first started the planning effort for the Nedsbar Forest Management Project, a scoping letter briefly describing the Nedsbar proposal and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on May 14, 2014. This letter included a map that showed approximately 3,400 acres of potential treatment areas. These potential treatment areas were selected for consideration after a preliminary evaluation by the BLM silviculturist and fuels specialists to determine which stands within the Planning Area were in need of treatment from a vegetation condition standpoint in order to meet long-term stand/landscape objectives.

Rationale for Elimination: This alternative became known as Alternative 2. This initial alternative was then screened through the filters described in Section 2.B., *Development of the Project*. Through this process, feasible treatment areas were distilled from the Planning Area and the initial scoping proposal was refined; some units were eliminated from consideration altogether and the boundaries of others were modified.

There were various reasons from eliminating specific stands from consideration in the Nedsbar Forest Management Project including, but not limited to, conservation and recovery actions for federally listed species, access, previous treatment, limited treatment needs, soil instability, logistical and economic feasibility. To avoid confusion with the scoping alternative, the title "Alternative 2" was not used for any of the alternatives analyzed in detail (Section 2.C.).

2. Avoid Regeneration Harvest

Rationale for Elimination: The purpose and need identified for this project (see Chapter 1) include improving conifer forest growth and vigor, reducing impacts to forests from insects and disease, and providing timber products,. In order to meet these objectives, silvicultural prescriptions, as described in the Medford District RMP (USDI 1995, Appendix E) were proposed depending on current forest conditions. Stands in the Planning Area were identified as having declining growth rates or experiencing deterioration due to high density stands levels, insects, disease, or other factors.

Approximately 26.5 acres (Unit 33-30) is proposed for structural retention regeneration harvest which would create growing space for a new cohort of trees and/or increase the growth of existing understory trees while maintaining structural complexity with the retention of 16-25 trees per acres greater than 20 inches DBH; reduce understory stem density in the current stand and control the growth rates of existing understory trees for long-term survivability; create regeneration opportunities for species that are shade intolerant and provide long-term success or survival of less prominent species (e.g., sugar pine); and reduce the long-term effects of forest disease by reducing the spread of disease to existing overstory and understory trees.

By avoiding regeneration harvest, the BLM would not be able to meet forest health objectives and would therefore not meet the purpose and need identified for this project.

3. Retain All Mistletoe Infected Trees

Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*) is a parasitic plant that infects Douglas-fir and is widespread in Southern Oregon dry forests. It is one of the primary diseases (besides root rot) that affects the growth and health of Douglas-fir. Douglas-fir dwarf mistletoe evolved with its host species over the past 10,000 years. The benefits of dwarf mistletoe as wildlife habitat and a food source are well known (Mathiasen 1996). Not only does the presence of mistletoe contribute to stand diversity through the creation of gaps, structural irregularity, and the accumulation of snags and down wood, it also serves as habitat for a variety of mammals, birds and arthropods. In particular, in the Siskiyou Mountains, large witch's brooms serve as nest platforms for spotted owls, fishers and raptors. There is evidence that groups of mistletoe-infected trees are the most likely areas for spotted owls to nest in the white fir and Douglas-fir forests of the Siskiyou Mountains (Marshall et al. 2003; Mallams and Goheen 2010).

Rationale for Elimination: Dry Douglas-fir stands (Douglas-fir/poison oak) and pine-oak stands historically were shaped by frequent fire, and due to fire suppression, the number of Douglas-fir trees is far in excess of historical ranges (Brown et al. 2004; North et al. 2004). The proposed forest management project does not attempt to eradicate dwarf mistletoe from the landscape; rather, it attempts to minimize it in specific areas so that the forest health objectives and management direction pertaining to all land use allocations as defined by the 1995 Medford District Resource Management Plan can be attained. Specifically, treatments occurring within mistletoe-infected stands meet the following objectives and direction:

- Reduce tree mortality and restore the vigor, resiliency, and stability of forest stands that are necessary to meet land use allocation objectives (USDI BLM 1995, p. 62).
- Design and implement silvicultural treatments in stands that are in a condition, or that will soon be in a condition, which prevents management objectives from being achieved. Treatments are intended to restore the ability of stands to respond to other management and to reduce the risk of mortality from insects, disease, and wildfire (USDI BLM 1995, p. 62).
- Design forest condition restoration treatments to be consistent with the long-term objectives of the allocation in which the treatment is proposed. Develop treatments in an interdisciplinary manner (USDI BLM 1995, p. 62).

The aforementioned objectives and direction are in addition to the Nedsbar Forest Management Project's stated purpose and needs that would be attained through treating mistletoe.

- Ensure sustainable forest production, and the renewable resources they provide, by managing forests to improve conifer forest vigor and growth (USDI BLM 1995, pp. 72-73).
- Provide timber products from AMA land allocations in accordance with the direction in the Medford District's 1995 Resource Management Plan (USDI BLM 1995, pp. 72-73).

The Medford RMP does not direct to manage for the survival of pathogens, nor to create or maintain habitat for wildlife by doing so.

Management efforts are focused towards minimizing the impacts of Douglas-fir dwarf mistletoe by maximizing tree species diversity and by reducing canopy layering. Stands composed of mixed tree species of all size classes provide barriers that inhibit the horizontal and vertical spread of mistletoe. Ponderosa pine, sugar pine, incense cedar, white fir and hardwoods are not susceptible to Douglas-fir dwarf mistletoe. Suppressed and intermediate size classes of Douglas-fir are targeted for removal, reducing the canopy height structure and reducing the potential for the vertical spread of mistletoe. With or without management activities, dwarf mistletoe will continue to be a stand and landscape feature on lands managed by the BLM, and Douglas-fir mistletoe will occur at natural rates within these conifer-dominated forest types.

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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 and the action alternatives (Alternatives 3-5). The Environmental Effects portion of this chapter provides the analytical basis for the comparisons of the alternatives (40 CFR § 1502.16) and the reasonably foreseeable environmental consequences to the human environment of each alternative on the relevant resources. Impacts can be beneficial, neutral, or detrimental. The affected environment is described to the level of detail needed to determine the significance of impacts to the environment of implementing the proposed activities under the action alternatives. The analysis of the direct, indirect, and cumulative effects is organized by resource and the Analysis Areas for actions proposed under this EA vary by resource. Analyses for all resources include the Project Area, which encompasses the areas where actions are proposed for the Nedsbar Forest Management Project.

1. Project Area and Analysis Area

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 forest thinning is proposed and where road construction, road improvements, or road decommissioning are proposed.
>
> The term **Planning Area** is used to describe the overall area of consideration that was reviewed for the development of the Nedsbar Forest Management Project.
>
> **Analysis Areas** vary by resource and include those areas that could potentially be affected by proposed activities. 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 in the Planning Area 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 Nedsbar Forest Management 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 proposal's cumulative effects, and as a basis for identifying the proposal'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 each of the alternatives. 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 Nedsbar Forest Management 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 Nedsbar Forest Management Project 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.

The following listing of activities is only presented to provide an overview of land management activities occurring within or adjacent to the Nedsbar Planning Area or associated Analysis Areas.

a. Timber Harvest on Private Lands

Under reasonably foreseeable future actions for private lands, it is assumed that private forest lands would continue to be intensively managed for timber production on approximately a 60-year rotation (USDI 1994:4-5). The actual timing of any private lands timber harvest is dependent on many factors, including valuations based on supply/demand, ownership, etc. We developed a reasonably foreseeable future scenario for private lands by interpreting aerial photography to establish current forest conditions on these lands and assumed a 60-year rotation for private timber lands within the Analysis Area. 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 scenario.

b. Fuels Reduction on BLM-administered Lands

Approximately 98 acres of non-commercial fuels treatments remain to be completed under the Bald Lick Forest Management Project.

c. BLM Forest Management Projects

A small amount of commercial timber harvest and non-commercial thinning on BLM-administered lands is anticipated to occur. Commercial units remain to be treated in the Lick Stew and Bobar Projects (175 acres total).

d. BLM Grazing Leases

The one active grazing allotment in the planning area, Lower Big Applegate, authorizes 119 cow/calf pairs, utilizing 258 animal unit months3 (AUMs). The 119 cow/calf pairs authorized to graze 258 AUMs is calculated using entire allotment acreage, which includes use outside of the Planning Area. Portions of the Sterling

3 The amount of forage needed to sustain one cow/calf pair for one month.

Springs and Tunnel Ridge Allotments are also within the Planning Area boundary, but are not active and are currently unavailable for grazing use.

e. Forest Service Projects

There are no reasonably foreseeable future actions proposed for Forest Service lands within the Analysis Area.

B. FOREST CONDITION

1. Introduction

The primary objectives for the Nedsbar Forest Management Project are to maintain and promote vigorously growing conifer forests, reduce tree mortality, and to produce a sustained yield of timber products from BLM-administered lands to support local and regional economic activity (refer to Chapter 1, *Purpose and Need*). Forest health and forest condition in the Nedsbar Forest Management Project Area include all components of forest ecosystems that influence stand and forest resiliency to environmental disturbances. Forest and individual stand resiliency to environmental stresses (natural or human-caused) is a direct reflection of stand health and stand condition. Environmental factors that can affect resiliency in this analysis include, but are not limited to, high stand densities, insect and disease occurrences, high growing-season temperatures, moisture and nutrient availability, vegetative competition, soil type, fire, and fire suppression. All of these factors can influence stand resiliency, production, mortality rates, and vigor.

2. Analysis Area/Spatial Extent

The Nedsbar Analysis Area is located 11 air miles south of Jacksonville near the community of Little Applegate. Forest management activities are proposed within the center of the Little Applegate and the east side of the Upper Applegate River 5th field watersheds. The Analysis Area is classified as an Adaptive Management Area land allocation. The total size of the Analysis Area is 18,958 acres, or approximately 30 square miles. BLM-administered lands comprise 15,924 acres within this area. Forest Service lands comprise 165 acres and private lands comprise 2,869 acres within this area. The BLM- administered lands comprise approximately 84 percent of this Analysis Area and are arranged in a fairly contiguous pattern. Due to the stand-level impacts of the proposed activities, the Analysis Area encompasses only those lands on which the proposed actions will have direct effects.
The forest condition for the Nedsbar Analysis Area was compiled from a variety of sources:

3. Methodology

- The Medford District Proposed Resource Management Plan/Environmental Impact Statement (PRMP/EIS, 1994) provided general vegetation information for planning and analysis.
- The Little Applegate River Watershed Analysis (USDI BLM and USDA FS 1995), Beaver Palmer Watershed Analysis (USDA FS 1994), and Applegate-Star/Boaz Watershed Analysis (USDI BLM 1998) provided baseline information specific to forest vegetation and the impacts of managing forest stands.
- Geographic information system (GIS) data described the type, amount, and distribution of forest vegetation on BLM-administered lands across the watersheds in which the project is located.
- Field visits to proposed treatment units and stand exam data provided site specific information.
- Research publications provided baseline information specific to forest vegetation, fire effects, and plant succession.

4. Assumptions

- Forest management activities will occur on BLM-administered lands allocated to planned, sustainable harvest. The type, quantity, and impacts of timber management activities were analyzed in the Medford PRMP/EIS for both the short-term (10 years) and long-term (decades).
- The *Revised Recovery Plan for the Northern Spotted Owl* (USDI FWS 2011) will influence stand treatment within the home range of known northern spotted owl sites based on NSO habitat types per RMP direction to protect and conserve federally listed species (USDI BLM 1995, pp. 50-51).
- Stands designated as RA32 by the BLM wildlife biologist will not be considered for forest management activities.
- Most private industrial forestlands have been and will continue to be intensively managed with final harvest on commercial economic rotations averaging 60 years (USDI BLM 1994, pp. 4-5).
- Impacts to forest vegetation by predicted regional climate change is uncertain. The regional climate has become warmer and drier with reduced snowpack and continued change is likely (USDI BLM 2008).

5. Forest Environment

The forest environment is comprised of accumulated live and dead plant biomass generally arranged in terms of the dominate vegetation in the overstory, midstory and understory. These characteristics of the forest environment can be manipulated and mitigated to achieve defined modifications to the composition, structure, ecosystem functions and potential effects (Pyne et al. 1996, Stephens and Ruth 2005). This report identifies five metrics that describe the forested environment as it relates to the project effects within the Nedsbar Forest Management Project. The metrics that are modeled over time are as follows:

Basal Area: Basal area4 is the common term used to describe the average amount of an area (usually an acre) occupied by tree stems. It is defined as the total cross-sectional area of all stems in a stand measured at breast height, and expressed as per unit of land area (typically square feet per acre).

Relative Density Index: Various scientific methods have been developed that can predict or identify a threshold level of density at which a forest stand will decline in production and health due to the impacts of excessive competition. Relative Density Index (RDI) is one such measure and is defined as the ratio of actual stand density to the maximum stand density attainable or expected for that stand, which is dependent upon the species composition. The maximum stand density or carrying capacity used in these equations is the density at which self-thinning (mortality) will occur. Relative density measures help determine if resources are being optimally utilized in stands and at which point density-dependent mortality will occur. Drew and Flewelling (1979) concluded that the correlative density index rating of 0.55 and greater for any given stand marks the initial point of imminent mortality and suppression.

Trees per Acre: The most basic measure of stand density expressed as the number of trees per acre (TPA).

Quadratic Mean Diameter: Quadratic mean diameter (QMD) is a measure of the average mean diameter of all trees in a measurement unit, which is calculated using the central tendency of the averages.

Canopy Cover: "Canopy cover refers to the proportion of the forest floor covered by the vertical projection of the tree crowns….Measurements of canopy cover assess the presence or absence of canopy vertically above a sample of points across an area of forest." (Jennings, S.B et al 1999). Canopy cover is a key metric important to stand-level microclimate, wildlife habitat requirements, and prey protection.

4 Basal Area - a) Of a tree: the cross-sectional area, expressed in square feet, of a tree stem measured at breast height. b) Of a forest stand: the total cross-sectional area of all the trees in a stand, measured at breast height, expressed in square feet per acre. Measurement of how much of a site is occupied by trees; directly related to stand volume and density.

6. Affected Environment

a. Topography

Elevation ranges from 1,500 to 5,700 feet within the Nedsbar Forest Management Project area and consists of steep terrain.

b. Physiography

The Nedsbar Forest Management Project is located within the Klamath Mountains Physiographic Province and includes portions of the Oak Savanna Foothills and Inland Siskiyous Ecological Regions (EPA).

c. Geology/Soils/Site Potential

Growth and development patterns of forests stands within the Analysis Area are driven by site productivity, which is a function of soil type, elevation, and available water and nutrients. Soil factors such as topsoil depth, soil texture, nutrient availability, and drainage affect the productivity of a site. While these factors impact the rate of tree growth and to what sizes they can attain, factors such as trees density and health impact the level to which trees are able to fully utilize on-site resources (Hann and Scrivani, 1987; Tappeiner et al., 2007).

d. Climate

The climate of the Analysis Area is generally warm and dry with typically cool, wet winters and hot, dry summers. Summer temperatures range from the daytime highs of 70 to 100+ degrees Fahrenheit (° F) during occasional heat spells. Winter lows drop regularly to 10° to 20°F. Annual precipitation averages 35 inches. Most of the precipitation occurs from mid-October to mid-April as rain or snow.

e. Disturbance Ecology

The current vegetation existing in the Analysis Area is a result of time, the unique geology of the area, aspect, natural disturbance, anthropogenic influences, fire and fire suppression. Over the course of thousands of years, native inhabitants regularly used fire on the landscape for a variety of purposes, mostly food production (USDI BLM 1998). Natural disturbance such as lightning fires, windstorms, and drought contributed to the variation of vegetation and stand types. Infrequent, stand-replacing natural fires played a dominant role. Disturbance mechanisms (abiotic and biotic) that influence the Analysis Area's forest stand structure include but are not limited to logging, grazing, mining, fire and fire suppression, bark beetles, pathogens, and dwarf mistletoe species associated with Douglas-fir, pine and true fir species (USDI 1998).

Fire

The historical fire cycle in southwest Oregon's low-elevation Douglas-fir and pine forests occurred every 20 years or less. As a result of fire suppression, the Nedsbar Analysis Area has missed approximately five fire cycles over the last 100 years (USDI BLM 1998). The absence of fire has converted open savannahs and grasslands to hardwood woodlands and initiated the recruitment of conifers. As hardwoods and shrubs encroach into open savannahs and grasslands over time, shade tolerant conifers begin proliferating through the understory converting the site to a mixed hardwood/conifer woodland condition. As a result, Oregon white oak is now a declining species largely due to fire suppression and encroachment by Douglas-fir on most sites (USDI BLM 1998). These sites generally do not support vigorous growth of shade tolerant conifers due to soil, moisture, and aspect. Therefore, Douglas-fir do not grow to normal size, form, and vigor. Conversions from pine to fir are also evident and occur in the same sequence as the conversion from hardwoods to conifers. The conversion from pine to fir has created stands that are stressed due to competition. These non-vigorous conifers become susceptible to insect and disease mortality or prematurely die off due to a lack of resources. Historically, Douglas-fir stands were comparatively open, with a higher proportion of mature ponderosa and sugar pine than at present (USDI BLM 1998). The absence of fire due to suppression efforts has changed the composition of the local forests to fire-intolerant, shade-tolerant conifers and has decreased the abundance of species such as Ponderosa pine and sugar pine (USDI BLM 1998).

Insects and Disease

Douglas-fir bark beetles and flat-headed wood borers are currently invading Douglas-fir at low to mid elevations in the Analysis Area and causing mortality in small pockets. Western pine beetle (*Dendroctonus brevicomis*) is invading ponderosa pine in the Analysis Area, particularly in stands with a high proportion of pine. Bark beetles are initially attracted to trees that are under stress. The susceptibility of trees to damage by bark beetles can be mitigated by stocking control which is tied closely with tree vigor (Larson et al. 1983). Stocking control increases growing space, water and nutrient availability, sunlight penetration, and photosynthesis rates. Altogether, site disturbance such as fire and thinning improves tree vigor. Although there is not a current widespread beetle infestation, treatments are designed to improve the vigor of trees to withstand potential outbreaks. Treatments primarily bring the vigor of Douglas-fir and ponderosa pine to a level where they are more likely to withstand attacks of any intensity in order to ensure the survival and perpetuation of pine in the Analysis Area. DeMars and Roettgering (1982) recommend that "reducing stand stocking to 55 to 70 percent of the basal area needed for full site utilization will relieve the competitive stress among the remaining trees, improve their vigor, and make them less prone to successful bark beetle attack." The Goheens (2010) state that whenever stand basal area exceeds 120 square feet per acre on drier sites or 140 square feet per acre on moister sites, the risk of beetle infestation is high (USDI BLM 1995).

Forest pathogens and subsequent beetle kill contribute to changing the forest stand structure and forest development pattern by creating openings of varied sizes and allowing light to reach the forest floor. In the Analysis Area, laminated (*Phellinus weirii*), annosus (*Heterobasidian annosum*) and Armillaria (*Armillaria ostoyae*) root diseases are present. Infections occur primarily in small pockets within the Analysis Area. Disease centers are variable in size, containing dead standing trees, and occasionally wind thrown trees. These root diseases kill host cambium, decay root wood, plug water conducting tissue, or cause some combination of these effects. Tree mortality from root disease occurs when trees with decayed roots are wind thrown or by bark beetle invasion on root disease-weakened trees.

Douglas-fir dwarf mistletoe (*A. douglasii*) within the Analysis Area is affecting Douglas-fir growth and vigor of all age and size classes. The most severe cases of Douglas-fir dwarf mistletoe are common on moist sites at elevations above 3000 feet in the Analysis Area. Infections are widespread throughout the 3000-5000 ft. elevation range of the Analysis Area. Infections are usually systemic and form bunched globose growths of branches called "witches' brooms." These brooms, occurring mostly in the lower third of the tree canopy, are produced by local physiological changes induced by the parasite to get the tree to transport food to the mistletoe. Heavy infections result in growth loss, wood quality reduction, top-killing, and mortality. Food needed for healthy tree growth becomes diverted to the brooms, significantly draining the host (Hull and Leonard 1964). Although the spread of the infection is slow, infected trees lose vigor and become increasingly susceptible to other infectious diseases and insect attack. Weakened trees emit a different chemical signature than healthy trees. Bark beetles consequently are drawn to trees in a weakened state and eventually kill the infected tree.

f. Plant Associations

The Nedsbar Analysis Area lies within the Mixed Conifer Zone as described by Franklin and Dyrness (1973). There are three tree series in the Nedsbar Analysis Area: Douglas-fir, ponderosa pine, and white oak (Table 3-1). Plant association (a stand or group of stands made up of plants characterized by a definite floristic composition consisting of uniformity in physiognomy and structure and uniform habitat conditions) descriptions within these series can be found in the Field Guide to the Forested Plant Associations of Southwestern Oregon (USDA FS 1996). Douglas-fir plant associations comprise the majority of forestland in the Analysis Area.

Table 3-1. Tree series and plant associations common to Nedsbar Analysis Area.

Douglas-fir Series / Plant Associations	Ponderosa Pine Series / Plant Associations	White Oak Series/Plant Associations
PSME-ABCO	PIPO–PSME	QUGA4-PSME/RHDI6
PSME-ABCO/PIPO	PIPO-QUKE	QUGA4-CYEC
PSME-PIPO		
PSME-BENE		
PSME-PIPO/RHDI6		
PSME-RHDI-BEPI		

Abbreviations:

PSME: Douglas-fir	ABCO: White fir	BENE: Oregon grape	CADE27: Incense cedar
PIPO: Ponderosa pine	HODI: Oceanspray	RHDI6: poison oak	QUGA4: Oregon white oak
BEPI: Piper's Oregon grape	QUKE: Black Oak	SYMO: Creeping snowberry	CYEC: Hedgehog dogtail

At the highest elevations on the eastside of the planning area the PSME (Douglas-fir)-ABCO (white fir) and PSME-ABCO/PIPO (ponderosa pine) plant associations are present. When rainfall is abundant, or the aspect is more conducive to cooler temperatures (such as north and east aspects), the plant associations most often found include PSME-PIPO, and PSME-BENE (dwarf Oregon grape). On the drier sites the PSME-RHDI (poison oak) and PSME-RHDI-BEPI (Piper's Oregon grape) plant associations are most prevalent. Pine and white oak series forests are usually found on south and west aspects and the lowest elevations (PIPO-QUKE (California black oak) and PIPO-PSME).

Landscape Pattern

Vegetation condition classes[5] can be used to describe the relative distribution of seral stages[6] across a watershed or landscape. The seedling/sapling and early condition classes most often represent the early-seral stages of forest succession. The poles and mid-condition classes are best represented as the mid-seral stage, while the mature condition class represents more late-seral stages of forest succession. Due to the fact that water, rock, and urban/agricultural are not considered vegetation, Table 3-2 below does not include them.

5 Vegetation Condition Class - The BLM Medford District Watershed Analysis Committee designated 8 vegetation condition classes to describe the types of and size of vegetation present on the landscape. The condition classes are as follows: grass and herbaceous vegetation; shrub lands; Hardwood/Woodlands; early seral stage trees (0 to 5 years of age); seedlings/saplings (0 to 4.9 inches DBH); poles (5 to 11 inches DBH); mid (11 to 21 inches DBH); and mature/Old-growth (21 inches DBH and larger trees). (DBH=diameter at breast height)

6 Seral stages - The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage (USDI 1995, p. 112)

Table 3-2. Vegetation condition classes in the Nedsbar Analysis Area (BLM-administered lands).

Vegetation Condition Class	Acres	Percentage of Total (%)	Percentage of Forestland (%)
Grassland, Shrubs	1,595	10	
Hardwood/Woodlands	3,728	23	
Early (0-5 years) and Seedlings/Saplings (0-4.9 inches DBH)	804	5	7
Poles (5-11 inches DBH)	1,453	9	14
Mid (11-21 inches DBH)	6,448	41	61
Mature (21+ inches DBH)	1,876	12	18
TOTAL ACRES	15,904	100	
TOTAL FORESTLAND ACRES	10,581		100

Vegetation condition classes are used to describe landscape patterns and are more easily measured by size of vegetation than by age of vegetation. Micro*storms[7] stand age or birth date is not correlated directly with Vegetation Condition Class because age and size are only roughly correlated. The above condition classes in themselves do not describe the structural characteristics of the vegetation and its degree of intactness (open vs. closed canopy, partial cut previously, never entered, etc.) Since most of our stands naturally exist with several cohorts, lumping them into one diameter range, such as the condition class definitions do, will often not permit the assessment of the functional characteristics of the class for vegetative and habitat assessments. They also do not allow the separation of functional old growth from mature stands. For that reason, three optional descriptors have been added which can provide additional information for the condition classes. These are: 1) McKelvey rating for the operations inventory (OI) unit; 2) whether the OI unit is intact or not; and 3) dominant age class for the OI unit entered in Micro*storms (USDI BLM 1994, p. 26).

Since landscape vegetative patterns are in constant development, current observations of the landscape vegetation are a snapshot at one single point in time. Although current vegetation stem densities are high and are mostly in the mid- and mature-seral stages, the vegetation condition classes of today are atypical when compared to historic patterns. Natural disturbances, such as fire, have historically controlled stand densities. With or without silvicultural management, the vegetation will continually change due to natural succession. Natural succession is a process in which vegetation types and conditions change over time in a given site. Species that appeared at an early stage of a site may be entirely nonexistent in future successional stages. The species that initially appear on a site are largely dependent on the seed availability (windblown seed sources, seed bank, serotinous cones, etc.), the type and severity of disturbance that brought the stand into an early-seral stage (either following a fire, wind event, harvest, insect infestation, disease, or other disturbance), and other biotic or abiotic factors.

Competition in a stand is directly correlated with stand density. The more stems (i.e., trees) that exist per acre on a site, the fewer resources are available per stem to sustain it. Each stem draws water and nutrients from the soil and occupies a place in the stand that captures sunlight. With the absence of disturbance often resulting from fire suppression, these sites become occupied by shade tolerant species capable of out-competing their shade intolerant neighbor trees. Various scientific methods have been developed over the decades that can predict or identify a threshold when a forest stand will decline in production and health due to factors such as competition.

7 Micro*Storms - A micro-computer database system providing background information and recommended treatment for each operations inventory unit (stand) (USDI 1995, p.107)

Relative Density Index (RDI: the ratio of actual stand density to the maximum stand density attainable in a stand with the same mean tree volume) is a measure of both stand and tree level health and productivity. Undisturbed populations eventually compete for growing space and gradually reduce the population as individuals die in a self-thinning process (Barbour, et al., 1987). Drew and Flewelling (1979) concluded that the correlative density index rating of 0.55 for any given stand marks the initial point of imminent mortality and suppression. A productive forest stand absent of natural or human density control will continue growing until it reaches a condition where the vegetation in the stand occupies all the available growing space. The aftermath results in widespread competition and declining productivity as evident in dense stem exclusion stands (Oliver 1981). A decrease in stand vigor is expected with continued overstocking and increasing stand age. According to stand exam data recorded in proposed treatment stands the overall average RDI for forested stands in the Nedsbar Analysis Area is 0.65, suggesting that the majority of stands have either entered the zone of imminent mortality or will enter that zone in the near future.

Coarse Woody Material

Many ecological processes have created the even- and uneven-aged forest stand structure as seen today in the Nedsbar Analysis Area. These processes are responsible for the variable amounts of coarse woody material (CWM) across the landscape. Coarse woody material provides habitat for wildlife, invertebrates, microbial and fungal species, as well as important ecological functions such as moisture retention, soil stabilization, and nutrient recycling. Amounts of CWM are influenced by forest stand history, soils and respective plant associations, climate, and topography. The amount and decay class of CWM reflects the stage of stand development (Table 3-3). In a natural cycle, two stages (stand initiation and old growth) typically have the greatest amounts of CWM. Older decay classes (3, 4, and 5) are more common and reflect coarse woody material created since stand initiation wildfires in the early 1900s.

Table 3-3. Coarse woody material decay classes.

Log Characteristics	Decay Class				
	1	2	3	4	5
Bark	Intact	Intact	Trace	Absent	Absent
Twigs <3 cm.	Present	Absent	Absent	Absent	Absent
Texture	Intact	Intact to partly soft	Hard, large pieces	Small, soft blocky pieces	Soft and powdery
Shape	Round	Round	Round	Round to oval	Oval
Color of wood	Original color	Original color	Original color to faded	Light brown to reddish brown	Red brown to dark brown
Portion of log on ground	Tree elevated on support points	Tree elevated on support points but sagging slightly	Tree is sagging near ground	All of tree on ground	All of tree on ground
Invading roots	None	None	In sapwood	In heartwood	In heartwood

7. Environmental Consequences

a. <u>Specific Methodology</u>

Stands were modeled in a growth and yield modeling system called ORGANON edition 9.1 (Hann 2013). Developed at Oregon State University, College of Forestry, the model predicts forest growth outputs based on

scientific formulas programmed into it. This model was used to better capture the difference of effects of forest treatments vs. no forest treatments. The Southwest Oregon variant was used to model stands in the Project Area. Output data reflect modeling assumptions (i.e. growth curves, regeneration dynamics, and spatial variability) and variability within the common stand exam plots.

b. Alternative 1 – No Action

The No Action Alternative would not meet the silvicultural objective to reduce stand densities to natural carrying capacities and create favorable growing conditions to improve individual tree health (vigor) for desirable species. Forest stands would surpass the overall average of 0.65 RDI, allowing density-dependent mortality to occur and leaving forested stands more susceptible to insect and disease agents. Stand densities would continue on their current trajectory of stand development and remain overpopulated. The current average relative density for the area indicates that the trees have entered the zone of imminent density-induced mortality. Tree vigor and growth will continue to decline as these stands continue on this trajectory. Growing conditions become stagnant at or above stand density index of 0.55, resulting in intensified competition and the stand begins excluding the weakest trees. If stand densities remain in this condition, large diameter trees decline in number and individual tree vigor will be reduced. "Individual trees have smaller crowns in dense stands, and thus each tree has less capacity for diameter growth than trees with larger crowns in less-dense stands." (Tappeiner 2007). No action would allow forest stands to remain overstocked and individual tree vigor and growth would remain poor. Lack of disturbance in fire-adapted systems, such as those found in the Analysis Area, has resulted in higher stocking densities than the site is capable of maintaining.

Without silvicultural treatments to control the establishment and growing space of trees, forest structure and species composition can shift. On pine sites that require at least 25 percent full sunlight, shade-tolerant white fir and Douglas-fir would continue to encroach and stands would remain in a dense stand condition in the absence of disturbance. Shade-intolerant pine and oak species would continue to decline in number from competition with encroaching shade-tolerant white fir and Douglas-fir. Because more shade-tolerant species are encroaching on sites better suited to early-seral species (Ponderosa pine), the shade-tolerant species exhibit poor vigor and require more moisture than the site can deliver, becoming easily stressed and succumbing to density mortality or beetle kill. The No Action Alternative would result in higher numbers of white fir and Douglas-fir trees that may cause long-term ecological impact to the conifer forests of the Nedsbar Analysis Area. A shift in species composition has major implications on forest processes and function. These shade tolerant trees will become a large component of the canopy that will contribute to a dense forest structure prone to a perpetual cycle of overcrowded stand densities resulting in competition mortality, drought-induced mortality, and/or mortality caused from insect and disease agents. Without management action, shade-intolerant species like Ponderosa pine and trees of large diameter, would continue to decline in number from such competition. The No Action Alternative would not meet the silvicultural objective of the purpose and need to promote the growth and establishment of tree species that are well adapted or most resilient to environmental conditions and natural disturbance regimes.

In regard to species and biological diversity, forested stands in the Analysis Area have become pre-disposed to stand-replacing fires and insect and disease epidemics. The relative densities also present a high fuel hazard across the landscape. A decrease in stand vigor is expected with continued overstocking and increasing stand age. Fire suppression has altered the landscape pattern of forest structure, density, and species composition. Without any form of density control, and the predicted periods of drought in the region, slow tree growth and poor vigor would result in individual tree and stand mortality. Wildfires have functioned in the past as a natural tool for thinning out the understories and removing dense pockets of forest. Without this tool, Douglas-fir trees in the Analysis Area have increased in number, along with other species such as true fir (white fir).

This increase can perpetuate forest pathogen effects that may result in a less resilient forest. The increase of Douglas-fir in southern Oregon coincides with the increased levels of dwarf mistletoe seen today. Without the cleansing effect of fire on densities of Douglas-fir seedlings, the pathogen is consequently perpetuating on the infected sites and spreading into previously uninfected stands. The amount of Douglas-fir dwarf mistletoe present in Southwest Oregon is at unprecedented levels (Goheen 2010). The spread of the parasite can infect

nearby stands of Douglas-fir and decrease growth rates of trees, thereby reducing stand volume production and promoting poor forest health. The presence of dwarf mistletoe can contribute to increased fire behavior during wildfire events. This is due to a century of fire suppression on forestlands. Higher levels of insect and disease infestation/infection are expected as stand density increases (Fetig et al. 2007). Tree mortality represents a reduction in stand volume production, a loss of revenue, and poor forest health. Diseases such as Douglas-fir dwarf mistletoe would persist and perpetuate the infection cycle on sites currently infected. Disease-susceptible trees continue to recolonize these sites and understory trees become infected and their likelihood of attaining large sizes is low. The pathogen survives on the site unless disease resistant species occupy the forest openings.

The No Action Alternative would allow the unchecked spread of disease to continue on the sites. The Medford District RMP (USDI BLM 1995, p. 194) gives the instruction to "design silvicultural treatments so that within-stand endemic levels do not increase and where possible, the affected trees contribute to the achievement of land use allocation objectives." The No Action Alternative would not meet the stated need to maintain and promote vigorously growing conifer forests, reduce tree mortality, and provide timber resources, in accordance with management direction for the Applegate AMA.

The 1995 Medford District RMP describes the Forest Condition (Forest Health) Restoration Objective that requires management emphasis on treatments and harvests that restore stand condition and ecosystem productivity. It directs management actions to include density management and understory reduction operations that reduce competition, increased use of understory prescribed fire, and fertilization (USDI BLM 1995). The No Action Alternative does not meet the forest health objectives as defined in the 1995 Medford District Resource Management Plan.

c. Alternative 4

Refer to Chapter 2, Section 2.C.2.a. for descriptions of the silvicultural prescriptions and descriptions of the different action alternatives.

Table 3-5. Proposed silvicultural treatments in Alternative 4

Silvicultural Prescriptions	Est. Acres
Selective Thinning DF 40%	588
Selective Thinning DF	76
Selective Thinning PP 40%	213
Selective Thinning PP	109
Group Selection 40%	148
Group Selection	6
Group Selection 60%	100
Density Management 60%	67
Structural Retention	26
Riparian Thinning	17
Small Diameter Thinning	150
Total Acres	1,498
Fuels	880

The total amount of proposed treatments in Alternative 4 combining commercial harvest and fuels treatments is 2,378 acres, which is approximately 15 percent of the BLM Analysis Area. Alternative 4 would best meet the stated objectives and those listed in the Medford District RMP for BLM-administered AMA lands because it is comprised of silvicultural treatments that utilize effective treatment methods to produce a desired outcome. Alternative 4 would break up surface and crown fuels that have been created under a regime of fire exclusion. The excess tree stems would be thinned to a desired stocking level to improve the growth and vigor of the remaining trees. These thinning treatments would also help to accelerate the development of heterogeneous stand structure, increase species diversity, and reduce hazardous ladder fuels. Additionally, these treatments would aid in reducing cumulative effects of insect and disease and their rate of spread to adjacent lands. Tree species diversity would continue to decline without treatments to maintain shade-intolerant species such as pine and oak. Maintaining these drought resistant species ensures the resiliency of forest stands during a period of climatic uncertainty.

Alternative 4 focuses on the long-term benefits of treatments to create more resilient stands and enhance northern spotted owl habitat over time. Alternative 4 allows for active forest management in conifer stands to occur that would meet multiple stand and landscape level objectives discussed in Chapter 2. There is no single stand level objective under this alternative. The prescribed treatments under this alternative allow flexibility in managing stands in the long-term. The retention of drought-tolerant and fire-resilient species and reducing the abundance of more shade tolerant species in the area, allows for a greater abundance of trees better adapted to local site conditions. In these conifer stands, a reduction of trees per acre would reduce competition-related mortality, increase tree vigor and growth, and maintain preferred species. The trend of forest conditions in the treated stands would improve and approach the range of natural variation associated with the plant series, leading to more complex stand structures. With an increase in tree vigor, the treated stands would be less susceptible to insects and diseases. Alternative 4 would reduce the impacts of dwarf mistletoe at the stand level by controlling the spread of diseases through the removal of heavily-infected trees and by maintaining and encouraging species such as pine and incense cedar that are resistant to it. Tree species diversity would be maintained or enhanced with these proposed treatments to maintain shade-intolerant species such as pine. Alternative 4 would limit the effects described above in the No Action Alternative. Treatments in Alternative 4, combined with past and potential future density reduction treatments in the watershed, would improve stand and landscape resistance and resiliency to environmental disturbances. Commercial and non-commercial treatments would reduce stand densities on BLM-administered lands. Tree growth and vigor would improve through the reduction of competition for limited site resources. This would increase the resiliency of stands and individual larger, older trees to ensure their longevity.

Table 3-6 displays the difference in stand conditions between the No Action Alternative (current condition) and Alternative 4 within a 30-year time period. The stand data below was collected from project units in all vegetation condition classes (poles through mature) and vegetation types (DF, PP) in the project area. Example stands were modeled for each treatment type to capture the differences in effects to northern spotted owl habitat for each treatment. The table also highlights the trends associated with stand density and canopy cover as silvicultural prescriptions are applied. Table 3-6 displays the current canopy cover to demonstrate the relationship of relative density index (RDI) of a stand and the number of trees occupying that same stand with and without management intervention.

Table 3-6. Current and estimated post-treatment stand conditions and effects on habitat.

	QMD (inches)	BA (ft^2)	TPA	Crown Ratio (%)	Canopy Cover (%)	Relative Density
Selective Thinning (Dispersal Maintain)						
Current Conditions	11.5	272	380	31	84	0.89*
30 years No Action	13.6	323	322	27	85	0.99*
Post-Treatment	20.7	107	46	40	40	0.28
30 Years Post-Treatment	23.4	136	46	37	45	0.37
Structural Retention Regeneration Harvest (Dispersal Removal)						
Current Conditions	6.5	206	899	43	75	0.84*
30 years No Action	10.2	257	454	42	76	0.88*
Post-Treatment	21.8	111	43	40	37	0.28
30 Years Post-Treatment	24.3	135	42	38	40	0.33
Density Management (Roosting and Foraging Maintain)						
Current Conditions	16.2	227	158	30	68	0.65*
30 years No Action	18.5	270	145	26	70	0.73*
Post-Treatment	16.3	180	124	30	60	0.51
30 Years Post-Treatment	18.6	220	117	27	62	0.59*
Selective Thinning (Roosting and Foraging Downgrade)						
Current Conditions	6.7	188	769	32	68	0.76*
30 years No Action	10.3	226	390	29	69	0.77*
Post-Treatment	19.4	130	64	25	44	0.35
30 Years Post-Treatment	21.7	162	63	23	48	0.4

*Relative Density (Curtis 1982) indices above 0.55 = zone of imminent density induced mortality. Without stand treatments that reduce trees per acre, RDIs that remain above the 0.55 RDI threshold leaves stands more vulnerable to drought, insect, and disease mortality. Reducing stand density is critical in meeting the stated purpose and need of the Nedsbar Forest Management Project.

Table 3-6 displays that 30 years following treatment, these stands would have less canopy cover than a "No Action" in 30 years; however, stand densities would be reduced and the largest trees in the stand would have more optimal growing conditions than a No Action 30-year projection. A treatment to reduce stand densities now would set the stand on a more desirable stand development trajectory to create a multiple canopy, multi-age stand for the future. These treatments would accelerate the development of forest stand conditions that meet long-term management objectives for northern spotted owl habitat and shift stand trajectories to encourage key habitat components for the future. Leaving stands at their current condition would not reduce stand densities to their natural carrying capacities and would not improve individual tree vigor in the next 30 years. Reducing stand densities through thinning treatments would promote the growth and establishment of tree species that are better adapted or most resilient to site conditions and natural disturbance regimes. Stands in which treatments

are not applied would maintain a higher relative density and would remain in a homogenous and uniform stand structure of less complexity for at least 30 years.

Figure 3-1 illustrates the difference in stand structure conditions in a mature Douglas-fir stand in the Nedsbar Project Area modeled with ORGANON and SVS over a 30-year time period. The Stand Visualization System (SVS) illustrates the prescriptions, portraying what existing forest stands look like today and after application of the proposed prescriptions (USDA FS and University of Washington 1995). ORGANON plot data was entered into the SVS program for the simulations. The SVS images below simulate the two modeled scenarios. The figure below shows the long-term change in stand condition following a Douglas-fir Selective Thinning treatment and a No Treatment in Dispersal Habitat.

Figure 3-1 Nedsbar stand – dispersal habitat.

a): Stand structure 30 yr. post-treatment **b): Stand structure 30 yr. no treatment**

Many stands within the Analysis Area exhibit simple, single layer structure or possibly a two-aged structure with overstory trees and understory trees but which lack mid-layer structure. These stands are overstocked and therefore lack growing space to accommodate new cohorts of trees to grow. To create multi-layered structure, with multiple heights and age classes, space must be created through thinning and the creation of openings. Retaining canopy covers of greater than 60 percent can hinder the ability to thin and create large enough openings for multi-layered tree structure.

Alternative 4 would meet the timber management assumptions and conifer growth and timber yield projections provided for in the 1995 Medford District RMP on approximately 89 percent of the acres commercially treated. Of the remaining 11 percent of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60 percent, it is likely that conifer growth and yield projections would not be met on these acres. However, these silvicultural treatments would reduce short-term impacts to forest stands described previously in this section.

d. Alternative 3

Alternative 3 focuses on treat and maintain prescriptions within NSO home ranges and CHU and does not propose any road building. Under Alternative 3, the stand level effects and landscape level effects differ from those described in Alternative 4. The stand level treatments in Alternative 3 would decrease treatment intensity for 144 acres in comparison to Alternative 4. An estimated 709 acres of commercial harvest could not be treated under Alternative 3 in comparison to Alternative 4: 1) due to access limitations associated with no road building and/or 2) based on the current canopy conditions of some stands there was not an option to enter the stand for treatment and meet the “treat and maintain” prescription. Since Alternative 3 proposes to treat less acres overall in comparison to Alternative 4, the landscape scale benefit to forest resiliency is less than Alternative 4. There are 1,541acres of proposed treatment under Alternative 3, which is approximately 10 percent of the BLM Analysis Area. Table 3-7 below shows the amount of treatment acres by type proposed under Alternative 3.

Table 3-7. Proposed silvicultural treatments in Alternative 3.

Silvicultural Prescriptions	Est. Acres
Selective Thinning DF 40%	96
Selective Thinning DF	50
Selective Thinning PP 40%	58
Selective Thinning PP	65
Group Selection 40%	98
Group Selection	6
Group Selection 60%	88
Density Management 60%	153
Structural Retention	26
Riparian Thinning	17
Small Diameter Thinning	133
Total Acres	789
Fuels	753

Alternative 3 focuses on the short-term retention of existing NSO habitat. Target canopy cover retention levels are higher in comparison to Alternative 4, and roughly the same in comparison to Alternative 5. Alternative 3 proposes treatments that would be beneficial to the forest stands and for the habitat it maintains. Similar to Alternative 4, these silvicultural treatments would generally result in stands with fewer but larger trees and trees with increased growth rates. The healthiest large conifers and hardwoods would be maintained by reducing adjacent competing vegetation. Commercial treatments would promote more drought-tolerant and fire-resilient species over shade-tolerant species. Variable stand structure would be maintained through individual tree selection. These treatments would aid in improving the resiliency within treated stands to better withstand disturbances such as; insects, diseases, and drought which are described earlier this section; however, there would be considerably less acres treated than in Alternative 4. The effects of less treatment acreage are described in detail under Alternative 1, the No Action Alternative. Alternative 3 would treat more acreage in comparison to Alternative 5.

Alternative 3 would meet the timber management assumptions and conifer growth and timber yield projections provided for in the 1995 Medford District RMP on approximately 69 percent of the acres commercially treated. Of the remaining 31 percent of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60 percent, it is likely that conifer growth and yield projections would not be met on these acres.

e. Alternative 5

Under Alternative 5, the stand level effects and landscape level effects differ from those described in Alternatives 3 and 4. The stand level treatments differ from Alternatives 3 and 4 by a decrease in treatment intensity or by differences in treatment types (commercial treatments vs. fuels treatments). Alternative 5 has a 962-acre reduction in commercial harvest as compared to Alternative 4. The reduction in commercial harvest is

due to alternative design which does not build any new roads and a strategy to take a lighter touch thinning approach by thinning only the non-commercial component of some of the forest stands. The acreage of fuels treatments are similar between Alternatives 4 and 5 by a difference of 4 acres; although the placement of these treatments differ in that 274 acres of forest stands proposed for commercial treatments in Alternative 4 are proposed for fuels treatments (non-commercial <8 inches dbh) in Alternative 5. Approximately 253 acres of commercial harvest are dropped from Alternative 5 in comparison to Alternative 3. Alternatives 3 and 5 do not propose road building, so the difference in commercial treatment acres are due to units deferred from commercial harvest in Alternative 5. Under Alternative 5, there is an increase in fuels treatments acreage in comparison to Alternative 3 by 123 acres, the placement of these treatments differ in that certain commercial treatments in Alternative 3 are fuels or non-commercial treatments in Alternative 5. Since Alternative 5 proposes considerably less treatment acreage than Alternative 4, the landscape-scale silvicultural benefit is less in comparison to Alternative 4, and slightly less in comparison to Alternative 3. The total amount of proposed treatment 1,412 acres, which is approximately 9 percent of the BLM Analysis Area. Table 3-8 below shows the amount of treatments proposed under Alternative 5.

Table 3-8. Proposed Silvicultural Treatments in Alternative 5.

Silvicultural Prescriptions	Est. Acres
Density Management 60%	321
Selective Thinning PP 40%	20
Selective Thinning PP 50%	187
Group Selection 50%	2
Group Selection	6
Total Acres	536
Fuels	876

Alternative 5 focuses on the short-term retention of existing NSO habitat. Target canopy cover retention levels are higher in comparison to Alternatives 3 and 4. Alternative 5 proposes treatments that would be beneficial to the forest stands and for the habitat it maintains. Similar to Alternatives 3 and 4, these silvicultural treatments would generally result in stands with fewer but larger trees and trees with increased growth rates. The healthiest large conifers and hardwoods would be maintained by reducing adjacent competing vegetation, the reduction in competing vegetation is considerably less in Alternative 5 in comparison to Alternatives 4, and slightly less in comparison to Alternative 3. Commercial treatments would promote more drought-tolerant and fire-resilient species over shade-tolerant species. Variable stand structure would be maintained through individual tree selection. These treatments would aid in improving the resiliency within treated stands to better withstand disturbances such as insects and diseases, and drought; however, there would be considerably less acres treated than in Alternative 4 and with decreased intensity of treatments. The effects of less treatment acreage are described in detail under Alternative 1, the No Action Alternative.

Alternative 5 would meet the timber management assumptions and conifer growth and timber yield projections provided for in the 1995 Medford District RMP on approximately 40 percent of the acres commercially treated. Of the remaining 60 percent of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60 percent, it is likely that conifer growth and yield projections would not be met on these acres.

f. Summary of Action Alternatives

Refer to Appendix G for a comparison of alternatives based using the metrics developed through community collaboration. Some of these metrics include RDI, QMD, canopy cover percentage, basal area, trees per acre, volume per acre etc.

In summary, stands under the Nedsbar Forest Management Project would benefit immediately from forest management treatments. However, the stand and landscape benefits vary by alternative. Alternative 4 has the highest number of acres treated where the silvicultural treatments would improve and/or maintain vigorously growing conifer forests, reduce tree mortality, and encourage a mixture of tree species that are more fire resilient and drought tolerant than its current condition. Alternative 4 does propose 167 acres of treat and maintain NRF where the full benefits of thinning on stand resiliency and growth would not be realized; but Alternative 4 would treat 783 more acres than Alternative 3 and 1,117 more than alternative 5 in a manner that meets full silvicultural objectives for forest growth and resiliency to insects and disease. The reduction in stand densities, preference of shade-intolerant species over shade-tolerant, and increasing growing space for residual trees would result from such treatments. The degree of silvicultural benefit varies between the different action alternatives. In stands which retain 60 percent or greater canopy cover, RDI indices will likely remain above the zone of suppression mortality. Stands which remain above this threshold are more vulnerable to drought, insect, and disease mortality, and are therefore, less resilient to disturbance. Shade-intolerant species require higher levels of light and lower levels of tree competition than more shade-tolerant species. The ability to create favorable conditions for shade-intolerant species, such as pine and oak, are limited when canopy cover retentions remain at 60 percent or greater on average, because high levels of canopy cover retention can be compromised when openings are created around shade-intolerant species. Alternative 4 would treat the most acres and at more optimal RDI levels in comparison to Alternatives 3 and 5, and would have more ability to create favorable conditions for species diversity.

Alternative 4 would meet the timber management assumptions and conifer growth and timber yield projections provided for in the 1995 Medford District RMP on approximately 89 percent of the acres commercially treated. Of the remaining 11 percent of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60 percent, it is likely that conifer growth and yield projections would not be met on these acres. However, these silvicultural treatments would reduce short-term impacts to forest stands described previously in this section. Alternative 3 would meet the timber management assumptions and conifer growth and timber yield projections provided for in the 1995 Medford District RMP on approximately 69 percent of the acres commercially treated. Of the remaining 31 percent of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60 percent, it is likely that conifer growth and yield projections would not be met on these acres.

Alternative 5 would meet the timber management assumptions and conifer growth and timber yield projections provided for in the 1995 Medford District RMP on approximately 40 percent of the acres commercially treated. Of the remaining 60 percent of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60 percent, it is likely that conifer growth and yield projections would not be met on these acres.

g. Cumulative Effects

Refer to Consideration of Past, Ongoing, and Reasonably Foreseeable Actions in Effects Analysis located in Section 3.A.2.

h. Past Actions

Since the implementation of the Medford District ROD/RMP in 1995, harvest has occurred on 983 acres of the 9,777 acres of BLM-administered forested lands within the Nedsbar Analysis Area of the Little Applegate and Upper Applegate 5th field watersheds. Commercial harvest treatments have included regeneration harvest, mortality salvage, individual tree selection and many different types of thinning (density management thinning, selective thinning and restoration thinning). Regeneration harvest treatments have created growing space for

new cohorts of trees to occupy stands and create a multi-layered structure. Thinning treatments have reduced stand densities and tree competition, which has increased the vigor of remaining trees. Thinning has also promoted more shade-intolerant trees by reducing the shade-tolerant species in close proximity. Individual tree selection has removed trees across all diameter classes and has reduced tree competition. Mortality salvage has removed trees killed or damaged by insects, wind, or wildfire and recruited young conifers. The remaining trees on these 983 acres of harvest have adequate site resources to maintain good growth rates with tree vigor at levels necessary to minimize mortality from competition or insects and disease. Expected natural mortality continues in treated stands at acceptable levels due to natural disturbance. Additionally, 717 acres of pre-commercial thinning and 2,852 acres of fuels treatments have been completed since 1995 in the Little Applegate River and Upper Applegate River 5th field watersheds.

On the 240 acres of private industrial timber lands in the Analysis Area, harvest activities have ranged from partial harvests to clear-cuts. Most of the private industrial timber lands have been logged over the past 60 years. Within these stands, management objectives are to maximize volume growth per acre. Of the 2,869acres of privately-owned lands within the Nedsbar Analysis Area of the Little Applegate and Upper Applegate fifth field watersheds, varying levels of harvest have occurred over the past 60 to 80 years. Conifer growth and timber yield rates for these lands are unknown. Most of these lands have houses or farms located near valley bottoms and generally occur in the lowest elevations in the watershed.

i. Present Actions

Management activities still in progress on BLM-administered lands in the Nedsbar Planning Area of the Little Applegate and Upper Applegate 5th field watersheds include: 175 acres of commercial harvest in the Lick Stew and Bobar Forest Management Proects and 98 acres of fuels treatments in the Bald Lick Forest Management Project. On private industrial timber lands, the current amount and duration of logging activity is variable. On lands owned by private individuals, the amount of logging is also variable, but harvesting is generally limited to small areas and individual trees are used for lumber or firewood.

j. Future Actions

At this time there are no proposed forest management projects within the Little Applegate and Upper Applegate 5th field watersheds. The BLM is currently involved in a collaborative planning effort with the Forest Service in the Upper Applegate watershed. Under this AMA planning effort, the Forest Service and BLM are working with stakeholders to collaboratively develop desired conditions, project purpose and need, and proposed activities to further restoration objectives in the Upper Applegate Watershed. A proposal may be developed by late summer or early fall; however not enough information exists at this time concerning a proposal to describe and assess cumulative effects. However, commercial treatments and vegetation treatments such as protection, maintenance, pre-commercial thinning, and release may occur. Within such stands, brush and hardwood control, commercial thinning and pre-commercial thinning are the three primary management activities most likely to occur, all of which would reduce stand densities, increase conifer growth, and redirect forest stands towards conditions that would be more resilient to landscape disturbances. These treatments would enhance seedling survival, reduce vegetative competition, and allow for increased conifer growth. From a silvicultural and forest resiliency objective, landscape scale adverse cumulative effects would not be anticipated; effects are anticipated to be positive. The Upper Applegate AMA planning effort will complete NEPA analysis, including cumulative effects analysis that will include activities that have occurred or are ongoing in the Nedsbar Planning Area, once a formal proposal has been developed.

On private industrial forest lands, future harvest plans are unknown. However, in stands with an average 8-inch DBH and greater, it is reasonably expected that commercial harvest may occur within 5 to 10 years. Industrial landowners would most likely use silvicultural methods that create early-seral stands. Post-harvest activities, such as conifer planting, brush and hardwood control, and pre-commercial thinning, may be scheduled to insure the survival, establishment, and maximum growth per acre of conifers. In stands with an average less than 8 inches DBH, little commercial logging is expected in the next 15 to 20 years. Small woodland owners in the Analysis Area would be more likely to treat their conifer forests to meet forest resiliency objectives, similar to

alternatives analyzed under this EA. Refer to Section 3.A.2. above, Consideration of Past, Ongoing, and Reasonably Foreseeable Actions, for a description of assumptions regarding timber harvest on private lands.

k. Findings

There is no potential for adverse cumulative effects to forest vegetation when considering forest treatments proposed under Alternatives 3, 4 and 5 along with current conditions and ongoing and reasonably foreseeable actions in the Analysis Area. Other forest management projects (past, ongoing, and reasonably foreseeable) within the Analysis Area are improving tree vigor, reducing risk for insect and disease impacts, and improving fire resiliency in forest stands. This project would increase the acreage within the analysis area of forest stands treated. The action alternatives considered under the Nedsbar Forest Management Project, when combined with past, ongoing, and reasonably foreseeable silvicultural actions on BLM-administered lands within the Analysis Area, would improve tree vigor, reduce the impacts of disease, and improve fire resiliency at the landscape scale although to a varying degree depending on the variation in treatments and total acres treated under each alternative. See Table 3-9 below for a comparison on acreage treated.

Table 3-9. Comparison of acreage treated between action alternatives.

Alternative	Proposed Commercial Treatment Acreage (approx.)	Small Diameter Thinning (Stewardship) Acreage (approx.)	Fuels Treatment Acreage	Total Approx. Acreage Proposed for Treatment	Percentage of treatment on BLM Lands within Analysis Area (%)
3	656	133	753	1,541	10
4	1,348	150	880	2,378	15
5	536	-	876	1,412	9

C. FIRE AND FUELS

This section describes the current condition of the landscape and discloses the effects of forest management activities on fire hazard. Smoke impacts, as a result of prescribed fire, are discussed in “Air Quality”.

1. Assumptions

Analysis Area: Includes all lands within the Planning Area (18,958 acres).

Project Area: Where appropriate, refers to units proposed for treatment under the action alternatives.

2. Issues/Concerns

Scoping (external and internal) generated the following issues related to implementing the proposed actions. These effects may or may not occur as a result of proposed actions but were of concern to members of the public or ID team members.

- What are the effects of forest management on fire hazard?
- What are the effects of forest management on the fire environment and wildfire behavior?
  - Will increasing the spacing between the canopies of trees alter microclimates (e.g. increased wind speeds, light, and temperatures)?
  - Will increased light lead to increased shrub and forb growth, drying of vegetation, and altered wildfire behavior?

3. Affected Environment

a. Fire Disturbance History

Fire is recognized as a key natural disturbance process throughout southwest Oregon (Atzet and Wheeler 1982). The landscapes that comprise the Analysis Area evolved with frequent fires affecting the vegetation and other key components of the ecosystem. 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 1995). 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). Frequent, low intensity fires served as a thinning mechanism, thereby 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.

b. Fire Exclusion/Suppression

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 that of fire exclusion. In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies.

In ecosystems that historically burned frequently, particularly the Ponderosa pine and the dry mixed-conifer forest types found in the lower and mid elevation areas of the BLM Medford District (Sensenig 2002, Huff and Agee 2000), the exclusion of fire combined with periods of higher than normal precipitation has promoted increases in fuel quantity and changes in fuel continuity and arrangement. As a result of the absence of fire, there has been a buildup of fuels and a change to a more fire-prone vegetative condition. This is particularly true for Ponderosa pine, dry Douglas-fir, and mixed-conifer forest types.

Trees facing more intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Increased tree mortality contributes to increased dead and down fuel loadings and increased fire behavior. The additional surface fuels provide for longer duration heat intensity (residence time), which in turn affects the severity with which the site burns, and the increased canopy closure along with the lower canopy heights allow for more scorching in the canopy and when environmental conditions are conducive to crown fire initiation and sustained crown fire runs. High intensity fires can damage soils and can impact riparian vegetation as well.

Ponderosa pine trees that thrive in fire prone environments are being shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, more fire resilient pine species are declining across the landscape. Trees growing at lower densities, as in Ponderosa pine stands, tend to be more vigorous and fire resilient.

Sites that have a less frequent fire regime (higher elevation white fir stand types in the southern end of the Analysis Area) display much the same fuel quantity and arrangement increase and possibly may burn with similarity in patch size and intensity to their historical pattern under some weather conditions and with more severe characteristics and larger patch size under severe fire weather conditions.

Fire history recorded over the past 20 years in southwest Oregon indicate a trend of more large fires which burn at higher intensities in vegetation types associated with low to mixed severity fire regimes. This trend is also seen throughout the western United States. Contributing factors are the increase of fuel loading attributed to the absence of fire, recent drought conditions, and past management practices.

The BLM has a master cooperative fire protection agreement with the ODF. This agreement gives the responsibility of fire protection of all lands within the Analysis Area to the ODF. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for firefighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size.

Due to ownership patterns and political constraints in southwest Oregon, the use of wildfire to meet resource objectives is not possible. There are stipulations within the protection agreement with ODF that allows BLM to designate areas that require special fire management activities during suppression efforts in order to insure damage to resources are minimized. It is recognized that restrictions could increase the cost of suppression which the BLM would incur and would require a modification of the contract. During suppression activities conducted on BLM-administered lands these guidelines would be followed:

- BLM resource advisors would be dispatched to fires which occur on BLM–administered lands. These resource advisors are utilized to ensure that suppression forces are aware of all sensitive areas and to insure damage to resources is minimized from suppression efforts.
- When feasible, existing roads or trails would be used as a starting point for burn-out or backfire operations designed to stop fire spread. Backfires would be designed to minimize fire effects on habitat. Natural barriers would be used whenever possible and fires would be allowed to burn to them.
- In the construction of fire lines, minimum width and depth would be used to stop the spread of fire. The use of dozers should be minimized and resource advisors would be consulted when appropriate. Live fuels would be cut or limbed only to the extent needed to stop fire spread. Rehabilitation of fire lines would be considered.
- The felling of snags and live trees would only occur when they pose a safety hazard or would cause a fire to spread across the fire line.
- The construction of helispots (for the purposes of fire suppression) should be minimized. Past locations or natural openings should be used when possible. Helispots would not be constructed within Riparian Reserves, or areas of special concern.
- Retardant or foam would not be dropped on surface waters or on occupied NSO nests.
- Resource advisors would determine rehabilitation needs and standards in order to reduce the impacts associated with fire suppression efforts.

c. Past Logging Practices

Commercial timber harvesting has occurred in the analysis area on BLM-administered lands since the 1960s. The intensity and acres harvested increased in the 1970s and 1980s. Past harvest techniques such as clearcutting, which were conducted before 1990 have resulted in stands of young and more flammable trees, which contribute to the current fire hazard ratings for the project Analysis Area.

Approximately 479 acres of BLM-administered lands were recently logged within the Analysis Area as part of the O'Lickety and Bald Lick Timber Sales and Lick Stew Stewardship. These projects acres included post-harvest fuels reduction work and prescribed burning to mitigate the surface fuel hazard that was created by the logging.

Timber harvest can increase fire severity, if not accompanied by adequate reduction of fuels, by increasing surface dead fuels (Sierra Nevada Ecosystem Project [SNEP] 1996, pp. 61-72). Studies that correlate logging

with increased fire behavior (Weatherspoon and Skinner 1995) are mostly based on the forest practice of not treating logging and thinning debris (slash). Thus, it is the added ground fuel which in a drier, hotter microclimate, as a result of opening forest canopy that contributes to increased fire behavior in a wildfire situation.

Opening forest canopies results in microclimatic changes particularly at the forest floor. A more open stand allows more wind and solar radiation resulting in a drier microclimate compared to a closed stand. This change in fuel moistures plays a major role in fire intensity and crown fire initiation. A drier microclimate generally contributes to more severe fire behavior. The degree of effects of microclimate change on fire behavior is highly dependent on stand conditions after treatment, mitigation to offset the effects of microclimate change, and the degree of openness. For example, Pollet and Omi (1999) found that more open stands had significantly less fire severity, while Weatherspoon and Skinner (1995) found greater fire severity.

Plantations are more susceptible to severe fire effects than unmanaged older forests (Weatherspoon and Skinner 1995). However, the same study indicated substantially less damage from wildfires where surface fuels were also treated. Once again, the structural attributes of young trees (crowns close to ground, crown consisting mostly of fine fuels), and the amount and location of forest floor fuels (logging/thinning debris, forest floor vegetation) are important factors.

Past Fuels Reduction Treatments

From 2002 to present, fuels treatments have occurred on approximately 6,359 acres of BLM-administered land within the Analysis Area, some of these acres have been treated multiple times with prescribed fire and the acres are counted again as a treatment. Approximately 479 of these acres were commercially thinned and followed up with prescribed burning. The fire hazard on all the treated acres has been reduced.

d. Fire Regimes

Climate and topography combine to create the fire regime found throughout the Analysis Area. Fire regime refers to the frequency, severity and extent of fires occurring in an area. Agee (1993) suggests that variable fire history, complex geology, land use history and steep environmental gradients of Douglas-fir hardwood forests of southwest Oregon and Northern California Siskiyou Mountains prevents generalizations about fire and its ecological effects (Agee 1993, pp. 283-284). Plant association groups are a credible link to historic ecological process, including fire regimes that occurred on sites in the past (Franklin and Agee 2003). Historic fire regimes and the departure from them, correlate to the change from historical to current vegetative structure. The change in vegetation also helps to describe the difference in fuel loading (dead fuels and live in the form of increased vegetation) from historical to current conditions.

These changes in vegetation and fuel conditions help to determine the expected change in fire behavior and its effects. This difference in many respects is attributed to fire exclusion, but also includes all human practices that would affect the extent, severity, or frequency of fire events compared to historical accounts. These practices include road building, livestock grazing, and some logging practices as well as fire suppression.

Three historic fire regimes are found within the Analysis Area (Schmidt et al. 2002):

Fire Regime 1: 0-35 years fire return interval, Low Severity

Typical climax plant communities include ponderosa pine, pine-oak woodlands, and oak woodlands. Large stand-replacing fire can occur under certain weather conditions, but are rare events (i.e., every 200 years).

Fire Regime 2: 0-35 years fire return interval, High Severity

This regime includes true grasslands and savannahs with typical return intervals of less than 10 years and ceanothus and Oregon chaparral with typical return intervals of 10-25 years. Fire severity is generally high to moderate.

***Fire Regime 3*: < 50 years fire return interval, Mixed Severity**

Typical plant communities include mixed conifer and dry Douglas-fir forests. Lower severity fire tends to predominate in many events. This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events.

Acreage in each Fire Regime Condition Class (FRCC) is denoted in Table 3-10. The majority of the acres in the Analysis Area falls under FRCC3 (46 percent) – mixed severity, then 29 percent of the acres are in FRCC1-low severity. Only 25 percent of the acres in the Analysis Area fall under the high severity fire regime (FRCC 2).

Table 3-10. Acres in each Fire Regime Condition Class in the Nedsbar Analysis Area

Fire Regime Condition Class	BLM (acres)	Private (acres)	USFS (acres)	Total acres
FRCC1	4,606.90	726.54	34.31	5,367.75
FRCC2	4,043.66	549.67	63.25	4,656.58
FRCC3	7,237.73	1,463.59	0	8,701.32
Total	15,888.29	2,739.80	97.56	18,725.65

e. Predicted Climate Changes

Several studies that model climatic change into the next century also caution land managers in the Pacific Northwest to plan for increased temperatures and possibly some increase in winter moisture in the form of rain over the coming years in the Pacific Northwest (Hessl 2004, Mote et al. 2003a, Mote et al. 2003b). These forecasts would indicate and suggest that climatic factors may, in the future, have a more dramatic impact on wildland fire extent and severity. With increases in warmer winter moisture to inspire vegetation growth along with warmer and dryer conditions in the summer months what is considered to be extreme drought conditions now, could easily be experienced with Pacific Dacadal Oscillations (PDO) or El Nino Southern Oscillation (ENSO) in the first half of this century. Change in ecosystem structure and spatial distribution is expected to result from this climatic variation, and wildland fire will be one of the agents that cause the changes in the ecosystems. Silviculture and fuels management treatments are one way land managers can enhance ecosystem resilience and protect private property.

f. Condition Class

The process for making an assessment on how much fire exclusion, along with other management activities, has affected an ecosystem is through classifying the current condition of the site based on a reference usually pre-dating when fire exclusion became an influence. Condition class descriptions are used to describe these affected ecosystems. Condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of components such as species composition, structural stage, stand age, and canopy closure. There are three condition classes:

Condition Class 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.

Condition Class 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

Condition Class 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

The timber stands proposed for treatment are in Condition Classes 2 and 3.

g. Fire Risk and Fire Hazard Assessment

Fire Risk

Fire risk is the probability of when a fire will occur within a given area. Historical records show that lightning and human caused fires are common in the Analysis Area. Activities within this area such as increased development of homes in the wildland urban interface dispersed camp sites, recreational use, and major travel corridors add to the risk component for the possibility of a fire occurring from human causes. The time frame most conducive for fires to occur in the Analysis Area is from July through September.

Information from the Oregon Department of Forestry database from 1960 to 2011 show a total of 87 fires occurred throughout the Analysis Area. Lightning accounted for 57 percent of the total fires and human caused fires accounted for 43 percent. Sixty-six percent of the fires started on BLM-administered lands. Lightning accounted for 53 percent of the fires which started on BLM-administered lands.

Over the past 51 years the Analysis Area has averaged 1.7 fires per year. Eighty-two percent of the fires were less than 0.25 acres in size. Only two fires were greater than 10 acres in size and both of these fires occurred on private land. The average acres burned per year over the past 51 years is less than 6 acres.

Fire Hazard

Fire hazard assesses vegetation by type, arrangement, volume, condition, and location. These characteristics combine to determine the threat of fire ignition, the spread of a fire and the difficulty of fire control. Fire hazard is a useful tool in the planning process because it helps in the identification of broad areas within a watershed that could benefit from fuels management treatment. Hazard ratings were developed for the BLM-administered lands within the Analysis Area and reflect the results of past human and natural disturbances. The existing fuel profile within the Analysis Area represents a moderate to high resistance to control under average climatic conditions. The timber stands that are proposed for treatment are in the moderate to high fire hazard (Table 3-11).

Table 3-11. BLM, Private, and Forest Service acres with low, moderate, and high fire hazard.

Fire Hazard	BLM (acres)	Private (acres)	Forest Service (acres)	Total (acres)
Low	3,076.74	464.71	15.58	3,557.03
Moderate	5,554.41	1,472.75	92.65	7,119.81
High	7,280.55	933.14	57.62	8,271.31

Crown Fire Potential

Wildland Fire Decision Support System (WFDSS) uses LANDFIRE 2012 (cir. 2010 data) and uses set weather from the Remote Automated Weather Station (RAWS) (Squaw Peak RAWS) using a 10 MPH windspeed from the Northwest to predict crown fire potential (Figure 3-2).

Figure 3-2. Potential crown fire activity.

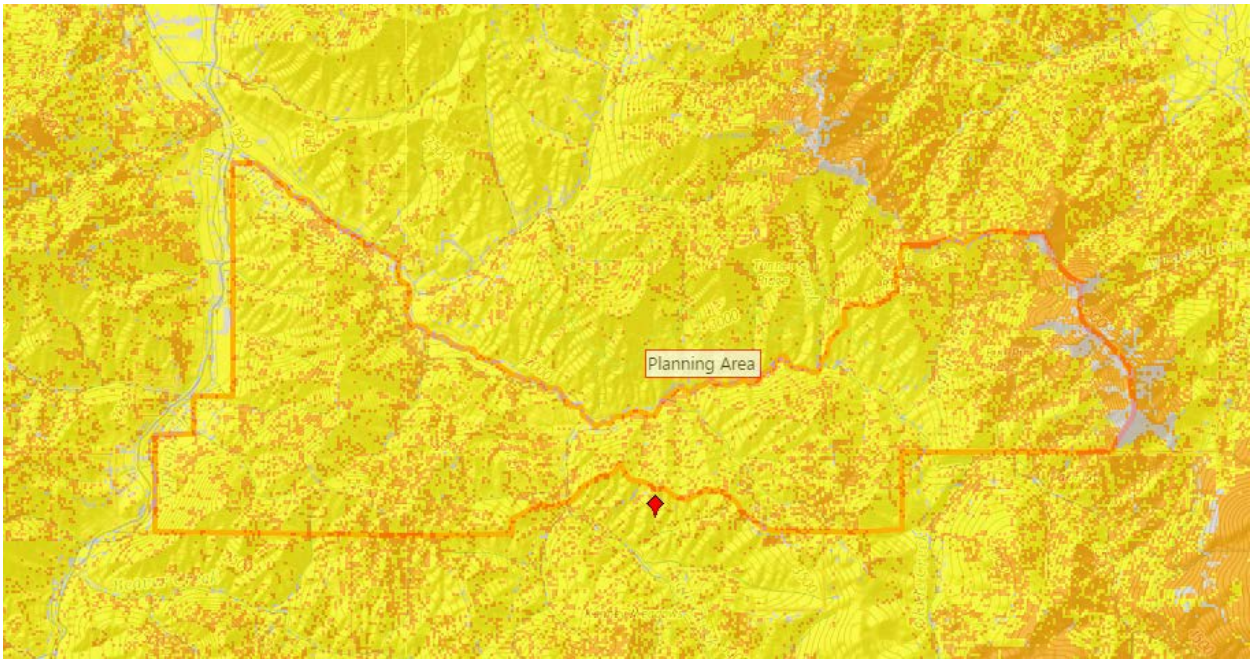
Incident	Analysis	Analysis Date	Time
Neds Bar	Neds Bar	07/29/2013	06:00

Wind Speed	Direction	RAWS Station
10 mph	315° azimuth	353213 - SQUAW

Crown Fire Activity Legend

Resolution: 60 meters **Units: no applicable units**

Value	Freq
No Fire	5,741
Surface Fire	120,402
Passive Crown	57,511
No Data	222



h. Fuels Reduction and Fire Restoration

Restoration to an historical range is inappropriate because the same set of historical conditions no longer exist (i.e., climate, population, species mix). A forest that is fire resilient has characteristics that limit fire intensity and increase resistance of the forest to mortality. Increasing forest resiliency means managing surface fuels to limit the flame length, removing ladder fuels to keep flames from transcending to tree crowns where trees have no defense against fire; decreasing crown density making tree to tree crowning less probable; and keeping large diameter trees, which are more fire resistant.

Logging is not a surrogate for natural fire process. No mechanical means of fuel reduction (e.g., grazing, timber harvest, thinning, or biomass utilization) can duplicate the unique ecological effects of wildland fire, such as soil heating, nutrient cycling and alteration of community composition and structure (Kauffman et al. 2004).

A number of ecological functions can be corrected by simply re-introducing fire in the ecosystem. However, reintroduction of prescribed fire without thinning can be problematic in stands with overly dense conditions (Agee and Huff 1986).

Fuel composition, amount and structure are the only drivers of wildfires that can be modified through management activities. Thinning alters the vertical and horizontal vegetative structure. Prescribed fire alters the amount and arrangement of forest floor fuels. There is little peer-reviewed research to support thinning alone as

a treatment to reduce unwanted fire behavior. However, there is general consensus from more than 90 years of fire research that fires burn hotter and spread faster when there is more fuel available to feed it. The basic objective of thinning is to remove material from the stand, thereby reducing the amount of fuel available for burning.

In a recent study on the effects of thinning on fire behavior, Graham et al. (1999) concluded that "depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species." Thinning accompanied by removal of thinning residues and slash and followed by periodic prescribed burning are effective (Omi and Martinson 2002, Pollet and Omi 2002, and Agee 1993). Treatments that result in forests with a lower density and larger trees show lower potential for crown fire initiation and propagation and for less severe fire effects (Pollet and Omi 2002).

Thinning is most apt to be appropriate where understory trees are sufficiently large or dense that attempts to kill them with fire (alone) would run a high risk of also killing the overstory trees. Low-elevation pine and mixed-conifer forests offer the highest priorities for thinning, in conjunction with prescribed fire, to contribute to restoration of wildlife habitat while making forests more resistant to uncharacteristically severe fire. Principles of fire-safe forest are most effective within plant groups assigned to the Ponderosa pine series, the Douglas-fir dry plant association group and the grand fir dry association plant group (Brown et al. 2004).

4. Environmental Consequences

a. Alternative 1 – No Action

Because no new management is proposed under this alternative, the effects described reflect current conditions and trends that are shaped by ongoing management and events unrelated to the project described under the Affected Environment. This section will highlight key findings related to the question "What would it mean to not reduce fire hazard in the Project Area?"

The current trend of increasing stand density which results in increased mortality to stands would continue for the timber stands that are proposed for treatment. Trees growing under these conditions often become weakened and are highly susceptible to insect epidemics and tree pathogens. High numbers of younger trees (mostly conifers) contribute to stress and mortality of mature conifers. Without treatment, the condition class of these acres would continue to deteriorate to a Condition Class 3.

With no forest management actions, there would be no temporary increase in surface fuels from timber harvest activities. Although there would be no harvest created slash, the existing surface, ladder, and canopy fuels would remain untreated for stands that are proposed for treatment.

Fire suppression would continue because there are no policies in place or being proposed that will allow fires to burn naturally within the Analysis Area. The entire Analysis Area is within the Wildland Urban Interface (WUI) and is a priority for fire suppression. BLM's 1995 RMP assumes that all suitable forested lands on industrial forest land ownership would be logged at about 60 year tree-growing rotations, although, there are no private industrial lands that are known to be scheduled for timber harvest at this time. Any private land timber harvest would meet ODF's standards for post- harvest fuels reduction. Defensible space and driveway treatments would likely continue by private land owners, but the amount is unknown. As a result of ongoing programs to implement defensible space around structures, driveways and roads for potential escape/evacuation routes, the risk of structure and human loss during wildfire events continually decreases.

b. Alternatives 2 through 5

All fuels reduction work proposed under Alternatives 2 through 5 are consistent with the objectives identified in the Jackson County Wildfire Protection Plans. The purpose of vegetation treatments under these alternatives is to reduce vegetative horizontal and vertical structure and to increase fire resiliency. The current science in determining extent and severity of wildland fire is based on three environmental variables, weather, topography

and fuels (Rothermel 1972, Albini 1976). Management activities on landscapes and within ecosystems seeking to affect wildland fire extent and severity have focused on treating of fuels. Forest fuels (including live and dead material), can be changed in terms of fire behavior and fire effects characteristics by silvicultural and fuels treatments (Agee 1996; Weatherspoon 1996), fire exclusion practices, and natural events.

Weather and topographic effects on fire behavior and severity are interrelated with the amount and distribution of fuels on a site with respect to the aspect, steepness of slope, and position on slope, along with atmospheric elements of temperature, relative humidity, in relation to fuel moisture, and wind speed and direction. When the environmental and atmospheric conditions are conducive to drying fuels and/or heating them to the ignition point during a fire we refer to them as available fuels. The interrelationship between slope and wind with the amount and arrangement of available fuel is critical in terms of allowing a fire to spread and increase in intensity. Without fuel loading becoming available to burn in a fire due to the effects of extreme weather there are no adverse effects to the vegetation or other site qualities. For example in some desert areas where vegetation is sparse and extreme fire weather is the norm (high temperatures, low relative humidity, windy unstable atmospheric conditions) fires often don't spread except under unusual wind conditions, due to the lack of continuous fuels. While the historic condition of the landscape is considered, the objective of thinning treatments proposed are not to restore those historic conditions, but rather to reduce hazardous fuels consistent with the Medford District RMP (USDI BLM 1995).

Activity Fuels /Surface Fuels

Timber harvest can increase fire severity, if not accompanied by adequate reduction of fuels, by increasing dead surface fuels. Treatments designed to reduce canopy fuels through density management, increase and decrease fire hazard simultaneously. Slash generated from the commercial thinning of timber stands, if not treated, would create surface fuels that would be greater than current levels. The existing surface fire behavior fuel models of the stands proposed for treatment are represented by a Timber Group fire behavior fuel model. Fuel amounts are measured in tons per acre for different size material. 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.

It is anticipated that fuel loadings (material 3 inches and less) after logging would be temporarily increased by approximately 3-11 tons to the acre prior to the scheduled fuel disposal activities to be completed. This would change the existing surface fuel model of most of the timbered stands to a Logging Slash Group which in turn would create higher rates of spread and greater flame lengths in the event of a wildfire. However, despite the temporary increase in ground fuels, research indicates that a reduction in crown fuels outweighs any increase in surface fire hazard (Omi and Martinson 2002). This temporary increase in surface fuels usually last less than one year (but can be up to two years); which is the time period that it takes to implement the fuel treatments to dispose of the surface and ladder fuels in these stands.

Any areas planned for fuels treatment may be reexamined by resource specialists at any stage of treatment to determine if the planned fuels treatment is still applicable. At the discretion of resource specialists, planned treatments may be changed to better meet the objectives outlined in this EA. Proposed changes will be limited to treatments and their anticipated effects analyzed under this EA.

Utilizing the modeling tool BEHAVE, with the parameters of a 6 mph wind speed and one hour fuels moisture of 6 percent , flame lengths in a slash fuel model are four feet compared to a one foot flame length in a timber litter model. Direct attack can be used under both of these scenarios. The rate of spread of a fire increases by 5 chains per hour in a slash fuel model. The size of a fire in a one hour period for a fire that is not suppressed would be 0.3 acres in a timber fuel type versus two acres in a slash fuel model. This difference is minimal in regards to impacts to the stand. Less than 14 percent of the BLM-administered land in the Analysis Area is proposed for treatment. Fire history in the area shows that 87 fires have occurred on BLM-administered lands in the Analysis Area over the past 51 years. Due to the small amount of acres being treated and the rare occurrence of a wildfire in the Analysis Area (1.7 fires/year), the probability of a fire occurring in a harvested unit is very remote.

Fuels treatments proposed for stands that are commercially harvested would occur within one year after a unit is harvested. Units that are hand piled by the timber sale purchaser are required, by contract, to be completed within four weeks after a unit has been harvested. Treatments would take place where slash created from thinning operations exceeds 3 tons per acre. Treatments should ensure that under most climate conditions, flame lengths would be less than three feet allowing for direct attack of a wildfire. The reduction of this material, along with reduced fire ladders and canopy fuels from forest thinning, would reduce fire behavior such as flame length, rate of spread and fire duration. With the reduction of flame length and fire duration the chance of a crown fire initiating in treated stands would be greatly reduced. Also, mortality of the smaller diameter conifers would be reduced.

In a study on the effects of thinning on fire behavior, Graham et al. (1999) concluded that "depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species." Thinning accompanied by removal of thinning residues and slash and followed by periodic prescribed burning are effective (Omi and Martinson 2002, Pollet and Omi 2002, Agee 1993, Graham 1999, and VanWagtendonk 1996). Treatments that result in forests with a lower density and larger trees show lower potential for crown fire initiation and propagation and for less severe fire effects (Pollet and Omi 2002).

Anecdotal observations should not be applied the same as rigorously tested scientific study, but they can be used to report and interpret trends. Anecdotal evidence on the Squires Peak Fire, which occurred in southern Oregon, showed that treatments to reduce fire behavior may have merit. Fire weather conditions during the Squires Peak Fire, as measured by the Energy Release Component Indices, were in the 89th to 90th percentile during the Squires fire event as measured by the Star and Provolt RAWS stations. This percentile is recognized as high but not extreme fire weather conditions. Even though winds were reported the evening the fire reached the treated area in the Kin's Wood project area, fire behavior decreased when it reached the treated area. Mortality to the residual stand was minimal due to the decreased fire behavior.

Fuels Model Descriptions for the Analysis Area

Pre-Treatment Fuel Models

Common pre-treatment fuel models in the Project Area include the following:

Timber Understory 5 (TU5): The primary carrier of fire in the Timber Understory models is forest litter in combination with herbaceous or shrub fuels.

Fuel Load tons/acre TU5:

1-hour- 4.00 tons/acre
10-hour- 4.00 tons/acre
100-hour- 3.00 tons/acre
Live woody- 3.00 tons/acre

Timber Litter (TL7, TL8, TL9): Primary carrier of the fire in the Timber Litter fuel models is dead and down woody fuel. Live fuel, if present, has little effect on fire behavior.

Fuel Load tons/acre TL7:

1-hour- 0.3 tons/acre
10-hour- 1.40 tons/acre
100-hour- 8.10 tons/acre

Fuel Load tons/acre TL8:

1-hour - 5.80 tons/acre
10-hour - 1.40 tons/acre
100-hour - 1.10 tons/acre

Fuel Load tons/acre TL9:

1-hour- 6.65 tons/acre
10-hour- 3.30 tons/acre
100-hour- 4.15 tons/acre

Grass-Shrub (GS2): The primary carrier of fire in the Grass-Shrub fuel model is grass and shrubs combined; both componets are important in determining fire behavior, All GS models are dynamic, meaning that their live herbaceous fuel load shifts from live to dead as a function of the live herbaceous moisture content. The effect of live herbaceous moisture content on spread rate and intensity is strong and depends on the relative amount of grass and shrub load in the fuel model.

Fuel Load tons/acre GS2:

1 hour- 0.50 tons/acre
10 hour- 0.50 tons/acre
Live Herbaceous- 0.60 tons/acre
Live Woody- 1.00 tons/acre

The most common Fuel Models found in Nedsbar Project Area are shown in Table 3-12.

Table 3-12. Fuel Models most common in the Nedsbar Project Area (82 percent).

Fire Carrier Category	Percentage
TU5	22%
TL7	19%
TL8	16%
TL9	15%
GS2	10%

Post-Harvest Fuels

In 2010, several Medford District fuels monitoring plots (i.e., FIREMON) were re-visited approximately five years after treatment. The majority of plots were located in the Ashland Resource Area. The plots were hand piled and burned (HPB)

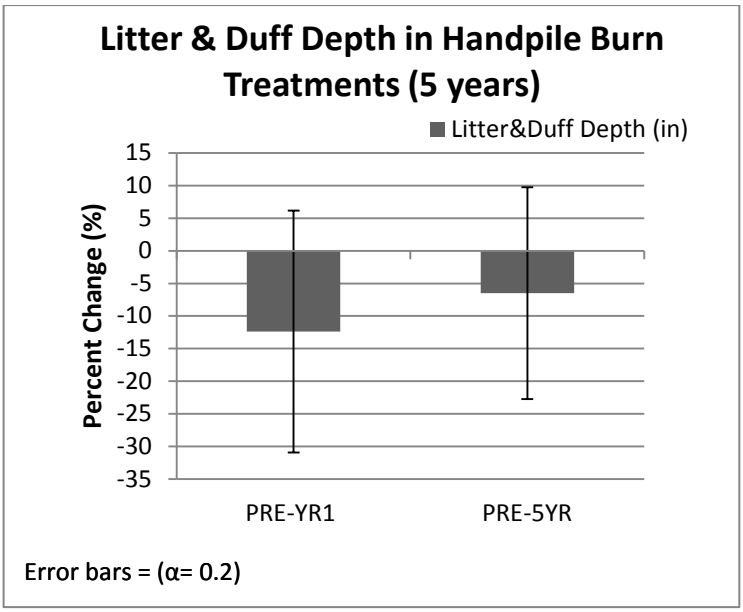
In this type of fuel treatments the total loading for dead and down surface fuels increased one year after treatments. In the HPB units, total surface fuel loading increased by an average of 30 percent from the pre-treatment condition, this change in 1 year post-treatment fuel loading was highly variable between plots.

Five years after treatments total surface fuel loading in the HPB treatments had decreased by an average of 38 percent from the pre-treatment fuel loading. This average change 5 years after treatment was significantly different from the 1 year post-treatment reading.

Duff and Litter

In HPB treatments litter and duff depth decreased by an average of 12 percent from pre-treatment to 1 year post treatment. Five years after treatment the average decrease was only 7 percent from the pre-treatment state. There were no statistically significant differences between the average changes in duff and litter depths 1 year or 5 years after treatments and changes were highly variable at all time scales (Figure 3-3).

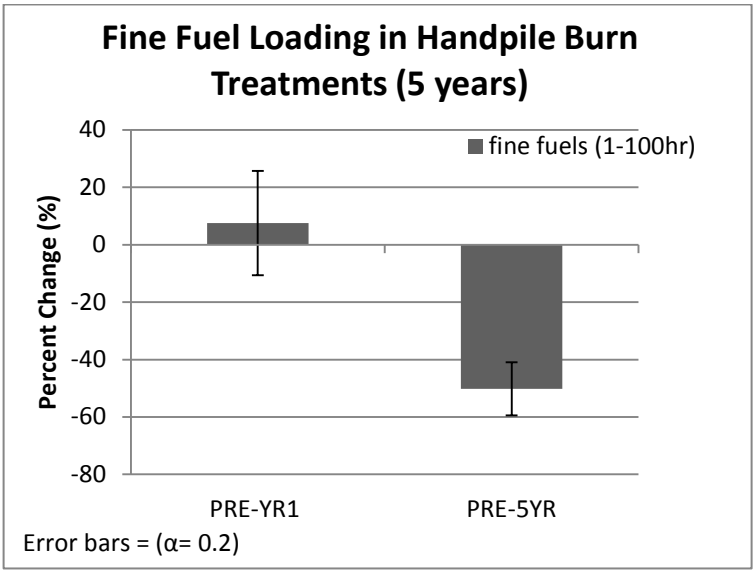
Figure 3-3. Change in litter and duff depth in handpile and burn fuel treatments from before to one year and five years after treatments. Error bars indicate 80% confidence (n=23).



Fine fuels

In the HPB units, fine fuel loading increased by an average of 8 percent from the pre-treatment condition (Figure 3-4). Five years after treatments fine fuel loading in the HPB treatments had decreased by an average of 50 percent from the pre-treatment fuel loading. This average change 5 years after treatment was significantly different from the 1 year post-treatment reading.

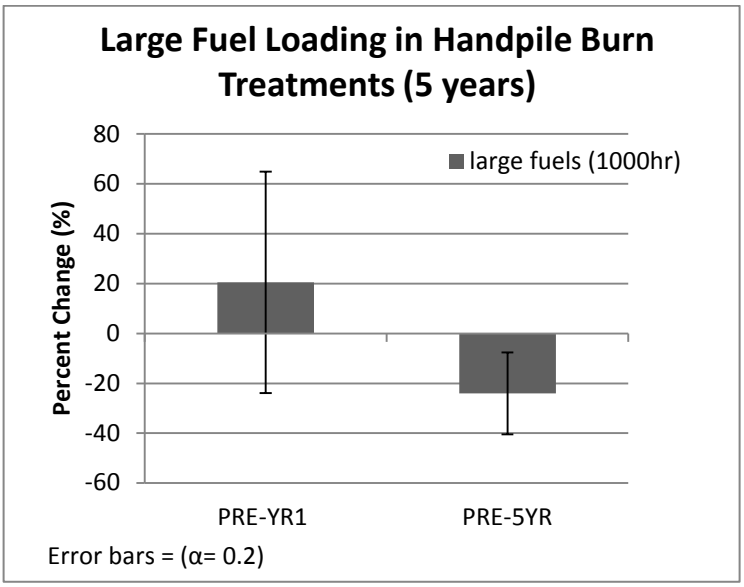
Figure 3-4. Change in fine fuel loading (1 - 100 hour) in handpile and burn fuel treatments from before to one year and five years after treatments. Error bars indicate 80% confidence (n=24).



Large Fuel (1000 hour)

In the HPB units, large fuel loading increased by an average of 21 percent from the pre-treatment condition (Figure 3-5). This change in 1 year post-treatment fuel loading was highly variable. Five years after treatments large fuel loading in the HPB treatments had decreased by an average of 24 percent from the pre-treatment fuel loading. This average change 5 years after treatment was not significantly different from the 1 year post-treatment reading.

Figure 3-5. Change in large fuel loading (1000 hour) in handpile and burn fuel treatments from before to one year and before to five years after treatments. Error bars indicate 80% confidence (n=24).



Fire Behavior

In general, observed Fire Behavior Fuel Models (FBFM) (Scott and Burgan 2005) prior to treatments exhibited greater fire behavior than those FBFM observed 5 years after treatments. This change in fire behavior fuel

models, shifting to reduced rates of spread and flame lengths, was particularly evident in mechanically masticated units. Five years after treatments, a few HPB units had moderate fuel loadings, while low loading fuel models represented the majority of plots. This indicates that 5 years after treatments, both types of treatments are still effectively reducing surface fuel loading and potential fire behavior. In some cases, after a HPB treatment these stands could change to a different fuel model group or stay within the same group and shift to one with lower amounts of fuels prior to treatment. Looking to eight years following treatments, there may be an addition of fuels to the treated stands and fuel loads should remain lower than they were after the HPB treatment. The differences in canopy closure of 40 and 60 percent among the silvicultural prescriptions will have little effect on the fuel models as the differences in fuel loading between the two would be unlikely to change the fuel model used for fire behavior calculations. The Group Selection prescriptions and the one Structural Retention unit (26 acres) will also have very little effect or change to the fuel models as these areas of treatment occur on approximately 20 percent of the overall unit acres. The Group Selection prescription is being used not to reduce fuel loading but to stimulate a conifer regeneration response. Therefore, the brush/conifer response will vary in each of the treated stands. Each stand will be monitored beginning 5 years after treatments and revisited according to the findings for any additional prescribed fire needs.

Relative Annual Burn Probability

Figure 3-6 represents relative burn probability and uses locally-calibrated surface fuels data. The relative annual burn probabilities were calculated by running 10,000 iterations, with each iteration representing a “fire year,” within the large fire simulation system (FSim). Weather conditions and fire distribution and frequency were determined by historically (previous 20 year record) informed probability distributions and observations.

Figure 3-6. Relative annual burn probability in the Nedsbar Planning Area.

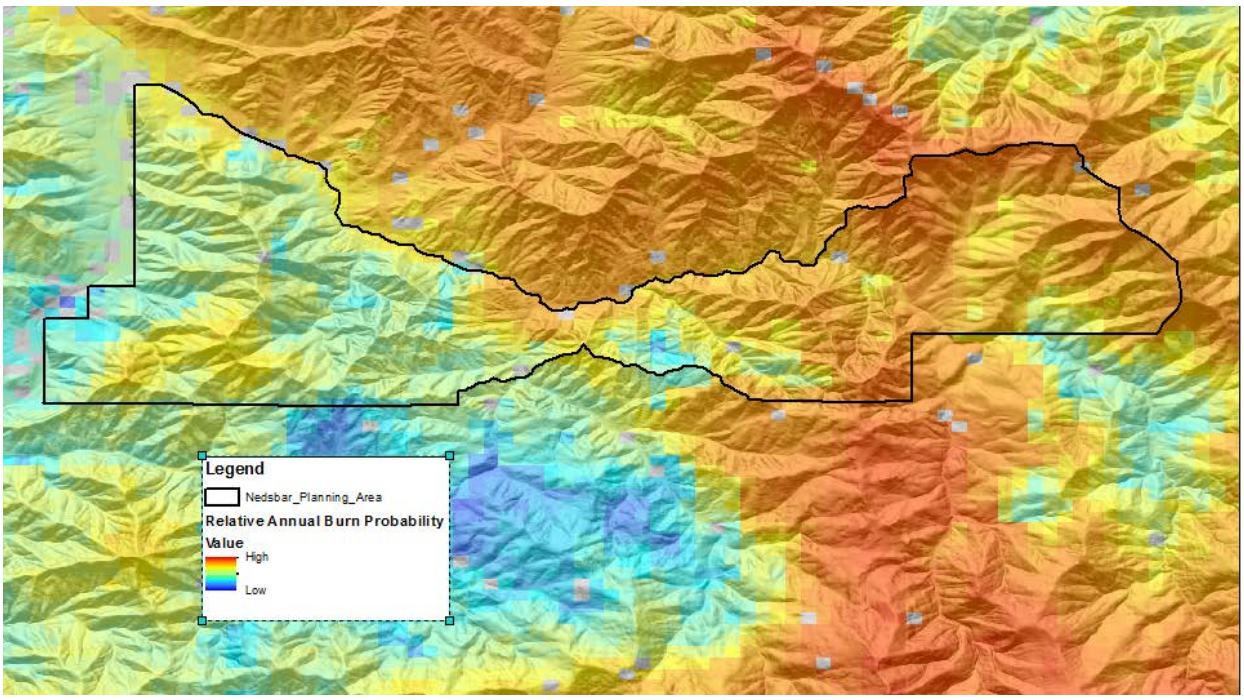


Table 3-13 shows the acres treated under each action alternative within the relative burn probability categories.

Table 3-13. Burn probability acres treated by category by alternative.

Planning Area Relative Burn Probability Categories	Acres treated by Alternative		
	Alt. 3	Alt. 4	Alt. 5
High	504	540	360
Moderate-High	486	612	486
Moderate	414	666	378
Moderate-Low	144	450	198
Low	90	162	36
Total BP acres	1,638	2,430	1,458
Total Unit acres	1,546	2,388	1,416

Alternative 4 would treat the greatest number of acres of high and moderate to high burn probability; Alternatives 3 and 5 treat slightly lower amounts of high and moderate to high burn probability at 990 and 846 acres, respectively.

Fire Resiliency

A forest that is fire-resilient has characteristics that allow it to readily recover from a fire event. A forest's resiliency to fire can be increased by applying fire safe principles. This means managing surface fuels to limit the flame length, removing ladder fuels to keep flames from transcending to tree crowns where trees have no defense against fire; decreasing crown density making it less probable for a crown fire to move from tree to tree; and keeping large diameter trees that are more fire resistant (Agee and Skinner 2005, Agee 1996, Agee 1993).

The implementation of forest thinning under Alternatives 3 through 5 involving thinning from below to remove suppressed, diseased, and/or over crowded intermediate and co-dominant trees while retaining the larger co-dominant and dominant trees within treated stands would promote fire resilient forest stands. These forest thinning prescriptions would result in a reduction in ladder fuels, an increase in the height to the base of tree crowns, the reduction of crown bulk density (canopy fuels), and would promote tree growth and large trees. All of these are important factors in reducing the potential for initiating and sustaining a crown fire in these stands (Omi and Martinson 2002) (Agee 1996, Agee and Skinner 2005). Thinning from below, removing the smaller diameter trees within a stand, would increase the average tree diameters as soon as treatments are completed. Over time, tree diameters would continue to increase with the growth of the residual stand. Larger diameter trees are more tolerant to surface fires so there would be less tree mortality in the event of a surface fire. Commercial thinning would also favor more fire tolerant species such as pine. Lowering basal area through thinning and prescribed fire can increase the long term vigor in the residual trees within a stand.

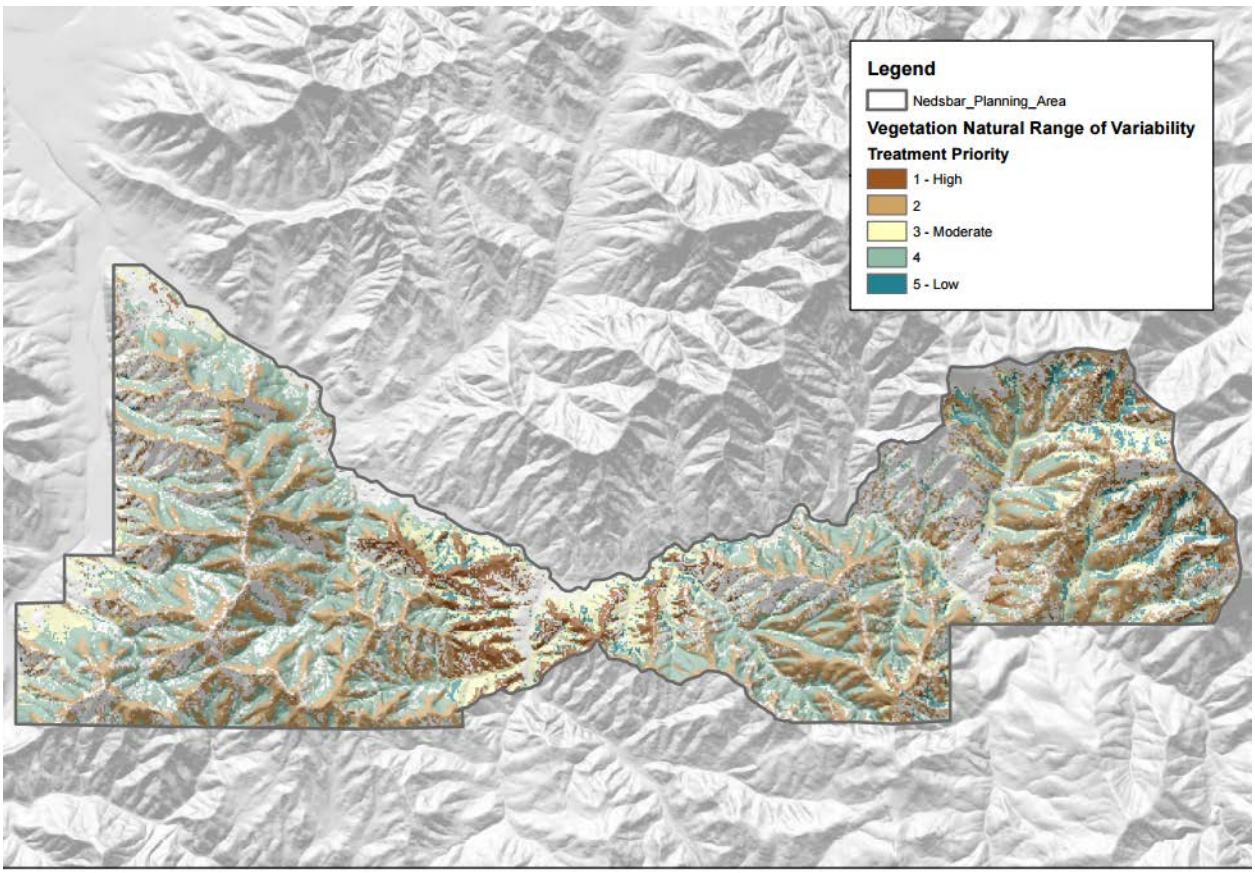
While the silvicultural prescriptions and objectives vary by prescription type, they are all designed to retain and/or promote healthy large trees. The maintenance of pine species on dry Douglas fir and pine sites contributes to the fire resiliency of forest stands. The larger the ponderosa pine, the greater its resilience to fire due to increasing bark thickness (Agee 1993, Agee 1996). Its bark is one of the key defense mechanisms against mortality from low intensity fire. Thus, removal of larger non-pine species, in this context, actually improves the ecological role of fire and subsequent fire resiliency of the stand by reducing competition for moisture and growing spaces. The fire resilience of the Analysis Area as a whole is improved due to the overall reduction in fire hazard within treatment units and previous fuels reduction treatments that have occurred on BLM-administered lands within the Analysis Area.

Vegetation Departure and Restoration Need

Historic conditions within the dry forests were more resilient to fire disturbance than current conditions, in large part, because frequent fire was present on the landscape (Brown et al. 2004, Hessburg and Agee 2003, North et al. 2009). Therefore, to measure dry forest fire resilience at the landscape scale, the BLM[8] quantified the departure of current vegetation structure and landscape composition patterns from a set of reference conditions that represent the historic range of variability (Barrett et al. 2010, Keane et al. 2009). In this approach, less departure from reference conditions represents greater fire resiliency. Figure 3-7 illustrates the departure of current vegetation structure and landscape composition patterns from a set of reference conditions that represent the historic range of variability for the Nedsbar Planning Area.

[8] The Nature Conservancy conducted this analysis of landscape-scale fire resiliency under an agreement with the BLM.

Figure 3-7. Treatment priorities based on Natural Range of Variability (NRV).



A recent regional evaluation of current forest structure suggests that, 40 percent of Oregon and Washington's conifer forests are in need of treatment through thinning and/or prescribed fire (Haugo et al. 2015). The analysis conducted by Haugo and others (2015) demonstrates a new approach for evaluating where, how much, and what types of restoration are needed to move present day landscape scale forest structure towards a Natural Range of Variability (NRV) across eastern Washington, eastern Oregon, and southwestern Oregon. Haugo and others (2015) built upon the conceptual framework of the LANDFIRE and Fire Regime Condition Class (FRCC) programs (Barrett *et al.* 2010). The LANDFIRE FRCC conceptual framework measures current forest structure departure from the NRV reference condition for a particular site and assumes that, given natural disturbance processes (e.g., historic fire regime), a biophysical setting (analogous to potential vegetation types) will have a sustainable range of variation in the proportion of each successional stage for a given landscape (Barrett *et al*. 2010). This reference condition—the percentage of a biophysical setting in each seral stage—approximates a NRV, or ecological condition, based upon the natural biological and physical processes.

Haugo and others (2015) used Washington–Oregon specific datasets to assess the need for changes to current forest structure resulting from disturbance and/or succession at watershed and regional scales. Table 3-14 shows the acres treated under each action alternative by departure class from the NRV.

Table 3-14. Acres of treatment under each action alternative by NRV departure priority.

Treatment Priority based on NRV	Acres Treated by Alternative		
	Alt. 3	Alt. 4	Alt. 5
High	208	241	181
Moderate-High	509	844	543
Moderate	181	264	147
Moderate-Low	350	645	324
Low	72	109	46
N/A	169	211	126
Total NRV Acres treated	1,490	2,314	1,366
Total Unit acres	1,546	2,388	1,416

Changes in Micro-Climate and Effectiveness of Fuels Treatments

Management of forest stands can result in altered micro climates (Agee 1996). Increasing spacing between the canopies of trees can contribute to increased wind speeds, increased temperatures, drying of topsoil and vegetation, and increased shrub and forb growth (Agee 1996). A more open stand allows more wind and solar radiation resulting in a drier microclimate compared to a closed stand. A drier microclimate generally contributes to more severe fire behavior.

The degree of effects of microclimate change on fire behavior is highly dependent on stand conditions after treatment, mitigation to offset the effects of microclimate change, and the degree of openness. For example, Pollet and Omi (2002) found that more open stands had significantly less fire severity, while Weatherspoon and Skinner (1995) found greater fire severity. In Pollet and Omi's study, more open stands had significantly less fire severity compared to the more densely stocked untreated stands. The degree of openness in the studied treated stands may not have been sufficient to increase fire activity. Weatherspoon and Skinner found commercially thinned stands in a mixed-conifer forest in the South Fork Trinity River watershed of the Klamath NF in northwest CA burned more intensely and suffered higher levels of tree mortality than unlogged areas (Weatherspoon and Skinner 1995). The partial cuts they examined were typically overstory removals, where large (mature and old growth) trees were removed leaving smaller trees. The study simply validates that smaller trees, due to thinner bark and crowns closer to the ground, will suffer more damage than large trees. Logging slash was not treated in the study areas. The proposed action for this project proposes to treat slash generated by the treatments and forest thinning would harvest some commercial sized ladder fuels.

Moisture content of live vegetation is an important consideration. The moisture content of live fuels compared to fine dead and down fuels is generally much greater. Where overstory canopy reduction results in the growth of live understory vegetation could contribute to reduced or increased surface fire behavior. Live fuels with higher moisture content can have a dampening effect on fire behavior compared to dead fine fuels (Agee et al. 2002, Agee 1996). Cured grasses and forbs can increase fire line intensity (Agee 1996); however, due to project design where ladder fuels have been removed and crown base heights increased, the risk of crown fire initiation and fire severity is reduced (Agee 1996, Omi and Martinson 2002, VanWagtendonk 1996).

Effects of Canopy Reduction on Fuel Moistures

Estimates of fuel moisture can be made from the measured ambient air temperatures and relative humidity within a stand. The following example is used to demonstrate the effects of canopy cover on fuel moisture. An ambient air temperature of 90° to 109° F and a relative humidity of 15 to 19 percent would result in 3 percent

fuel moisture for 1-hour time lag fuels. The fuel moisture of 10-hour fuels would be 5 percent; and the 100-hour fuel moisture would be 7 percent.

Corrections to fuel moistures are then needed to account for slope, aspect, time of day, month, and percent shading. Percent shading is calculated by using greater than 50 percent shading (shaded) or less than 50 percent shading (exposed). Cloud cover as well as timber overstory (canopy closure) is utilized in calculating percent shading.

Utilizing the example from above (1 hour time lag fuels at 3 percent) to correct fuel moisture on a site that has the attributes of (a) north slope, (b) slope greater than 31 percent, (c) 12:00 pm in August, (d) no cloud cover, would add 3 percent to the fuel moisture for a total of 6 percent.

Utilizing the same parameters but for an area that has shading greater than 50 percent would add 4 percent for a fine fuel moisture of 7 percent. The difference between the two sites is one percent, and would have minimal impacts to fire behavior.

In the study *Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, California*, Odion et al. (2004) found closed canopy forests had less high-severity fire than open canopy forests and non-forest vegetation types. Based on this finding, they also concluded that a long absence of fire is also a predictor of low severity fire effects. However, this study used no local and specific weather data except for an acknowledgement that a multi-year drought preceded the 1987 wildfires. The known inversion conditions during these fires may have had a distinctive effect on the way these landscapes burned.

Weatherspoon and Skinner (1995), who studied the same fires and area, also reported lower fire severity in uncut forests, and stated their finding was likely attributable to the absence of activity fuels and the relatively closed canopy conditions which reduces wind speeds and fuels drying of fuels. They admitted some findings to be less than conclusive due to the lack of local weather information from the time of the fires, reporting that the reconstruction of the highly variable weather conditions was not possible due to the smoky inversions and shortages of people during the first few days of the fire when much of the area burned. However, their findings emphasized the need for effective fuels treatments after management actions. They found partial cut stands with some fuels treatment suffered less damage than partial cut stands with no treatment.

Use of Polyethylene (PE) Covering for Burn Piles

Under Alternatives 3 and 4, polyethylene covers are proposed to cover burn piles keep the fuels dry until they can be burned. Alternative 5 proposes the use of Kraft paper to cover the piles.

The Oregon Department of Forestry Smoke Management Plan addresses the issue of utilizing plastic to cover piles. In section 629-048-0210, Best Burn Practices; Emission Reduction Techniques, it states that “Best burn Practices” involves methods that ensure the most rapid and complete combustion of forest fuels. Covering of handpiles is a “Best Burn Practice”. Also in this section it states “When covers will not be removed and thus will be burned along with the piled forest fuels, the covers must not consist of materials prohibited under OAR 340-264-0060 (3) (OAR n.d.c.), except that PE sheeting that complies with the following may be used: (a) Only PE may be used. All other plastics are prohibited.”

An addendum to the original Wrobel and Reinhart literature review (2003) on the use of PE sheeting to enhance combustion efficiency, discusses the rules affecting PE burning. Oregon and New Mexico are the only western states that allow burning of PE pile covers. Oregon has addressed the issue based on the findings reported by Wrobel and Reinhart (2003). The Oregon Department of Environmental Quality and the Oregon Department of Forestry developed an MOU for PE that was adopted in 2005. The MOU suggests that the plastic material is removed prior to burning when practicable. Adequate debris/slash is placed over the plastic sheeting to ensure the plastic remains covering the piles until the piles are burned. As stated above this ensures the most rapid and complete combustion of slash debris. Due to the difficulty of removing the plastic cover from below the debris, especially after long-term exposure to the elements, it is operationally and economically impractical to remove the plastic prior to burning. Therefore, the plastic is usually left in place and burned along with the pile. As

required, PE sheeting is used to cover piles. In a 2009 study, Jung et al. concluded that no increase in any hazardous chemical species as a function of low density PE was found.

Scoping comments suggested using Kraft paper instead of PE plastic to cover slash piles. Combustion studies involving lignocellulosic materials suggest that uncoated Kraft Paper may produce some of the same substances as PE (Garcia et al. 2003). It also states that from an operational standpoint, Kraft paper is a more expensive, less durable, and less effective means of minimizing moisture intrusion into the pile because of its tendency to degrade more rapidly than PE. In turn, fuel moisture is increased, combustion efficiency is reduced, and more accelerants may be needed for pile ignition.

Additionally, the weight and means of packaging Kraft paper contributes to decreased production and increased per unit cost of covering piles. The use of Kraft paper averages 55 pounds per square bundle compared to 12 pounds per roll for PE use. It takes 3 bundles of Kraft paper (165 pounds) to cover the same number of piles that one roll of PE (12 pounds) will cover. Kraft paper bundles are 4 by 4 foot square and are awkward to pack into a unit compared to a roll of PE that can be easily packed into the unit. The size and shape of Kraft paper bundles combined with increased weight could also contribute to increased potential for worker injuries (e.g., knee, back, and ankle sprains) during operations.

D. SOIL RESOURCES

Definitions of relevant terms:

Short-term: less than 10 years

Long-term: 10 years or more

1. Issues

Soil-related issues associated with the Nedsbar Project have been identified through public scoping or ID team specialists and will be addressed in this document. These relevant issues are:

- How would proposed gound-based and cable yarding, and associated road construction affect soil productivity (compaction, displacement, and change in organic matter and soil chemistry)?
- What are the effects of forest and fuels management activities on fragile soils?
- Would proposed project activities increase soil surface temperatures and dry out the soil?

2. Affected Environment

The proposed Nedsbar Forest Management Project is located within the Upper, Middle, and Lower Little Applegate River, Star Gulch-Little Applegate and Beaver Creek-Little Applegate 6th field watersheds. This is located in the Klamath Mountains geomorphic province. In summary, this is composed of ancient, highly metamorphosed rock including granitic, volcanic rocks (meta-andesite, basalt and volcanic breccia), interlayed schist, serpentine, gabbro and meta-gabbro. Some of the bedrock has been weathered to saprolite so there is more profile development in these areas.

Due to the presence of granitic rock in some of the analysis area, there are fragile soils for surface erosion potential (FM) in the project area.

The topography within the Project Area proposed units ranges between 10-80 percent slopes. Elevation ranges from approximately 1,500 feet to 5,600 feet. The Project Area is located within the larger Planning Area, and for the purpose of this analysis, is defined as the area where the soil resource would be affected with the implementation of proposed actions. Cumulative effects as it relates to soil productivity processes of erosion, compaction, and burning will be analyzed within the Project Area (on-site).

The broader Planning Area (18,958 acres) is the scale at which the risks of erosion leaving the project site and compaction affecting water run-off are analyzed in Section 3.E., *Water Resources*. Within the Planning Area, 15,924 acres are BLM-administered lands.

a. Description of Soils Series

A table of the predominant soils identified in proposed harvest units is listed below (Table 3-15), followed by a general description of the soil series recognized by the Natural Resource Conservation Service. See the soils map (Map 3-1) for the location of the soils on the landscape. There may be minor amounts of other soil series included within the proposed units.

Table 3-15. Soil series and characteristics.

Map Unit #	Soil Series Name	Depth (in.)	Soil Texture between 3 and 6 inches depth	Soil Sensitivity Category	Plastic Limit between 2 and 6 inches depth*
87F, 87G	Jayar	29	Very gravelly loam	1	PI: NP LL: 0-14
25G, 26G	Caris-Offenbacher	45	Gravelly loam	1(S), 2	Caris PI: 5-10 LL: 5-15 Offenbacher PI: 5-10 LL: 25-35
108E, 108F	Manita	58	Loam	3	PI: NP-10 LL: 25-35
196E, 195E, 195F	Vannoy	49	Silt loam	3	PI: 5-10 LL: 25-35
197	Vannoy-Voorhies	47	Vannoy: Silt loam Voorhies: Very gravelly loam	3	Voorhies PI: 5-10 LL: 25-35
188E, 188G, 189E, 189G	Tallowbox	34	Gravelly sandy loam	1	PI: NP LL: 0-14
187A	Takilma	60	Cobbly loam	2	PI: NP-5 LL:25-35
164D, 165E, 166E	Shefflein	66	Loam	2	PI: NP-10 LL: 15-25
158B, 158D	Ruch	70	Gravelly silt loam	3	PI: 5-10 LL: 25-35
113E, 113G	McMullin-Rock outcrop	21	Gravelly loam	1	PI: NP-5 LL: 20-30

Map Unit #	Soil Series Name	Depth (in.)	Soil Texture between 3 and 6 inches depth	Soil Sensitivity Category	Plastic Limit between 2 and 6 inches depth*
110B, 133A, 1C, 208C, 23A, 31A, 50E, 155G and W.	Minor soil map units present (not likely within proposed units)				

2= (moderately sensitive): burn only in spring-like conditions when soil and duff are moist. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment of snags as specified in the Standards and Guidelines. Write fire prescriptions that reduce disturbance and duration and achieve low fire intensity.
3= (least sensitive): burn to avoid high-intensity (severe) burns to protect a large percentage of the nutrient capital. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment of snags as specified in the Standards and Guidelines (USDI 1995, p. 168).
S= slopes ≥ 65%
*figures provided from the NRCS Web Soil Survey, *http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm*

The physical properties of the soil series are relevant to the determination of soil moisture content requirements for ground-based operations. The liquid and plastic limits are the moisture content at which the soil changes physical states. For example, the solid state is when the soil is dry enough that it will not mold or change shape, the plastic state is when the soil is wet enough to be moldable; this is when compaction could occur. Not all soils have the plastic state, some go directly from solid to liquid (primarily due to a lack of clay). The liquid state occurs when the moisture content of the soil is at a point where the soil acts more like a liquid, the micro-pores are all saturated and water flows freely through the profile. Water ponding could occur at this state and certain disturbances at this state have the potential to have detrimental impacts to soils. Therefore, these are general guidelines for developing project specific Project Design Features regarding soil moisture limits for ground-based operations. The PDFs minimize soil compaction and ensures compaction would not exceed the 12 percent analyzed in the 1994 Medford District FEIS RMP.

Fragile soils

There are soils classified as fragile under the Timber Productivity Capability Classification (TPCC) Handbook (USDI 1986) in the proposed Nedsbar Project. This determination was made by reviewing the Medford District's current corporate GIS layer for fragile soils as well as the 1995 Medford District RMP/ROD, Map 6. Since this information is compiled broadly and is not based on site specific field review, the proposed projects were assessed during site-specific field review to determine site stability. Field data collected ultimately determines the specific areas where forest management activities are suitable. This field review determined there were fragile soils present in the proposed activities.

The type of fragile soils present in this watershed are fragile for surface erosion potential soils (FM) and fragile for slope gradient soils (FG). Fragile (FM) soils have surface horizons that are highly erodible. Soils are derived from granite or schist bedrock. Fragile (FG) soils consist of steep to extremely steep slopes that have a high potential for surface ravel. Gradients commonly range from 60 to greater than 100 percent (USDI BLM 1995, p. 155). These can be placed in two general categories: suitable for timber sale activities or non-suitable for timber sale activities. There are no units proposed in non-suitable fragile sites. There are, however, units proposed in fragile suitable sites. Sites that are non-suitable will not be discussed further in this analysis because they will not be affected by project activities.

The Medford district RMP also has BMPs for fragile soils. The applicable ones are:

- Avoid fragile soils when planning road systems.
- Cable- Use full or partial suspension when yarding on FG, FM and FW soils.

- Tractor- Avoid tractor yarding.
- Helicopter- Employ helicopter yarding to avoid or minimize new road construction on fragile soils.
- Prescribe cool burns and only burn in the spring on FG and FM soils.

Table 3-16 and Map 3-1 indicate the general area that these soils are in.

Table 3-16. Fragile soils in Project Area.

Map Unit #	Soil Series Name	Reason Fragile
188G, 189G	Tallowbox	FM (granitics)
164D, 165E, 166E	Shefflein	FM (granitics)

Caris

The Caris soil series is moderately deep, well-drained soils on hillslopes. These soils formed in colluvium derived from altered sedimentary and volcanic rock. Typically, the surface layer is covered with needles and twigs about 1 inch thick. The topsoil is a very dark grayish brown gravelly loam (0-7 in). There is a transition horizon of dark yellowish brown, very clay loam (7 -12 in). Subsoil is a dark yellowish brown very gravelly clay loam (12-20 in) to an extremely gravelly loam (20-31 in). Bedrock is fractured, metamorphosed volcanic bedrock at 31 inches. Depth to bedrock ranges from 20 to 40 inches. Permeability is moderate. Available water capacity is about 2 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. This soil is rated as severe potential for erosion off road/trail due to slope/erodibility. It has a low resistance to compaction due to sand, clay surface structure type and size. But, it is rated as having a high potential for recovery according to the NRCS soil data.

Jayar

The Jayar soil series is a moderately deep, well-drained soil on hillslopes. These soils formed in colluvium derived from altered sedimentary and volcanic rock. Typically, the surface is covered with a layer of needles, leaves and twigs about 1 inch thick. The A horizon is a dark grayish brown gravelly loam (5 in) then transitions to a dark brown very gravelly loam (5 to 11 inches). At depth from 11 to 16 inches, the soil transitions to BA horizon depth where it is a dark brown very gravelly loam. The C horizon, from 16 to 24 inches is also a dark brown very gravelly loam. Bedrock is at 24 inches of highly fractured and partially weathered metavolcanic rock. Depth to bedrock ranges from 20 to 40 inches. Permeability is moderate. Available water capacity is about 3 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

For harvest equipment operability, only soils under 35 percent slopes were assessed since there would not be ground based equipment on slopes higher than that. This soil has a low resistance to compaction due to sand, clay, surface structure size, grade and type. The slopes of this soil are too steep for ground based operations so, compaction would not be an issue in that regards Additionally, there are no proposed temporary or new road construction, designated skid trails or spur roads propsed in these soils. This soil is rated as having a high potential for recovery.

Manita

The Manita soil series consists of deep well drained soils on hillslopes. Formed from colluvium derived dominantly from metamorphic rock. There does not appear to be an O horizon. The topsoil is a dark brown loam (0-8 inches). The subsoil is a dark reddish clay loam from 8-13 inches depth and a yellowish red clay loam from 13 inches to 58 inches which is the depth of partially weathered siltstone. Permeability is moderately slow. Available water capacity is about 8 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and

the hazard of water erosion is high. The potential for erosion off road/trail has moderate (108E) to severe (108F) potential for erosion off road/trail. The difference is based on areas of steeper slope. This soil is moderately (E) and poorly (F) suited for ground based operability. The difference is based on slope differences. The overall rating is based on slope, soil strength and dusty ratings. This soil has low resistance to compaction due to clay, sand, surface structure size, surface structure grade and range production. But it has a high potential for restoration.

McMullin

The McMullin soil series consists of shallow, well drained soils on hillslopes and plateaus. These soils formed in colluvium derived from igneous rock and altered sedimentary rock. There does not appear to be an O horizon. The topsoil is a dark reddish brown gravelly loam (0-7 inches). The subsoil is a dark reddish brown gravelly clay loam (7- 17 inches). Bedrock is at 17 inches and is fractured Andesite. Permeability is moderate. Available water capacity is about 2 inches. The effective rooting depth is 12 to 20 inches. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. This soil is rated severe for erosion potential off road/trail due to slope/erodibility. It is well-suited for ground based operability (only for the soils under 35% slope, see discussion above under the Jayar soil). It has a low resistance to compaction due to sand, clay surface structure grade, size and type. It has moderate potential for recovery because of depth

Offenbacher

The Offenbacher soil series is moderately deep, well drained soils on hillslopes. These soils formed in colluvium derived from altered sedimentary and volcanic rock. Typically, the surface layer is covered with leaves, needles and twigs about 1 inch thick. The topsoil is a dark grayish brown gravelly loam (0-4 inches). The next horizon is a transition to the subsoil, a dark brown gravelly loam (4-9 inches). The subsoil is a loam for all the different subhorizons (9-34 inches) within that range, the color changes from a reddish brown to a yellowish red. Bedrock is fractured metamorphosed volcanic rock at 34 inches. The depth to bedrock ranges from 20 to 40 inches. Permeability is moderate. Available water capacity is about 4 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. This soil is rated as severe potential for erosion off road/trail. It has a low resistance to compaction due to sand, clay, surface structure size and grade. But it is rated as having a high potential for recovery.

Shefflein

The Shefflein soil series consists of deep, well drained soils on alluvial fans and hillslopes. These soils formed in alluvium, colluvium and residuum derived from granitic rock. There does not appear to be an O horizon. The topsoil is a dark brown loam (0-4 inches). The color changes at depth of 4 inches down to 10 inches to a reddish brown but is still a loam. The subsoil is a reddish brown, clay loam from 10-40 inches. At that depth more sand is present and it becomes a sandy clay loam (40 to 56 inches). Bedrock is decomposed granitic rock. This soil is classified as fragile for surface erosion by the BLM. Permeability is moderately slow. Available water capacity is about 8 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. This soil is moderately suited for ground based operability (only poor rating is the low soil strength). It is rated severe for erosion potential off road/trail due to slope/erodibility. It has a low resistance to compaction due to sand, clay, surface structure size, type and grade. It has a high potential for recovery.

Tallowbox

The Tallowbox series consists of moderately deep, somewhat excessively drained soils on hillslopes and ridges. These soils formed in colluvium derived from granitic rock. Typically these soils are covered with leaves, needles and twigs about 1 inch thick. The topsoil is a dark brown gravelly sandy loam (0-6 inches). A transition horizon from the topsoil to the subsoil is a dark brown, sandy loam (6-12 inches). The subsoil is a brown, gravelly sandy loam from 12-23 inches. Bedrock is decomposed granitic rock at 23 inches. The depth to bedrock ranges from 20 to 40 inches. This soil is classified as fragile for surface erosion by the BLM. Permeability is moderately rapid in the Tallowbox soil. 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 high. This soil is rated severe for erosion potential off road/trail due to slope/erodibility. It is moderately suited for ground base

operability. It has moderate resistance to compaction due to sand, surface structure size and type and fragments. There is a high potential for recovery.

Vannoy

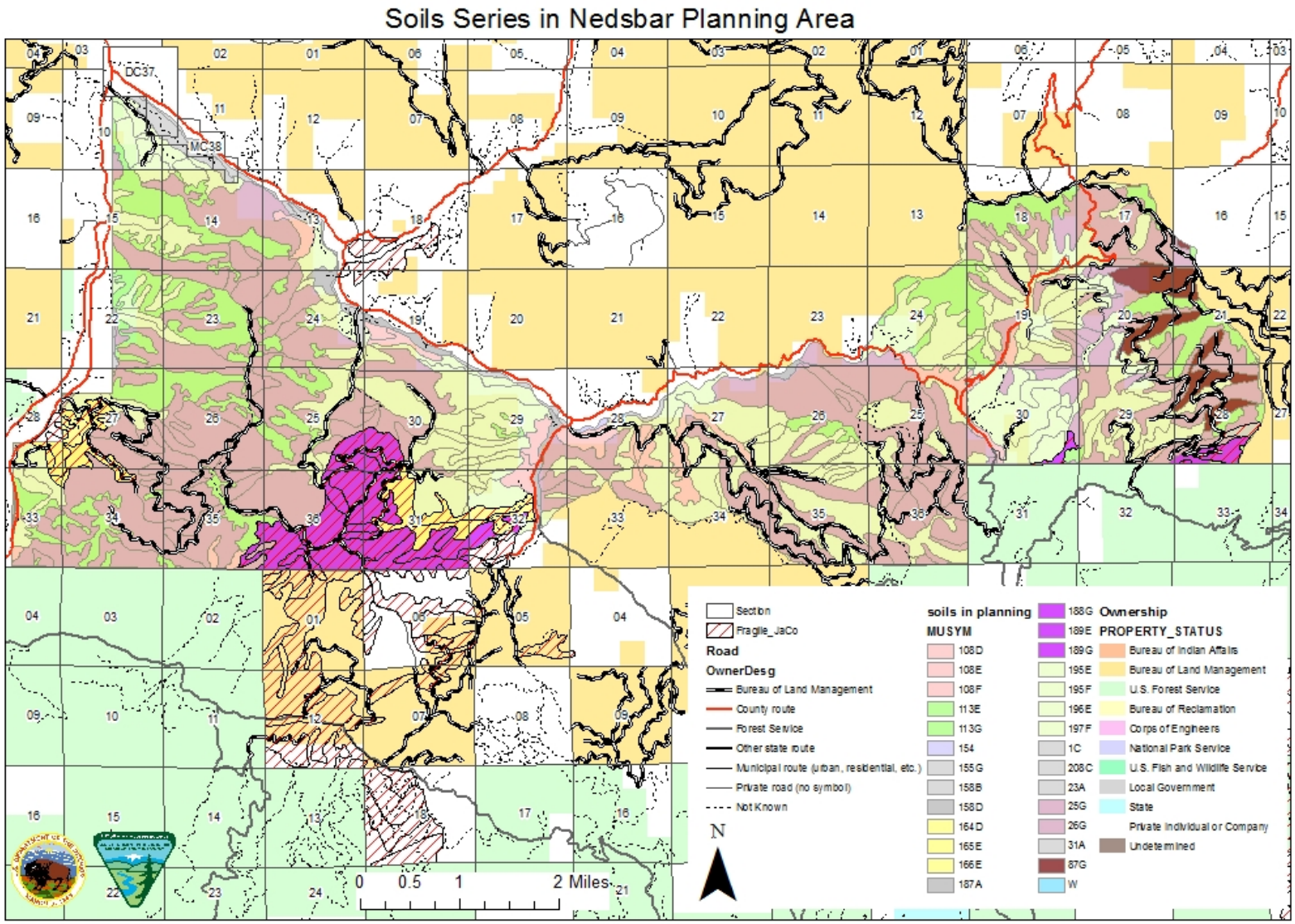
The Vannoy soil series consists of moderately deep, well drained soils on hillslopes. These soils formed in colluvium derived from altered sedimentary and volcanic rock. Typically, the surface layer is covered with needles, leaves and twigs about ¾ inch thick. The topsoil is a dark brown silt loam (0-4 inches). The soil transitions to a reddish brown silt loam (4 to 11 inches). The subsoil is a yellowish red clay loam (11-38 inches). Bedrock is weathered, highly fractured metamorphosed rock. Permeability is moderately slow. Available water capacity is about 5 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. This soil is rated as severe for erosion potential off road/trail due to slope/erodibility. It is rated as moderately suitable for ground based operability due to slope and low strength. (This rating is only included in soils that are where ground based operations could occur (based on slope). It has a low resistance to compaction due to sand, surface structure size, grade and type and range production. But it is rated as having a high potential for recovery.

Voorhies

Voorhies soil series consists of moderately deep, well drained soils on hillslopes. These soils formed in colluvium derived from altered sedimentary and volcanic rock. Typically, the surface layer is covered with needles and twigs about 1 inch thick. The topsoil is a very dark grayish brown, very gravelly loam (0-3 inches). Dark brown, very gravelly loam (3-8 inches).the topsoil transitions to the subsoil as the profile accumulates more clay from depth of 8 inches down to 12 inches and is a brown, very gravelly clay loam. The subsoil is a brown, very gravelly clay loam (12-18 inches) and then becomes more cobbly from 18-36 inches to a brown, very cobbly clay loam. At 36 inches depth, bedrock is partially consolidated, weathered metamorphic rock. Depth to bedrock ranges from 20 to 40 inches. Permeability is moderate. Available water capacity is about 3 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. This soil is rated severe for erosion potential off road/trail due to slope/erodibility. It is rated as having low resistance to compaction due to sand, clay, surface structure size, grade and type. This soil has a high potential for recovery.

Amaranthus et al. (1985) estimated the natural erosion rates for soils in the Klamath Mountains to be about 0.13 yd^3/ac/year, and erosion rates increased in harvest areas to 0.89 yd^3/ac/yr (Aramanthus et al. 1985, p. 233). Erosion rates are highly dependent on the intensity and amount of rainfall that a particular site receives in a given time period. Other factors that affect erosion rates are steepness of slope, ground cover, soil particle cohesion and the amount/degree of disturbance. This means that if projects are designed to minimize amount of disturbance by changing logging system due to slope, minimizing yarding corridors or skid trails and other design features, as is proposed in all action alternatives, this number would be much lower.

Map 3-1. Generalized Soil Types in the Nedsbar Forest Management Project Area.



b. Roads

There are approximately 83 total miles of road in the Planning Area. Many of the designed surfaced roads on private land appear to have been built more than ten years ago and are in stable condition, but surfacing is below optimum to minimize road-related erosion, particularly during winter use. Soil loss from a lightly graveled roadbed is roughly equivalent to loss from an ungraveled one. By contrast, soil loss from fully graveled roadbeds (6 to 8 inches thick) was only 3-8 percent of that from the bare soil roadbed of otherwise similar construction (Swift 1988). In the Swift study, erosion rates from the natural surfaced and minimal surfaced roads were about 1.4 tons/acre/inch rain, while the adequately rocked roads yielded less than 0.1 ton/acre/inch rain. Although erosion rates vary depending on site hydrology, soil type, topography, climate, and engineering treatments, these figures provide an example of the relative amount of erosion that may occur.

It is estimated that every one mile of road occupies 4 acres. Therefore, approximately 332 acres in the Planning Area are roaded and removed from vegetative productivity. In the Planning Area, there are approximately 14 miles of non-GTRN roads which includes user-created roads and trails and 2.52 miles of the Sterling Mine Ditch is within the analysis area. Where heavy trail use occurs, soil is compacted and the top soil and organic horizon have been physically displaced from traffic, resulting in bare, surface-compacted soil. The soil characteristics may influence the amount and distance these particles are displaced. Finer textured soils, such as may develop from basalt and sedimentary rock, are especially susceptible to puddling, compaction, and subsequent rilling. Heavy loam soils are usually the most resistant to erosion (Rice et al. 1972, p. 323). In the Planning Area, most soils are a gravelly loam, there are also silt loams and clay loams and gravelly sandy loam.

c. Soil Productivity

Soil is a fundamental resource that controls the quantity and quality of such renewable forest resources as timber, wildlife habitat, forage, and water yield. Soil productivity is the inherent capacity or potential of a soil to produce vegetation, and the fundamental measure of soil productivity is the site's carrying capacity for plant growth. The key properties directly affected by management are site organic matter (OM) and soil porosity. These two properties regulate critical site processes through their roles in microbial activity, soil aggregate stability, water and gas exchange, physical restrictions on rooting, and resource availability (Powers et al. 2004, p. 194). Site organic matter and soil porosity are most important when measuring the effects of management, although other factors such as water regimes, soil biological types and populations, and soil loss can also affect long-term soil productivity.

A sustained flow of organic matter from primary producers to the forest floor and into the soil is vital to sustained site productivity through its influence on soil protection, the activity of beneficial soil organisms, soil water-holding capacity, soil structure and aggregate stability, and nutrient supply. Organic matter influences the interception and retention of solar heat by the soil. It dissipates the energy of falling water (rain). Organic matter is the ultimate source of substances that bind soil particles together into stable aggregates that resist erosion. Through its carbon compounds, organic matter constitutes the energy source for soil fauna and microbes, and is a concentrated reservoir of plant nutrients supplied to the soil.

In the Project Area, organic matter is present on all sites that are proposed for treatment except in units where Manita, McMullin and Shefflein soils are present. Not all of the soils in the Project Area have an O horizon however. Most of the organic matter is in the form of down wood, leaf litter and needle cast, and was produced from trees, shrubs, grasses, and moss. Soil organic matter appears typical for the region, with most of the sites having either between 0-1 inch to no measured Organic horizon at all. This is typical for this area, likely due to the steepness of slope, parent materials and dry climate. Except for areas disturbed by roads and trails, and sites with gravels and cobbles surfaces, most of the soil in the

Project Area has at least a thin ground cover of organic material. On most sites, soil organic matter consumption appears normal, with a very thin layer of decomposing matter at the soil and litter layer interface. Approximately 80 acres of units are in soils without a surveyed O horizon. Of that, 31 acres are on proposed tractor yarded ground. Approximately 20 acres of that are in typical soils where surface soil erosion is not a high concern so the lack of an O horizon is not an issue. The other 11 acres are in soils that are prone to surface erosion and the lack of an O horizon could further exacerbate the issue. These soils are on very gentle slopes greatly reduces the potential for surface erosion.

Soils that are included in proposed ground-based units are the only ones where typical organic horizon depths are noted in this assessment. Soils in ground based units are the Caris, Manita, McMullin, Offenbacher, Shefflein, Tallowbox, Vannoy, Voorhies, The Manita, McMullin and Shefflien do not typically have an Organic horizon (57 acres). The Caris, Offenbacher, Vannoy and Voorhies soils all have organic horizons which range from ¾-1 inch.

The reduction in soil porosity (compaction) results in the loss of soil aeration and moisture availability, and increases the resistance of soil particles to root growth. Reduced soil porosity can also reduce water infiltration rates, thereby accelerating surface runoff and soil erosion. The size distribution of soil pores is also important for maintaining a productive site. Large pores and cracks are important for soil drainage, aeration, and root access; smaller pores store soil water and are the sites of nutrient retention and microbial activity. Both kinds of pores are required for productive soils.

Rapid gas exchange in soils is required for optimum microbial activity and growth of plant roots. Adequate supply of oxygen for root growth can be assured if there is a network of continuous, air-filled pores present in a soil. Soil water storage is very important because total site water use is generally positively correlated with growth. Factors that decrease soil water storage are detrimental to productivity, and those that increase it are beneficial (Childs et al. 1989).

d. Past Actions

The relevant part of analyzing past actions is determining what events or actions previously occurred, whether current proposals repeat those actions or events, and whether current proposals have similar or different anticipated effects. In addition, past events are manifested in current conditions, the starting point for the addition of cumulative effects. One lesson learned from past actions is that some roads were located without regard to erosion, slope stability and stream sedimentation impacts. Clearcutting and broadcast burning in the 1980s created highly erosive conditions, especially when ground-based yarding systems were used without much regard for the location and number of skid trails, and/or tractor-piling of slash was incorporated. These sites have been re-established with vegetation and, except for roads, erosion rates are near natural levels.

Past timber harvest on BLM-administered lands in the Planning Area has been sporadic. An inventory of past actions with harvest dates and units of treatment was made for the Analysis Area using past harvest records and photo interpretation. Timber harvest records, in combination with the operations inventory data, were used for evaluating past actions on BLM-administered land.

It is estimated that about 2,631 acres of the 18,957 acre Planning Area has had some type of timber harvest in the past. Of that, 677 acres had been ground based harvested, 1,954 acres had been cable/skyline yarded and less than 1 percent helicopter yarded. It is assumed that most of past harvest in ground-based units occurred before 1980 and was not on designated skid trails. During the 1970s and through the 1980s, implemented clearcutting was often followed by broadcast burning of the logging slash on the site. During the 1980s on BLM-administered land, tractor harvesting was restricted to designated skid trails that would impact about 12 percent of the harvest area. It is estimated that unrestricted tractor logging resulted in about 25 percent of the area being compacted.

Since 1980, there have been approximately 106 acres of tractor-harvested acres on BLM-administered land in the Planning Area. Oftentimes, compaction is less than 12 percent in these units. However, assuming all tractor units on BLM-administered lands since 1980 are 12 percent compacted, the result is approximately 12.7 acres of land that is compacted from skid trails and associated landings. Approximately 19 acres of BLM-administered land were harvested prior to 1980. Soil that was compacted before 1980 would likely still be compacted. In these areas, soil productivity is in the process of being restored and these areas may be up to 25 percent compacted (approximately 4.75 acres). In the actions alternatives, any operations off designated skid trails are limited by moisture restrictions. The rest of the acres (552 acres) in the Planning Area that have been tractor logged are on private land. The percentage of soil compacted in these areas is unknown.

In the Planning Area, 9,359 acres have no evidence of past logging. The rest of the acreage is not logged due to agricultural land, industrial land, water, naturally non-forest or residential (6,967 acres).

Past actions in the Planning Area were mapped. Approximately 139 acres of past tractor were on fragile soils, 99 of those acres are on private property (most (85 acres of it) in 2006 and the rest in 1964) and 38 of those acres are on BLM-administered lands. The BLM harvests were in 1998 and 1983. Bald Lick, O'Lickety and Wagner Anderson were the most recent BLM timber sales in the planning area harvested between 2009 and 2013.

There are grazing allotments in the planning area. Tunnel ridge, and Sterling Springs are currently not being utilized but have been in the past and the Lower Big Applegate is currently being utilized. It is approximately 14,514 acres with 78 AUM within the Planning Area.

This could increase the amount of acres of compacted soil in areas where cattle congregate. The primary effects that livestock grazing has on the soil resource is disturbance leading to increased erosion and an increase in bulk density when cattle grazing occurs during wet soil conditions. The most basic concept is that the application of weight (cattle) to soil which is wet, would compress more soil into smaller volumes, thereby increasing bulk density of soil (weight per unit volume). The effect of compaction is to diminish the volume of soil in the plant rooting zone that can store oxygen and water (pore space), thereby limiting rooting volume of the plants. As treading is greatest at the soil surface, this can lead to decreased soil permeability of both air and water. Lowered rates of water infiltration may lead to higher rates of surface runoff during heavy rains and to greater soil erosion, a problem often related to overgrazing (Wells and Dougherty 1997). If vegetative cover, root systems and current soil bulk density are kept intact during grazing, soil degradation is not expected to occur from grazing.

The season of use allocated for allotments in the area would reduce the amount of exposure that cows could have to wet soil; however, exposure may still occur in areas that hold more water. Densities are likely to be higher in some places because cattle tend to congregate. However, due to the low overall density and season of use, the anticipated effects of cattle grazing in the Project Area is minimal and is not expected to be large enough to noticeably add to the effects of the action alternatives. Also, the anticipated effects are minor in comparison to the other actions occurring in the Project Area.

It is difficult to predict compaction's effects on soil productivity because of all the variables, but McNabb and Froehlich (1983) estimate that stand growth losses can range from 5-13 percent, and compaction's effects can last 30 years. In a 2004 compaction study of Arkansas forest, Lucklow and Guldin found evidence that old disturbance areas have partially self-mitigated since the previous harvest entry. The old disturbance compaction observed in this study was caused from harvest equipment activities that occurred at least 15-20 years earlier. Old disturbance areas are composed of secondary or primary skid trails and areas that received 1-2 equipment passes. They estimate it would take from 50-80 years for skid trail soil density levels to recover to near-natural density levels (Lucklow and Guldin 2004). This estimated recovery period is in line with other findings. Perry (1964) (in Greacen and Sands 1980) estimated a 40-

year recovery period for reduced infiltration rates on old compacted woods roads to approach natural rates on a southern Arkansas soil. For this reason, it is assumed that compaction in areas harvested by tractor prior to 1970 are considered recovered.

3. Environmental Consequences

As no new management is proposed under Alternative 1, the effects described for this alternative reflect current conditions and trends that are shaped by ongoing management and events unrelated to the Nedsbar Forest Management Project.

Alternative 2 (BLM's scoping proposal in May 2014) was considered but eliminated from detailed analysis as originally proposed and won't be discussed further in this analysis.

For the action alternatives (Alternatives 4, 3 and 5), discussions are focused on the direct and indirect impacts of proposed actions on soil resources. Effects discussion also includes the cumulative impacts of those direct/indirect effects of implementing proposed actions when added incrementally to past, present, and reasonably foreseeable actions, if applicable. This analysis focuses on how a particular proposed action would affect soil characteristics or soil erosion processes. The main concerns to the soils resource in this area is the effect to soil productivity (compaction) and unstable/erosive soils. Surface erosion is a concern in areas of fragile soils (FM) and from road beds.

It would be futile to try to predict specific quantitative values for erosion, as there are too many variables to consider, such as rainfall amount, duration and intensity during storm events. The effects of the proposed activities will be compared to natural rates. The appropriate scale for measuring soil productivity criteria (i.e. compaction, erosion, and effects of burning) is site-specific or on a unit-by-unit basis. Therefore, the Analysis Area for determining effects to soil productivity encompasses the area where forest management and transportation management activities are proposed, also described as the Project Area.

The risk of erosion leaving the project site and compaction affecting water run-off are analyzed in the *Water Resources* section and will not be discussed further in this section.

The broader Planning Area (18,958 acres) is the scale at which effects to soil stability/soil erosion are considered. The Planning Area is the overall area of consideration that was reviewed for the development of the Nedsbar Forest Management Project and is based on watershed boundaries, drainage boundaries, and ownership boundaries. At this scale, effects to unstable sites within and surrounding the Project Area can be analyzed for potential cumulative effects.

Short-term impacts (or effects) are those anticipated within less than 10 years, and those impacts anticipated 10 years or longer in the future are considered long-term. However, studies (Rice et al. 1972) and local observations by BLM soil scientists reveal that vegetation recovery and erosion rates can return to near-normal levels within approximately 5 years.

a. Alternative 1—No Action

The effects of the No Action Alternative on soil resources would be the continuance of existing erosion rates currently occurring throughout the Planning Area. Erosion rates are at near-natural levels throughout the Planning Area, except in areas where roads and trails exist. Units that were harvested in the past have stabilized, with vegetation and erosion rates back to near natural levels.

Roads that are currently in poor condition would not be improved and the amount of erosion presently occurring would likely continue.

There is no way to be certain what future actions may occur on private land, but it is presumed that all private lands having timber of commercial value would be harvested in the near future (within 10 years). These actions would increase the amount of disturbed soil in areas adjacent to the Project Area.

b. Alternative 4

The main concern to the soils resource in this area is the effect to soil productivity (compaction). And soil erosion due to areas with steep slopes and presence of granitic soils in portions of the Planning Area.

There is a concern raised during scoping about drying out the soil and increasing temperature. This is not expected to be an issue due to evapotranspiration rates of trees being much higher than evaporation rates from the soil surface.

Permanent Road Construction

There are no proposed roads in Fragile Soils.

Seven permanent roads, totaling 3.2 miles, are proposed to be constructed under this alternative. There are no new roads are proposed in fragile soils. Permanent road construction would have the greatest impact on soils as it will directly remove the soil from vegetative productivity and would alter natural erosion rates and infiltration rates. There are some roads that will be naturally decommissioned (see discussion below) which would slightly offset the amount of roads on the landscape but there would be an increase in road mileage.

The construction of new roads has a direct effect on soil productivity on that site. The soils in these locations would be bladed and compacted. With the assumption that 1.0 mile of road equals approximately 4 acres, 13 acres of land would be removed from vegetative productivity.

The Natural Resource Conservation Service provides several rating factors for different soils. Construction limitations, soil compaction resistance, and soil restoration potential are factors that were used to determine potential effects to the soils in areas of proposed road construction.

The soil compaction resistance rating ranges from high, moderate or low resistance. Compaction is predominantly influenced by moisture content, depth to saturation, percent of sand, silt, and clay, soil structure, organic matter content, and content of coarse fragments. High resistance indicates that the soil has features that are very favorable to resisting compaction. Moderate resistance indicates that the soil has features that are favorable to resisting compaction. Low resistance indicates that the soil has one or more features that favor the formation of a compacted layer.

The soil restoration potential is rated as either: high, moderate, or low potential. This interpretation rates each soil for its inherent ability to recover from degradation, which is often referred to as soil resilience. (Natural Resources Conservation Service n.d.)

Road construction would be limited to between May 15th and October 15th or during dry soil conditions. Following use, all newly constructed permanent roads would receive adequate rock surfacing or would be closed with a gate or blocked and winterized prior to the wet season. Soil erosion from road construction is expected to be avoided or minimized due to the incorporation of these PDFs, and other PDFs identified in Chapter 2, which would reduce the potential for runoff and off-site erosion from intensive winter storms and saturated soil conditions.

The following paragraphs describe the site characteristics that exist at each of the proposed road locations.

Proposed road in 39S-3W-23 and 26 (0.22 miles) is a realignment of a portion of road 39S-3W-27.02. This is due to the grade of the existing road being too steep for haul. This realignment goes through

Caris-Offenbacher soils (soil map unit 26G) and McMullin-rock outcrop soils (soil map unit 113G) at the end. The location of the proposed road is sidelope of maximum slopes of 60 percent. It is rocky ground so full rehabilitation may be difficult. The 26G map unit has a low resistance to compaction due to sand, clay, surface structure size and type and range production. However, it is rated as having a high potential for soil restoration. The 113G map unit has a low resistance to compaction due sand, clay, surface structure size, grade and type. It is rated as having moderate potential for restoration (due to depth).

Proposed road in 39S-2W-25 (extension of 39-2-25.1 road) is approximately 0.07 miles. This road is in the Vannoy-Voorhies soils (map unit 197F) and Caris-Offenbacher soils (map unit 26G). This road is located on ridgetop for most of the length with a portion just below ridgetop. The ridgeline is around 12 percent slope with side slopes beyond the road prism of around 70 percent. The 26G has a low resistance to compaction due to sand, clay, surface structure size and type and range production. However, the potential for restoration is high. The 197F has a low resistance to compaction due to sand, surface structure size, grade and type and range production. However, this also has a high soil restoration potential. Proposed road in 39S-2W-25/26 is a total of 0.20 miles with three different segments. This is located through Vannoy-Voorhies soils series (soil map units 197F) and Caris-Offenbacher (soil map units 25G and 26G). Approximately 380 feet of the road is on contour slope of sideslopes around 45 percent in soil map unit 197F. It then follows the shoulder/ridge on 25G soil map unit. These soils are rated as having low resistance to compaction, and high restoration potential.

Proposed road in 39S-2W-26&27 is approximately 0.76 miles. This road is located in 195F, 197F and 25G soil map units. It starts in the 195F and 197F soils as it climbs uphill. It climbs over the ridge on the north side in the 25G soils. This proposed road climbs through oak savannah with maximum side slopes of 50 percent on the way uphill. After the proposed road climbs up the hill, it is located at or right below the ridge. The last segment of road below ridgetop is on approximately 80 percent sideslopes in 25G. These soils have a low resistance to compaction and high potential for restoration.

Proposed road in 39S-2W-35 and 26 is approximately 0.43 miles. This road is located in Vannoy-Voorhies (soil map units 197F and 195F). There is sidehill/contour in the 197F soils with a sideslopes of 50 percent or less. The proposed road then goes uphill on approximately 12 percent slope on 195F and 197F soils. It has a low resistance to compaction and high restoration potential.

Proposed road in 39S-2W-36 is 0.42 miles. This road is located in Vannoy- Voorhies soils (soil map units 196E, 197F, 25G and 26G). For most of the proposed road, it is located on a sharp ridge, there are some areas where the road is located just below the ridge and would be cut into the hillslope. The maximum side slope is 60 percent. The resistance to compaction is low and the potential for restoration is high.

Proposed road in 39S-1W-19, 20, 29, and 30 is approximately 0.57 miles. This road is in 195F, 196E, 25G, and 26G soil map units. The proposed location begins on a ridge/shoulder and then contours along 26G and 25G and 195F soil map units. The maximum sideslope is approximately 50% and the majority of the length of the road is on sideslopes under 40 percent. The resistance to compaction is low and the potential for restoration is high.

Temporary Road Construction

The following paragraphs describe the site characteristics that exist where proposed temporary roads are located. There are 7 proposed temporary roads totaling 1.3 miles.

Proposed road in 39S-2W-19/39S-3W-24 (0.22 miles) extends beyond road (39S-3W-25 spur 1) on a gentle slope, it turns up an alluvial fan ridge of granitic origin and follows the top for approximately 680 feet. It is located in the Vannoy soils (195E) and Vannoy-Voorhies (197F) soil map units. Where this road occurs, slopes are less than 11% at the beginning of the route (in map unit 195E) and 18 percent

along the alluvial fan ridge (197F). Both soils have a low resistance to compaction due to sand, surface structure size, grade and type and range production. However, both soils have a high soil restoration potential.

Proposed road in 39S-3W-23 is 0.13 miles. It is in 25G and 113G. This is just below ridge top, contouring around to the ridge. This is an extension of an old existing footprint. The maximum side slopes are around 65 percent. Around the end of the route the side slopes are around 35 percent at the ridge. The resistance to compaction is low and the potential for restoration is high in 25G and moderate in 113G due to depth.

Proposed road in 39S-3W-27 is 0.10 miles. It is on an old skid trail footprint. The road is on the 195E soil map unit. The topography is gentle, about 16 percent slopes. The resistance to compaction is low and the potential for restoration is high.

Proposed road in 39S-2W-28 is 0.12 miles in 108E. This is around 30 percent side slopes. The road climbs uphill, the maximum road grade is around 19 percent with an approximate range from 16-19 percent slopes. Soil Map Unit 108E has a low resistance to compaction due to clay, sand, surface structure size, grade and range production. This soil has a high potential for restoration.

Proposed road in 39S-2W-34 is 0.15 miles, located in 196E, 195F soil map units. The maximum sideslopes are around 60 percent. Road follows contour just below the ridgeline. There is a jeep road at the ridge above. This would cross the top of a slightly concave hillside. The resistance to compaction is low and the potential for restoration is high.

Proposed road in 39S-2W-31 is 0.07 miles in 197F. This is a short ridgetop road in between 197F and 25G soil map units. Maximum side slopes are about 60% below the ridge (outside of the road prism). Maximum sideslope of the location of the road is 40%. The grade (slope up the ridgeline) is approximately 13 percent. The resistance to compaction is low and the potential for restoration is high.

Proposed road in 39S-3W-10 and 15 is 0.49 miles. It is in 197F, 195E, and 195F soil map units. This road would gradually climb the hill and end up at the top of a ridge. This is sidehill most of the way with the maximum sideslopes approximately 55 percent. This would require cut and fill. The resistance to compaction is low and the potential for restoration is high.

Use of Existing Spurs for Roads

Existing Spurs are proposed in this project. This is where soils location had been compacted and/or displaced at some time in the past and are still recovering. In general, it is favorable to disturb soil that has already been disturbed as opposed to soils not previously disturbed. There will still be additional direct impacts to the soils in these areas as the footprint may be widened and soil that has since recovered slightly would be disturbed again. There are a total of 1.01 miles of existing spur roads in this alternative.

Existing spur in 39S-2W-33 would be used as a road in this alternative. It is 0.57 miles. It is on ridgetop. This located on 196E, 197F, and 25G soil map units.

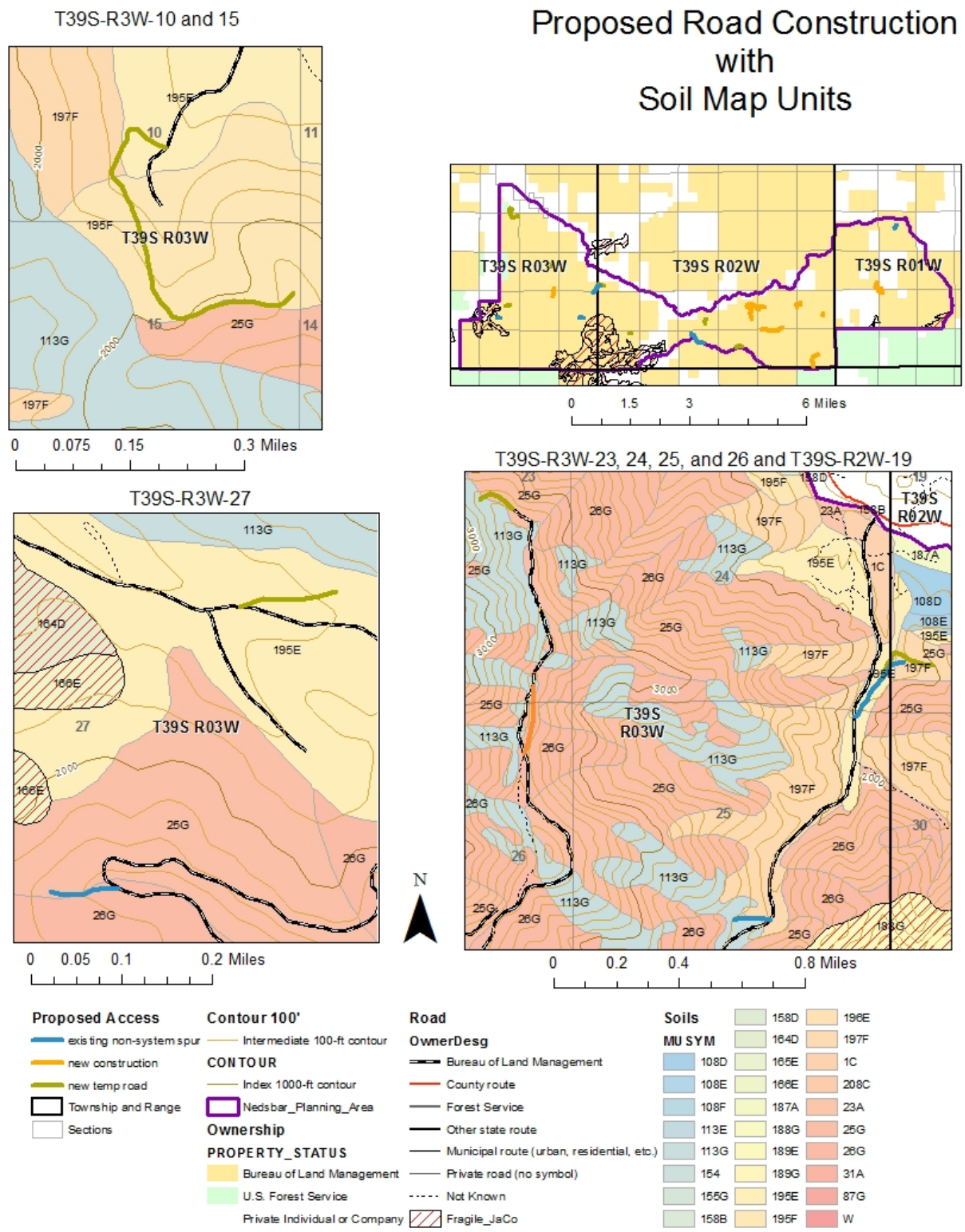
A road proposed on an existing template in 39S-1W-17 is approximately 0.12 miles long on 196E soil map unit. This is all on ridge top.

A road proposed on an existing template in 39S-3W-27 is approximately 0.077 miles on 25G and 26G soil map units. The majority of the route is on ridge top.

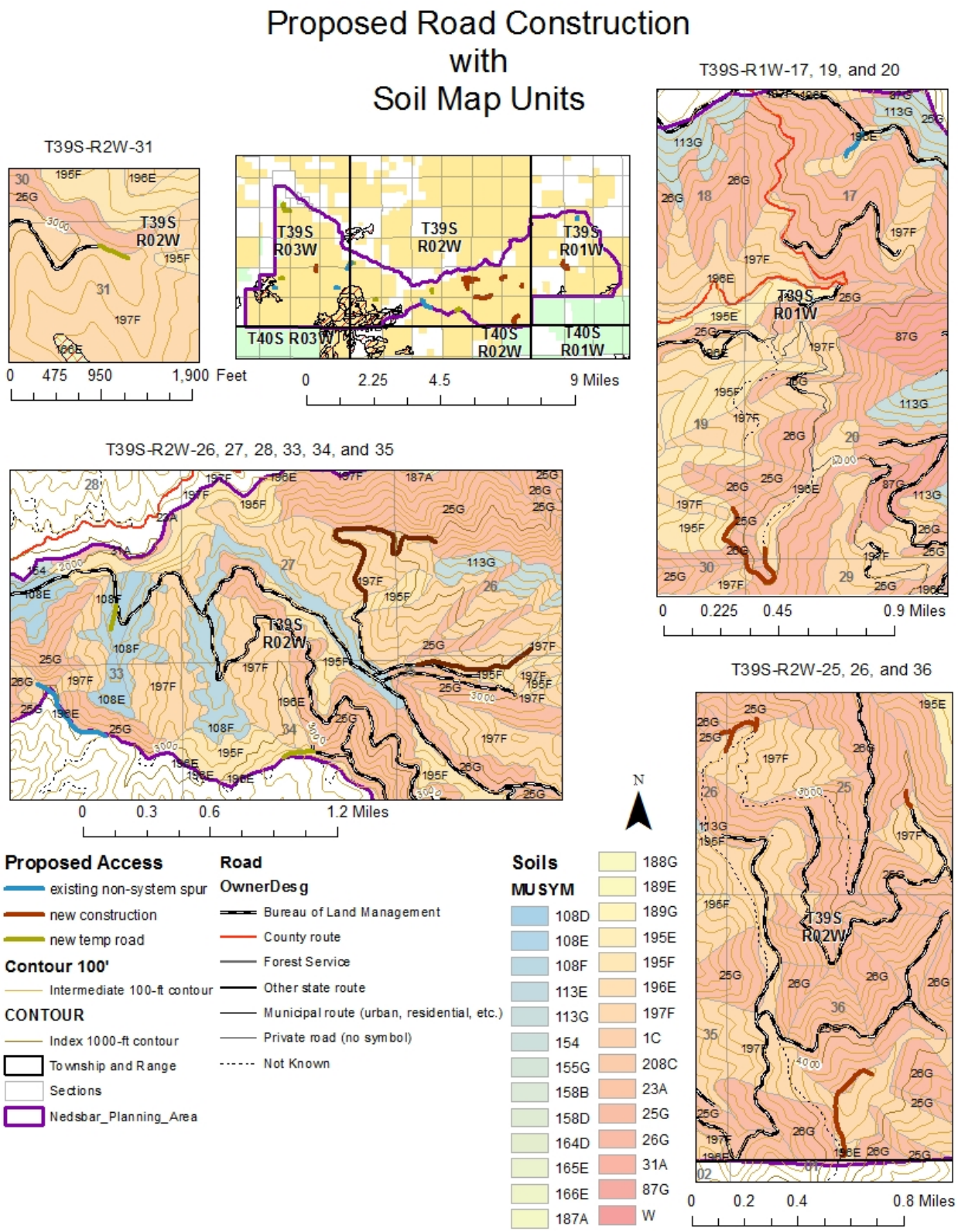
A road proposed on an existing template in 39-2W-25 is approximately 0.12 miles on 113G and 197F soils. The slope of the road is approximately 20 percent at the beginning of the route but then becomes more gradual towards the end.

The following two maps (Maps 3-2 and 3-3) include all proposed roads, temporary roads, and existing template spurs.

Map 3-2. Road Construction and Existing Non-System Spur Roads with Soil Unit Maps.



Map 3-3. Road Construction and Existing Non-System Spur Roads with Soil Unit Maps.



The effects of temporary and permanent road construction are the same both during construction and during use. However, differences in effects to soil resources between temporary and permanent road construction occur once a project is completed, as temporary roads would be fully decommissioned at the close of project activities. For this project, temporary roads would be mechanically decompacted and blocked once project activities are completed. If project activities span more than one operating season the road would be effectively blocked during the wet season to prevent motorized use. Blockage at the entrance would consist of placing earthen berms, logs, slash, boulders, and other material so the entrance is camouflaged and vehicle use is precluded.

Soil erosion from the construction and decommissioning of temporary roads is expected to be avoided or minimized due to the incorporation of PDFs. For example, seasonal restrictions during all road construction activities would reduce the potential for runoff and off-site erosion from intensive winter storms and saturated soil conditions. All roads are proposed to be permanent with the potential for them to be temporary.

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 return in the long-term (10+ years).

There would be a noticeable increase in soil erosion the first few significant rain events after construction. Erosion rates from roads and landings on the Klamath geomorphological unit (similar to that of the Planning Area) were reported to be approximately 14.51 $yd^3/ac/yr$ (Swanson and Dyrness 1975 in Aramanthus et al. 1985, p. 233). This total includes mass slope failures from roads and landings on unstable slopes in calculating the number. Because all of the proposed temporary roads would be located on gentle topography and stable slopes, it is anticipated that under average rainfall conditions, the erosion rates would be less than one-half of those reported by Swanson (less than 4 $yd^3/ac/yr$) the first few substantial storm events after construction, and would decrease to about three times that of natural rates after three years. Typically, newly constructed roads lose the most soil primarily during the short period before grass becomes established and the roadbed is graveled or compacted. Soil loss from fully graveled roadbeds was 3-8 percent of that from the bare soil roadbed of otherwise similar construction (Swift 1988, p. 321).

The total amount of soil that would be compacted and removed from productivity from road construction and realignment would be approximately 13 acres (new road construction) and 5 acres (temporary road construction). An additional 4 acres of soil were already disturbed and compacted in the existing template; however, from use of these roads, any recovery that did occur is lost.

Designated Skids and Tractor Swing Trails

There are no designated skids or tractor swing trails in fragile soils.

Designated skid trails and tractor swing trails will be analyzed together as their effect to soil erosion and productivity are expected to be the same. There are four designated skids (0.58 miles total). There are five tractor swing trails (1.00 miles total). A total of 1.58 miles of trails would be used. The effect is similar to the effect of skid trails within tractor units except that these trails receive a lot higher use. The soil is likely to be more compacted, topsoil displaced and a wider area impacted than an in unit skid trail. These trails would be camouflaged from road intersections to prevent OHV use after the project is complete. This would minimize effects. Additionally, waterbars and seed and mulch would be implemented to reduce risk of further erosion after project activities cease.

Road Improvement

The effect of road improvements to the soil resource is that some of the work (water dips, grading, shaping roads, replacing and installing culverts, and cleaning ditches) would displace soil from the current location. This soil, however, is already disturbed due to the presence of the road. Work involved with improvement would result in minimal disturbance, and would ultimately improve the road due to improved shaping, drainage and spot rock surfacing, which would reduce future soil erosion.

Some of the roads are currently blocked and would have the existing barricades removed. There would be disturbance on the road bed surface and where some of the roads have been grown over, vegetation would be uprooted and the soil surface re-bladed. Some roads would need to be widened as well.

Some of the roads needed for log haul would require more improvements than others. Some roads currently having erosion issues would have improvements from this project that otherwise may not occur.

There are roads proposed for haul that are not currently within the BLM transportation database. All of these non-system roads would need some degree of vegetation clearing. The soil is already compacted and had been used in the past. Grass on the surface would not be bladed off unless it poses a fire hazard. These non-system roads are in varying states; some are fairly open and need minimal improvements for haul whereas some are overgrown and would require brushing and removal of an existing barricade. The soil on these non-system roads is in the process of recovering. Although vegetation is growing currently, the soil is likely still compacted and roots may be inhibited at some point in the soil profile. All of the non-system roads blocked after use. Soil productivity would not be fully restored in the short-term but it is expected that in the long-term, soil productivity would be in an improved state from their current status.

Approximately 61 miles of road would be used. The roads are categorized by needing different treatment.

- No road stabilization/drainage improvements. Road would be maintained to meet BLM standards.
- Spot rocking and/or drainage improvements. Road would be maintained to meet BLM standards.
- Reshaping road and reestablishing drainage. Road would be maintained to meet BLM standards.

Of this, 1.25 miles of road is in Category C (in need of reshaping and re-establishing drainage).

The rest of the haul routes are currently being used and the impacts to soils would remain the same from these actions.

Road Decommissioning

There are four roads that will be naturally decommissioned. This is a total of 1.9 miles. These roads are already in various states of re-vegetation and soils are currently improving naturally. By officially decommissioning these roads, this trend will continue and soil productivity will continue to improve.

There are also roads proposed for long term closure. Soil productivity is not necessarily expected to improve in these roads, but there would be improvements to drainage conditions that would reduce overall soil loss long-term.

Road Work Summary

Permanent road construction would remove an additional 15.8 acres of land from vegetative productivity. Soil erosion from road construction is expected to be avoided or minimized due to the incorporation of PDFs, which would reduce the potential for runoff and off-site erosion from intensive winter storms and saturated soil conditions.

Soil productivity from the proposed temporary road construction and road decommissioning is not expected to be recovered in the short-term; however, full recovery would occur in the long-term (10+ years). The amount of time needed for soils to recover for natural decommissioned roads versus mechanically decommissioned roads would be longer; however, short-term impacts would be avoided as no ground-disturbing activities would occur.

Soil disturbance due to road improvements would be minimal, as actions would be confined to the existing disturbed road prism. Additionally, associated PDFs would help to minimize soil erosion, minimize movement of soil particles from the road to local streams, and discourage future use of the roadbed by OHVs.

To summarize, some soil disturbance would occur under Alternative 4. However, of associated PDFs would minimize the potential for resulting impacts from road construction, road decommissioning, and road

improvements. There would be an overall increase in road miles from new road construction (1.36 miles) due to the proposed road decommissioning offsetting the total mileage.

Landings

The construction of landing areas for tractor yarded units would disturb less than one-half acre and would be associated and managed consistent with the temporary road construction and decommissioning. The landings would be decommissioned (e.g., scarified, seeded and mulched, or other approved methods) before the winter rains. Potential erosion from the proposed new landings would be less than twice the natural erosion rate immediately after construction, and would return back to near-natural rates within 3 to 5 years. This small increase in erosion rates is predicted due to the gentle topography of the areas proposed for tractor yarding and required PDFs addressing the treatment of landings for erosion control during and after use.

Helicopter yarding requires the use of helicopter landings generally one acre or less in size. Helicopter landing construction requires level ground with an open canopy for safety purposes. The selection of new helicopter landing sites was made with considerations for the amount of ground disturbance needed and the distance needed to fly the logs. The greatest potential for erosion and sedimentation from helicopter yarding is the ground disturbance from landing construction. Selecting areas with level ground reduces the amount of excavation needed to construct the landing.

The Medford District ROD/RMP recommends helicopter yarding to avoid or minimize new road construction on fragile soils (USDI BLM1995, p. 156). In the process of planning this project, the yarding systems for several harvest units were changed to helicopter yarding; as a result, road access was no longer needed and the associated road construction was dropped.

The soils in the decommissioned landings are not expected to be recovered in the short-term.

Forest Management

Refer to Chapter 2 for a description of the proposed treatments. Treatments would have similar effects on erosion and sedimentation rates because the amount of ground disturbance between these treatments is expected to be similar. The difference in the number of trees removed between these treatments would not decrease slope stability or increase soil disturbance. Therefore, based on the cutting regime of these treatments, the amount of soil erosion and sedimentation is expected to be minimal.

Soil disturbance from timber harvesting is not avoidable, but it can be minimized. Preventative measures are more effective in minimizing impacts on soils than remedial mitigation because of the remedial expenses, loss of productivity until mitigation occurs, and the possibility that the original soil conditions may never be restored (Miller et al. 2004). The commercial timber harvest activities proposed in Alternative 4 would disturb, on average, about 15 percent of the ground in the proposed harvest units. As a result of implementing designated skid trails, the units tractor logged (272 acres) would result in approximately 12 percent or less of the area compacted (USDI BLM 1995). Designating skid trails would minimize the area that would be disturbed during tractor logging operations.

In an Oregon State University study on partial cutting (using designated skid trails), designated skid trails occupied only 4 percent of the area, compared to 22 percent for conventional logging (Bradshaw 1979). In a study of thinning and partial-cutting utilizing yarding systems, skidding logs caused soil disturbance on approximately 21 percent of the site, resulting in 13 percent displacement and 8 percent compaction (Landsberg et al. 2003). Observations of the units proposed for harvest reveal very few old skid trails still apparent across the landscape. Tree and brush vegetation has re-established in most of the skid trails that were previously compacted from past harvesting. In Alternative 4, any operations off designated skid trails are limited by moisture restrictions and minimizing the number of passes. This is expected to result in a slight soil disturbance, but detrimental compaction (over 2 inches depth) is not expected to occur.

Whole-tree yarding using a mechanical harvester would not cause any detrimental compaction as a result of using such equipment during dry soil conditions or on 18 inches or greater of snowpack, and snow conditions

are such that negligible ground surface exposure occurs during operations (USDI BLM 1995, p.166).

Soil particles are not expected to be displaced beyond the units from timber harvesting activities. The decrease in soil pore space as a result of the compacted skid trails causes a slower infiltration rate that may increase overland flow. Although erosion rates would increase initially in the harvested units, soil particles would not reach local waterways under normal rainfall conditions because of the gentle topography and Riparian Reserve buffers. 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. Even logging systems that cause the most disturbances seldom bare more than 30 percent of the soil surface. Because surface erosion depends primarily on extent and continuity of bare areas, soil loss is usually slight (Rice et al. 1972).

The natural erosion rate in the Klamath Mountains is expected to be 0.13 yd^3/ac/yr. Harvested areas are estimated to be 0.89 yd^3/ac/yr (Aramanthus et al.1985). However, this project differs in that unstable areas[9] would be avoided, which would result in different (lower) estimates. Consequently, the actual erosion rate is expected to be less than the estimated amount due to required project design features which incorporate Best Management Practices for reducing effects to soils. 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).

Short-term erosion rate potential would increase moderately (15-50 percent over undisturbed rates) in the tractor units where slopes exceed 20 percent 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 trails, causes a slower infiltration rate and larger amounts of sediment laden surface runoff. On slopes less than 20 percent and/or where skid trails follow the contour, runoff velocity tends to be reduced and soil particles are transported only a short distance. In this situation, soil particles would remain on site and not reach local waterways.

Geppert et al. (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 proposed for treatment in Alternative 4, as such sites were screened through the Timber Productivity Capability Classification (TPCC) process (USDI BLM 1994, p. 3-85; USDI BLM 1988) and removed from the timber harvest base.

A big influence on soil compaction is the moisture content of a soil when operated on. The plastic limit is the moisture content where a soil acts as a plastic and can be moldable. When the soil is at a lower water content than this, soil will not change shape under pressure. Soil aggregates could be crushed or displacement could occur. When at a lower water content than the plastic limit, soil compaction is less of a risk (Penn State College of Agricultural Sciences 2014 http://extension.psu.edu/agronomy-guide/cm/sec1/sec11f).

1,261 acres of the proposed Alternative 4 units have no evidence of past logging.

Logging Systems

In the Project Area, units would utilize ground-based yarding systems which include tractor and mechanical harvesters, skyline (cable) yarding systems, and helicopter yarding systems. There are soils identified as fragile for surface erosion soils (classified as FM). These are generally soils weathered from granitic or schistic parent materials and are prone to surface erosion especially when disturbed.

9 Unstable areas are different from fragile soils in this context. Unstable areas are considered to be areas with current slope stability issues which are avoided in the Project Area. Fragile soils that are located in the Project Area have some characteristics of unstable soils but due to site indicators are not expected to result in slope instability after the proposed actions.

Ground-based (Tractor, Mechanized Harvesters and Bull-line) Yarding

In total, 224 acres of ground based yarding is proposed. Of that, 11.2 acres are on fragile for the potential for surface erosion soils (classified as FM). These are generally soils weathered from granitic or schistic parent materials and are prone to surface erosion especially when disturbed.

Tractor Yarding

The requirements for tractor yarding are that they remain on designated skid trails spaced 150 feet apart and manually cut trees and pull them to the skid trails. Where possible, existing skid trails are utilized to avoid the overall increase in unit area compaction. It is assumed that 12 percent of the unit area would be compacted.

Mechanized Harvesters

Mechanized harvesting equipment (feller bunchers and cut-to-length machines) would be allowed in the Nedsbar Forest Management Project. For these types of harvesting equipment to be effective, operations off of designated skid trails are needed. Mechanical equipment is driven to the trees for harvest; however, there is a requirement for equipment to have the capability to reach 20 feet. Project Design Features were developed to minimize impacts of using mechanical harvesters off of designated skid trails.

Adherence to the following PDFs would greatly reduce the potential for detrimental compaction within the unit. PDFs include requirements to operate in dry soil conditions, a limited number of allowable passes (1 to 2), and limiting the number of mechanical trails to an average of 50 feet spacing off the designated skid trails. Activity allowing other equipment or multiple passes would be restricted to designated skid trails. In dry soil conditions (under the plastic limit), deformation is not expected to occur, due to the lack of moisture. “Soil compaction is not likely to cause much damage if traffic is limited to dry soil conditions (i.e., drier than the plastic limit)” (Penn State College of Agricultural Sciences 2014). On these 1-to-2 pass trails, it is possible that the beginning portion of the trail closest to the intersection of the designated skid trail may be passed by the equipment more often due to herringbone-type movement. Although this would be avoided where possible by planning and cutting multiple trees in a single pass, when it does occur in the dry soil conditions, it is not expected to result in detrimental compaction.

In ground-based regeneration harvest units, compaction would be alleviated from skid trails. This is a requirement in the Medford RMP on final harvests.

Approximately 11.2 acres of the proposed ground based treatment units are in fragile soils. It is assumed that 12 percent of the unit area would be compacted. The areas that are fragile soils have been field reviewed. The portions in the ground based units in fragile soils have a gentle slope. Surface erosion is very unlikely in areas of gentle slope.

Bull-Line Yarding

Bull-line yarding is proposed in this project. This yarding method allows for yarding material on slopes generally greater than or equal to 35 percent to landings or roadsides. This method winches trees short distances (generally less than or equal to 150 feet) with no suspension from the ground. This yarding system does not require guy line anchors, tail hold trees, or cable corridors. The anticipated effects would be less ground disturbing than ground-based equipment on 35 percent or greater slopes. Gouging may occur in this yarding system and the degree of this depends on the size of log, yarding distance, degree of slope, and other factors as the log drags up the hillside. Bull-line yarding has the potential to disturb the soil in the corridor more than skyline yarding; however, this would generally occur over a smaller area and shorter distances than skyline yarding corridors. Otherwise, the effects would be similar to skyline yarding.

Skyline Yarding (Cable)

There are 826 acres of skyline yarding proposed in Alternative 4.

Skyline (cable) yarding uses the partial suspension of logs during yarding operations to reduce the amount of ground disturbance. This yarding system typically has much less ground disturbance than tractor yarding

because suspension of the lead end of the log during haul back reduces the amount of gouging and lateral swing from the log.

The amount of estimated ground disturbance from skyline yarding is very difficult to quantify because slope configuration (convex slopes, benched ground) along with the lift capability of the cable machine determines the amount of ground disturbance for a given harvest unit. This is reflected in the variability of the research results where Dyrness (1967) found 12.1 percent ground disturbance and Klock (1975) found 2.8 percent soil disturbance after skyline (cable) yarding. The differences in results are mostly due to differences in topography, soil types, and cable machines used in study areas.

Helicopter Yarding

There are 449 acres of helicopter yarding in Alternative 4.

Helicopter yarding systems use helicopters to move logs from a harvest unit and transport them to a helicopter landing. Typically, helicopter yarding has the lowest amount of ground disturbance compared to tractor and cable yarding because the logs are flown to the landing as opposed to being dragged by a cable system or a tractor. Klock (1975) found 0.7 percent soil disturbance where McIver and Starr (2001) found 3.4 percent soil disturbance after helicopter yarding. These differences are probably due to topographical and climatic differences at the time of yarding.

Fuels Reduction and Non-Commercial Treatments

Prescribed burning of activity fuels planned under Alternative 4 would be in the form of hand pile burning. The increase in erosion rates over present levels would be less than 15 percent as a result of burning hand piles because the piles would be spaced throughout the units and would occupy approximately 3-5percent of the total area. The increased potential of soil particle movement would be low due to the gentle slope, spacing of piles, and vegetation between the piles. High soil temperatures generated by burning piles would severely and negatively affect soil properties in 3-5 percent of the unit by physically changing soil structure and reducing nutrient content. In most pile burning operations, the duff and woody debris associated with the piles is completely consumed.

Duff and woody debris represent a storehouse of minerals and protection for the soil surface. Since nitrogen losses are roughly proportional to the amount of duff consumed, burn prescriptions that allow greater retention of woody debris benefit long-term site productivity. Burning volatizes organic nitrogen, or changes it into a readily available form (for plant use). Large proportions of the total nitrogen budget can be lost through volatilization in the sites where pile burning occurs. Total foliar nitrogen content is also reduced (14 percent in moderate burns, 33 percent in intense burns), and the effects last at least four years (Atzet et al. 1987). Overall, soil productivity would experience a slight (less than 15 percent) decrease through short-term effects, but potential long-term positive effects would be realized from the proposed actions as the risk of catastrophic fire is diminished.

Understory Reduction treatments proposed in this project are expected to have minimal effects to soils. There would be no material yarded in these units. Therefore, ground disturbing yarding would not occur. Where pile burning would occur, the effects to soils would be similar to what was described above for fuels reduction pile burning. There are 880 acres of proposed fuels treatments in Alternative 4.

Summary

There would be a net increase in compacted area in the tractor harvest units, averaging about 12 percent, which would slightly decrease long-term soil productivity. Based on research and past monitoring of operational activities, it is assumed there would be a 5 percent loss of productivity on all lands that would be tractor harvested using designated skid trails. The loss is accounted for in the Medford District non-declining timber harvest calculations (USDI BLM 1994). Soil productivity would experience a slight (less than15 percent), short-term negative decrease, but potential long-term positive effects would be realized by thinning and prescribed fire. There would be a slight to moderate (15-50 percent) increase in erosion rates as a result of the combination of harvesting timber and fuel reduction activities (i.e., slashing, prescribed burning), which would

last approximately 3 to 5 years. A slight cumulative long-term increase in erosion rates would occur as a result of road building.

With regard to soil productivity, there is currently little direct evidence to indicate that harvest removal alone leads to soil depletion over several succeeding rotations (Beschta n.d.). A crucial aspect that affects soil productivity is cutting intensity, or the proportion of standing trees harvested (i.e., clear-cutting vs. shelter wood vs. selection cutting). As cutting intensity decreases, so, too, do the effects on the soil.

Another critical aspect of a silvicultural regime is the rotation, or cycle length. Rotation length determines the intervals at which the site is entered and disturbed, and the rate at which nutrients are removed, redistributed or lost. Rotation length is especially important from the point of view of cumulative effects because it determines the time periods allowed for recovery between harvests. Soil productivity decline should be least likely when low silvicultural intensity is combined with high inherent productivity and favorable conditions. Soil erosion may prove cumulative over time if periodic disturbances that result in soil leaving the site occur, at intervals too short for the site to stabilize and result in recovery. In the Nedsbar Forest Management Project, soil disturbance would not result in a significant amount of soil leaving the site, and erosion rates would return to near-normal within approximately 5 years.

Cumulative Effects

Refer to the beginning of Section 3.A.2. for descriptions of past, present and reasonably foreseeable future actions.

Soil erosion may prove cumulative through time if periodic disturbances occur (that result in soil leaving the site) at intervals too short for the site to stabilize to bring about recovery. This should not be the case as a result of the Nedsbar Project as soil disturbance would not result in a significant amount of soil leaving the site and erosion rates would return to near normal within about 5 years. Most past harvest that had a substantial effect on soil erosion rates was over 20 years ago and most sites have recovered from those events. Therefore, cumulative effects to the soil resource as a result of timber harvest would be minimal if the soil resource is allowed enough time to recover from the disturbance of this project.

Timber harvest on adjacent private lands is expected to occur.

Private forestland is managed following the Oregon Forest Practices Act. The Oregon Forest Practices Act identifies soil disturbance greater than 20 percent of an area to be soil damage and anything above that needs to be remediated. Additionally, operators shall avoid excavating skid trails on slumps or slides. There are additional requirements specific to high landslide hazard areas. Listed are the most relevant ones on pages 46-48 in the Harvesting Forest Practice Rule Guidance page.

- Operators and the State Forester shall share responsibility to identify high landslide hazard locations and to determine if there is public safety exposure from shallow, rapidly moving landslides.
- Operators shall not construct skid roads on high landslide hazard locations.
- Operators shall prevent deep or extensive ground disturbance on high landslide hazard locations during log felling and yarding operations.

Assuming the Oregon Forest Practices Act is being implemented, slope stability issues from timber harvest on private lands is not expected to occur. Although, disturbed sites are in general at more of a risk of slope failure under high rainfall situations than undisturbed areas. If however, slope instability issues are addressed and avoided in private land as they are on federal land then the cumulative effects of slope instability are not expected.

c. Alternative 3

The effects of Alternative 3 are expected to be similar, but less than the effects of Alternative 4. There is no road construction or temporary road construction proposed in this alternative. That would result in a decreased amount of soil compaction and subsequent loss of soil productivity.

The main concern to the soils resource in this area is the effect to soil productivity (compaction). And soil erosion due to areas with steep slopes and presence of granitic soils in portions of the Planning Area.

Use of existing non-system spurs, designated skid trails and tractor swing trails are still proposed in this alternative. The same effects are expected to occur from this action as Alternative 4.

Existing Non-System Spur Roads, Road Realignment, Tractor Swing Trails, Designated Skid Trails

Refer to discussion in Alternative 4 of the descriptions.

The existing spurs proposed in this alternative are: the footprint in 39S-3W-19 and 24 off of Grouse Creek road (0.25 miles) and the footprint in 39S-1W-17 (0.12 miles) (ridgetop). The effects of using these footprints are discussed in Alternative 4 and would be the same in this alternative. This is a total of 0.37 miles.

Designated skid trails in 39S-2W-34 and 39S-2W-28 is in this alternative for a total of 0.20 miles. Refer to description in Alternative 4.

Tractor swing trail in 39S-1W-30 is in this alternative for a total of 0.22 miles. Refer to description in Alternate 4.

Road Decommissioning

The same roads proposed for natural decommissioning in Alternative 4 are proposed in Alternative 3.

Road Improvement

Refer to discussion in Alternative 4.

The main difference is a reduction in the road mileage proposed for Category C from 1.25 miles in Alternative 4 to 1.01 miles in Alternative 3. There is a total of 48 miles of haul route.

Landings

Refer to discussion in Alternative 4.

There are less landings proposed in Alternative 3 than Alternative 4, therefore the effects to the soils would be less.

Forest Management

The effects to soils from forest management would be the same in Alternative 3 as Alternative 4 except for the reduction in treatment acres would result in less overall disturbance.

Logging Systems

In the Project Area, units are proposed as ground-based (134 acres), skyline (283 acres) or helicopter (372 acres).

Refer to the discussion in Alternative 4.

There is an overall reduction in treatment acres in Alternative 3 compared to Alternative 4. The effects of the different logging systems are expected to be the same as Alternative 4 just to a lesser extent (709 acres less). There are approximately 6 acres less ground-based unit in fragile (FM) soils. Overall, the direct effects from logging systems would be the same as Alternative 4, just to a lesser extent as the treatment acres are reduced.

Fuels Reduction and Non-Commercial Treatments

The direct effects of activity fuels reduction treatments would be the same in Alternative 3 as Alternative 4 except for a the amount of area treated would be reduced. Activity fuels treatments would occur on 753 acres, which is 127 acres less than Alternative 4.

Riparian Thinning

The effects are expected to be the same as Alternative 4.

Summary

The effects of implementing Alternative 3 are similar to Alternative 4. The main difference is new and temporary road construction. Without the 3.24 miles of proposed new road construction and 1.28 miles of new temporary road construction there is a difference in the amount of acres of soil impacted. There would still be 2 miles of road to be naturally decommissioned which would result in an overall reduction in road miles in the project area. There is also a reduction in areas treated in this alternative so there would be less impacts to soils.

Cumulative Effects

Refer to the discussion in Alterative 4. The cumulative effects are expected to be the same but slightly less acreage of soil disturbance.

d. Alternative 5

This alternative does not contain any road construction, road construction or realignments.

Tractor Swing Trails, Designated Skid Trails

The same tractor swing trails, designated skid trails and existing spurs proposed in Alternative 3 are proposed in Alternative 5 with the addition of one designated skid trail in 39S-3W-35 that is 0.06 miles on ridgetop.

Road Improvement

There would be less road improvement than both Alternatives 3 and 4 due to fewer miles of haul routes.

Landings

There are 5 helicopter landings proposed in Alternative 5. This less than both alternatives and would result in less soil disturbance. Refer to the landing discussion in Alternative 4 for the effects to soils.

Forest Management

The effects to soils from forest management would be the same in Alternative 5 as Alternatives 4 and 3 except for the reduction in treatment acres would result in less overall soil disturbance (536 acres).

Logging Systems

There is an overall reduction in treatment acres in Alternative 5 compared to Alternatives 4 and 3. The effects of the different logging systems are expected to be the same as Alternatives 4 and 3, just to a lesser extent. Approximately 124 acres of tractor, 289 acres of skyline, and 122 acres of helicopter yarding are proposed. Of that 10 acres of fragile soils are within ground based units. Overall, the direct effects from logging systems would be the same as Alternative 4, just to a lesser extent as the treatment acres are reduced.

Fuels Reduction and Non-Commercial Treatments

The direct effects of activity fuels reduction treatments would be the same in Alternative 5 as Alternative 4 except for a the amount of area treated would be slightly reduced (876 acres).

Summary

The effects of implementing Alternative 5 are somewhat similar to Alternatives 4 and 3. The main difference is no road construction, road realignments or use of existing footprints for a temporary spur.

Cumulative Effects

Refer to the discussion in Alterative 4. The cumulative effects are expected to be the same but reduced.

E. WATER RESOURCES

1. Issues

Water-related issues associated with the Nedsbar Project have been identified through public scoping or interdisciplinary team specialists and will be addressed in this document. These relevant issues are:

- How would the disturbance associated with combination of new road construction, road renovation, and log hauling activities affect water quality from the potential short-term increased sediment produced?
- The mainstem of the Applegate River, Grouse Creek, Yale Creek, and the Little Applegate River are within the Analysis Area and are listed as 303(d) streams for varying reasons. Would the non-point source pollution (sedimentation) from management activities have the potential to degrade the aquatic ecosystem (e.g., reduced water quality for salmon, steelhead, and trout)?
- How would forest thinning (and associated canopy reduction), logging (particularly tractor yarding) and road construction affect hydrologic flow, peak flow and low flow, leading to increased erosion, stream channel downcutting, or the potential to increase the adverse effects of flooding?
- What is the potential for adverse cumulative effects on water quality and hydrologic function within the Little Applegate and Upper Applegate Watersheds from road building, timber harvest activities, grazing, OHV use, and fire suppression on BLM, Forest Service, and private lands?

2. Analysis Area Description

The 18,958 acre or 29.6 square mile Nedsbar Planning Area is located within the Little Applegate and Upper Applegate Watersheds. The Little Applegate and Upper Applegate Watersheds are two of the seven 5th field watersheds within the Applegate Subbasin. The land within the Planning Area drains into the portion of the Little Applegate River from Second Water Gulch to the confluence with the Applegate River and into the portion of the Applegate River from approximately 1 mile downstream from the Beaver Creek confluence to the confluence with the Little Applegate River.

Two watershed analysis documents provide general background information for the Planning Area: The Little *Applegate River Watershed Analysis* (USDI BLM and USDA 1995) covers the portion of the Nedsbar Project in the Little Applegate River Watershed, and the *Applegate-Star/Boaz Watershed Analysis* (USDI BLM 1998b) covers the portion of the Nedsbar Project in the Upper Applegate River Watershed. These watershed analyses reflect some of what was known about these watersheds at the time they were completed; the water resources analysis for this environmental assessment relies on additional information, much of which is more recent than that contained in the watershed analysis documents.

The Analysis Area is larger than the Planning Area (Map 3-4 in Section 3.F., *Aquatic Habitat and Fish*), and for purposes of assessing the affected environment and the proposed project, specifically cumulative effects, the Analysis Area for water resources will consider portions of the Upper Little Applegate River, Yale Creek, Lower Applegate River, Beaver Creek-Applegate River, and Star Gulch-Applegate River. These are called subwatersheds and represent 6th field hydrologic unit codes (HUCs). These subwatersheds are further subdivided into 7th field HUCs called drainages which range in size from 548 to 4,018 acres (Table 3-17). The major creeks within the Analysis Area that may or may not represent 7th field HUCs are First Water Gulch, Second Water Gulch, Waters Gulch, Lick Gulch, Yale Creek, Grouse Creek, Rush Creek and Boaz Gulch. The total size of the Analysis Area is 31,717 acres or 49.6 square miles and consists of drainages where treatments are proposed. There are a couple areas where proposed actions slop over into an adjacent drainage not included in the Analysis Area (described above). The first location is just outside the LA 0218 and LA 0209 drainages where approximately 0.58 miles of new road construction (about 0.42 miles of proposed permanent road and about 0.16 miles of proposed temporary road) is proposed. This proposed road is along a ridge dividing LA 0218, LA 0209, and LA 0145 (Glade Creek). Approximately half the length of this proposed road is on the Glade Creek side of the ridge. Changes in road densities and canopy cover within the Glade Creek drainage would be minor and would not negatively affect criteria used to assess potential changes in peak flows or cumulative effects;

therefore, the drainage was not included in the Analysis Area. The second location is in UA 0212, over the ridge from LA 0406 and UA 0218 where approximately 306 acres are proposed for fuels treatment. No road building or timber harvest would be associated with this treatment and there would be no hydrologic connectivity for the proposed treatment. Therefore, the UA 0212 drainage was not included in the Analysis Area. The actions proposed in these drainages are still included in the summary of effects for each action alternative.

The size of a drainage is large enough to assess the cumulative effect of actions that, taken individually (site scale) may not be significant, but when combined with effects from other activities occurring within the drainage, may have a potential impact ("cumulative effect"). The drainage areas are small enough to avoid "drowning out" evidence of adverse effects. As the size of the Analysis Area increases, there is an increasing possibility of the analysis indicating that there is "no problem" when in fact individual drainages may have issues of concern.

Table 3-17. Analysis Areas with acres and ownership.

Sub-Watershed (6th field)	HUC 7 (drainage)	Acres	BLM (%)	Private/Other (%)
Beaver Creek Applegate River	UA 0218	4,018	43	57
Star Gulch Applegate River	UA 0360	2,926	75	25
	UA 0363	2,327	46	54
Upper Little Applegate River	LA 0127	1,746	34	66
	LA 0130	1,146	86	14
	LA 0203	808	29	71
	LA 0206	2,244	74	26
	LA 0209	1,525	88	12
	LA 0215	2,607	81	19
	LA 0218	2,005	95	5
	LA 0221	1,090	66	34
Yale Creek	LA 0330	1,672	76	24
Lower Little Applegate River	LA 0403	1,812	57	43
	LA 0406	1,879	98	2
	LA 0409	548	69	31
	LA 0442	1924	67	33
	LA 0445	1440	43	57
Total	-	31,717	66	34

The BLM manages approximately 66 percent of the Analysis Area (Table 3-17). The US Forest Service manages land along the southeastern and southwestern edges of the Analysis Area for a total of 9 percent. Private lands encompass 25 percent of the Analysis Area. Private ownership is mixed with mostly larger parcels owned by industrial timber companies and the remaining small parcels held by private individuals.

Surface water in the proposed Nedsbar Analysis Area includes streams, ditches, springs, wetlands, and small reservoirs. Streams in the Analysis Area are classified as perennial, intermittent with seasonal flow (long duration intermittent), intermittent with ephemeral flow (short duration intermittent), and dry draws with ephemeral flow. Stream types on BLM-managed lands were identified through site visits and stream surveys; USFS and non-federal land stream types were estimated using aerial photo interpretation and extrapolation from information on adjacent BLM-managed lands. Streams categorized as perennial or intermittent on federal lands are required to have Riparian Reserves (see Section 2.B.1.a.) as defined in the *Northwest Forest Plan* (USDA and USDI BLM 1994a). 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. 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).

Groundwater supplies in the Upper Applegate Watershed portion of the Analysis Area are limited and primarily found in valley bottom alluvium of the Applegate River corridor (USDI BLM 1998b). The situation is likely similar in the Little Applegate Watershed portions of the Analysis Area, since ground water supplies in most areas of the Rogue basin are limited (USDI BLM 1995). Well water quality problems are prevalent throughout the Rogue basin, arising from natural sources such as arsenic, boron, and fluoride. Surface contaminants such as nitrate and fecal matter may enter ground water through improperly constructed wells. Increasing demand from rural population density increases and years with below-normal precipitation have been identified as factors affecting ground water supplies in Jackson Country (USDI BLM 1995). The RMP/EIS identified that an increase in rural population density has been accompanied by an increase in ground water diversion, and this trend is expected to continue (USDI BLM 1995, pp. 3-13). None of the Nedsbar Analysis Area has been identified as a critical groundwater area by the Oregon Water Resources Department (OWRD 1989).

3. Affected Environment

Average annual precipitation in the Nedsbar Analysis Area ranges from 20-25 inches near the confluence of the Little Applegate River and Applegate River (elevation 1,800 feet) to 50 inches at the headwaters of First Water Gulch (elevation 5,600 feet). Precipitation falls predominately from November through March and summer months are typically very dry. The rain patterns in the winter months are wide based with relatively low intensity and long duration in contrast to localized, short duration, and high intensity summer storms that occasionally occur.

Within the Nedsbar Analysis Area, moderate to high streamflows usually occur between mid-November and April, with runoff peaking in February and March. Significant flows can also be produced by local, high intensity summer storms, though these events are relatively rare and their effect is limited to the local area. The lowest streamflows generally occur in August and September. Many of the tributary streams in the Analysis Area become dry in late summer. Flows in the Applegate River are regulated by the Applegate Dam upstream of the Analysis Area, maintaining higher-than-historic summer flows, and decreasing winter peak flows. There are no flood control structures on the Little Applegate River. Summer low flows in the Little Applegate River are heavily impacted by irrigation diversions, including the McDonald Ditch diversion in the upper portion of the watershed and a number of smaller diversions lower down in the watershed. The McDonald Ditch is part of the Talent Irrigation District system; water from this diversion is transported out of the upper portion of the watershed and delivered to Wagner Creek in the Bear Creek Watershed to the north. Other diversions in the Little Applegate are primarily for irrigation of farmland within the watershed, and most return flows are delivered back into the Little Applegate River.

Water quantity in the 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 Areas include: land clearing (for agricultural and residential use), timber harvest, road operations, water withdrawals, and fire suppression. These past actions and their effects on hydrologic processes and water quantity are described in this section.

Streamflows are naturally low during the summer due to low precipitation, reduced soil drainage, and sustained high evapotranspiration. Water withdrawals, primarily for irrigation, exacerbate the low flow condition. Fire suppression has resulted in overly dense forest stands with high transpiration rates that likely contribute to decreasing the amount of water available for summer streamflows. Past harvest which occurred on private lands in the Analysis Area often included riparian vegetation. Following the harvest of riparian overstory, solar radiation increased water temperatures and rates of evapotranspiration.

Within the Analysis Area, rain predominates in the lower elevations (generally below 3,500 feet). Winter precipitation in the higher elevations (generally above 5,000 feet) usually occurs as snow, which ordinarily melts during the spring runoff season from April through June. A mixture of snow and rain occurs between approximately 3,500 and 5,000 feet elevation (USDI BLM 1995) and this area is referred to as either the rain-on-snow zone or transient snow zone (TSZ). The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Historically, geomorphic processes that shape landscape and channel geometry are triggered by large, infrequent storm events. In recent times, these events can be characterized by warm moist storms that result in high intensity, long duration rainfall. The results can be intensified when rainfall occurs on shallow snow packs in this elevation range, and then are quickly melted by rain and warm winds (rain-on-snow event).

The percent of a watershed in the transient snow zone (TSZ) can indicate elevated risk of adverse impacts. These impacts can be accelerated by modifications to forest canopy cover and roads and other disturbance features. Drainages where TSZ compromises greater than 25 percent of the area are of hydrologic concern, particularly where large openings such as clearcuts exist. The TSZ occupies substantially less than 25 percent of all the subwatersheds in the Analysis Area except one. The TSZ occupies 34 percent of the Upper Little Applegate Subwatershed. In total, the TSZ occupies 9 percent of the Analysis Area (Table 3-18). Large areas of vegetation removal in the transient snow zone are of particular concern due to alterations of the streamflow regime and the potential for resultant increased peak flow magnitudes (Christner and Harr 1982).

The degrees to which hydrologic processes are affected by vegetation canopy reduction (e.g., land clearing or timber harvest) are summarized based on the extent and location. Extent refers to the amount of a drainage area that is below critical thresholds, and therefore at risk. Location refers to whether or not canopy reduction occurs within the TSZ. Openings in the TSZ and potential risk for peak flow increases are analyzed using the Oregon Watershed Assessment Manual (OWAM; Watershed Professionals Network 1999, vol. IV, pp. 9-11) risk assessment method. This method indicates that drainages with more than 25 percent of the area in the TSZ may be at risk for possible peak flow increases. The TSZ occupies more than 25 percent in 3 of the 17 drainages associated with the proposed project (Table 3-18). In addition, the peak flow risk assessment method uses the percent of rain-on-snow area that currently has less than 30 percent crown closure. The most recent aerial photos were used to estimate the area with less than 30 percent crown closure in the rain-on-snow zone (Table 3-18).

Different levels of harvest in watersheds have demonstrated variable effects on peak flows (Wemple et al. 1996, Harr et al.1979). When less than 25 percent of a watershed is harvested, no detectible change in peak flows have been observed (Stednick 1996). It should be noted the majority of literature available regarding the relationship between harvest and flow have focused on clear cut harvesting, many in areas that removed close to 100 percent of the overstory canopy. For this analysis, any area where 30 percent or greater of the forested acres is less than 30 percent canopy cover is assumed to be hydrologically altered and responds similar to a clearcut. This is particularly true if a large percentage of the drainage is located within the TSZ.

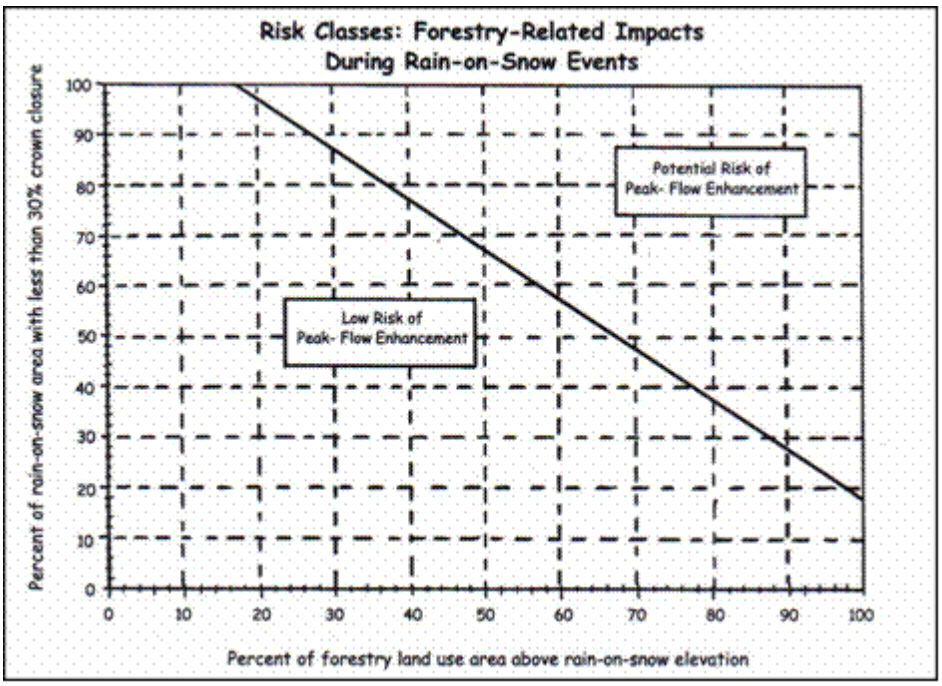
Table 3-18. Percent of transient snow zone (TSZ) with less than 30 percent canopy cover.

Subwatershed	HUC 7 (drainage)	Percent Forested Area Less Than 30% CC[1]	Percent within TSZ	Percent Forested Area Less Than 30% CC within TSZ [1]
Beaver Creek-Applegate River	UA 0218	3	1	0
Total		*3*	*1*	*0*
Star Gulch-Applegate River	UA 0360	8	5	12
	UA 0363	6	0	0
Total		*7*	*3*	*6*
Upper Little Applegate River	LA 0127	4	63	1
	LA 0130	1	73	1
	LA 0203	37	14	13
	LA 0206	16	63	5
	LA 0209	4	21	12
	LA 0215	0	13	0
	LA 0218	4	20	6
	LA 0221	0	2	0
Total		*10*	*34*	*4*
Yale Creek	LA 0330	0	2	0
Total		*0*	*2*	*0*
Lower Little Applegate River	LA 0403	7	0	0
	LA 0406	3	11	5
	LA 0409	2	0	0
	LA 0442	7	0	0
	LA 0445	0	0	0
Total		*4*	*2*	*1*
Total - All		*5*	*9*	*3*

[1] CC – Canopy Cover; includes existing disturbance features such as roads and landings, and acreages for units recently harvested in O'Lickety, Lick Stew, and Bald Lick with less than 30 percent CC.

The risk of peak-flow enhancement is estimated from the OWAM risk assessment graph (Figure 3-8) which uses the percent of the Analysis Area that is within the rain-on-snow zone and the percent of the rain-on-snow zone with less than 30 percent canopy cover (Table 3-18).

Figure 3-8. Graph for estimation of the risk of peak-flow enhancement from forestry-related impacts during rain-on-snow events (WPN 1999: IV-11).



Values that fall below the diagonal line represent a low risk of peak-flow enhancement, while values above the diagonal line indicate a potential risk of peak-flow enhancement. The diagonal line roughly represents peak-flow increases of 8 to 10 percent, which represents the lower boundary of detectability. Table 3-18 and Figure 3-8 was used to determine the percent of rain-on-snow zone with less than 30 percent crown closure that represents the boundary between the two risk classes for each Analysis Area that has more than 25 percent in the rain-on-snow zone (Table 3-18). None of the drainages in Table 3-18 have high percentages of reduced canopy cover within the TSZ and therefore have a low risk of peak-flow enhancement.

It should be noted that 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 percent 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). What this suggests is 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 6 years or less, where channel forming processes are minor in effect.

Most of the increase in sedimentation associated with forestry activities is attributed to forest roads (Sullivan 1985). Research (Reid and Dunne 1984, Luce and Black 1999) supported by local and regional field evaluations have consistently found roads to be the primary source of accelerated erosion in wildland watersheds. Roads impact aquatic systems through both chronic and episodic erosion. Chronic erosion is where material is detached and transported to streams via the road surface and drainage structures such as cross drains and inboard ditches. This occurs in response to precipitation events throughout the year. Episodic erosion usually occurs as a result of intense rainfall and rain-on-snow events within the TSZ. Large failures often occur as a result of culvert plugging, stream diversion and fillslope landslides. In addition, where road densities are high, concentration and routing of stormwater may result in increased peak flows. Both road density and road density with Riparian Reserves are gross indicators of the level of road impacts in watersheds. 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.

Within the Analysis Area, 12 of the 60 miles of system roads located within Riparian Reserves are unsurfaced. It is likely that a majority of the 26 miles of non-system roads within Riparian Reserves in the Analysis Area are unsurfaced as well. Natural or unsurfaced roads are generally more likely than surfaced roads (rocked or paved) to contribute sediment to streams. In addition, some native surface roads are open during the rainy season. This type of use can render drainage features ineffective and result in concentrated flow and increased erosion.

Some recent improvement s to road drainage have been completed, primarily road surfacing and rolling dips associated with the O'Lickety Timber Sale and BLM's deferred road maintenance project. Within the Analysis Area there are road segments lacking adequate drainage or located within close proximity to streams. Lack of road maintenance or improper road maintenance by all jurisdictions within the Analysis Area has increased sediment production or the potential for sediment production. In localized areas there is also an expanding network of OHV trails – though these tend to be mostly outside of the Analysis Area, near Anderson Butte. These features often utilize old road beds or are established through repeated off-road travel, or user created trail unauthorized construction. They exist on the landscape irrespective of sensitive soils, adequate drainage, or proximity to watercourses and are also responsible for increased sediment production.

Although grazing that degrades aquatic habitat and increases erosion on both public and private land is within the Analysis Area, chronic erosion from road surfaces, cut banks, and inboard ditches where they connect to streams likely represents the dominant source of sediment input to streams.

As part of this planning effort, a Transportation Management and Inventory Assessment (TMIA) was conducted for portions of the roads in the Analysis Area and in the road network above Sterling Creek located within the Ashland Resource Area. All BLM-managed roads in the TMIA were evaluated for public and/or administrative access needs versus resource impacts and recommendations were made regarding changes in maintenance levels, decommissioning/obliteration, or other actions necessary to remediate resource concerns. Recommendations were also made on reciprocal roads located both on private and BLM-managed lands. If appropriate, these recommendations were presented to affected landowners for consideration. Information was also collected on user created or non-system routes, including trails on BLM-managed lands that confirmed location, extent, and resource concerns.

Road densities in the Analysis Areas range from 2.0 to 8.1 mi./mi.^{2} with an overall road density of 4.4 mi./mi.^{2} (Table 3-19). High road densities, greater than 4.0 mi./mi.^{2} (King and Tennyson 1984), are found in eleven of the seventeen Analysis Areas (bold highlight). Roads built in riparian areas can adversely affect stream temperature, magnitude and timing of flows, and sediment. Riparian road densities range from 2.7 to 11.6 mi./mi.^{2} with an overall road density of 7.7 mi. /mi.^{2}. Higher riparian road densities, particularly on private lands are likely the result of steep dissected terrain and many roads being located within valley bottoms. As indicated in Table 3-19, in nearly all the Analysis Area HUC 7 drainages, road densities (overall, in Riparian Reserves on federal lands, and in riparian areas on private lands) are considerably higher on private lands, which is typical of mixed ownership drainages within the Analysis Area and elsewhere.

Table 3-19. Road miles and road densities for all drainages in the Analysis Area.

Analysis Area HUC 7	Road Miles			Road Density[2]			Road Miles – Riparian			Road Density[2] – Riparian		
	BLM	Non-BLM[1]	Total	BLM	Non-BLM[1]	Total	BLM	Non-BLM[1]	Total	BLM	Non-BLM[1]	Total
UA 0218	6.7	29.7	36.4	2.5	8.3	5.8	2.0	9.2	11.2	4.5	12.1	9.3
UA 0360	5.8	13.5	19.3	1.7	11.8	4.2	1.6	6.6	8.2	2.7	18.6	8.0
UA 0363	6.5	12.9	19.4	3.9	6.5	5.3	0.8	6.6	7.4	2.4	10.8	7.8
LA 0127	4.5	4.1	8.7	4.9	2.3	3.2	1.1	1.9	3	6.9	4.1	4.7
LA 0130	5.0	1.9	6.9	3.3	7.3	3.9	0.6	0.02	0.62	2.8	1.0	2.7
LA 0203	1.6	3.2	4.8	4.4	3.5	3.8	0.3	1.5	1.8	4.0	4.8	4.7
LA 0206	9.6	4.7	14.4	3.7	5.1	4.1	2.3	1.1	3.4	7.8	8.1	7.9
LA 0209	8.0	2.1	10.1	3.8	7.3	4.3	2.6	1.4	4.0	7.0	10.2	7.8
LA 0215	1.7	6.6	8.3	0.5	8.4	2.0	1.1	4.1	5.2	2.1	14.3	9.0
LA 0218	11.7	1.2	12.9	3.9	7.5	4.1	1.7	0	1.7	3.3	0	3.1
LA 0221	1.2	6.1	7.3	1.1	10.4	4.3	0.3	2.4	2.7	1.2	9.1	5.3
LA 0330	2.2	4.1	6.3	1.1	6.6	2.4	0.4	3.3	3.7	1.1	11.6	5.7
LA 0403	2.0	13.0	15.0	1.2	10.7	5.3	0.2	6.2	6.4	1.2	13.4	10.3
LA 0406	9.2	1.4	10.6	3.2	24.9	3.6	2.7	0.9	3.6	6.2	24.2	7.6
LA 0409	0.3	3.6	3.9	0.5	13.5	4.5	0	1.8	1.8	0	16.8	9.2
LA 0442	2.2	12.9	15.1	1.1	12.9	5.0	0.2	9.8	10	0.4	21	10.8
LA 0445	2.0	16.1	18.1	2.1	12.6	8.1	1.0	7.8	8.8	5.0	14.1	11.6
Totals	80.3	122.3	217.5	2.5	8.1	4.4	18.9	64.6	83.5	3.4	12	7.7

[1] Non-BLM lands include Forest Service and Private ownership.
[2] Road density is measured in miles/miles^2.

Until such time when the DEQ identifies surrogate measures associated with roads (outside the Beaver Creek drainage, where measures exist), the BLM will continue to utilize compliance with the Aquatic Conservation Strategy (ACS) in the Analysis Area (USDI BLM 2005) as a surrogate for assessing progress toward achieving goals for water quality on streams within the Analysis Area. Watershed restoration is a critical component of the ACS. Recommendations for watershed restoration activities that would reduce erosion from BLM-managed lands are found in the *Little Applegate River Watershed Analysis* (USDI BLM and USDA 1995), *Applegate-Star/Boaz Watershed Analysis* (USDI 1998b), and *the Water Quality Restoration Plan for the Applegate Subbasin* (WQRP) (USDI BLM 2005). Decommissioning or upgrading roads is a priority, with the highest priority given to roads that are contributing large amounts of sediment to streams as well as roads in Riparian Reserves, unstable areas, and midslopes. The WQRP's sedimentation recovery goal for roads is to decrease sediment production and delivery from roads (USDI BLM 2005). Active restoration techniques identified in the

WQRP include: maintaining adequate drainage facilities on all BLM-maintained roads open for administrative access during the wet season; improve or install new drainage systems and surfacing on non-system roads near Riparian Reserves or unstable terrain; decommission or obliterate roads not critical for future management activities; allow for 100-year runoff events, including associated bedload and debris, when installing new stream crossing structures and for existing stream crossing structures that pose substantial risk to Riparian Reserves; and apply appropriate road BMPs identified in the RMP to minimize soil erosion and water quality degradation (USDI BLM 2005). Within the past five years BLM restoration efforts have included decommissioning 0.34 miles in LA 0127(First Water Gulch drainage) and1.6 miles in LA 0218 (Lick Gulch). The Lick Gulch decommissioning/obliteration was entirely within a Riparian Reserve.

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. Cold-water aquatic life such as salmon and trout are the most sensitive beneficial uses in the Applegate River and its tributaries (ODEQ 2003a). The Oregon Department of Environmental Quality (DEQ) 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.

The BLM is recognized by Oregon DEQ as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. The BLM and DEQ have a Memorandum of Agreement (MOA) that defines the process by which the BLM will cooperatively meet State and Federal water quality rules and regulations. In accordance with the MOA, the BLM in cooperation with the Forest Service, DEQ, and the Environmental Protection Agency is implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDA and USDI BLM 1999). Under the Protocol, the BLM will protect and maintain water quality where standards are met or surpassed, and restore water quality limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The BLM would also adhere to the State Anti-degradation Policy (OAR 2005; 340-041-0004) under any proposed actions.

In 2003, the DEQ completed the Applegate Basin Total Maximum Daily Load (TMDL) which was approved by the U.S. Environmental Protection Agency (EPA). Approved BLM actions include land management addressed in the Resource Management Plan (1995) providing that Best Management Practices (BMPs) and project design features (PDFs) are followed to prevent exceedance of the TMDL.

The Applegate Subbasin WQRP (USDI BLM 2005) assumes that measures implemented to meet the temperature TMDL will also meet the likely riparian vegetation surrogate measure targets for the sedimentation TMDL. The Northwest Forest Plan Riparian Reserves would likely be more than that required to meet the percent effective shade targets (for temperature and will also provide additional protection from sediment. Other approved BLM actions include management actions in the Resource Management Plan (USDI BLM 1995) providing that Best Management Practices and Project Design Features are followed to prevent adverse effects to achieving compliance with the TMDL.

4. Environmental Consequences

As no new management is proposed under Alternative 1, the effects described reflect current conditions and trends that are shaped by ongoing management, natural processes, and other land uses and events. Alternative 2 was considered but eliminated so no discussion will follow on that alternative. Discussion for Alternatives 3, 4 and 5 reflect the direct and indirect impacts of the proposed actions. Effects discussion also includes cumulative impacts of those direct/indirect actions when added incrementally to past, present, and reasonably foreseeable actions. Short-term effects are defined as those lasting ten years or less and long-term effects last greater than ten years (USDI BLM 1995).

As part of the assessment of cumulative effects, a discussion of reasonably foreseeable future activities combined with those of the action alternatives is included at the end of the each alternative's effects section.

Below is a summary of those actions that may occur with reasonable certainty. The Affected Environment section summarizes present conditions in the Analysis Area, which are shaped by past actions.

Future harvest on commercial private timber lands would likely occur within the Analysis Area and it is assumed that it will continue at a similar rate as has occurred in the past. Private lands are governed under state forestry regulations, and as such receive a different level of protection than federal lands. Analysis of effects from private timber harvest generally considers the worst case scenario (i.e., all suitable forested lands would be logged at about 60 year tree-growing rotations) with regeneration harvest and road building as the predominate effects. As derived from air photo interpretation, currently approximately 2,843 acres of private timberland within the Analysis Area is predominantly 60 years old or older and may be available for harvest. The drainages with the highest percentage of those acres are 0130, 0203, 0206, 0330, 0363, and 0409 which contain 127 acres (11 percent of drainage), 208 acres (26 percent of drainage), 414 acres (18 percent of drainage), 236 acres (14 percent of drainage), 760 acres (33 percent of drainage), and 90 acres (16 percent of drainage), respectively.

A small amount of commercial timber harvest and non-commercial thinning on federal land (BLM) is anticipated to occur. Commercial units remain to be treated in the Lick Stew and Bobar projects (175 acres total). Non- commercial, fuels treatments totaling 98 acres also remain. No new road construction is proposed and canopy cover would not be reduced below levels of concern with any of these activities, therefore no appreciable synergistic effects are anticipated. There are no reasonably foreseeable future actions proposed for Forest Service lands within the Analysis Area.

a. Alternative 1 – No Action

No actions are proposed under Alternative 1 (the No Action Alternative). Therefore, direct and indirect effects of choosing Alternative 1 would be that the current conditions, which are the result of past actions (not related to the Nedsbar Forest Management Project), would persist in the Analysis Area. Alternative 1 describes the anticipated effects of not implementing an action at this time.

Under Alternative 1, there would be no changes in percent of BLM-administered forest lands with canopy cover less than the historic level, areas of compacted soil, and road densities. There would, therefore, be no change to the potential of increasing the magnitude and frequency of peak flows on BLM-administered lands.

Past events in the Analysis Area that currently have the potential to influence peak streamflows and increase erosion rates include grazing, timber harvesting, wildfire, road construction, OHV use, 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. Risk assessments for potential increased peak flows and sediment consider the effects of these past actions in their methodology. For example, areas previously harvested are included in the analyses of canopy cover (Table 3-18). Portions of the Quartz Fire 2001 burned into LA 0203. In addition, some timber sale units in the O'Lickety, Lick Stew, and Bald Lick projects reduced canopy cover below 30 percent in LA 0206. Canopy cover percentages in Table 3-18 include acres from these units and acres of documented blowdown in the Analysis Area.

A high intensity wildfire over part or all of the area could drastically alter the surface water and groundwater regime. Immediately after a severe fire, the loss of vegetation would make more groundwater available for streamflow and low summer flows would likely increase. However, the absence of vegetation may also result in an increased risk of higher peak flows. In a relatively short time, vegetation would reestablish and less water would be available for summer flow. It would take a longer period of time for vegetation to recover sufficiently for peak flows to return to their normal range. A high severity fire could also reduce or eliminate riparian vegetation and expose large areas of bare soil to the erosive forces of rainfall, likely increasing soil erosion and sedimentation.

The BLM has treated approximately 6,359 acres within the Analysis Area to reduce hazardous fuels reducing potential for large-scale high-intensity wildfire. Under Alternative 1, there would be a missed opportunity to contribute toward a landscape approach for reducing hazardous fuels and fire risk in the Analysis Area. A high

intensity fire would be a concern for potential increases in the magnitude and frequency of peak streamflows and increased sediment delivery should one occur.

Under Alternative 1, there would be no immediate change in existing water quality on BLM-administered lands. A recent deferred road maintenance project upgraded approximately 8.5 miles of roads by out-sloping roads where possible and eliminating inboard water drainage. This has reduced long-term maintenance needs for these roads. Into the future, the remaining roads in the area would be periodically 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 and/or that are poorly located are more likely to chronically deliver sediment to channels, modify flow, and experience road failures during extreme precipitation events. Surface erosion from roads would be expected to remain a concern, and the risk of sediment inputs to streams would be expected to remain relatively constant. Since there would be no road closures or decommissioning there would be no action to decrease road densities or interactions with streams and resource impacts attributed to road and OHV use, particularly within Riparian Reserves, would continue.

Reasonably foreseeable future actions planned on BLM-administered lands in the Analysis Area include a small amount of commercial timber harvest and non-commercial thinning. As previously mentioned, under the No Action Alternative, no new road construction is proposed and canopy cover would not be reduced below levels of concern with any of these activities, therefore no appreciable additional effects are anticipated.

Other foreseeable future actions planned on BLM-administered lands in the Analysis Area include routine road maintenance activities and continued livestock grazing in the Lower Big Applegate allotment. Reasonably foreseeable future livestock grazing would likely continue to negatively affect water quality in scattered locations by increasing turbidity/sedimentation through streambank disturbance and riparian vegetation removal. However, utilization across the allotment is considered light to moderate and gradual improvements to hotspots is anticipated as a result of potential measures incorporated into renewals of grazing leases (Section 3.A.2.d).

Under reasonably foreseeable future actions, it is assumed that private forest lands would continue to be intensively managed for timber production, although unlikely, would be harvested within the next 10 years. The actual timing of any timber harvest on private land is dependent on many factors, including valuations based on supply/demand, ownership, etc. It was assumed that canopy cover would be zero percent after the reasonably foreseeable future timber harvest on private lands.

In the longer 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). As a result, hydrologic changes, particularly the changes in snowpack and runoff patterns are among the most prominent and important consequences. 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.

b. Alternative 3

Direct and Indirect Effects

The primary difference affecting water resources between Alternative 3 and Alternative 4 (described below) is that no new permanent or temporary road construction is proposed. In addition, there are less harvest acres (709 acres less) and fewer road mileages (16.5 miles less within the Analysis Area) proposed for timber haul. This alternative has approximately 52 percent of the commercial harvest volume of Alternative 4.

Alternative 3 proposes treating forest stands utilizing a variety of silvicultural prescriptions. A total of 789 acres are proposed for commercial harvest. An additional 753 acres are proposed for non-commercial (fuels)

treatments. Five new helicopter landings up to one acre in size could be constructed. Harvest methods include tractor, cable, and helicopter, with the majority (372 acres) proposed for helicopter. Tractor yarding would be limited to designated skid trails, and generally slopes less than 35 percent. Three skid trails are proposed outside of treatment units. This is to allow access for harvest without constructing temporary roads.

Anticipated effects of implementing Alternative 3 are the same as described for Alternative 4, with the exception of effects described for road construction, and the amount of short-term increases in sediment and turbidity as a result of hauling and road maintenance would be less. In addition, Alternative 3 would reduce road mileage in the Analysis Area by 1.88 miles, whereas Alternative 4 would have a net increase of 1.36 miles.

Cumulative effects discussion for Alternative 4 is also applicable for Alternative 3. Although there are both natural and human induced risk factors for cumulative effects, Alternative 3 is not expected to increase these within the Analysis Area drainages, or the larger subwatersheds.

c. Alternative 4

Direct and Indirect Effects

This alternative proposes treating forest stands utilizing a variety of silvicultural prescriptions. A total of 1,498 acres are proposed for commercial harvest. An additional 880 acres are proposed for non-commercial (fuels) treatments. Harvest methods include ground-based, cable, and helicopter with the majority (826 acres) proposed for cable systems.

Within stands where canopy cover is currently 30 percent or greater, proposed treatments would not reduce canopy cover below that level. This would not result in appreciable reductions in canopy cover at the drainage scale. Tractor yarding would be limited to designated skid trails, and generally slopes less than 35 percent. Nine skid trails are proposed outside of treatment units. This is to allow access for harvest without constructing temporary roads. Designating skid trails and reusing old skid trails would reduce the area that would be compacted during logging operations. The use of a mechanical harvester would not cause any detrimental compaction as a result of using such equipment during dry soil conditions. Twelve new helicopter landings up to one acre in size could be constructed. No new landings are proposed in Riparian Reserves, though one existing landing in a Riparian Reserve of Neds Gulch would need to have existing snags felled to be used safely. Following use, all new landings would be treated by decompacting the surface, seeding, scattering slash and other debris, and closing or barricading the entrance. Since new landings are located in areas where canopy cover is currently 30 percent or less, there will be no increase in forested acres with less than 30 percent canopy cover.

With the exception of riparian thinning in unit RT 27A, 27-32B, unit RT-19, and the removal of trees in the right-of-ways for new proposed roads in LA 0218 (Lick Gulch) and LA 0406 (Grouse Creek), no harvest within Riparian Reserves would occur. Stream temperatures would not be affected by the proposal since all Riparian Reserves, except those mentioned above would have no removal of canopy cover. Unit 27A, 27-32 B and the 2 stream crossings proposed in LA 0218 are in the Riparian Reserve of intermittent streams. Since these stream typically flows in response to winter and spring storms, thinning in this unit will not affect summer stream temperatures. Neither the proposed road, nor the riparian thinning in unit RT-19 (in LA 0406) will remove any primary shade for Grouse Creek, a perennial stream. Thinning in unit RT-19 will slightly reduce secondary shade in the Riparian Reserve from a range of 50-80 percent canopy cover across the unit to a range of 50-60 percent canopy cover across the unit. This reduction is unlikely to affect stream temperature in Grouse Creek. since no thinning would occur between the proposed road and Grouse Creek in the Riparian Reserve. All thinning treatments in Riparian Reserves in the project would be in compliance with both the Applegate Subbasin TMDL (ODEQ 2003a) and Applegate Watershed WQRP (USDI BLM 2005).

Where fuel treatments occur, tree thinning and low intensity underburning and pile burning would retain a mix of hardwoods and conifers, organic duff layer, leaf litter, and coarse wood debris. Collectively these forest components provide nutrients, bacteria and fungi decomposers, and mycorrhizae to maintain long term site productivity. Additionally, fuel treatments would likely occur over a period of years, distributing activity over

time. These activities would not appreciably decrease canopy cover as only small diameter vegetation would be cut and piled.

Proposed transportation activities include temporary and permanent road construction, road maintenance, renovation, long-term closures and passive decommissioning. A total of 3.24 miles of new permanent road construction and 1.28 miles of temporary road construction would occur. All of the road construction (permanent and temporary) would be in drainages within the Analysis Area (see Section 3.E.3., *Affected Environment* above). Temporary roads would be constructed, used, and decommissioned during a single dry season if possible, or storm proofed and decommissioned the following season. Temporary roads would be fully decommissioned by decompacting the surface, scattering slash and other debris, and blocking vehicle access after use. Hydrologic recovery would occur over time provided the closure is effective and vegetation becomes established.

As a result of the TMIA process in the Little Applegate Watershed, numerous road segments were identified and recommended for decommissioning, of which 1.88 miles of roads are proposed for full decommissioning and another 7.34 miles are proposed for long-term closure. Full decommissioning would entail mechanically treating the road, or if there is currently an effective closure in place and the drainage is stabilized, the road would not be physically treated but fully decommissioned by removing it from the transportation system (i.e., natural decommissioning). The roads proposed for natural decommissioning in the Nedsbar project, 39S-01W-19.0, 39S-03W-27.1B, 39-02W-25, and 39-02W-34.3 are currently designated as year-round closures. These four roads are in various states of natural decommissioning, the 19.0and 25.0 roads being the most recovered with vegetation. Permanent decommissioning these four roads insures the vegetative and hydrologic recovery of 7.1 acres of Riparian Reserve. For the 7.34 miles of roads proposed for long-term closure under this alternative, treatment may entail stabilizing drainage, including removing culverts as necessary and installing features to restrict vehicle use. An additional 7.75 miles of road were identified in the TMIA process that are recommended for decommissioning as funding becomes available.

Actions included in this alternative that have a potential of affecting water quality through sediment delivery include landing construction and use, road use and maintenance, cable and tractor yarding, and road construction/renovation. Log hauling and associated road maintenance, could entail ditch cleaning, road blading, and maintenance of drainage features. The total mileage of roads proposed for haul and potentially maintenance, including those outside the Analysis Area is 67.1 miles. Log truck traffic, especially on unsurfaced roads, loosens the road surface and makes that material available for transport to channels. Most log haul under this alternative is not on unsurfaced roads. Also, wet season road use may be considered on roads with adequate surfacing (see Section 3.F., *Aquatic Habitat and Fish*). When road use and maintenance is performed improperly or best management practices (BMPs) are not implemented the potential for sediment delivery to streams increases dramatically, particularly during the wet season. Examples of maintenance practices that may increase sediment production include sidecasting material, undercutting cutslopes, improper disposal of material, and unnecessary disturbance within Riparian Reserves, particularly ditch blading. Luce and Black (1999) found no significant increase in erosion when only the road surface was treated; however, statistically significant erosion occurred when road ditches were bladed. Luce and Black (2001) observed an 87 percent decrease in erosion and sediment transport from roads in years one and two following road maintenance activities. Within this proposal hauling, road construction, and road maintenance activities are expected to result in short-term increases in sediment and turbidity. However, if BMPs are implemented and maintenance activities are properly conducted, particularly during the wet season, these increases are expected to be minor.

Road construction (permanent and temporary) has the potential to increase sediment production as well, especially within Riparian Reserves and where stream crossings are present. Road construction for permanent and temporary roads in the Analysis Area drainages is summarized in Table 3-20. Analysis Area drainages with high road densities currently and permanent new road construction are in bold. These mileages are comprised of a total 14 proposed roads: 8 permanent and 6 temporary. Six of the roads have portions of their length in Riparian Reserves. Construction of these roads will include three intermittent stream crossings. Two of these crossings are on permanent roads in LA 0218 (Lick Gulch), one is on a temporary road in LA 0360 (Neds Gulch). The remainder of the proposed new road construction, both permanent and temporary, is located on or

near ridgetops or in areas where indicators of instability were not observed. This minimizes the potential for both road failures and delivery of sediment through new ground disturbance. Although proper implementation of PDFs and BMPs greatly reduces the magnitude of the effects of road construction, short-term increases in sediment and turbidity are possible. Compared to the existing road system (218 miles) in the Analysis Area, the amount of proposed permanent net increase in roads (1.3 miles) is relatively minor. In drainages with a net increase of road density there is a proportionate increase in compacted area associated with the road.

Table 3-20. Effects to road density from proposed road construction and decommissioning in the Analysis Area.

Analysis Area HUC 7	Current Road Density [1,2]	New Road Construction type		Natural Decommission Road (mi.)	Road Density Including Alt. 4 Permanent Roads [1,2]
		Permanent (mi.)	Temporary (mi.)		
UA 0360	4.2	-	0.21	0.2	4.2
LA 0130	3.9	0.13	-	-	3.9
LA 0203	3.8	0.10	-	-	3.8
LA 0206	4.1	0.33	-	0.5	4.1
LA 0209	4.3	0.48	-	0.9	4.1
LA 0215	2.0	0.39	-	-	2.1
LA 0218	4.1	1.48	0.15	0.3	4.5
LA 0221	4.3	-	0.12	-	4.3
LA 0406	3.6	0.22	0.22	-	3.7
LA 0442	5.0	-	0.12	-	5.0
LA 0445	8.1	-	0.50	-	8.1
Total	-	3.2	1.3	(1.9)	-

1 Road density is measured in miles/miles^2.
2 Road density including data from all ownerships

An indirect effect that is difficult to quantify is OHV use following harvest. In areas not already effectively closed by gates or other measures, OHV use of skid trails and other features such as previously closed roads has been observed. There is potential for an increase of unmanaged OHV trails which can lead to elevated sediment rates and adverse impacts to soils and other resources. These effects may persist over time. Within the Analysis Area, generally light use is occurring; however, acute and persistent effects are noticeable within the Rush Creek drainage (0206) in meadows and the few riparian areas with gentler topography. The probability that OHV use will increase as a result of this alternative is low, primarily because PDFs designed to discourage this type of use are included in this proposal. They include blocking and camouflaging main skid trails at landings and intersections with roads and effectively decommissioning all temporary roads.

Project Design Features and BMPs are designed to protect water quality and are integral in ensuring compliance with applicable State and Federal statutes, such as the CWA. BMPs required for this project are contained in the Medford District Resource Management Plans (USDI BLM 1995), and include newly revised road BMPs that were incorporated as part of an RMP update (USDI BLM 2011). With the proper implementation of PDFs and

BMPs, there would be minor increases of sediment routed to stream channels, largely the result of road use and haul. Also, since no reduction in canopy cover less than 30 percent will occur, there is little probability the proposal would modify the magnitude or timing of peak or base flows.

In the 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). As a result, hydrologic changes, particularly the changes in snowpacks and runoff patterns are among the most prominent and important consequences. 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. Under this alternative, although some of the BLM-administered lands have been treated to reduce fuel amounts and continuity, additional vegetation and fuels treatments under limited circumstances may decrease the likelihood a high intensity wildfire occurring over part or all of the area. This would maintain or slightly improve watershed resiliency, as would a reduction in road densities. However, given the uncertainty in climate models and predicted effects on a site specific scale, it is difficult to make accurate statements pertaining to this alternatives effect on climate change and resultant impacts.

Increased road density, particularly with Riparian Reserves, can increase the potential for sediment delivery to stream channels. Road densities are considered moderate to high in all drainages, particularly within Riparian Reserves. Permanent road construction in Alternative 4 will increase road densities in five drainages within the Analysis Area to varying degrees. The largest increase in road density is in LA 0218, from 4.1 mi./mi.^{2} to 4.5 mi./mi.^{2}. Alternative 4 includes fully decommissioning (natural) 1.88 miles of road in the Analysis Area which reduces the net increase of permanent road in the Analysis Area to 1.36 miles. More importantly, all of the 1.88 fully decommissioned miles of road are in Riparian Reserves.

Overall, Alternative 4 does not reduce canopy cover below critical thresholds or result in appreciable increases in road density. These would be the primary catalysts that may trigger synergistic responses. The proposal does not appreciably decrease canopy cover within the TSZ that may result in peak flow increases. Sediment production resulting from road use and construction may increase in the short-term. In many cases riparian vegetation vigor would improve over time, thus potentially decreasing stream temperatures.

Cumulative Effects

As described in the affected environment section, impacts from roads, recreation, and past logging has altered watershed processes in the upper drainages of the Analysis Area. In the lower stream reaches of the drainages in the Analysis Area grazing, roads, residential development, channel alteration, and water diversions are responsible for degraded aquatic processes and conditions. This mix of impacts is typical of many of the drainages that are tributary to the Applegate River and Little Applegate River.

It is expected that reasonably foreseeable future actions including rotational harvest on private industrial timberlands that maintain forest conditions in an early to mid seral condition (USDI BLM 1995) and land disturbance attributed to development of private lands will continue. An estimated 4,029 acres of private forest stands are potentially available for harvest within the Analysis Area (Table 3-21). Under the reasonably foreseeable future timber harvest on private forest lands, there would be increases in four drainages where values currently below the threshold of 30 percent could be exceeded[3].

Table 3-21. Reasonably foreseeable future timber harvest on private forest lands.

Analysis Area	Reasonably Foreseeable Future Harvest on Private Forest Lands		
	Acres	Current Percent Canopy Cover Less Than 30%[1]	Percent Canopy Cover Less than 30% Following Private Harvest[2]
UA 0218	271	3	17
UA 0360	48	8	12
UA 0363	**760**	**6**	**52**
LA 0127	43	4	7
LA 0130	127	1	16
LA 0203	208	39	65
LA 0206	**414**	**16**	**34**
LA 0209	101	4	11
LA 0215	96	0	19
LA 0218	15	4	4
LA 0221	46	26	14
LA 0330	236	0	24
LA 0403	**140**	**7**	**29**
LA 0406	30	3	6
LA 0409	90	2	24
LA 0442	**149**	**7**	**29**
LA 0445	69	0	20

[1] Includes all ownerships.
[2] Assuming all private forestland greater than 60 years is harvested close to the same time.
[3] Bold indicates drainages that may be at elevated risk after private harvest, excluding drainages already exceeding 30 percent prior to harvest.

Activities on BLM-administered lands will likely continue to focus on commercial thinning for forest health and fuels reduction projects. Some recovery is expected to occur as previously harvested areas within Riparian Reserves improve shade and large wood recruitment. Grazing impacts on private lands will likely continue to occur at near present levels.

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 less than 30 percent. Drainages with large percentages of private land with forested stands greater than 60 years old were also included in this analysis. Although unlikely, if all those acres were reduced below 30 percent canopy cover within ten years, some drainages would be at levels where potential cumulative impacts may be magnified. This alternative does not elevate the potential for cumulative effects beyond those that may be currently occurring.

Although there are both natural and human induced risk factors for cumulative effects, this alternative is not expected to increase these within the Analysis Area drainages, or the larger subwatersheds.

d. Alternative 5

Direct and Indirect Effects

The primary difference affecting water resources between Alternative 5 and Alternative 4 is that no new permanent or temporary road construction is proposed. In addition, there are less harvest acres (962 acres less) and fewer road mileages (25 miles less) proposed for timber haul. This alternative has approximately 37 percent of the commercial harvest volume of Alternative 4.

Alternative 5 proposes treating forest stands utilizing a variety of silvicultural prescriptions. A total of 536 acres are proposed for commercial harvest. An additional 876 acres are proposed for non-commercial (fuels) treatments. No new helicopter landings are proposed in this alternative. Harvest methods include ground-based, cable, and helicopter with the majority (289 acres) proposed for cable systems. Ground-based yarding would be limited to designated skid trails, and generally slopes less than 35 percent. Two skid trails are proposed outside of treatment units. This is to allow access for harvest without constructing temporary roads.

Anticipated effects of implementing Alternative 5 are the same as described for Alternative 4, with the exception of effects described for road construction, and the amount of short-term increases in sediment and turbidity as a result of hauling and road maintenance would be less. In addition, similar to Alternative 3, Alternative 5 would reduce road mileage in the Analysis Area by 1.88 miles, whereas Alternative 4 would have a net increase of 1.36 miles. Cumulative effects discussion for Alternative 4 is also applicable for Alternative 5. Although there are both natural and human induced risk factors for cumulative effects, Alternative 5 is not expected to increase these within the Analysis Area drainages, or the larger subwatersheds.

F. AQUATIC HABITAT AND FISH

The proposed Nedsbar Forest Management Project would be located primarily in the northwestern half of the Little Applegate 5th field watershed. The project also includes commercial harvest and road work in portions of three small 7th field drainages (HUC 7s) which front the Applegate River to the east, in the Upper Applegate 5th field watershed. The aquatic Analysis Area is comprised of all HUC 7s (drainages) where project elements are proposed and includes14 Analysis Area drainages in the Little Applegate Watershed, and the three small frontal drainages, which include the named channels of Boaz and Neds Gulches in the Upper Applegate Watershed. Additionally, it is likely that some timber haul would utilize main line roads in additional Little Applegate drainages and in both the Wagner and Anderson Creek catchments, in the Bear Creek Watershed. These areas will be included in the analysis for effects related to haul only.

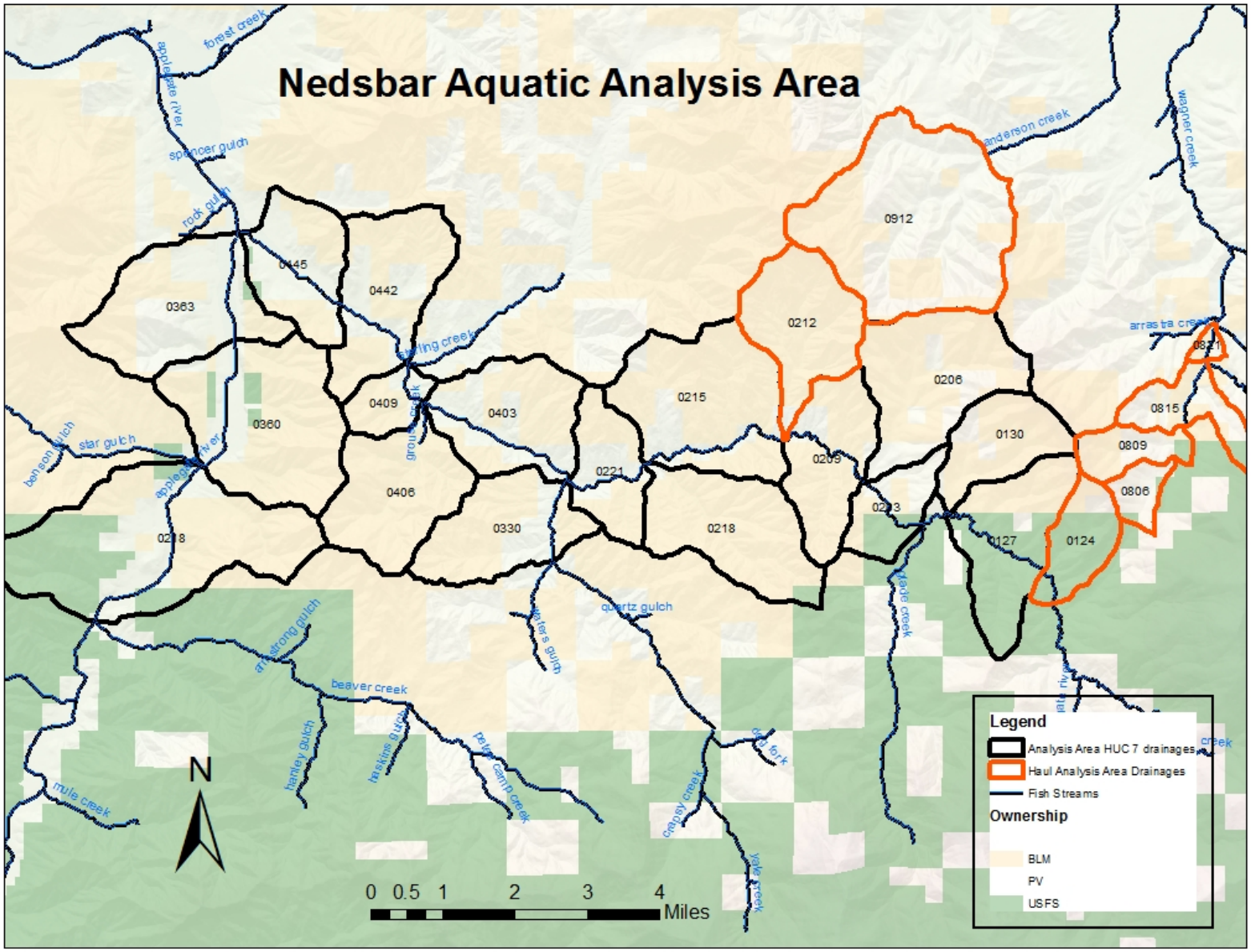
For fisheries analysis purposes, drainage areas will be grouped by major catchment, defined as areas that drain to distinct fish bearing streams. In the Nedsbar Forest Management Project, Analysis Areas include:

- the lower portion of Yale Creek and all of Grouse Creek, which are both fish bearing tributaries to the Little Applegate River,
- the Little Applegate River itself and its numerous small frontal drainages (hereafter referred to as Little Applegate Frontals) below the Forest Service property boundary, and
- the Applegate River and its small frontals, including Boaz Gulch (Map 3-4).

A fuels treatment unit is also proposed in a small headwater drainage of Beaver Creek. The unit does not include any streams or Riparian Reserves, and would have no causal mechanism to impart any impacts to aquatic habitat, and therefore, has been excluded from further analysis and Beaver Creek is not included in the aquatic Analysis Area. Additionally, three harvest units have small portions (total less than 6 acres for Alternative 4, and 3 acres for Alternative 5) which slop over ridge lines into adjacent drainages. These portions of the units are all ridge top and would have no causal mechanism to affect aquatic habitat and have been excluded from further analysis as well.

The entire Little Applegate and Upper Applegate Watersheds will be discussed in this analysis, as the NWFP requires that Aquatic Conservation Strategy objectives (see Appendix H) will be analyzed at the site, drainage, and 5th field watershed scales. However, the primary focus of this analysis will be on the aforementioned analysis catchments (the site and drainage scales), as it is in these particular streams that potential effects to fisheries resources from this project would be discernable.

Map 3-4. Fish and aquatic habitat Analysis Area in the Nedsbar Project.



1. Key Fisheries and Aquatic Resources Issues

a. Background

Riparian areas and instream aquatic habitats in the watershed are currently degraded from a host of past and ongoing activities within the watershed, particularly but not limited to:

- Extensive road construction has created high road densities in several of the Analysis Area drainages and led to increased sediment inputs to aquatic habitat.
- Past timber harvest has reduced riparian canopy cover and the potential for large wood inputs in areas.
- Valley bottoms have been converted from forestland to rural residential and agricultural lands, reducing riparian cover, flood plain connectivity, and water quality and quantity.

Sediment levels are so high in the Little Applegate River that they may be the limiting factor to salmonid production in the system. Anthropogenic inputs of excessive sediment include high road densities and especially, episodic ditch failures. Natural erosion processes are also a contributing factor, as the Little Applegate Watershed includes areas of steep slopes and highly erodible granitic soils. Within the Analysis Area specifically, sediment levels are known to be high in the fishless Boaz Gulch, Lick Gulch, and Rush Creek drainages, as well as in the mainstem of the Little Applegate River.

Aquatic habitat and fish-related issues potentially associated with the Nedsbar Forest Management Project have been identified through public scoping or ID team specialists and will be addressed in this document. These relevant issues are:

- What is the potential for effects to aquatic habitats and associated organisms, including native salmonids and other fishes, from timber harvest and road construction, maintenance, and hauling activities?
- How does the proposed commercial timber harvest and road construction affect riparian canopy cover and the potential for large wood recruitment to streams?
- What is the potential for adverse cumulative effects on aquatic habitat and associated organisms from timber harvest and road construction?
- How would timber harvest, road work, and fuels treatments affect attainment of Aquatic Conservation Strategy (ACS) objectives?

b. Endangered Species Act and Coho Critical and Essential Fish Habitat

In 1997, the Southern Oregon/Northern California Coasts (SONCC) Evolutionary Significant Unit (ESU) of Coho salmon (*Onchorynchus kisutch)* was listed as "threatened" with the possibility of extinction under the ESA by the National Marine Fisheries Service (NMFS). On May 5, 1999, NMFS designated Coho Critical Habitat (CCH) for SONCC Coho salmon. Critical Habitat includes "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers." It further includes "those physical or biological features essential to the conservation of the species and which may require special management considerations or protection...", including all historically accessible waters (FR vol. 64, no. 86, 24049; USDI FWS 1999).

Essential Fish Habitat (EFH) has been defined by NMFS as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This definition includes all waters historically used by anadromous salmonids of commercial value (in this instance, coho salmon). CCH and EFH in the Analysis Area are limited to the mainstem of the Applegate River in the Upper Applegate Watershed, and the lowest 1.4 miles of the Little Applegate River, where a barrier falls prevents upstream migration of coho and chinook.

c. Riparian Reserves

Under the NWFP, Riparian Reserves (RRs) have been established on all stream channels displaying annual scour located on Federal lands. Areas of unstable/potentially unstable ground are also managed as RRs. Riparian Reserve widths have been identified as 155 feet in the both the Little Applegate and Upper Applegate Watersheds. Widths are measured as slope distance from the edge of the stream, and are applied to both sides of the channel. These RR widths are in accordance with the 1995 Medford District RMP, and follow the Standards and Guidelines on page C-31 in the SEIS ROD (USDI BLM 1994b). The primary function of RRs is to provide shade and a source of large wood inputs to stream channels. Additionally, they are a source of nutrient inputs to the aquatic ecosystem, provide bank stability, maintain undercut banks that offer prime salmonid habitat, filter sediment carried from disturbed ground via overland flow, and provide habitat for a diverse range of other aquatic and terrestrial organisms (Meehan 1991).

d. Aquatic Conservation Strategy

The ACS was developed to restore and maintain ecological health of watersheds and aquatic ecosystems on public lands. It includes 9 objectives, which guide BLM's management of Riparian Reserves. These objectives are examined at the site (e.g., a single pool or stream reach), HUC 7 (drainage) and HUC 5 (large watershed) scale. The nine objectives and effects from implementation of proposed actions are described in Appendix H: Consistency with the Aquatic Conservation Strategy. The Nedsbar Forest Management Project does not impact Aquatic Conservation Strategy Objectives beyond the site level.

2. Past, Ongoing, and Reasonably Foreseeable Future Actions

This section will present projects that are ongoing or proposed in the foreseeable future that may add cumulative impacts to fisheries resources, when combined with anticipated impacts resulting from the Nedsbar Forest Management Project, within the Analysis Area. Anticipated effects to fisheries resources will be described from each action. For any foreseeable future action determined to have any anticipated effects to aquatic habitat, the cumulative effect of the action coupled with effects from the Nedsbar Forest Management Project will be discussed at the end of this analysis.

a. Federal Timber Harvest

Recent past harvests have occurred within the Little Applegate Analysis Area on BLM lands and are incorporated into the past harvest analysis history and are reflected in the current watershed conditions. Additionally, there are 175 acres of identified commercial harvest units that may be logged in the foreseeable future on BLM lands in the Analysis Area (analyzed under the Bobar and Bald Lick EAs). Canopy cover would remain within the range of natural variability within harvested units for all of these federal timber projects, and therefore they would not affect peak flows. All projects incorporated full width RR, and therefore water temperatures would not be affected. Excluding haul, no other project elements related to the harvest of these units, which are accessed by existing roads, are expected to contribute any negative effects to aquatic habitat. Hauling of the timber from these units would have hydrological connectivity with aquatic habitat, and therefore is the only activity with any potential to contribute sediment to streams and will be considered in the aquatic habitat effects summary discussion of this analysis.

b. Fuels Treatments

Approximately 98 acres of fuels treatments are likely to occur in the foreseeable future on BLM lands. These treatments would occur in commercial timber units, which were recently harvested in Lick Gulch. Fuels treatments would leave riparian buffers, require minimal ground disturbance, and would not treat large trees. All check lines would be waterbarred and rehabilitated after ignition operations were completed. Because stream side shade producing vegetation would be buffered, treatments would not lead to increases in water temperature or sediment inputs to channels. Canopy levels would not be reduced by treatments, nor would ground compaction increase; hence peak flows would not be affected. The only effect fuels treatments may have to fisheries resources is a possible increase in ground water storage and subsequent release to streams

throughout the dry season. However, any extra water available is likely to be utilized by remaining vegetation before entering stream channels. For these reasons, fuels treatments are not expected to impact fisheries resources, and hence they would not contribute to cumulative impacts.

c. Private Timber Harvest

At this time, it is not known when or where other private timber harvest will occur in the Analysis Area, but is assumed that it will continue to occur at a similar rate as has occurred in the past, with similar effects to aquatic habitats. Private lands are governed under State forestry regulations, and as such, receive a different level of protection than Federal lands. Analysis of effects from private timber harvest generally considers the worst case scenario (i.e., all suitable forested lands would be logged at approximately 60-year tree-growing rotations). This analysis will assume that, in general, all suitable private lands will continue to be subject to intense timber harvest, and that the amount of disturbance to aquatic systems as a result of this harvest will continue similar to present rates, helping to maintain degraded aquatic habitats.

d. Grazing

The Lower Big Applegate grazing allotment overlaps with the Analysis Area. However, past monitoring suggests that animals predominantly remain in the southern portion of the allotment, which is in the Beaver Creek Subwatershed. While there is no physical reason cows could not cross the drainage divide into the Analysis Area, cattle and signs of cattle have not been apparent in any in the Analysis Area drainages. The steep topography may dissuade animals from migrating far from their turn out location, which is off the Beaver Creek Road. Regardless, the rocky armored nature of most of the channels in the Analysis Area would render them relatively resilient to impacts by cattle, and furthermore, there is little suitable browse in perennial areas where the allotment and Analysis Areas overlap, as this area is north aspect and generally forested landscape lacking meadow systems. For these reasons and at this time, it does not appear as if federal lands grazing is contributing negative effects to aquatic habitat in the Nedsbar Analysis Area streams.

3. Affected Environment – Fish and Designated Habitat

This section will present baseline conditions in the watersheds and within the Analysis Area drainages specifically, as well as anticipated effects resulting from this project. The effects of past actions manifest themselves in the current conditions. Effects added on top of these past actions as a result of the Nedsbar Forest Management Project, coupled with foreseeable effects from ongoing projects as described above, are the cumulative effects of this project to fisheries resources.

a. Fish Distribution

Upper Applegate River Watershed

The Upper Applegate Watershed supports fall Chinook salmon, coho salmon, summer and winter runs of steelhead, and Pacific lamprey, all of which are anadromous fish that return from the ocean to spawn in the Applegate and its tributaries. Resident rainbow and cutthroat trout, sculpin, and Klamath small scale suckers are native resident fish that spend their entire lives in the river (Table 3-22). Within the Analysis Area, only the mainstem Applegate River supports any populations of fish; Boaz Gulch and the other small frontal streams are not fish bearing streams. The Applegate River supports a recreational sport fishery, primarily for winter steelhead and native and hatchery-produced trout.

Little Applegate River Watershed

The Little Applegate supports fall Chinook and coho salmon to approximately river mile 1.4, where a waterfall creates a barrier and precludes further upstream movement of these species. Steelhead, Pacific lamprey, resident trout, and sculpin are present in upstream reaches and in many of the larger tributary streams, including Grouse and Yale Creeks, which are within the Analysis Area (Table 3-22).

Table 3-22. Fish distribution in the Nedsbar Forest Management Project Analysis Area streams.

Stream	Coho and Chinook	Steelhead	Trout
Applegate River	6.6	6.6	6.6
Little Applegate River	1.4	15.2	15.2
Grouse Creek	0	0.6	0.6
Yale Creek	0	1.3	1.3
Total Fish/habitat Miles	8.0	23.7	23.7

b. Designated Habitat

CCH and EFH are present in the mainstem of the Applegate River throughout the Analysis Area upstream to Applegate Dam, and in the lower 1.4 miles of the Little Applegate River. The Analysis Area includes 8.0 miles of habitat designated as both CCH and EFH, for both coho and Chinook salmon. No project elements proposed in the Nedsbar Forest Management Project would occur directly in, over, or adjacent to designated habitats. Consultation with the NMFS was not warranted for this project, because no project elements are proposed adjacent to designated habitat, and potential effects to aquatic habitat are anticipated to be small in magnitude and occur well upstream of listed habitat. Implementation of this project was determined to have "no effect" to CCH or EFH in the Analysis Area.

4. Affected Environment – Aquatic Habitat

a. Upper Applegate Watershed

Aquatic habitat in the watershed includes free flowing stream reaches, including the mainstem of the Applegate River, and its major tributaries which include the fish bearing Beaver, Palmer, and Mule Creeks, and Star Gulch. None of the fish bearing tributaries are within the aquatic Analysis Area, which only includes the mainstem of the Applegate, fishless Boaz and Neds Gulches, and portions of several other very small fishless frontal drainages.

The greatest alteration of habitat in the watershed resulted from the construction and operation of Applegate Dam. Besides creating a large unnatural slack water habitat suitable for non-native species, the dam presents a complete upstream passage barrier to migration by aquatic species. It has also significantly altered the hydrological regime, most notably by reducing the frequency and magnitude of flood events, and by ensuring stable summer release flows. The latter in particular has benefited fish, particularly fall Chinook salmon, which now have reliable adequate flows during the fall, when historically the river could be very low, or even lack surface flows in sections during prolonged dry spells. This has allowed Chinook to proliferate in the Applegate, resulting in runs that are likely stronger than they were before the dam. However, the dam significantly reduced the amount of accessible spawning and rearing habitat for coho and Steelhead, fishes that historically occurred much higher in the subbasin. The dam has also resulted in a deficit of substrate, including suitable spawning gravels, in the Applegate River immediately downstream of the dam, as gravels and cobbles are blocked from downstream passage.

Other disturbances to aquatic habitat of note include an extensive road network which allows for the transport and input of sediment to the stream system, historic and ongoing instream gold mining which has resulted in sluiced out substrates, removal of large woody debris, and led to artificially straightened, armored, and constrained stream banks from tailings piles, and increased turbidity during the instream work period. Additionally, the floodplains of the Applegate River and lower Beaver Creek have been settled, resulting in significant reductions in riparian corridors as lands have been cleared for pastures and home sites, and in further channel straightening and confinement.

Fish bearing streams in the watershed generally do not suffer from excessive sedimentation, with Beaver Creek being the notable exception. Beaver Creek drains areas of highly erodible granitic soils, and this, coupled with past management practices (in particular roads), has led to excessive inputs of decomposed granitic sand to the system.

Analysis area streams in the Upper Applegate Watershed include three frontal drainages on the east side of the Applegate River. These steep, west-facing slopes are dry and hot. Vegetation is complex, comprising many different plant communities depending on slight variations in soil depth and moisture. Riparian areas are narrow, but contain a wide variety of more mesic trees and plants; upland slopes vary from white oak or live oak woodlands to pine and Douglas-fir stands.

Boaz Gulch is the largest of these frontal tributaries to the Applegate River within the Analysis Area. The mouth is very steep, and the lower 0.5 mile often flows subsurface through deep alluvial deposits (now pasture). Boaz Gulch is steep and fishless.

The mainstem of Boaz Gulch has three major problems: eroding banks, lack of large wood, and a poorly-designed road that contributes fine sediments to the stream and is impassable through much of the year. Boaz Gulch has more boulder substrate than would be expected for a stream of its size. These boulder substrates may have been exposed by channel scouring during the 1997 flood. Regardless, they constitute the only way for the stream to store and route sediment. This will be important, because 1998 BLM stream surveys found that short-duration tributaries were storing large amounts of fine sediment – as much as 90 percent of a tributary's substrate.

b. Little Applegate River Watershed

Aquatic habitat in the Little Applegate consists of the mainstem of the Little Applegate River and its principal tributaries, including Sterling, Grouse, Yale, Glade, and McDonald Creeks. Portions of the mainstem of the Little Applegate, the entirety of Grouse Creek, and the lower reach of Yale Creek are within the Analysis Area. Smaller fishless tributaries included in the Analysis Area include Rush Creek and Lick Gulch.

In the Little Applegate River, the greatest alterations of aquatic habitat stem from irrigation withdrawls and transfers, which involve numerous ditch systems. One ditch system in particular is a noted chronic contributor of large amounts of fine sediment (decomposed granitic sand) as the ditch suffers periodic failures, resulting in debris-torrent like events where hillsides are scoured out and many tons of fine sediment are contributed to aquatic habitat. This has resulted in fine sediment levels in the Little Applegate River that are well above desirable, and reduced the quality of spawning and rearing habitat.

Other notable alterations include numerous diversion dams which act as seasonal migration barriers to aquatic organisms, past mining practices, removal of instream large wood, and reductions in riparian corridors, particularly along the mainstem of the Little Applegate, as stream adjacent areas have been converted to pasture land, home sites, and roads. This has resulted in further inputs of fine sediment and increased summer water temperatures.

Instream habitat in Grouse Creek, which is composed of a single HUC 7 drainage, includes substrate compositions composed of a healthy mix of gravels, cobbles, and boulders; little bedrock is exposed in the channel. There is little to no bank erosion through the stream. Like many streams in the Applegate sub-basin, Grouse Creek has insufficient amounts of wood. However, one mainstem reach and one tributary do have moderate amounts of wood. BLM stream surveyors rated 72% of the reaches in the Grouse Creek drainage as Proper Functioning and 25 percent as Functioning At Risk (USDI BLM 1999).

Yale Creek is the next major Little Applegate tributary, upstream of Grouse Creek. Yale Creek is also the largest Little Applegate tributary; its drainage area is actually divided into two separate HUC 7s, only one of which (the most downstream HUC 7, #0330) is included within the Analysis Area.

Most of mainstem Yale Creek is sediment-starved. Even before the 1997 flood, mainstem Yale Creek had very low amounts of sand and little gravel (although high amounts, greater than 10 percent, silt). Only the lower

reach, downstream of the confluence with Waters Gulch, contained about 15-20 percent fines, and little gravel. Post-flood spawning surveys above the confluence with Waters Gulch (about one third of the way upstream) confirm that there are few places with quality spawning beds within mainstem Yale Creek.

Conversely, the tributaries within the one Analysis Area drainage are storing and/or releasing sediment downstream. Several have slumping problems or potential. Soils on the west side of Yale Creek appear to be thin and gravelly, supporting shrub savannah and oak woodlands, both indicators of shallower soils. Streams through these types of plant communities tend to contain and/or transport finer sediments than those in more forested areas. There is also a road in bad condition which was partially decommissioned ten years ago. This road runs across the headwalls of the headwater tributaries of First Water Gulch (a west-flowing tributary of Yale Creek). Although soils appear to be naturally erosive, this road appears to be contributing to channel instability or fine sedimentation in short-duration intermittent sections downstream of road crossings.

Several of Yale Creek's tributaries in HUC#0330 also have a fair amount of wood. Two reaches even have greater than 25 key pieces of wood/mile, a tributary near the mouth of Yale Creek, and a tributary to First Water Gulch. Two additional reaches have moderate amounts of wood (10-25 key pieces/mile): the mainstem of and a tributary to First Water Gulch. In 1999, a BLM stream survey crew rated 43% of these tributary reaches (on BLM) as Properly Functioning, but 54 percent Functioning at Risk.

1993 ODFW surveys in mainstem Yale Creek counted few wood pieces of any size in the first 3.5 miles of Yale Creek (ODFW 1993). Only the reach upstream of Kenney Meadows (Section 10) contained moderate amounts of wood – many not "key" pieces, and many trapped in debris jams. Post-flood surveys counted very few "key" pieces of wood $\geq$ 24" dbh in mainstem reaches on BLM land. Consequently, pool and glide habitat is in short supply. Where there are large debris jams, the pool habitat appears to be of excellent quality.

In August 2001, the Quartz Fire burned several Yale Creek tributaries, including the entire sub-drainage of Quartz Gulch. Subsequent sediment monitoring by BLM has not found excessive sediment deposition in Yale Creek resulting from Quartz Gulch.

Fishless Lick Gulch, a large HUC 7 drainage on the south side of the Little Applegate River, is the next major tributary, upstream of Yale Creek. Lick Gulch is severely incised, as are many nearby tributaries (USDI BLM 1991). This deep downcutting may be a partly a gold-mining legacy. Clearcut logging (down to streambank) and road construction may have also contributed. It could also be related to natural geology. Some reaches are prone to slumping; travertine deposits are common. Lick Gulch also stores an excessive amount of fine sediment: 50-100 percent sand and silt; the remaining sediment is primarily gravel.

Despite logging, four reaches in Lick Gulch have high or moderate numbers of "key pieces" of wood. Other reaches store large amounts of small wood. In Lick Gulch and tributaries, the size of the wood is probably not as important since Lick Gulch itself is quite small (approximately 4 ft. wetted summer width) and its tributaries are even smaller. Canopy closure on Lick Gulch is also generally excellent now that old clearcuts have grown up and riparian area hardwoods have closed in over the channels.

BLM stream surveyors rated 70 percent of the streams in the Lick Gulch drainage as Properly Functioning (PFC). Twenty percent were rated as Functioning-at-Risk-with-an-Upward trend (FARU). Only 10 percent were rated in a "poor" category: Functioning-at-Risk-with-a-Downward-trend (FARD). Note that "properly functioning" is defined as the minimum condition for stream processes to function.

Fishless Rush Creek, a single HUC 7 drainage located upstream of and across the Little Applegate River from Lick Gulch, drains the south-facing, grassy slopes of Anderson Peak as well as forests that appear to be situated on ancient slump beds. Rush Creek stores an excessive amount of fine sediment in the stream channel. Several reaches of the stream have wide depositional riparian areas with healthy (on federal land) multi-storied vegetation and numerous springs and seeps. Other reaches are steep and stair-stepped with travertine deposits. Rush Creek also has had human disturbance that has undoubtedly exacerbated the amount of fine sediment in the stream channel; a road running along Rush Creek is known to have been routing fine sediment into Rush Creek in the past. Rush Creek is known to have some very steep OHV trails in it, some of which are

hydrologically connected with aquatic habitat. Additionally, extensive logging and road building throughout the drainage, especially on private industrial timber lands, is likely contributing additional fine sediment to the drainage. An additional problem for Rush Creek and its tributaries is that the channels contain little large wood. Rush Creek is diverted into a pond on a private ranch at the mouth. This pond likely acts as a sediment catch basin, catching and storing a large percentage of the fines that are transported down Rush Creek. BLM stream survey crews rated only 28 percent of the stream channels in Rush Creek as PFC. The rest were either FAR-without-an-apparent trend (30 percent), FARD (26 percent), or Not Properly Functioning (16 percent).

5. Environmental Consequences – Aquatic Habitat

a. Alternative 1 – No Action

The No Action Alternative would have no direct or indirect effects, and hence would not have any potential to contribute to cumulative effects to aquatic habitats, as no ground disturbing activities would occur. Aquatic habitats within the drainages, individual catchments, and the larger watersheds would continue to exist in their current state. As no new road construction would occur, road densities would remain at the current level within the Analysis Area. In general, though, fish habitat would continue to be impacted as a result of past and ongoing activities, notably altered flow regimes, water withdrawals and diversions, episodic ditch failures, and continuing high road densities.

b. The Action Alternatives

Three action alternatives are proposed. Alternative 4 has the greatest amount of harvest and road work, and therefore, would have the greatest potential to impart impacts to aquatic habitat. For this reason, it will be discussed in the following analysis in the greatest detail, and is presented first, below.

Alternative 4

Alternative 4 proposes various prescriptions of commercial timber harvest and yarding (including in RRs), permanent and temporary road and landing construction and maintenance, passive road decommissioning, and log hauling, as described in Chapter 2, Section 2.C.2 of this document. Commercial harvest activities could be followed up by activity fuels treatments depending upon remaining fuel loads, and in select units, PCT treatments.

Ground-disturbing activities in or near stream channels and hydrologically connected roads have the greatest potential to impact fish habitat; it is these activities that could increase erosion and sediment transport to, and storage in, stream channels. The *Soils* and *Water Resources* sections (Sections 3.D. and 3.E., respectively) of this document describe where and by what means erosion will likely occur, and the mechanisms for displaced sediments to enter the stream network. The harvest and yarding of timber, permanent and temporary road construction, and log hauling proposed under Alternative 4 have been identified as having the greatest potential to increase erosion rates (see Section 3.D.). Of these activities, two proposed new roads and numerous portions of haul routes would have direct hydrologic connectivity to aquatic habitat. Units and haul routes are widely spread amongst the Analysis Area drainages (Table 3-23).

Table 3-23. Amount of harvest activity proposed in Alternative 4 in each of the Analysis Area drainages in the Nedsbar Forest Management Project.*

HUC 7 Drainage	Harvest (acres)	Road construction (miles)		Haul Routes (miles)*
		Perm.	Temp.	
218 (Boaz Gulch)	198	0	0	5.4
360 (Neds Gulch)	99	0	0.1	3.3
363	19	0	0	0.1
Applegate R. Frontals total	316	0	0.1	8.8
406 (Grouse Creek)	259	0.2	0.2	7.7
330 (Yale Creek)	26	0	0.1	0.7
124	0	0	0	2.3
127	76	0	0	5.7
130	121	0.1	0	5.0
203	20	0.1	0	2.9
206 (Rush Creek)	122	0.3	0	1.8
209	121	0.5	0	3.9
212 (Muddy Gulch)	0	0	0	0.2
215	76	0.4	0	3.1
218 (Lick Gulch)	233	1.6	0.2	12.0
221	34	0	0.1	2.9
403	1	0	0	0
409	18	0	0	0.3
442	28	0	0.1	0.2
445	42	0	0.5	1.6
L Applegate R. Frontals total	1,177	3.2	1.2	49.9
Anderson Creek	0	0	0	3.7
Wagner Creek	0	0	0	3.9
Total haul Analysis Area	1,493	3.2	1.3	66.7

** Note that haul routes are estimated based on easiest access to timber units from paved roads, and only includes those portions which are not paved. All reported acres and miles in this table are rounded to the nearest whole acre or tenth of a mile.*

Commercial Timber Harvest and Landings

There are three primary mechanisms by which timber harvest and new landing construction may influence aquatic habitat:

- Removal of streamside vegetation reduces shade, which can increase water temperature, and reduce recruitment potential of large wood, a key habitat feature of aquatic systems.
- Reduction of canopy (particularly in the transient snow and snow zones) if applied to large areas of watersheds has been shown to alter hydrological processes, such as increasing peak and base flows, or altering the timing of these flows, which in turn, may impact channel and habitat features (see Section 3.E.).
- Ground disturbance and compaction from yarding corridors or skid trails can bare soils, reduce infiltration, channel overland flow, and route eroded particulates (fine sediment) downslope towards stream channels.

In the Nedsbar Forest Management Project, most harvest would occur outside of RR, at a minimum distance of one site potential tree height (the expected height of coniferous trees upon maturity (approximately 100+ years) from the edge of the stream channel. Riparian thinning is proposed in five units and would include approximately 17 acres of harvest within RR, and is discussed in detail below in the RR section of this analysis (see Section 2.C.2.a).

In upland units, harvest units as proposed would retain at a minimum 35 percent overstory canopy cover following harvest, and across the landscape and within each Analysis Area drainage, canopy levels would remain well above threshold levels that would have any probability of measurably affecting or altering the timing of peak or base flows (see Section 3.E.).

Twenty-one potential helicopter landings (new and existing) have been identified for this project, which could be up to an acre in size each (see Chapter 2, Maps 2-1 to 2-3). No new landings are proposed in RRs, however one existing landing in the RR of Neds Gulch would need to have snags felled around it to allow for safe ingress/egress and is discussed in the Riparian Reserves section of this analysis (see Section 3.F.6). All of the identified landings would be hydrologically disconnected from the stream system, and the new landings would be decompacted and rehabilitated after use (see PDFs in Section 2.C.4.). For these reasons, construction and use of new helicopter landings would not impact fish or aquatic habitat, and would not add a cumulative effect.

Riparian buffers are known to be effective at filtering off-site sediment movement, such as may occur following ground disturbance in harvest units (Rashin et al. 2006). Rashin et al. found that sediment delivery to streams is unlikely when erosion features (i.e., yarding corridors) are greater than 10 meters from the channels. In the Nedsbar Forest Management Project, most harvest units would be buffered from stream channels by full width RR, with the exception of 26 acres of proposed riparian thinning, which would occur upslope of existing roads and would retain intact buffers of 50 feet (15 meters) or more between the roads and channels. No yarding corridors would cross any stream channels, and therefore, fine sediment delivery to streams from harvest is unlikely to occur as a result of harvest and yarding. In sum, no connectivity, and therefore no causal mechanism, would exist for commercial timber harvest to input sediment through the riparian buffers and into stream channels.

Activity Fuels and Non-commercial Thinning and Fuels Treatments (including pile and maintenance underburning)

These activities would treat non-commercial small diameter vegetation and accumulated understory fuels remaining in the commercial harvest units following harvest operations where needed. Non-commercial fuels and thinning treatment activities would involve only hand crews with saws, thinning small-diameter vegetation. Very little ground disturbance would occur. Any check lines would be rehabilitated following ignition operations, reducing the risk of the fire-lines contributing sediment downslope. The treatments would leave no-treatment buffers, as outlined in the PDFs, around stream channels, and hence would not reduce shade afforded

to stream channels. Ground cover, such as forbs and grasses, trees greater than 8 inches dbh, and all riparian plant species would remain in the no-treatment buffers after fuels activities. This activity would not impact aquatic habitat. The vegetative buffers remaining adjacent to channels would trap any off-site sediment or ash mobilized as a result of fuels treatment activities. There is no probability that aquatic habitat would be affected, as no avenue would exist for sediment or ash to enter the channels from fuels treatments. In sum, fuels/PCT treatments as proposed in the Nedsbar Forest Management Project would have no causal mechanism to affect any aquatic habitats, and hence would not contribute to cumulative effects.

Roads

Of all forest management activities, roads typically have the greatest potential to influence aquatic habitat in forested watersheds. Impacts include both near-term and ongoing (chronic) impacts. Near-term impacts stem from activities which include new ground disturbance, such as construction or maintenance of road segments. These activities lead to increased potential for erosion and transport of sediment to channels. Sediment contribution to channels stemming from these activities generally diminishes after one to three years (Luce and Black 2001, Megahan 1974).

Long-term and indirect effects are more pervasive, and may persist even beyond the life of the road. For example, new road construction requires clearing along the road right of way. Where a road crosses a stream, this means the removal of shade-producing riparian vegetation, which would not fully recover until long after the road is decommissioned or abandoned. Road segments located away from stream channels can also greatly influence aquatic habitat. Numerous studies have shown how roads may increase the length of the drainage network by intercepting ground or surface flow and precipitation, resulting in disruption of natural flow paths. This, in turn, may lead to increases in peak flow and/or timing to peak flows (Wemple et al. 1996, Jones et al. 1999). Increased peak flows, if great enough, can cause channel adjustments that physically alter aquatic habitat. Additionally, roads cut through steep side slopes or in unstable areas are susceptible to failure, which can trigger mass wasting events such as debris torrents, capable of scouring out channels and transporting and depositing tons of material, including large wood and sediment of all size classes, in large episodic pulses.

Weathering of road surfaces can lead to chronic sediment and turbidity contributions to aquatic habitats, and maintenance and use of roads (such as for haul) can accelerate rates of erosion, particularly during the wet season (Luce and Black 1999, Reid and Dunne 1984). Intercepted runoff which becomes concentrated over erodible road surfaces mobilizes and transports sediment with it. Surfaces armored by pavement do not experience this type of chronic weathering, and rocked roads are more resistant than natural surfaced ones. For these reasons, natural surfaced (or broken down rocked surfaced) roads with a high degree of hydrological connectivity are particularly problematic to aquatic habitat. Within the Analysis Area, fine sediment delivery to stream channels resulting from weathering of road surfaces is the main concern. The area is not at high risk for debris torrents.

It is important to note that not all roads or road segments contribute deleterious effects to aquatic habitat. Many variables interact to determine the potential for any given stretch of road to influence aquatic habitat, with the most important being the degree to which the road is hydrologically connected with the aquatic system (Furniss et al. 2000, Jones et al. 1999, and MacDonald and Coe 2008). Hydrological connectivity is present at any point where roads and streams interface. Mid-slope and valley-bottom roads constructed in areas of high drainage density (which necessitates many crossings) have a high degree of connectivity, while ridgetop segments that do not cross channels have no connectivity. Segments with high connectivity have high potential to affect aquatic habitat, while those with no connectivity have no potential. Two of the proposed new roads in the Nedsbar Forest Management Project would have hydrological connectivity to the aquatic system.

In addition to channel crossings, the design of the road also plays into the degree of hydrological connectivity. Roads which are designed to shed intercepted water quickly off their surface and back to the forest floor have connectivity only from the point of the last turn out device to where the road crosses the stream. Examples of such designs include outsloped road surfaces, rolling dips, and waterbars, which when constructed and maintained properly are effective and common designs used to reduce connectivity between roads and the aquatic system (Luce and Black 2001 and MacDonald and Coe 2008). Contrast this with an insloped road

drained by an inboard ditch with few cross drains; such a road would have a greater portion of its length directly connected to the stream, and hence a greater potential to impact aquatic habitat. Connectivity also changes in response to climatic conditions, with the greatest road-stream hydrological connectivity occurring during the wettest period of the year, when soil moisture contents are high, groundwater tables elevated, and runoff more likely (Furniss et al. 2000). For this reason, wet season use of a given road system has a much higher potential to contribute impacts to aquatic habitat than dry season use. In the Nedsbar Forest Management Project, road construction, and log haul are proposed. Road construction would be restricted to the dry season (see PDFs as described in Chapter 2); hauling would be allowed during the wet season on rocked surfaced roads (see Appendix C for a road list).

Road Construction

Under Alternative 4 in the Nedsbar Forest Management Project, new permanent and new temporary road segments are proposed to facilitate access to timber units, totaling approximately 4.5 miles in length. Temporary roads would be constructed, used, and decommissioned during a single dry season if possible, or storm-proofed and decommissioned the following season. All temporary road surfaces would be scarified, seeded, mulched/slashed, waterbarred, and barricaded following harvest operations. Portions of five of the proposed new roads would be within RR, and two would have hydrological connectivity with aquatic habitat. Therefore construction, use, and decommissioning of these roads would have potential to input sediment into aquatic habitat.

One proposed permanent road would cross an intermittent stream in the fishless Lick Gulch drainage. This road would require cut and fill slopes along portions of its length due to the steepness of the side-slope it would traverse, resulting in increased disturbance area and increased likelihood of the road surface interfering with sub-surface hydrological processes. Additionally, there would likely be direct contributions of sediment into the intermittent channel at the crossing location. Past work conducted by the resource area involving culvert removals/replacements suggest up to one cubic yard or less of sediment input is likely to result from this type of work. As the proposed new road would be permanent, it would also have the potential to contribute chronic inputs of sediment into the small intermittent channel during storm events.

One proposed permanent road would cross another small intermittent tributary in Lick Gulch. This road would not require cut and fill slopes, and is proposed to provide access upslope from an existing poorly located road which was constructed adjacent to a perennial stream. The intent is to allow the old road to continue to recover (it is already overgrown and on the way to being passively decommissioned), and reroute the new road out of the RR of the perennial stream. The new road would also require a culvert, which could potentially result in up to a cubic yard of sediment to the intermittent tributary. Again, as the new road would be permanent, it too would have potential to contribute chronic inputs of sediment into the small intermittent tributary during storm events.

The Lick Gulch drainage has relatively high levels of coarse wood in its channels, and therefore it is likely that the coarser grain sediment inputs resulting from the culvert installations would be captured and stored in Lick Gulch and would not be conveyed to downstream fish bearing habitats. The finer grain chronic inputs resulting from weathering and surface erosion of the road surfaces could episodically be pulsed into the intermittent streams during storm events and would either pass through the system as turbidity pulses, or settle out in depositional areas. Both of the proposed new permanent roads in Lick Gulch would be behind barricades, which would preclude vehicle traffic on them after logging operations were over. This would reduce surface erosion rates, and therefore chronic inputs of fine sediment would be anticipated to be very small from either of these two roads.

One short temporary road is proposed within the outer portion of the RR adjacent to Neds Gulch, a fishless intermittent tributary north of the Boaz Gulch drainage. It would not cross any channels. The road would be constructed, used, and decommissioned in a single dry season (or winterized until decommissioning occurs the following dry season). All disturbed surfaces would be seeded and mulched. For these reasons, and because the road would not be hydrologically connected with aquatic habitats, there is no potential for this road to contribute sediment to aquatic habitats.

A proposed temporary road would cross a dry draw within the RR of Grouse Creek, a steelhead stream. Dry draws are not considered streams, and therefore are not usually considered as a hydrological connection point, based on the fact that they rarely convey surface flow or have the capacity to transport sediments. However, given the proximity of the draw crossing to fish habitat, further analysis of the crossing is warranted. The draw crossing would be approximately 120 feet from fish habitat in Grouse Creek, and separated by an irrigation ditch which crosses over Grouse Creek via a pipe. Dry draws only convey water during very rare flood events. For example, during the wet winter of 2015/2016, which featured numerous high flow events (Star Gulch, a nearby Applegate River tributary recorded a peak flow event that ranked as a 16-year flood event) the dry draw near Grouse Creek did not show signs of surface flow. For this reason and because there is a ditch between the crossing and the creek, there is no potential for construction, use, and decommissioning of this road to directly contribute sediment to Grouse Creek. Indirectly, some sediment remaining after decommissioning could be conveyed to the dry draw during winter storms. This sediment would likely be assimilated into the dry draw, which is very low gradient at this point (valley bottom). Channel roughness present in the draw between the crossing point and the ditch, in the form of vegetation, wood, and other debris, would capture and filter any mobilized sediment prior to its reaching the ditch adjacent to Grouse Creek during flood events (the only time the draw would flow water).

The other proposed roads would be located on/near ridge tops and would not be hydrologically connected with aquatic habitat. Construction of these roads would lead to increases in road densities as described in Section 3.E. *Water Resources* of this document, but would have no causal mechanism to impart effects to aquatic habitat.

Passive Road Decommissioning

Four riparian roads would be allowed to continue to passively decommission, and would be re-designated in the database from currently listed as closed to decommissioned, including one riparian road in Lick Gulch, totaling about 0.3 miles, in conjunction with construction of a new road outside of the RR. The other roads include approximately 0.5 miles of riparian road in Rush Creek, 0.9 miles in Owl Gulch, a Little Applegate frontal, and 0.2 miles which parallel an intermittent tributary in Neds Gulch. All of these roads are stable, natural surfaced, do not include any drainage infrastructure, and are already overgrown by vegetation, and are well on their way to being hydrologically recovered. No ground disturbance would be associated with passive decommission, so it would not impart a negative effect to water quality. As stated, these roads are already more or less recovered, and the Proposed Action would be to re-designate them in the database from currently listed as closed to decommissioned.

Haul Routes

Haul is known to accelerate erosion rates on roads through the breakdown of surface material and creation of erosion features, such as ruts. Roads are more susceptible to disturbance when they become saturated. During such periods, they are more likely to develop ruts which can expose the subgrade. Dry-season use is less damaging, as ruts are unlikely to result, but heavy use (even in the dry season) would result in increased erosion of the road surface through the breakdown of aggregate or native surfaces. Because haul increases erosion rates, portions of haul routes with connectivity to streams would be expected to contribute some amount of sediment to the aquatic system.

Under Alternative 4 in the Nedsbar Project, log haul could occur on an estimated 66.7 miles of non-paved roads, including 27 miles of natural surfaced roads, in the haul Analysis Area, which includes areas in the Wagner and Anderson Creek catchments in the Bear Creek Watershed. Note that the haul routes analyzed in the following analysis include routes across county and/or privately maintained roads, and are estimated based on best available access to timber units from paved surfaced roads, and therefore will not match haul route mileage estimates reported in Chapter 2 of this EA. The estimated total volume of traffic would be approximately 2,000 truck loads. Proposed commercial units in this sale are widely spread over a large geographic area, and so too are the haul routes. This would limit the amount of traffic that any one non-paved road segment would receive, reducing the potential for impacts to surfaces relative to higher volumes of traffic. The main line access points in the Little Applegate Watershed include the Grouse Creek, Lick Gulch, Little Applegate, and Brickpile Ranch

Roads, all of which are rocked. Other main access routes include the Boaz Gulch, Wagner, and Anderson Creek roads, which are also rocked roads. Throughout the entire Analysis Area, haul routes include an estimated 106 channel crossings, 33 of which would be over perennial streams. Given the high degree of hydrological connectivity between haul routes and the aquatic system, haul is likely to result in both direct and indirect inputs of sediment into aquatic habitats in the vicinity of the crossings. Four crossings would be over fish bearing streams. These include three crossings over the Little Applegate on paved bridges, and one crossing over Wagner Creek, also a paved bridge.

The majority of the haul routes (roughly 75 percent) and crossings (83 percent), including 28 of the 33 perennial crossings, would be in the Little Applegate Watershed. The highest concentration of crossings occurs on the main line Little Applegate Road itself, which is adjacent to the Little Applegate River, in HUCs # 0206, 0209, 0212, 0215, and 0221. However, the volume of log truck traffic expected on this particular road segment is anticipated to be relatively light (estimated at 56 truck-loads), which would limit the magnitude of sediment contributed to aquatic habitat near the mainstem of the Little Applegate.

All log hauling on native surfaced roads would be seasonally restricted to the dry season, May 15th to October 15th. Winter haul would be allowed on certain well-maintained rocked roads in accordance with BMPs (see Chapter 2). Hauling operations would be stopped if they could result in damage to the road beds. Dust abatement measures (water or lignin applied to dry road surfaces) may be used to reduce dust during the dry season on rocked and natural surfaced roads (except for County roads).

Weathering of road surfaces can lead to chronic sediment and turbidity contributions to aquatic habitats, and haul can accelerate rates of erosion, particularly during the wet season (Luce and Black 1999 and Reid and Dunne 1984). Where roads are hydrologically connected to streams, eroded sediment from road surfaces can be input directly to the channel. Hydrological connectivity is present at any point where roads and streams interface. Connectivity also changes in response to climatic conditions, with the greatest road-stream hydrological connectivity occurring during the wettest period of the year, when soil moisture contents are high, groundwater tables elevated, and runoff more likely (Furniss et al. 2000). For this reason, wet season use of a given road system has a much higher potential to contribute impacts to aquatic habitat then dry season use. Due to the high number of stream crossings, and because wet season log haul is proposed on numerous routes, haul is likely to result in inputs of sediment to streams in the Analysis Area based on anticipated truck traffic alone.

The heavier the volume of haul, the greater the potential for breakdown of the road surfaces to occur. Small direct contributions of fine sediment could occur if dust mobilized by haul should settle out in perennial stream channels crossing or adjacent to the haul route. PDFs include the use of dust abatement which would minimize the likelihood of airborne contributions occurring. The more likely method of sediment contribution from haul would be indirectly, as the fine sediment that remains on the road prism would be available to be transported off of the road during the first significant rain events following a season of haul. Properly engineered roads are capable of shedding the majority of mobilized sediment off of the road (or road ditch) downslope and into vegetation. However, the road/ditch distance from the last cross drain located on either side of a channel crossing would directly contribute captured water and mobilized sediment into the stream channel. Therefore, use of the roads for haul would increase the risk of road-derived sediment transport to stream channels, particularly in the vicinity of road/stream crossings. As discussed above, wet season haul has the highest likelihood of contributing sediment to streams, so the following analysis assumes wet season use.

It is difficult to accurately quantify how much sediment may be generated on any given road surface from haul, as there are many variables that influence erosion rates, transport potential, and subsequent deposition into aquatic habitat. Luce and Black (2001) found that a volume of haul equivalent to 12 daily truck loads per work day for one month (240 total truck loads) on rocked roads during the wet season in the coast range of Oregon increased sediment production from the road surface by ~ 380 kg/km of road. Note that the study did not attempt to quantify how much of this increased sediment production was likely to find its way to aquatic habitat, and that it was conducted in the coast range, which receives ~ 3 times the average annual precipitation as the Analysis Area, and that haul was allowed to continue during precipitation events. Also note that the authors did not offer a quantitative comparison of wet season vs. dry season haul erosion rates, but they did note that proscription of wet weather haul is an effective BMP for reducing sediment production stemming from haul.

A very rough estimate of the potential magnitude of sediment produced by haul may be obtained by incorporating the erosion rates reported by Luce and Black and calculating the number of truck loads anticipated to result from this sale. The following analysis does not attempt to break out winter/wet vs dry season haul routes or differences in erosion and sediment transport rates, which should overestimate the amount of sediment produced by haul. The analysis further assumes that: the purchaser would opt to winter haul every unit (i.e., would not harvest and haul during the dry season); an average unit volume of 6,000 board feet of timber per acre; that an average log truck load is 4,500 board feet of timber; that only the 50 meters of road on the uphill side of each crossing is hydrologically connected with the aquatic system; a constant rate of aggregate break down; and that all sediment generated in this connected area is immediately conveyed to the stream. Within the haul Analysis Area catchments, the 106 stream crossings would equate to 5,300 meters of hydrologically connected routes spread across the entire Analysis Area. Utilizing erosion rates described by Luce et al., one truck load would equate to ~ 1.6 kg of sediment production per kilometer of road, or 0.18 lbs of sediment per log truck crossing. Each crossing in GIS was assigned an estimated haul volume value (number of truck crossings) based on the unit acres accessed by each particular crossing. The result of the analysis estimates 4,434 pounds of sediment contributed to channels in Analysis Area streams from haul. Assuming that 2,106 lbs of wet soil = 1 cubic yd, this would equate to roughly 2.1 cubic yards, spread amongst all 106 stream crossings. Inputs were estimated site-specifically for each Analysis Area drainage and as indicated in the discussion above are a function of both the number of stream crossings, which act as an effect multiplier, and with the estimated haul volume, and are presented in Table 3-24 below.

The analysis indicates that less than 0.5 of a cubic yard (cu yd) of sediment would be input into any of the Analysis Area drainages. The largest magnitude of sediment inputs would occur in Boaz Gulch, Lick Gulch, drainage 0221 (a little Applegate frontal below Lick Gulch) and in headwater drainages of Wagner Creek due to high hydrological connectivity and estimated haul volume in these particular drainages. These inputs would not all occur at the same time. A typical timber sale contract is for three years, so the likely scenario given implementation of Alternative 4 would be that the sediment inputs to aquatic habitat from log haul would be spread out both spatially and temporally over the entire Analysis Area and over three years' time. Inputs would occur during the wet season (again, assuming a worst case scenario), when stream flows were elevated and capable of transporting, sorting, and depositing sediments.

Sediment input directly to fish habitat would be limited to the portions of the haul roads adjacent to the Little Applegate River (estimated total contribution of ~ 0.13 cu yds), Grouse Creek (0.04 cu yds), and Wagner Creek (0.07 cu yds) and would most likely be manifested as small turbidity pulses rather than coarse grain sediment which would be more likely to settle out into pools. Other inputs resulting from haul would occur primarily in headwater areas well upstream of fish habitat, and would only occur during high precipitation events. Given the small magnitude of sediment estimated to be generated from haul, that it would be contributed over large spatial and temporal scales, and that contributions would primarily occur in headwater stream reaches and during such times as when turbidity would be naturally elevated, it is anticipated that contributions from haul to fish habitat would be undetectable beyond contributions from other sources.

Table 3-24. Estimated sediment input from haul routes under Alternative 4.

	Roads	Number of Crossings		HUC 7 Drainage	Haul Routes
	Miles	Perennial	Intermittent	Truck loads	cu. yds.
218 (Boaz Gulch)	5.4	0	4	443	0.07
360 (Neds Gulch)	3.3	0	9	521	0.39
363	0.1	0	0	0	0
Applegate R. Frontals Total	*8.8*	*0*	*13*	*NA*	*0.46*
406 (Grouse Creek)	7.7	7	3	120	0.04
330 (Yale Creek)	0.7	0	0	0	0
124	2.3	1	0	397	0.03
127	5.7	5	3	397	0.22
130	5.0	2	2	248	0.05
203	2.9	2	4	56	0.03
206 (Rush Creek)	1.8	1	0	56	0.01
209	3.9	1	5	56	0.03
212 (Muddy Gulch)	0.2	1	0	56	0.01
215	3.1	2	6	56	0.04
218 (Lick Gulch)	12.0	2	11	452	0.34
221	2.9	3	6	662	0.29
403	0	0	0	0	0
409	0.3	1	0	162	0.01
442	0.2	0	0	0	0
445	1.6	0	3	56	0.01
L Applegate R. Frontals Total	*49.9*	*28*	*43*	*NA*	*1.11*
Anderson Creek	3.7	2	7	128	0.10
Wagner Creek	3.9	3	10	397	0.44
Total Haul Analysis Area	*66.7*	*33*	*73*	*NA*	*2.11*

**Note that haul routes are estimated based on easiest access to timber units from paved roads, and only includes those portions which are not paved. Estimated haul volume in this table it reported as the highest estimated number of truck loads which would occur over any given crossing within each drainage, usually at the bottom or top of the drainage, depending on direction of haul. This table includes both wet and dry season routes, so sediment production from haul is likely an overestimation. Numerous drainages have the same amount of volume where one distinct route passes through multiple drainages. For example, note drainages # 203, 206, 209, 212, and 215, which are Little Applegate River frontals bisected by the Little Applegate Road. The total haul volume for all of the drainages would be 56 truckloads, not the sum of all of the drainages.*

Alternative 3

Alternative 3 would not include any new road construction, and drops those units proposed under Alternative 4 which would have been accessed by the new roads. Under this alternative, 789 acres of commercial timber harvest is proposed (including thinning in RRs), which is 53 percent of the total acres proposed for harvest under Alternative 4. Other notable differences between the two alternatives are that under Alternative 3, 1.2 miles of road renovation would occur, and haul routes would be reduced by approximately 17 miles to 51 miles. The reduction in haul route mileage would reduce the number of haul route stream crossings relative to Alternative 4. Haul routes would cross the same amount of fish bearing streams under Alternative 3 as described in Alternative 4. Also, the volume of haul would be reduced considerably, by roughly half of what would occur under Alternative 4. No road segments proposed for renovation would include any stream crossings, therefore there would be no hydrological connectivity between renovation and no causal mechanism for this activity to affect aquatic habitat. And as no new roads would be constructed, and because haul volume and hydrological connectivity would be considerably reduced, it is anticipated that considerably less sediment would be contributed to aquatic habitat under Alternative 3 relative to Alternative 4. Table 3-25 displays harvest acres, haul, and renovation proposed under Alternative 3 by drainage, below.

Table 3-25: Amount of harvest activity proposed in Alternative 3 in each of the analysis area drainages in the Nedsbar Forest Management Project, including the number of stream crossings the estimated haul routes would include.*

HUC 7 Drainage	Harvest (acres)	Road Renovation (miles)	Haul (miles)	# estimated haul route Stream Crossings		Sediment (Cu yds) From haul*
				Perennial	Intermittent	
218 (Boaz Gulch)	121	0	5.1	0	1	0.05
360 (Neds Gulch)	67	0	3.0	0	9	0.22
363	19	0.1	0.1	0	0	0
Applegate R. Frontals Total	*207*	*0.1*	*8.2*	*0*	*10*	*0.27*
406 (Grouse Creek)	212	0.1	4.2	1	1	0.02
330 (Yale Creek)	0	0.1	0	0	0	0
124	0	0	1.4	1	0	0.01
127	46	0	5.7	5	3	0.12
130	121	0	3.6	2	1	0.03
203	16	0.2	2.7	2	4	0.01
206 (Rush Creek)	63	0.1	1.5	1	0	0
209	0	0	1.5	1	5	0.01
212 (Muddy Gulch)	0	0	0.2	1	0	0
215	0	0	2.7	2	6	0.01
218 (Lick Gulch)	42	0.1	6.6	1	5	0.03
221	33	0.5	2.7	3	5	0.05

403	1	0	0	0	0	0
409	0	0	0	0	0	0.01
442	0	0	0	0	0	0
445	42	0	1.6	18	30	0.02
L Applegate R. Frontals Total	*581*	*1.1*	*29.9*	*18*	*36*	*0.32*
Anderson Creek	0	0	3.7	2	7	0.09
Wagner Creek	0	0	5	3	10	0.24
Total Analysis Area	*788*	*1.2*	*50.5*	*25*	*57*	*0.92*

**Note that haul routes are estimated based on easiest access to timber units from paved roads, and only includes those portions which are not paved. All reported acres and miles in this table are rounded to the nearest whole acre or tenth of a mile. This table includes both wet and dry season routes, so sediment production from haul is likely an overestimation.*

Alternative 5

Alternative 5 is similar to Alternative 3 in that no new roads would be constructed. The biggest difference is that it would further reduce the amount of harvest acres by an additional 30 percent, down to 536 acres, which is about 65 percent less than proposed under Alternative 4. Note that there would be more units in some drainages, and less in others under Alternative 5 relative to Alternative 3 (Maps 2-7 through 2-9), which changes the haul volume any given drainage would receive. The main difference this alternative would have in regards to aquatic habitat is that due to the reduction in harvest volume and dropping of additional units, haul routes, number of haul crossings, and haul volume across the Analysis Area as a whole would all decrease relative to both of the other action alternatives, though volume would increase in some of the drainages relative to Alternative 3. Estimated haul routes in Alternative 5 would include roughly 42 miles of routes, or about 8 miles less than in Alternative 3, and 24 miles less than under Alternative 4. Crossings would be reduced as well, and notably the mainline road up Grouse Creek would not be used for haul, which would mean one less crossing over fish bearing streams as compared to the other action alternatives. Due to the reduction in haul, volume, and hydrologically connected routes, implementation of Alternative 5 would result in less sediment input into aquatic habitat (Table 3-26, below) than Alternatives 3 and 4. Additionally, no riparian thinning is proposed under Alternative 5. This would result in no reduction in future wood recruitment potential.

Table 3-26: Amount of harvest activity proposed in Alternative 5 in each of the analysis area drainages in the Nedsbar Forest Management Project, including the number of stream crossings the estimated haul routes would include.*

HUC 7 Drainage	Harvest (acres)	Haul (miles)	# estimated haul route Stream Crossings		Sediment (Cu yds) From haul*
			Perennial	Intermittent	
218 (Boaz Gulch)	52	4.0	0	1	0.02
360 (Neds Gulch)	61	3.0	0	9	0.13
363	0	0	0	0	0
Applegate R. Frontals total	*113*	*7.0*	*0*	*10*	*0.15*
406 (Grouse Creek)	84	3.4	0	0	0
330 (Yale Creek)	15	0	0	0	0
124	0	1.4	1	0	0.01
127	52	4.7	3	4	0.08
130	97	2.4	2	0	0.02
203	9	2.8	2	4	0.02
206 (Rush Creek)	32	1.4	1	0	0
209	34	1.5	1	5	0.02
212 (Muddy Gulch)	0	0.2	1	0	0
215	0	2.7	2	6	0.03
218 (Lick Gulch)	74	4.1	1	5	0.06
221	23	2.6	4	5	0.06
403	0	0	0	0	0
409	0	0	0	0	0
442	0	0	0	0	0
445	0	0	0	0	0
L Applegate R. Frontals total	*420*	*25.6*	*16*	*29*	*0.31*
Anderson Creek	0	3.7	2	7	0.03
Wagner Creek	0	5	3	10	0.21
Total haul Analysis Area	*533*	*42.4*	*23*	*56*	*0.69*

**Note that haul routes are estimated based on easiest access to timber units from paved roads, and only includes those portions which are not paved. All reported acres and miles in this table are rounded to the nearest whole acre or tenth of a mile. This table includes both wet and dry season routes, so sediment production from haul is likely an overestimation.*

Aquatic Habitat Effects Summary

Alternative 4 would have the highest likelihood to impart negative effects to aquatic habitat and would also result in the largest magnitude of impacts. Short-term there would be a high probability of inputs of fine sediment to channels in the Analysis Area resulting from haul and in particular the proposed new road construction, which of all proposed activities would contribute the greatest amount of sediment to any given reach of aquatic habitat. Long-term, chronic erosion stemming from the surfaces of the permanent new roads would have the potential to contribute small amounts of sediment during storm events (chronic pulses) into two small intermittent streams in the fishless Lick Gulch drainage. Lick Gulch has high existing road densities (see Section 3.E.) and high sediment loading already, and as much of the new construction, and in particular the hydrologically connected construction, would take place in Lick Gulch, this situation would be exacerbated. Direct contributions resulting from activities as proposed in Alternative 4 are estimated to total up to 4.1 cubic yards (Table 3-27), more than half of which would directly result from new road construction. Lick Gulch notwithstanding, other inputs would be spread out over time and space, would occur primarily in the form of brief pulses of elevated turbidity during high flow events, and any sediment/turbidity increases to any given piece of habitat at any given time would be minor and undetectable relative to existing sediment and turbidity levels which would occur during such events. Alternatives 3 and 5 would result in an estimated reduction of 75 percent or more of total sediment contribution to aquatic habitats compared to Alternative 4, and would not result in long term chronic contributions of sediment to Lick Gulch, such as may occur if proposed new permanent roads would be built as proposed under Alternative 4.

Future private timber harvest is assumed to continue at present levels, and cumulative effects to water resources have been assessed (see Section 3.E.). Future private harvest is expected to continue to contribute to the declining trend in streambank stability, sedimentation potential, and health of riparian areas currently present in the Analysis Area.

Cumulatively, log haul from reasonably foreseeable harvest units on BLM lands within the Analysis Area is anticipated to contribute small amounts of sediment to aquatic habitat (estimated total of 0.18 cubic yards, and incorporated into Table 3-27) to drainages HUC # 0206, 0218, and 0221 in the Little Applegate Watershed, and in Anderson Creek. Assuming the most degrading alternative is selected and implemented as described (Alternative 4), this project could contribute up to an additional estimated 4.11 cubic yards of sediment to aquatic habitat in the short term (1 to 3 years). Long term, there would be a slight risk for increased inputs from the permanent new road surfaces as described above. Inputs would be much less under Alternatives 3 and 5, as described above, and would be limited to short term (1 to 3) years only. The magnitude of any inputs resulting from any of the action alternatives would still be minor relative to existing sediment levels.

Table 3-27: Estimate of total sediment contribution to Analysis Area drainages by Alternative with anticipated additional haul from reasonably forseeable future harvest on BLM-administered lands.

HUC 7 Drainage	Alt 4	Alt 3	Alt 5	Reasonably Foreseeable Haul*
218 (Boaz Gulch)	0.07	0.05	0.02	0
360 (Neds Gulch)	0.39	0.22	0.13	0
363	0	0	0	0
Applegate R. Frontals total	0.46	0.27	0.15	0
406 (Grouse Creek)	0.04	0.02	0	0
330 (Yale Creek)	0	0	0	0
124	0.03	0.01	0.01	0
127	0.22	0.12	0.08	0
130	0.05	0.03	0.02	0
203	0.03	0.01	0.02	0
206 (Rush Creek)	0.01	0	0	0.02
209	0.03	0.01	0.02	0
212 (Muddy Gulch)	0.01	0.01	0	0
215	0.04	0.01	0.03	0
218 (Lick Gulch)	2.34	0.03	0.06	0.04
221	0.29	0.05	0.06	0.04
403	0	0	0	0
409	0.01	0.01	0	0
442	0	0	0	0
445	0.01	0.02	0	0
L Applegate R. Frontals total	1.11	0.33	0.30	1.0
Anderson Creek	0.10	0.09	0.03	0.08
Wagner Creek	0.44	0.24	0.22	0
Total Analysis Area	4.11	0.92	0.70	0.18

6. Affected Environment – Riparian Reserves

In general, Riparian Reserves in the Analysis Area are dominated by conifer and riparian hardwood stands adjacent to the wetter areas typically found in the valley bottoms, while grass, wood, and shrubland type vegetation is common in the drier and more upland areas. Riparian Reserves in most of the smaller Analysis Area streams are relatively intact, while corridors adjacent to the larger streams have been impacted by stream

adjacent roads. Additionally, pre-NWFP logging on federal lands did not leave riparian buffers around stream channels and some areas were subjected to stream adjacent harvests. Stream side areas adjacent to past harvest units are in some state of recovery, depending upon the amount of time since harvest.

Within the Analysis Area drainages, there are an estimated 3,514 acres of RRs (calculated from geographic information system [GIS]) on BLM and USFS-administered lands. There are many more acres of riparian areas located on private lands that do not receive the same level of protection as that provided by RRs. Overlaying the vegetation condition (GIS) layer with Riparian Reserve boundary layer is a useful way to display current vegetative states of the reserves over the large area encompassed within the project boundary. Note, however, that the vegetative condition layer was generated primarily to reflect upland conditions, and only estimates the conditions in riparian areas, especially those areas adjacent to stream channels (the primary shade and large wood-producing zone). A summary of existing vegetative states in RRs on BLM-administered lands within the Nedsbar Analysis Area is presented by drainage in Table 3-28.

Table 3-28. Seral state of Riparian Reserves on BLM lands in the Nedsbar Analysis Area. Numbers have been rounded, and sums may be plus/minus one acre.

HUC 7 Drainage	Riparian Reserve Acres by Vegetation Type						
	Grass and shrubs	Hardwoods	Early Seral (seedlings/saplings)	Poles (5-11" DBH)	Mid Seral (11-21" DBH)	Mature (>21" DBH)	Total Acres of RRs
218 (Boaz Gulch)	14	93	11	7	139	23	287
360 (Neds Gulch)	64	91	4	0	184	37	379
363	16	29	6	16	105	45	217
Applegate River Frontals total	94	213	21	23	429	105	883
406 (Grouse Creek)	11	61	3	33	107	64	278
330 (Yale Creek)	24	26	0	28	137	23	237
127	7	5	7	45	18	11	102
130	0	0	18	9	81	27	135
203	5	3	3	0	32	6	48
206 (Rush Creek)	10	18	12	7	124	17	188
209	15	59	23	8	81	54	239
215	33	197	15	0	72	20	337
218	12	48	25	9	174	48	326
221	1	59	27	0	61	11	159
403	0	50	0	0	51	3	103
409	0	5	0	3	37	11	57
442	61	137	0	2	85	5	293

445	35	53	0	27	15	0	129
Little Applegate River Frontal total	214	721	133	171	1075	300	2631
Analysis Area Total	308	934	154	194	1503	405	3514

The seral stage of vegetation surrounding the reserves can provide insight to how well the reserves are capable of functioning, in terms of providing shade and as a source of large wood inputs. For the purpose of this analysis, it was assumed that trees in a mid-seral stage (minimum 11 to 21 inches DBH or older will function to provide sufficient shade to stream channels, and that pole-sized trees (5 to11 inches DBH) and younger may not provide sufficient shade to stream channels to prevent solar penetration to the stream channel. It was also assumed that only stands in a mature stage (greater than 21 inches DBH) are capable of providing a source of large wood of sufficient size to encourage channel modification and habitat improvements. Hardwoods were not included in this comparison, as they do not conform well to dbh measurements, and do not provide large wood of the same quality that conifers do (Beechie et al. 1999). Excluding hardwoods (a common component of riparian areas) and pole-sized trees may tend to underestimate the percent of reserves that are currently providing sufficient levels of shade to stream channels. Table 3-29 displays the percent of all reserves that are in mid-seral or greater stage (capable of providing high levels of shade), and in a mature stage (capable of providing large wood to channels).

Table 3-29. Percent of all reserves in mid-seral or greater, and mature seral stages in the Analysis Area.

HUC 7 Drainage	% of Reserves in Mid Seral Stage or Greater (Trees 11 to 21" DBH)[1]	% of Reserves in Mature Stage (Trees greater than 21" DBH)[1]
218 (Boaz Gulch)	56	8
360 (Neds Gulch)	58	10
363	69	21
Applegate R. Frontals Total	60	12
406 (Grouse Creek)	62	23
330 (Yale Creek)	68	10
127	28	11
130	80	20
203	79	13
206 (Rush Creek)	75	9
209	56	23
215	27	6
218	68	15
221	45	7
403	52	3

HUC 7 Drainage	% of Reserves in Mid Seral Stage or Greater (Trees 11 to 21" DBH)[1]	% of Reserves in Mature Stage (Trees greater than 21" DBH)[1]
409	84	19
442	31	2
445	12	0
L Applegate R. Frontal Total	*52*	*11*
Analysis Area Total	*54*	*12*

[1] Does not include acres of hardwoods, which likely underestimates actual shade provided to stream channels.

This analysis suggests that RR capable of providing maximum levels of shade and inputs of large wood are deficient throughout the entire Analysis Area. Some of this can be attributed to natural causes; within the Analysis Area RR, there are over 1,240 acres of grass, shrubs, and hardwoods, which are typical riparian vegetative communities in the drier sites common to south and west aspects in the Upper and Little Applegate Watersheds. These acres, which account for 35 percent of all calculated RR acreage, tend to overstate the amount of degradation which has occurred within the RRs. The amount of the RRs in early seral and pole aged stands is a better indicator of degradation, as it is assumed that these are relatively recently logged stands that have not yet recovered to the point where they are capable of providing shade and/or large wood, though natural events such as fire can also lead to young stands. Approximately 348 acres of such stands exist in the Analysis Area, which is less than 10% of all RR acreage. In any case it is clear that shade and a lack of source inputs for large wood are a concern within many of the Analysis Area drainages and their associated Riparian Reserves.

7. Environmental Consequences – Riparian Reserves

a. Alternative 1 – No Action

The No Action Alternative would have no direct or indirect effects to RRs within the Upper Applegate and Little Applegate River Watersheds. The reserves would remain as they are currently, slowly recovering as stands mature. It is anticipated that levels of shade and large wood input will slowly increase over time on Federal lands. As this alternative would not contribute any direct or indirect affects to the reserves, no cumulative effects would result from implementation of the No Action Alternative.

b. Alternative 4

Activities proposed in RRs under the Nedsbar Forest Management Project include new road construction, commercial timber harvest, log skidding, passive road decommissioning, and log haul. Haul would not change the existing condition of the RRs. New road construction through RRs would have the greatest negative effect to the RRs, as all vegetation along the road right-of-way would be removed. Riparian Thinning treatments are also proposed, which would reduce stocking densities in the outer portion of the RRs, but would retain no touch buffers adjacent to streams. These treatments would include approximately 17 acres of RRs. Treatments of the outer portions of the RRs would thin from below and retain all trees over 20" dbh. The primary concern to aquatic habitat from these proposed activities would be the potential for decreased shade levels afforded to channels which could lead to increased stream temperatures, and a reduced potential for future wood inputs.

Roads and Skids

Under Alternative 4, 0.6 miles of new roads (permanent and temporary) are proposed within RRs. This would equate to an estimated roughly 2.2 acres of riparian vegetation which would be removed (Table 3-30 below). A short skid trail would also bisect the outer portion of a RR adjacent to an intermittent stream in Lick Gulch for ~ 365 feet, which could disturb roughly 0.1 acres of vegetation.

Of the new roads, two are proposed within the RR of perennial streams, including one near fish bearing Grouse Creek. This road, proposed as temporary new construction, would parallel Grouse Creek for roughly 450 feet, and would be located approximately 120 feet away from the channel edge. Most of this area (330 feet) would pass through an existing meadow, which appears to have been an historic home site, and which is already open. The existing canopy cover (or lack thereof, in this case) would not be changed by the road in this portion. The remaining 120 feet which parallels the creek would traverse through a forested area which would need to be cleared for the road ROW. The forest between the right-of-way and the channel is very dense, and would remain to provide a high level of shade to the Grouse Creek. No trees would be removed in this buffer zone; the edge of Riparian Thin Unit 19 has been adjusted to the road right-of-way edge. Given the relatively short length of ROW adjacent to the creek, that it would be located between 130 feet and 150 feet away from the channel, and that a dense buffer would remain between the ROW and channel, it is extremely unlikely that the new road would reduce shade to the channel to the point it would elicit a detectable response to stream temperatures. Because the right-of-way would be within a site potential tree height of the channel, the road would reduce slightly the potential for future wood contributions to Grouse Creek.

One short (~ 110 feet long) temporary new road is proposed within the outer portion of a RR of a fishless perennial stream in the Lick Gulch drainage. This road would head upslope of an existing road, and would traverse a riparian thin unit and ultimately would access an upland unit. The road would be located ~ 125 feet upslope of the channel. Given the very short length, and the distance from the proposed road to the stream channel, and that an undisturbed buffer of 125 feet of mature riparian vegetation would remain between this road and the channel, there is no potential stream temperatures could be affected by this particular temporary road.

The other segments of road proposed in RRs are within the reserves of intermittent streams, where summer water temperatures are not a concern as they would be dry early in the season. All of these segments bisect the RRs perpendicularly rather than paralleling them for long distances, reducing the amount of disturbance acreage. Wood inputs would be reduced slightly where the new roads cross the streams. This would have little impact to aquatic habitat or aquatic organisms, as the intermittent streams provide only marginal temporary habitat for a limited number of aquatic organisms. The streams would be very unlikely to ever contribute wood to downstream habitats which provide much higher quality aquatic habitat.

Four riparian road segments (~ 2.0 mi.) would be allowed to continue to passively decommission. This would ensure the continued recovery of an estimated 7 acres of stream adjacent riparian vegetation.

Commercial Timber Harvest and Landings

Under Alternative 4, approximately 17 acres of commercial harvest is proposed within RRs. The harvest as proposed would be consistent with ACS objectives relating to maintaining and restoring the health of riparian vegetation. Thinning prescriptions are proposed to reduce stocking densities in the RRs, reducing fire hazard and/or increasing growth rates of remaining conifers. The riparian thinning prescriptions would retain 50 ft. no-touch buffers, so channel shading vegetation would be retained adjacent to all channels within the primary shade zone near the riparian harvest units. Minimum canopy cover of 50-60 percent would be retained in the portion of the RRs beyond 50 feet from the channels. Riparian thin units are all proposed adjacent to upland units, and easily accessed by existing roads.

All but two of the proposed riparian thin units are adjacent to small intermittent streams, which are dry for the bulk of the year, flowing only during the wet winter months. Therefore riparian thinning applied to these areas would not affect summer stream temperatures. One unit (riparian thin unit # 19) would occur adjacent to the perennial Grouse Creek. Thinning in this unit would occur east of the creek, upslope of an existing road, and the majority of the trees between the road and the outer edge of the RR (310’ from the channel edge) are greater than 20” DBH, so most of the shade-producing vegetation in the secondary shade zone would be retained. The stream orientation means that the portion of the RR affected would provide shade only during the early morning hours, reducing the risk of increasing solar loading relative to noon or afternoon sun. These factors, coupled with the full retention 50’ stream adjacent buffer which contains numerous hardwoods and conifers and which would continue to supply primary shade to the channel, make it very unlikely that the light touch thinning as

proposed in the outer portion of the Grouse Creek RR would result in detectable increases in stream temperatures.

Riparian thin Unit RT-28 is proposed in the outer portion of a RR on a fishless perennial tributary to the Little Applegate. This unit would also be located upslope of an existing road, from 50' to 140' away from the channel. This unit is west of the stream, and parallels the channel for roughly 700 lineal feet. Given the aspect of this stream, there is greater potential to increase solar loading during the portion of the day when temperature concerns are highest. However, because only 700 feet of the outer portion of the RR would be treated, and that the primary shade zone would be left intact, and that canopy cover in the secondary shade zone of the RR would remain above 50 percent, it is unlikely that implementation of riparian thinning in this unit would result in a detectable increase in stream temperatures.

Future wood recruitment potential would be reduced, but only very slightly. The primary wood delivery mechanisms to streams are either large scale stochastic events such as landslides and debris torrents, or via direct falling of trees into adjacent aquatic habitat. In the Analysis Area, landslides and debris torrents are very rare; the vast majority of wood contributed to channels comes from direct falling of trees into the channel. Harvesting of trees outside of the 50' full retention buffer would reduce the number of stems per acre, and thus would likely correspond with a slight reduction in future wood input potential. This slight reduction would not measurably impact fish habitat. All but one of the proposed riparian thinning units would occur in small headwater channels well upstream of fish distribution. These small channels would be unlikely to ever contribute large wood to downstream habitats. Proposed riparian thin unit #19 is adjacent to the fish bearing reach of Grouse Creek. Roughly 600 feet lineal feet of the unit would be within less than one site potential tree height of the channel. The potential for future wood delivery to this 600' of stream could be reduced slightly, but existing instream wood is currently present at this site, and on site large trees would still remain to provide future wood inputs.

One landing in the RR of Neds Gulch would need to be maintained by the felling of snags in and around it to make it safe for helicopter use. This would disturb up to an acre of riparian area, though the trees in this area are already dead, and therefore the disturbance would be minimal. Snags would be felled towards the channel and left as coarse large wood within the RR. As the trees to be felled are dead, they do not provide much shade, and as Neds Gulch is intermittent, stream temperatures are not a concern regardless. Large wood input potential also would not be affected, as the snags would be felled towards the channel and left within the RR.

Table 3-30: Acres of disturbance proposed under Alternative 4 within the Nedsbar Analysis Area drainages

HUC 7 Drainage	Acres RR disturbance		
	New roads*	Thinning	Total
218 (Boaz Gulch)	0	0	0
360 (Neds Gulch)	0.5	8.1	8.6
363	0.3	0	0.3
Applegate R. Frontals Total	*0.8*	*8.1*	*8.9*
406 (Grouse Creek)	0.4	7.4	7.8
330 (Yale Creek)	0	0	0
127	0	0	0
130	0	0	0
203	0	0	0

HUC 7 Drainage	Acres RR disturbance		
	New roads*	Thinning	Total
206 (Rush Creek)	0	0	0
209	0	0	0
215	0	0	0
218 (Lick Gulch)	0.9	0	0.9
221	.1	1.1	1.2
403	0	0	0
409	0	0	0
442	0	0	0
445	0	0	0
L Applegate R. Frontal total	*1.4*	*8.5*	*9.9*
Total	*2.2*	*16.6*	*18.8*

* New roads includes 365' of proposed skid trail which would bisect the outer portion of a RR adjacent to an intermittent channel, and one existing one acre landing in a RR of Neds Gulch which would need to have snags felled.

c. Alternative 3

Alternative 3 is similar to Alternative 4 with regards to potential effects to RR with the one major difference: no new road construction would occur. This would retain the 2.2 acres of riparian vegetation that would be removed under Alternative 4. Riparian thinning as proposed under Alternative 3 would be the same as described under Alternative 4. The net difference in disturbance within Riparian Reserves would be roughly 12 less under Alternative 3.

d. Alternative 5

Alternative 5 does not propose any activities in RRs, hence no changes to this indicator would occur. Because this alternative would not thin riparian areas as described for Alternatives 3 and 4, these 16.6 acres would remain at their current stocking density, resulting in areas that may be less fire resilient.

Regardless of which alternative ultimately is selected, overall, as the recovery of RRs on federal lands continues, it is anticipated that both shade levels and inputs of large wood will eventually increase over stream channels on BLM-administered lands within the Analysis Area. However, it will take many years for the RRs to achieve their full potential, and benefits would be limited in areas already impacted by permanent roads.

G. WILDLIFE

1. Introduction

This section discusses terrestrial wildlife habitat and the potential impacts to terrestrial wildlife species from the action alternatives as described in Chapter 2 of this document. For the purpose of this analysis, the EA section will hereafter refer to two reference scales: the Project Area and the Wildlife Analysis Area. The project area describes where actions are proposed, such as areas where forest management or transportation management

activities are proposed. The larger Wildlife Analysis Area will be described below for each species and is used for a more applicable spatial scale for species with larger home ranges and dispersal movements.

Only federally listed or Bureau Sensitive species known or suspected to be present within the project area, addressed in the issues, and impacted by the action alternatives area addressed in this EA. Appendix I provides additional information on special status species known or suspected to occur within the Project Area.

2. Issues

Wildlife-related issues associated with the Nedsbar Project have been identified through public scoping or ID team specialists and will be addressed in this document. These relevant issues are:

- What are the effects of the Nedsbar Forest Management Project (timber harvest; mistletoe management; tractor, cable, and helicopter yarding; and new road construction) on northern spotted owl, their prey, and their critical habitat?
- What are the effects of the Nedsbar Forest Management Project (including timber harvest, road renovation and construction) on wildlife habitats, including late-successional habitat?
- What are the effects of timber harvest, road renovation, and construction on Pacific fisher and their habitat?
- What are the effects of timber harvest, road renovation and construction on other sensitive wildlife species, including bats, black salamander, and Johnson's hairstreak butterfly?
- What are the effects of the Nedsbar Forest Management Project on neo-tropical migratory birds?
- Manzanita provides food for a variety of animals year round; what are the effects of fuels reduction on manzanita species?
- What is the potential for the incremental effects of the Nedbar Forest Management Project (timber harvest, road construction, skid trails and corridors, and landings) to contribute adverse cumulative effects to wildlife and their habitats) when considered with other past and on-going timber harvest, existing high road densities, and existing OHV routes?

3. Affected Environment

a. Northern Spotted Owls (Federal Threatened)

Scale of Analysis

The northern spotted owl direct, indirect, and cumulative effects from the action alternatives are analyzed by assessing habitat conditions within 1.3 miles of proposed units. This scale of analysis is based on the provincial home range of NSO, which is 1.3 miles for the Klamath Mountains Province (Thomas et al. 1990, Courtney et al. 2004), where this project is located. The Analysis Area includes all known spotted owl sites potentially affected by the proposed actions. This is the same scale of analysis used for consultation.

Habitat Status

The northern spotted owl, a federally-listed threatened species, is associated with existing habitat in and adjacent to the Nedsbar Project Area. Spotted owls are closely associated with older forests for nesting, foraging, and roosting throughout most of their range (Forsman et al. 1984, Carey et al. 1990, and Solis and Gutierrez 1990). Spotted owl habitat within the Analysis Area was divided into four habitat types: Nesting, Roosting, Foraging (NRF), Dispersal-only, Capable, and non-Habitat (Table 3-31 and Figure 3-9). Table 3-1 depicts, to the best of the wildlife biologist's knowledge, the current amount and type of NSO habitat as described for lands managed by the BLM within the NSO Analysis Area. The geology, fire history, ownership patterns, and past management practices have resulted in this current distribution of NRF, dispersal, and non-habitat within the NSO Analysis Area and Project Area. The past management actions include the completed past projects listed in the Chapter 3 Introduction. The current baseline includes updates to habitat from all past activities including

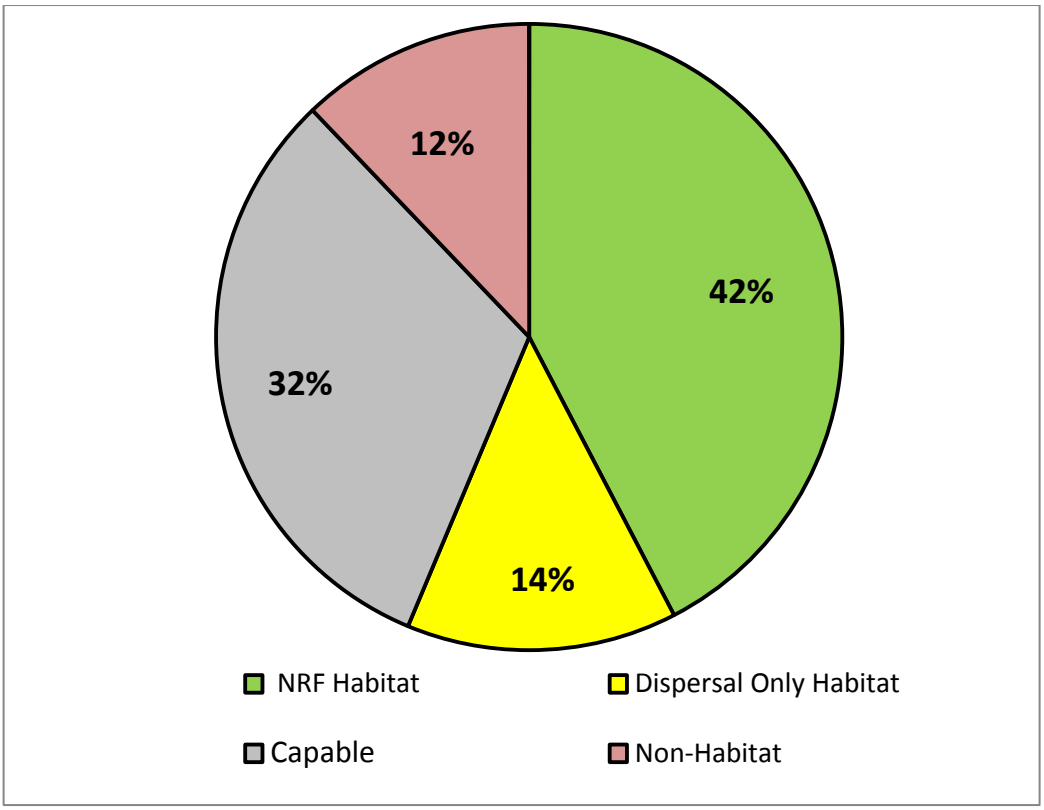
post-harvest monitoring of the recently implemented timber sales and stewardship projects in the Nedsbar Analysis Area, including habitat updates from the O'Lickety, Lick Stew, Bald Lick, and Wagner Anderson Projects. These actions have determined the existing current habitat condition for the Affected Environment within the NSO Analysis Area.

Table 3-31. Northern spotted owl habitat types on BLM Lands in the Nedsbar NSO Analysis Area.

Habitat Type	Description	Acres on BLM-Administered Lands
Nesting, Roosting, and Foraging (NRF)	Meets all spotted owl life requirements. Stands are generally older than 80 years, have a high canopy cover (greater than 60%), a multilayered structure, and large overstory trees. Deformed, diseased, and broken-top trees, as well as large snags and down logs, are also present. Suitable habitat also includes areas with more uniform structure that may not have nesting structures, but provides roosting and foraging habitat with flying space for owls in the understory.	11,957
Dispersal Only Habitat	Not suitable for spotted owl nesting/roosting/foraging, but has sufficient patchy cover to be used for travel between suitable stands, a minimum 40% canopy cover, and an average tree diameter greater than 11 inches with flying space for owls in the understory.	3,946
Capable Habitat	Forest that is currently not spotted owl habit, but can become NRF or dispersal in the future as trees mature and canopy fills in.	8,905
Non- Habitat	Lands that do not provide habitat for spotted owl and would not develop into NRF or dispersal in the future (open prairies, meadows, shrub lands, etc.)	3,425
	Total	28,233

Field work to classify NSO habitat was conducted in the proposed treatment stands. Areas outside of proposed treatment units have not been verified on the ground. Mapping of habitat outside of proposed treatment areas is estimated as NSO habitat types with the use of aerial photos. Habitat connectivity is important for wildlife movement and species viability. The Nedsbar Analysis Area is highly fragmented. There are large gaps between habitat patches which may influence species' movement.

Figure 3-9. Percentages of northern spotted owl habitat on BLM lands within the Nedsbar Analysis Area.



Northern Spotted Owl Recovery Plan

On June 30, 2011, the USFWS released the Revised Recovery Plan for the Northern Spotted Owl for public comment (USDI FWS 2011). This Revised Recovery Plan recommends achieving recovery of the spotted owl through recovery actions, such as conserving spotted owl sites and retaining high quality habitat. The Recovery Plan is not a regulatory document; it provides guidance to bring about recovery through prescribed management actions and supplies criteria to determine when recovery has been achieved. The BLM continues to work with the Service to incorporate Recovery Goals and Actions consistent with BLM laws and regulations.

Recovery Action 6 (RA 6)

Approximately 417 acres of young stand thinning treatments (dispersal and capable habitat) planned in the Nedsbar project would accelerate the development of structural complexity and biological diversity and would meet Recovery Action 6.

Recovery Action 10 (RA 10)

The BLM worked to meet the intent of Recovery Action 10 by planning the projects to minimize effects to spotted owl sites To the extent practicable, the Ashland project biologist and core team followed principles in the SW Oregon Recovery Action 10 Guidance Document (USDA FS USDI FWS 2013) to reduce impacts to sites with recent pair and/or reproduction activity within the project area.

Recovery Action 32 (RA 32)

The intent of RA 32 is to maintain 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. Within the administrative units of the Rogue River-Siskiyou National Forest and the Medford District BLM, an interagency, interdisciplinary team was created to develop a methodology for identifying Recovery Action 32

structurally complex forest for project level planning and NSO consultation needs in SW Oregon (USDA FS and USDI BLM 2010). Stands proposed for treatment in the Nedsbar Project Area were evaluated using interagency draft methodology. Stands evaluated and meeting the definitions in the methodology are referred to as RA32 stands. Through field evaluations, 20 acres within the proposed units were determined to meet RA32 stand conditions. No harvest activities, fuels reduction treatments, road construction, yarding corridors, or skid roads are planned to occur within RA32 stands.

Critical Habitat

The USFWS published the *Revised Critical Habitat for the Northern Spotted Owl*, which designated NSO critical habitat on Federal lands, in the *Federal Register* on December 4, 2012 **(**77 FR 233:71876-72068) and became effective January 3, 2013.

A CHU (critical habitat unit) identifies geographic areas that contain features essential for the conservation of the NSO and may require special management considerations. For the NSO, these features include particular forest types of sufficient area, quality, and configuration distributed across the range of the species that will support the needs of territorial owl pairs throughout the year, including habitat for nesting/roosting/foraging, and dispersal. Approximately 49% (17,512 acres) of Federal land within the Project Area is in designated critical habitat (only Federal land is designated as critical habitat). On BLM lands, the CHU portion of the Nedsbar Area contains 7,812 acres of NRF habitat 2,931 acres of dispersal-only habitat, 4,114 acres of potential habitat, and 1,420 acres of non-habitat.

The Nedsbar project is located in the Klamath East (KLE) critical habitat unit (also referred to as Unit 10) and specifically, it is within the subunit KLE 6. The KLE–6 subunit consists of approximately 18, 934 acres in Josephine and Jackson Counties, Oregon and comprises lands managed by BLM that are managed as directed by the NWFP (USDA FS and USDI BLM 1994, entire). Special management considerations or protection are required in this subunit to address threats to the essential physical or biological features from current and past timber harvest, losses due to wildfire and the effects on vegetation from fire exclusion, and competition with barred owls. This subunit is expected to function for demographic support to the overall population and for north-south and east-west connectivity between subunits and critical habitat units.

Northern Spotted Owl Sites Associated with the Analysis Area

The Nedsbar Project Area is located within the provincial home ranges (1.3-mile radius from the site center) of 13 historic spotted owl sites. Of the 13 sites, there are 4 historic sites on Forest Service (one is a shared site with BLM). The complete history of the Forest Service sites is unknown, but at one time territorial pairs were present at all of the sites. A historic NSO site is defined as a location with evidence of historic or current use by NSOs. Evidence includes breeding, repeated location of a pair or single bird during a single season or over several years, presence of young before dispersal, or some other strong indication of occupation.

No known nests are located within the proposed treatment units. The survey history for each NSO site within the analysis area has varied over the years. Reproduction has been confirmed at seven sites in the last 20 years. For purposes of this analysis, all sites are assumed to be occupied. While there is no requirement to survey for spotted owls prior to implementing forest management actions, the BLM conducted six survey visits to all of these sites in 2014, and three visits in 2015. Six visits are planned for 2016 and spot check surveys will continue as required by the protocol in 2017 and 2018.

All of 13 home ranges completely contained in the Analysis Area are historic sites, including four sites on Forest Service land. These sites have not been surveyed or monitored consistently in the past 15 years. Surveys for the BLM sites started again in 2014 after 5 to 14 year break from surveys (approximately eight year average since surveys were last done at the sites). Spotted owls were only detected in two of the sites in 2014. Additionally, one unknown strix species (barred or spotted owl) was heard at one site in 2014. Spotted owls were only detected in two of the sites in 2015 (only one site was the same as in 2014). Eight of the total ten sites on BLM within Analysis Area have been occupied by a pair of spotted owls at least one year since the original surveys in the early 1990s. Only limited survey history is available for the three Forest Service sites.

Of these 13 known sites, nine are designated Known Spotted Owl Activity Centers (KSOACs), with approximately 100 acre core areas. The KSOACs were established by Standards and Guidelines of the Northwest Forest Plan to protect the 100 best northern spotted owl habitat acres in close proximity to nest sites or activity centers, known to exist as of January 1, 1994 (NWFP, p. C-10). No Nedsbar treatments are proposed in these KSOACs. There are 24 NSO sites which have a portion of their home range overlapping the Analysis Area. However, no units are proposed within these home ranges, so no effects are anticipated.

Northern Spotted Owl Provincial Population Trends

Eleven demographic studies have been established to represent owl status across the range of the NSO (Forsman et al. 2011). Owl sites and productivity are annually monitored in this area to:

- Assess changes in population trend and demographic performance of spotted owls on federally administered forest lands within the range of the owl, and
- Assess the changes in the amount and distribution of nesting, roosting, and foraging habitat and dispersal habitat for spotted owls on federally administered forest lands.

Metadata analysis evaluates population statistics of the owls in the demographic study areas. The most recent metadata analysis, published in 2016, found that fecundity, the number of female young produced per adult female, is declining. Dugger et al. (2016) concluded that fecundity, apparent survival, and/or populations were declining on most study areas, and that increasing numbers of barred owls and loss of habitat were partly responsible for these declines. The 2016 metadata analysis found these declines are occurring in more study areas than indicated in the last 2011 metadata analysis (Forsman 2011). The 2016 data indicate that competition with barred owls may now be the primary cause of northern spotted owl population declines across their range.

The Klamath Demography Study Area (KDSA) is in the Klamath province where the Nedsbar project is located. The KDSA is approximately 32 miles northwest of the Nedsbar Project. The last three years of annual reports for the Klamath Study Area have shown declines in occupancy rates, fecundity, and the number of nesting attempts and juveniles detected.

Barred Owls

The 2011Revised Recovery Plan for the Northern Spotted Owl identifies competition from the barred owl as a threat to the spotted owl (USDI FWS 2011). Barred owls (*Strix varia*) are native to eastern North America, but have moved west into spotted owl habitat. Existing evidence suggests that barred owls compete with northern spotted owls for habitat and prey with near total niche overlap and that interference competition (Dugger, et al. 2011, Van Lanen, et al. 2011, Wiens et al. 2014) is resulting in increased northern spotted owl site abandonment, reduced colonization rates, and likely reduction in reproduction (Olson, et al. 2004, Dugger, et al. 2011, Forsman, et al. 2011, Wiens 2014).

Barred owls are detected opportunistically because the BLM does not conduct barred owl surveys across the District. These incidental observations are increasing within the Medford District, which matches the trend of increasing numbers of barred owls across the range of the northern spotted owl. Incidental observations across the District, as well as information from the Klamath Demography Study Area, indicate that barred owls are increasing in this area. Local populations of barred owls are likely to increase over time. Observational data suggests direct competition with and aggressive displacement of spotted owls from prime nesting habitat.

The BLM did not conduct surveys specifically for barred owls in the Nedsbar Project Areas. While the BLM did not specifically survey for barred owls, a study in the Oregon Coast range suggests that over the course of a season, spotted owl surveys to protocol (> 3 visits) allow ~85% of the barred owls present in the area to be detected (Wiens et al. 2011). Additionally, the 2012 NSO survey protocol allows for a reasonable assurance that spotted owls in an area will be detected, even where barred owls are present. The Service and cooperators conducted analyses of historical spotted owl survey data, leading to estimates of detection rates for spotted owls that account for the effects of barred owl presence. These detection rates, along with data on spotted owl site

colonization and extinction probabilities, and empirical analysis of spotted owl site occupancy, were utilized in developing the survey protocol used by the BLM in the Project Area. Use of the 2012 Protocol serves two primary purposes: (1) provide a methodology that results in adequate coverage and assessment of an area for the presence of spotted owls, and (2) ensure a high probability of locating resident spotted owls and identifying owl territories that may be affected by a proposed management activity, thereby minimizing the potential for unauthorized incidental take (USDI FWS 2012).

Barred owls have been recorded when detected during spotted owl surveys. Since NSO surveys started again in 2014, barred owls have been detected at 4 sites. In 2014, a barred owl pair with young was detected near one NSO nest site.

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 this 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).

b. Fisher (Bureau Sensitive Species)

The Nedsbar project is within the range of the West Coast DPS of fisher. The Service issued a proposal to list the West Coast Distinct Population Segment (DPS) of fisher (*Pekania pennanti*) as a threatened species under the Endangered Species Act in the Federal Register on October 7, 2014 (79 FR 194:60419-60443). This proposal occurred during early planning of the Nedsbar project. On April 14 2016, the USFWS announced the West Coast Distinct Population Segment (DPS) of fisher (*Pekania pennanti*) would not be listed under the Endangered Species Act, and was later published in the Federal Register on April 18, 2016 (81 FR 74:22710-22808).

Scale of Analysis

The NSO Wildlife Analysis Area is used to analyze habitat for fisher. Home range size for fisher is variable, but in the nearby Ashland Watershed study, the average fisher home range is approximately 1, 920 acres. Thus the 51,440 acres Wildlife Analysis Area is a conservative approach to analyze potential effects to fisher home ranges and would be expected to yield a reasonable representation of effects to the species.

Habitat and Species Status

Fishers are 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 fallen 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. Fishers typically den in areas with canopy cover greater than 80% (USDI FWS 2006).

Females usually give birth in cavities (natal den) in large live or dead trees. These cavities are in trees with openings that access hollows created by heartwood decay (Aubry and Raley 2002). After the kits become more active, the females move them to a larger den (maternal den) on or near the forest floor. These dens are primarily cavities in the lower bole or butt of live or dead large trees. Fishers also use snags, mistletoe brooms, rodent nests, logs, and cull piles for rest sites (Lofroth et al. 2010).

Fishers are highly mobile and have large home ranges, and travel over large areas. They are commonly observed at the lower 2/3 of the slope and connectivity in these riparian reserves provides cover from predators for fisher movement. In the Southern Cascades population, the average home range for females was approximately 6,200 acres (25 km^2). Male home ranges varied from approximately 36,300 acres (147 km^2) during breeding season to 15,300 acres (62 km^2) during the nonbreeding season (Aubry and Raley 2006). Other fisher research studies on the west coast have shown that fisher mean home range size vary considerably. Females' mean home ranges vary from 1.7 km^2 to 59 km^2, and males' from 7.4 km^2 to 177.5 km^2.

The northern spotted owl NRF and Dispersal habitat-types described above 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). Dispersal habitat was added to also represent denning habitat based on the nearby Fisher study on Forest Service Managed lands in the Ashland Watershed. Maternal and natal dens were located in spotted owl dispersal habitat. The key habitat component for these dens in the drier forests have been cavities in hardwoods (madrones and oaks). Adding all dispersal habitat is likely an overestimate of total denning habitat, but it is a conservative approach to try to analyze potential habitat with denning structure.

Based on the NSO habitat analysis, approximately 15, 903 acres of suitable fisher denning and resting habitat exist on BLM-administered lands within the Analysis Area. However, all of these acres may not provide optimal fisher habitat because past harvest practices and land ownership patterns have resulted in a highly fragmented landscape. BLM "checkerboard" ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA FS and USDI BLM 1994). This checkerboard ownership pattern was created by the Congressional acts that provided land grants, and is beyond the scope of the BLM's authority. There are large gaps between habitat patches which may influence movement of fisher. The dispersal distance for a fisher is likely related to habitat quality and spatial separation of habitat. Fisher tend to avoid areas with no overhead cover likely because of the exposure to predators (Buskirk and Powell 1994). Large areas without overhead cover may create a barrier to dispersing fisher (Powell 1993, Jones and Garton 1994, Weir and Corbould 2010).

Fisher surveys using baited camera stations and hair snares have been conducted in portions of the Analysis Area. Fishers were detected at camera stations and have been observed in forested areas within the Analysis Area. No dens have been identified. Currently the only way to find a den is through radio telemetry studies. The habitat within the Nedsbar Project Area and Analysis Area is likely used for all stages of fishers' life history (i.e., foraging, resting, dispersing, reproduction).

According to the nearest fisher study in the Ashland Watershed, the average fisher home range is approximately 1,920 acres. Since female home ranges frequently overlap, the project area has the potential to contain at least three female home ranges and one male home range, and possibly more, depending on their home range juxtaposition on the landscape surrounding the project area.

c. Siskiyou Salamander *(Plethodon Stormi)*

The Siskiyou Mountains Salamander is a member of the family Plethodontidae, the lungless salamanders. Members of the genus *Plethodon* respire primarily through their skin and are completely terrestrial. The Siskiyou Mountains salamander (SMS) is considered a talus or rock substrate obligate, and has rarely been found far from talus deposits or fissured rock outcrops (Stebbins 1985, Nussbaum 1974). Forested stands with high canopy cover and larger conifers, when associated with rocky soils, often harbor abundant populations of Siskiyou Mountains salamander (Nussbaum et al. 1983, Ollivier et al. 2001, Welsh and Ollivier 1998, Suzuki et al. 2008). These stands are most common on north facing slopes where this species reaches its highest abundances (Nussbaum et al. 1983) and is most commonly encountered (Farber et al. 2001). Within the range of the Siskiyou Mountains salamander (SMS), the landscape is somewhat fragmented by past timber harvest practices and current fire regimes, and is a patchwork of stands of different seral stages, from early seral to

mature forests. Siskiyou Mountains salamanders and their habitat are found nested within this patchy forested regime.

Current management direction for the Siskiyou Mountains Salamander is described in detail in the Conservation Agreement for the Siskiyou Mountains Salamander (*Plethodon stormi*) in Jackson and Josephine Counties of Southwest Oregon; and within Siskiyou County in northern California (USDI FWS 2007). This Agreement adopts the Conservation Strategy (Olson et al. 2007) developed for this species (USDA FS and USDI BLM 2007) and utilized the following strategy:

1) Sites identified for Siskiyou Mountains Salamander conservation were selected by a panel of scientists and natural resource managers from records in the GeoBOB databases. These sites are referred to as "high-priority" sites. The potential role of a site was reviewed at the Applegate River Subbasin, 6th field watershed and individual site scales.

2) At the Applegate Subbbasin scale, each site was evaluated based on the distribution of known sites, federal land allocations, the predictions of a habitat model, and the predicted risk to persistence from natural (fire) and anthropogenic disturbances.

3) Within each 6th field watershed, sites were selected for protection to reduce extinction likelihood within the watershed and to contribute to well-distributed, interacting sub-populations. Locations that occurred in or near existing Federal Reserve land allocations as defined in the Medford District Resource Management Plan and the Rogue River National Forest Plan were prioritized for selection. Land allocations include large Late-Successional Reserve owl cores, botanical set-asides, and Riparian Reserves.

There are a total of 201 sites on BLM managed lands (adding up to 4,786 acres) set aside for SMS management as identified in the Conservation Agreement signed on August 16, 2007. There are 14 high-priority sites located within the Nedsbar Analysis area (totaling 665 acres); one of these sites is within treatment units. Numerous Siskiyou Mountains salamander sites were found during mollusk surveys in the project area. Two proposed vegetation management units with pockets of talus habitat were found to be occupied by SMS. In the SMS Conservation Assessment (p. 23) these specific sites are mentioned to be in addition to the reserve system established through the Standards and Guidelines in the Medford BLM Resource Management Plan. The site will be monitored for occupancy post treatment.

Ground-truthing of the high-priority site polygons within the Nedsbar Project Area revealed significant differences between modeled habitat areas and the on-the-ground physical habitat. Each site was ground-truthed to more accurately match the on the ground habitat (talus). These areas have been flagged on the ground in areas where management activities are proposed. As described within the Conservation Strategy, management discretion of high-priority salamander sites is expected. Although specific sites were selected and delineated as high-priority salamander management areas, the Strategy allowed for flexibility to fine tune these recommendations during project planning. Project design features developed for SMS are described in Chapter 2.

Population Status

According to the Conservation Agreement for the Siskiyou Mountains Salamander in Jackson and Josephine Counties of Southwest Oregon (2007), nothing is known about the population trends for Siskiyou Mountain Salamander. The rationale for discontinuing the survey requirement was that enough known sites were already protected to ensure persistence of the species in the northern portion of its range.

d. Other Wildlife Species of Concern

USFWS Birds of Conservation Concern and Game Birds below Desired Condition

Resident (found year-round) and Neotropical bird species are addressed here due to widespread concern regarding downward population trends and habitat declines. BLM has interim guidance for meeting federal

responsibilities under the Migratory Bird Treaty Act and Executive Order 13186 (EO). Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through Instruction Memorandum No. 2008-050 (USDI BLM 2008). The Instruction Memorandum relies on two lists prepared by the US 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 (project area is in BCR 5) and *Game Birds Below Desired Condition* (GBBDC). Table 3-32 displays those species that are known or likely to be present in the analysis area.

Table 3-32. BCC and GBBDC species known or likely to be present in the Project Area.

Scientific Name	Common Name	Status
Patagioenas fasciata	band-tailed pigeon	GBBDC
Zenaida macroura	mourning dove	GBBDC
Contopus cooperi	olive-sided flycatcher	BCC
Selasphorus rufus	Rufous hummingbird	BCC
Carpodacus purpureus	purple finch	BCC

GBBDC – Game Birds below Desired Condition
BCC – Birds of Conservation Concern

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.

Band-tailed pigeons are generally found in temperate and mountain coniferous and mixed forests and woodlands, especially pine-oak woodland. They will often forage in diverse habitats not used for nesting, including cultivated areas, suburban gardens and parks (Braun 1994). Mineral springs and mineral graveling sites are important for mineral intake by adults, especially during the nesting season. Pigeons show strong fidelity to mineral sites and have been documented traveling 32 miles from a nesting site to a mineral spring (Jarvis and Passmore 1992).

Mourning doves 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 are 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. 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 cover 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 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). Nests sites are located in a variety of plants and sites including shrubs, drooping lower branches of trees-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).

The **purple finch** is likely to be found in the project area. In summer, purple finch mainly breed 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). In winter they are more widespread, using forests, shrubby areas, weedy fields, hedgerows, and backyards.

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 Sensitive Species program. However, protection is afforded under the Bald and Golden Eagle Protection Act and under the Medford District RMP.

In Oregon, golden eagles inhabits 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' tall and 3' wide), and often built in large live ponderosa pines (>30" DBH) or on ledges along rims and cliffs (Marshall et al. 2003). There are no known golden eagles nests in the project are but they are often seen soaring in the Applegate and there are large enough trees in the project area to support nesting.

4. Environmental Consequences

The following discussion describes relevant effects that each alternative would have on federally listed, Bureau sensitive, and other species of concern and their habitat. The effects analysis on wildlife species is organized by vegetation treatment and road work. Impacts to wildlife from the proposed actions are measured by changes to stand structure in different habitat types.

a. Alternative 1 – No Action

Northern spotted owl

Under the No Action Alternative, some future foreseeable actions within the Nedsbar Analysis Area (listed in the introduction of Chapter 3) would alter northern spotted owl habitat. A summary of ongoing and foreseeable actions within the wildlife Analysis Area is provided in Section 3.A.2.

Table 3-33 shows the acres of proposed changes to NSO habitat on BLM lands within the Analysis Area that would occur regardless of the Nedsbar project. On privately owned lands, predicting future foreseeable actions is difficult due to the multitude of individual landowners. It is assumed that industrial timber lands would be harvested on a 60-year rotation (RMP EIS; USDI BLM 1995, pp. 3 & 4-5 to 3 & 4-6) and would be maintained in early to mid-seral habitat. The vast majority already of private land quantify as unsuitable habitat across the landscape. The potential for retention and maintenance of existing late-successional forest, as well as the development of future late-successional forest in the Nedsbar Project Area is greatest on federal lands.

Since acres of existing spotted owl habitat on US Forest Service and private lands were not available, this analysis will only focus on effects to BLM lands within the wildlife Analysis Area. The acres in Table 3-33 are from the following projects: Jack-Ash hiking trail, planned fuels treatment, and Bobar Thin and Lick Stew. These projects would continue regardless of Nedsbar project implementation. Projects that do not affect NSO habitat are not included in this analysis. All previous activities are accounted for in the baseline data (see Table 3-33 above and included in Table 3-35 as well). This includes fuels treatments, timber harvest and habitat reductions from past wildfires.

Table 3-33. Effects to spotted owl habitat on BLM lands within the Nedsbar Planning Area from Existing and Foreseeable Projects.

Alternative	NRF Removed	NRF Downgraded	NRF Treated and Maintained	NRF No Treatment	Dispersal Only Habitat Removed	Dispersal Only Habitat Treated and Maintained	Dispersal Only No Treatment
Baseline	0	0	0	11,957	0	0	3,946
Alt. 1	0	22	79	11,856	0	148	3,798

Under Alternative 1, management activities would remove or alter suitable habitat within the wildlife Analysis Area and habitat would continue to develop along current successional pathways. Table 3-33 describes the effects for ongoing and/or foreseeable projects in the Analysis Area. Projects that don't affect NSO habitat are not included in this discussion. The acres in Table 3-33 are from the following projects: Jack-Ash hiking trail, planned fuels treatment, and Bobar Thin and Lick Stew. These projects would continue regardless of Nedsbar project implementation. All previous activities are accounted for in the baseline data. This includes fuels treatments, timber harvest and habitat reductions from past wildfires.

Under Alternative 1, management activities would not remove or alter suitable habitat within the Wildlife Analysis Area and habitat would continue to develop along current successional pathways. Some timber stands within the project area are dense and could be more prone to large scale wildfire events. Additionally, the development of large tree structure comparable to that of remnant trees used by spotted owls is not likely to occur because current stand conditions are too dense and trees are not developing the diameter to height ratio required to develop this structure. This ratio was historically created through frequent fire events that reduced stem densities and competition that created open-grown conditions. Current stand conditions would likely develop into less complex stand structures and species compositions than that of old growth stands (Sensenig 2002).

As a result of these dense forest stands, spotted owl NRF habitat characteristics, such as large live trees, large limbs, broken top snags, multi-storied stands, and higher canopy cover would be at greater risk for loss through stand replacing fires. Additionally, stand replacing fires would remove or downgrade habitat randomly across the landscape, setting back succession and development. Even with foreseeable fuel hazardous reduction projects proposed within the Analysis Area, wildfire would remain the most immediate hazard to spotted owl habitat within the Analysis Area under the No Action Alternative.

Fisher

The following discussion describes relevant effects that each alternative would have on fisher and their habitat. The effects analysis is organized by vegetation treatment and road work. Impacts to fisher from the proposed actions are measured by changes to stand structure in different habitat types. Project effects to fishers are measured by the changes to denning and resting habitat in acres.

Under the No Action Alternative, no vegetation management would be implemented under the Nedsbar project and there would be no direct effects to fisher on BLM-administered lands. No suitable fisher denning and resting habitat would be removed within the fisher Analysis Area through existing projects or future foreseeable projects (see Table 3-34). Under the No Action Alternative, thinning treatments proposed in existing projects would reduce the quality of 22 acres of suitable denning and resting habitat due to the reduced canopy cover. Approximately 227 acres (-1.6 percent) of the existing denning and resting habitat would be maintained throughout the fisher Analysis Area. These areas would continue to provide suitable habitat for fisher and other

late-successional forest habitat dependent species and would help maintain future connectivity throughout the watersheds.

Throughout the remainder of the Analysis Area, habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl (NRF and Dispersal). Without treatment , the current stand conditions would likely develop into less complex stand structures and species compositions than that of late-successional stands (Sensenig 2002), or at the very least, would require a much longer time scale to develop into more complex, late successional habitat (Tappeiner et al. 1997). Habitat conditions would remain generally unchanged at the unit scale in the short term unless a major disturbance such as fire, wind, ice, insects, or disease occurred. Particularly to fishers, the greatest risk of No Action is the potential wildfire related loss of large live remnant conifers as well as snags and down wood important to fisher natal and denning habitat.

Table 3-34. Effects to Fisher Denning Habitat on BLM Lands within the Analysis Area from Existing and Foreseeable Projects.

Alternative	Fisher Denning/Resting Removed	Fisher Denning/Resting - Reduced Quality	Fisher Denning/Resting Maintain	Total Planned Activities	Fisher Denning/ Resting No Treatment	Non-Habitat
Baseline	0	0	0	0	15,903	12,330
Alt. 1	0	22	227	249	15,654	11,081

Siskiyou Salamander

Under the No Action Alternative, future foreseeable actions with the Analysis Area would alter northern spotted owl habitat. A summary of ongoing and foreseeable actions on Federal lands is provided in the introduction to section 3 of this EA. On privately owned lands, predicting future foreseeable actions is difficult due to the multitude of individual landowners. It is assumed that industrial timber lands would be harvested on a 60-year rotation (RMP EIS; USDI BLM 1995, pp. 3&4-5 to 3&4-6) and would be maintained in early to mid-seral habitat. The vast majority already of private land quantify as unsuitable habitat across the watershed. The potential for retention and maintenance of existing late-successional forest, as well as the development of future late-successional forest in the Analysis Area is greatest on federal lands. Since acres of existing spotted owl habitat on USFS and private lands were not available, this analysis will only focus on effects to BLM lands within the Nedsbar Analysis Area. Future and foreseeable actions on BLM lands would be 249 acres of treatments over the next 5 years.

b. Alternative 3, 4, 5 Effects Common to All Alternatives

Northern Spotted Owl

Vegetation Management

When discussing changes to spotted owl habitat, the following describes how various vegetation treatments change habitat conditions after treatment implementation. Canopy cover is used as one of the key habitat components because it is highly important to NSO nest site selection and general habitat use, because increased levels of canopy afford protection from predators, and regulate temperature extremes (Courtney et al. 2004). “NRF removed” denotes that canopy cover is reduced to < 40 percent in nesting, roosting or foraging habitat resulting in non-suitable habitat. NRF downgraded denotes that the NRF habitat has been downgraded to “dispersal-only” habitat because 40 to 59 percent canopy cover would be retained post-harvest. NRF treated

and maintained denotes that habitat is modified but still provides nesting, roosting or foraging habitat because a minimum 60 percent canopy cover would be retained, as well as other key habitat features such as snags and coarse woody material. Dispersal removed denotes that canopy cover is reduced to < 40 percent resulting in non-suitable habitat. Dispersal treated and maintained denotes that habitat is modified but still provides dispersal because at least 40 percent canopy cover would be retained.

The proposed habitat modification associated with all action alternatives could affect individual adult spotted owls or young, such that their normal behavior, survival, and/or reproduction might be compromised. The loss of key habitat features such as mature trees and high canopy cover would increase the likelihood of spotted owls in the Analysis Area to be subject to: displacement from nesting areas; increased competition of suitable nest sites; decreased survival due to increase predation and/or limited forage availability; reduction of future nesting opportunities; and reduction of dispersal capabilities (USDI FWS 2006). Under any of the proposed alternatives, common prescriptions will be applied and will result in the proposed habitat modifications, creating a mosaic of habitat types (nesting, roosting, and foraging, as well as non-habitat). Therefore, there would still exist a mosaic of habitat types within the home ranges of the known spotted owl sites within the Analysis Area. The proposed harvest in all action alternatives would not preclude spotted owls from nesting within the Analysis Area, because NRF habitat would still be retained in untreated areas, including the KSOAC 100 acre core areas. Additionally, season restrictions listed as Project Design Features would prevent disturbance to nesting spotted owls within the Analysis Area during the critical breeding season.

Northern Spotted Owl Sites

When analyzing the impacts to spotted owls, the amount, intensity and duration of treatment are not the only factors to consider. A critical factor to consider is the spatial distribution of the habitat found across the landscape and where the proposed treatments would occur in relation to known NSO nest sites. These areas of use are defined as follows:

- **Nest Patch** is the 300-meter (984-foot) radius area around a known or likely nest site; it is included in the core area (USDI BLM 2016).
- **Core Area** is a 0.5-mile radius circle (approximately 500 acres) from the nest or center of activity to delineate the area most heavily used by spotted owls during the nesting season; it is included in the provincial home range circle. Core areas represent the areas which are defended by territorial owls and generally do not overlap the core areas of other owl pairs (USDI BLM 2016).
- **Provincial Home Range** is defined by a circle located around an NSO activity center and represents the area owls are assumed to use for nesting and foraging in any given year. For the Western Cascade Province the home range is a 1.2 mile radius circle (approximately 2,894 acres (USDI BLM 2016). The home ranges of several owl sites may overlap.

These three areas represent how NSOs utilize the forest environment around their nest sites, and the importance of the habitat located within each spatial scale to a given NSO pair. They also provide a better understanding of how habitat altering treatments may affect NSOs life functions depending on where the treatment would occur in relation to known NSO nest sites.

No harvest treatments are proposed in the Nest Patch of any NSO sites under any of the action alternatives. Research has shown that the habitat quality within 300 meters (984 feet) of a nest site (known as the nest patch) is critically important to determining nest site positioning across the landscape (Perkins et al. 2000).

Spotted Owl Prey Species

Treatments associated with all action alternatives that would remove, downgrade, or maintain spotted owl habitat may also impact foraging by changing habitat for spotted owl prey species (USDI FWS 2006). Residual trees, snags, and down wood retained in the thinned stands would provide some cover for prey species over time, and would help minimize harvest impacts to some prey species, such as dusky-footed woodrats. Treatment implementation would be spread out temporally and spatially within the Analysis Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term

effects at the project level. Northern spotted owls seldom venture far into non-forested stands to hunt. However, edges can provide better hunting opportunities for owls due to the increased vulnerability of the prey and easier access to the prey (Zabel et al. 1995).

Bingham and Noon (1997) reported that a spotted owl core area is the area that provides the important habitat elements of nest sites, roost sites, and access to prey, benefiting spotted owl survival and reproduction. Rosenberg and McKelvey (1999) reported that spotted owls are "central place" animals with the core area (the area closest to the nest) being the focal area. Several studies (Wagner and Anthony 1998, Dugger et al. 2005, Zabel et al. 2003, Bingham and Noon 1997) indicate the core area size for the Klamath province is 0.5 miles from the nest site (or 500 acres). Therefore, effects to prey species for each alternative would be assessed by the amount of habitat treated within the 0.5 mile core area. The core area is a 0.5-mile radius circle (approximately 500 acres) from the nest or center of activity to delineate the area most heavily used by spotted owls during the nesting season; it is included in the provincial home range circle. Due to the spatial distribution of the proposed treatments, adequate and sufficient prey habitat would remain outside of the core area, but within the home range, which would continue to provide suitable foraging opportunities within the home range.

Barred Owl and NSO Interactions

This analysis considered new information presented in the 2011 Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011). Specifically, the recovery plan identified barred owls as one of the primary threats to the recovery of the spotted owl. Barred owls reportedly have reduced spotted owl site occupancy, reproduction, and survival (USDI FWS 2011). There is a perceived threat because barred owls use habitats typical of spotted owl habitat. They may be able to coexist through habitat segregation; however, whether this would occur is unclear (Courtney et al. 2004). Barred owls may be more of a habitat generalist and occupy a wider diversity of habitat types than spotted owls.

The cause of the barred owl invasion is not clear and the BLM has no control over barred owls or their encroachment into NSO habitat. To what extent the barred owl range expansion is a result of humans altering the environment is unknown (Monahan and Hijmans 2007, Livezey et al. 2008). The Nedsbar project meets Recovery Action 32, which is intended not to further exacerbate competitive interactions between spotted owls and barred, by retaining older and more complex multi-layered conifer forests. As mentioned above 20 acres of RA 32 habitat were identified in the Nedsbar project and removed from treatment.

Summary of Effects on Northern Spotted Owls from Implementation of All Alternatives

Table 3-35 summarizes the effects of the alternatives on the northern spotted owl.

Table 3-35. Summary of action alternative effects of all alternatives on spotted owl habitat on BLM lands within the Nedsbar Analysis Area.

Alternative	NRF Removed	NRF Downgrade	NRF Treat and Maintain	NRF No Treatment	Dispersal Only Removed	Dispersal Only Treat and Maintain	Dispersal No Treatment
Alt. 1	0	22	79	11,856 (99%)	0	148	3,798 (96%)
Alt. 3	33	0	289	11,635 (97%)	122	461	3,363 (85%)
Alt. 4	109	269	214	11,365 (95%)	141	935	2,870 (73%)
Alt. 5	2	30	212	11,713 (98%)	4	668	3,274 (83%)

Fisher

Vegetation Management

Proposed treatments in all the action alternatives would remove and reduce the quality of suitable fisher habitat; however, no known denning sites would be impacted and proposed activities would not be expected to cause direct mortality of any fishers.

Areas proposed for selective thinning treatments that would reduce the canopy cover below 40 percent would no longer provide suitable fisher denning and resting habitat, because key components, such as large snags, large down wood, multiple canopy layers, and canopy cover would be reduced and large trees would be removed. These areas would not provide foraging habitat until vegetation reestablishes to provide cover in approximately 5-10 years.

Proposed selective thinning treatments and group select treatments with at least 40 percent canopy retention would have short-term negative effects to fisher prey species due to the reduced vegetation. These effects are relatively short-term, as understory vegetation typically returns within 5 years and 60 percent canopy cover returns within 10-15 years. However, these short-term effects to fisher prey species would be minimal because the large amount of untreated areas within the Analysis Area would continue to provide forage habitat while canopy cover in the treated stands increases. Additionally, all treatments would retain large snags and coarse woody debris (CWD) to provide future habitat for fishers, and reduce potential impacts.

Project activity disturbance effects to fishers are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987, Powell 1993). Disturbance from project activities would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Fishers are highly mobile, and with large home ranges, they would likely move to another part of their home range while the activity is ongoing, which would result in a minimal short-term impact. Disturbance from project activities would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Ongoing radio telemetry work in the nearby Ashland watershed has shown that fishers are quick to respond to environmental changes (e.g., heavy snowfall) by moving to other parts of their home ranges (Clayton 2012). Seasonal restrictions incorporated as PDFs for other resources would benefit fishers by restricting project activities until young are approximately six weeks

old, approximately the age when fisher move young from natal dens and become more mobile. As indicated in the Affected Environment, surveys have detected fishers within the Fisher Analysis Area. If denning sites are found within the Project Area, seasonal restrictions would be implemented to avoid disturbance.

Summary of Effects on Fisher from Implementation of All Alternatives

Table 3-36 summarizes the effects of the alternatives on fisher.

Table 3-36. Summary of the effects of all alternatives on fisher habitat on BLM lands within the Nedsbar Analysis Area.

Alternative	Fisher Denning/Resting Removed	Fisher Denning/Resting - Reduced Quality	Fisher Denning/Resting Maintain	Total Fisher Habitat Treated	Fisher Denning/Resting No Treatment
1	0	22	227	249	15,654 (98%)
3	155	0	750	905	14,998 (94%)
4	250	269	1,149	1,668	14,235 (90%)
5	6	30	880	916	14,987 (94%)

Siskiyou Salamander

Vegetation Management

All action alternatives propose treatments within talus habitats for Siskiyou Mountains salamander. Removal of overstory may cause desiccation of the rocky substrates and loss of the moss ground cover, a microhabitat feature of Siskiyou Mountain salamander sites. Tree-felling and ground-based logging systems disturb the substrate which can result in substrate compaction and deconsolidation of the stabilized talus, which reduces or eliminates substrate interstices used by salamanders as refuges and for their movements up and down through the substrate. Site preparation practices such as broadcast burning removes the moss covering that helps to stabilize the talus.

Short term effects for all action alternatives would be a reduction in canopy cover that may change current cool moist forest floor conditions to warmer and drier conditions post-harvest. This change in microsite conditions may decrease the suitability of some talus habitat patches for Siskiyou Mountains salamander until the vegetation layers have been restored and the canopy cover increases. Long term effects for all action alternatives would be the reduction in stem densities and ladder fuels, resulting in a lower risk of a stand replacing fire event.

There is suitable habitat (pockets of talus) mapped in conjunction with the development of the conservation strategy. These are widely spread throughout the western part of the project area (in T. 39 S R. 3W). This location is within the Applegate Subbasin and described as a “hot spot” by the authors which identifies a high level of species richness of rare and uncommon taxa identified from previous survey efforts. These ‘hot spots’ include known sites of fungi, bryophytes, lichens, vascular plants and mollusks.

One of the primary threats to Siskiyou Mountains salamander is loss of high quality habitat. Salamanders move through the small pockets of space up to several feet below the forest floor. Disturbance of this habitat by heavy equipment can compact the rock and reduce the ability of salamanders to move through their habitat. Compaction can also harm individuals that are near the surface (Olson et al. 2007).

Other Wildlife Species of Concern

USFWS Birds of Conservation Concern and Game Birds Below Desired Condition

While the extent and scope would change for each action alternative, the general effects described below would be the same for all action alternatives. Due to the variety of habitat requirements, any action that changes or removes vegetation used by one species may benefit another. Therefore, analyzing the total acres treated by alternative best describes impacts to land birds. Species that require dense cover and forage have benefited from lack of fire and dense understories could be negatively affected by density management and thinning treatments designed to reduce vegetation density.

Due to habitat removal, songbird composition and abundance in treated stands could be reduced in the short term (Janes 2003; Hagar et al. 2001; Siegel et al. 2003). There would be a reduction of late-successional forest habitat from structural retention units. This would remove hiding cover and nesting habitat for neoptropical birds that use older forests. However, riparian buffers, untreated areas, and 100-acre spotted owl activity centers would continue to provide enough late-successional forest habitat within the project area for birds that use late-successional forest habitat. Additionally, existing large diameter snags and down wood found in older seral stands would be retained in the project area, and would continue to provide nesting, roosting, or foraging opportunities for species dependent on these key habitat structures.. Habitat for birds that use early seral habitat would increase as a result of structural retention treatments. Species, such as the Rufous Hummingbird, which use nectar producing plants would benefit from the increase in forbs and flowering shrubs that would occur post treatment. This increase would continue until the tree canopy recovers and shades out these plants. Additionally, the Olive-sided flycatcher would benefit from the creation of additional openings through structural retention and group selection treatments because they forage in open areas.

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, untreated areas adjacent to the treatment areas would provide refuge and nesting habitat, which would help minimize short term loss of habitat. Activities occurring during active nesting periods could even cause some nests to fail. Seasonal restrictions/Project Design Features would protect some nests from disturbance during project activities. There would be no perceptible shift in species composition the following breeding season because of the small scale habitat modifications in relation to the project area. The loss of a nest during one nesting season would not be expected to reduce the persistence of any bird species in the Analysis Area. Overall, populations in the region would be unaffected due to this small amount of loss that would not be measurable at the regional scale. Analyzing bird populations at this scale, as appropriate, is supported by Partners in Flight (California Partners in Flight 2002).

As described in the Affected Environment, the five USFWS species of concern (band-tailed pigeon, mourning dove, olive-sided flycatcher, rufous hummingbird and purple finch) known or suspected to occur in the project area prefer open to semi-open forests, stand edges, woodlands, brush, and agriculture land to nest and forage.

c. Alternative 3

Northern Spotted Owl

Vegetation Management

Selective thinning treatment types that would reduce canopy cover below 40 percent would remove 33 acres of NRF spotted owl habitat and 122 acres of “dispersal-only” habitat (see Table 3-5). These acres would not be expected to provide NRF or “dispersal-only” habitat for many years post-treatment (USDI FWS 2006) because

specific key habitat elements would be removed, including large-diameter trees with nesting cavities or platforms, multiple canopy layers, adequate cover, and hunting perches (USDI FWS 2011).

Approximately 153 acres would be thinned but would still function as NRF habitat (reduced quality) because a minimum of 60 percent canopy cover and key habitat features would be retained. Alternative 3 would treat but maintain 461 acres of "dispersal-only" habitat. These treatments would reduce the canopy cover within the stand, but would still function as spotted owl "dispersal-only" habitat.

Treatments proposed for maintenance of NRF and dispersal habitat would provide long term beneficial effects to habitat. Treatments would improve ecological health of the stands, reduce the chance of tree loss due to suppression mortality, and would reduce the intensity and risk of wildfire by removing excess fuels. In the short term, treatments adjacent to NRF and dispersal habitat could provide potential protection as the stands are made more fire resilient.

Even though treatments would occur in NRF and dispersal habitat, the effects would be minimal because they would be short-term in nature; activities would be distributed both spatially and temporally across the Project Area; and seasonal restrictions listed as project design features would avoid adverse disturbance to nesting spotted owls within the Analysis Area. Additionally, approximately 11,635 acres of NRF habitat and 3,363 acres of "dispersal-only" habitat would not be treated within the Nedsbar Analysis Area. Therefore, 99% of the existing NRF in the Analysis Area would continue to provide NRF habitat for nesting owls in the future. The combined acres of untreated NRF and dispersal only habitat (14,998 acres) within the analysis area would continue to provide sufficient habitat for dispersal. These untreated areas are sufficient in area and configuration to continue to facilitate dispersal within and throughout the Analysis Area.

Road and Landing Construction

Approximately 1 acre of NRF habitat and 5 acres of dispersal habitat would be removed from road and landing construction under Alternative 3. The majority of the new road and landing construction is proposed in within low habitat suitability according to the Relative Habitat Suitability (RHS) output from the MaxEnt model (USDI FWS 2011). These locations are not expected to provide long-term suitability. Only minimal effects to spotted owls are anticipated from the road construction because the location is at least 0.5 miles from a known nest site. Additionally, seasonal restrictions listed as project design features would avoid adverse disturbance to adjacent nesting spotted owls during road construction. The proposed road and landing construction is not expected to affect spotted owl dispersal within the Analysis Area because the actions are small in scope and would not be a barrier for dispersal. The proposed construction would affect 0.01% NRF and 0.15% Dispersal of the NSO within the analysis area. Therefore, road and landing construction is not expected to diminish survival or recovery of the spotted owl due to the small percentage of habitat affected.

Northern Spotted Owl Sites

Under Alternative 3, there are 535 acres of proposed treatments in spotted owl habitat (NRF or dispersal) within 13 owl home ranges: 0 acres of NRF would be removed. 219 acres of NRF and 316 of dispersal would be treated, but would be maintained and mostly function in the same manner following treatment; no NRF habitat would be downgraded to dispersal habitat; 3 acres of dispersal would be removed for roads and landings. Across the Wildlife Analysis Area, more than 97 percent of existing suitable (NRF) northern spotted owl habitat would remain untreated. Therefore, only minimal negative effects are anticipated as a result of the proposed treatments (Appendix F).

Critical Habitat

Approximately 239 acres NRF habitat would be treated and 'maintained' within the 2012 designated critical habitat. Long-term beneficial effects may be expected in these stands in critical habitat, as these thinning treatments would improve the health of the stands and make them less susceptible to severe losses from wildland fire or suppression-related diseases.

Spotted Owl Prey Species

Proposed treatments in Alternative 3 would alter the current habitat conditions for spotted owl prey species in 905 acres of spotted owl habitat (NRF and dispersal-only) which may also provide foraging opportunities. Only 1 acre of Dispersal habitat (<0.1 percent) of the total potential foraging acres on BLM lands within the 0.5 mile core areas would be treated. Treatment implementation would be spread out temporally and spatially within the Analysis Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term effects at the project level.

Summary of Effects on Spotted Owl Critical Habitat from Implementation of Action Alternatives

Table 3-37 summarizes the effects of the alternatives on spotted owl critical habitat.

Table 3-37. Summary of effects of all alternatives on spotted owl critical habitat on BLM lands within the Nedsbar Analysis Area.

Alternative	NRF Removed	NRF Downgrade	NRF Treat and Maintain	NRF No Treatment	Dispersal Only Removed	Dispersal Only Treat and Maintain	Dispersal No Treatment
BASELINE				7,812			2,931
Alt. 1	0	0	79	7,7343 (99%)	0	148	2,783 (95%)
Alt. 3	0	0	239	7,573 (97%)	4	381	2,546 (87%)
Alt. 4	8	220	188	7,396 (95%)	18	747	2,166 (74%)
Alt. 5	1	30	172	7,609 (97%)	3	514	2,414 (82%)

Fisher

Vegetation Management

The proposed treatments in Alternative 3 would occur in 905 acres of suitable denning and resting fisher habitat on BLM-administered lands. Of these acres, 155 would be removed and 750 would be treated and maintained. This alternative would remove trees, potential snags and coarse woody debris suitable for denning and resting habitat.

Selective thinning treatments that would reduce the canopy cover below 40 percent would remove 155 acres of suitable fisher denning and resting habitat within the Project Area. However, some legacy components would be maintained. Fishers use a variety of habitats, including old regeneration harvests and heavily thinned stands which have large residual trees either within the stands or at the edge. In the Southern Oregon Cascade Range Fisher Study, Aubry and Raley (2006) located fishers in managed forests with various degrees of overstory removal as long as the structures from the original forest were still present.

Proposed treatments maintaining habitat and retaining 40 and 60 percent canopy cover (750 acres) would continue to provide cover and key habitat features (i.e., large overstory trees, snags, hardwoods, and CWD)

essential for the life cycle of the fishers. These units would still meet fisher habitat needs for resting and foraging, and fishers would still be expected to use these stands.

Road and Landing Construction

Approximately 6 acres of denning and resting habitat would be removed from road and landing construction under Alternative 3. Only minimal effects to fishers are anticipated from the road because as mentioned above, fishers are highly mobile and have large home ranges, and would likely move to another part of their home range while the activity is ongoing, which would result in a minimal short-term impact. The proposed road and landing construction is not expected to affect fishers dispersing within the Analysis Area because the actions are small in scope and would not be a barrier for dispersal. The proposed construction would affect 0.16% of the fisher denning and resting habitat within the analysis area. Therefore, road construction is not expected to diminish fisher occupancy and survival in the Analysis area due to the small percentage of habitat affected.

Summary

The management actions in Alternative 3 would not contribute to the need to federally list the fisher as threatened or endangered because no known denning sites would be lost and suitable denning and resting habitat within the Analysis Area would be retained in untreated units. Habitat features, such as large snags and coarse woody material, would be retained throughout the Analysis Area, which would provide future habitat for denning and resting, and further reduce potential impacts. Fishers would not be precluded from dispersing or foraging in the Analysis Area because suitable habitat would still be retained, units with higher canopy retention would aid in dispersal, and key habitat features would be retained throughout the Analysis. Approximately 14,998 acres or (94 percent) of suitable fisher denning and resting habitat would not be treated throughout the Analysis Area.

Siskiyou Salamander

Alternative 3 proposes forested stand treatments using different prescriptions (as described in Section 2.C.2.) for a total of 1,541 acres treated.

d. Alternative 4

Northern Spotted Owls

Vegetation Management

Selective thinning treatments that would reduce the canopy cover below 40 percent would remove 109 acres of NRF spotted owl habitat and 141 acres of “dispersal-only” habitat (see Table 3-35). These acres would not be expected to provide NRF or “dispersal-only” habitat for many years post-treatment (USDI FWS 2006) because specific key habitat elements would be removed, including large-diameter trees with nesting cavities or platforms, multiple canopy layers, adequate cover, and hunting perches (USDI FWS 2011).

There are 269 acres proposed for thinning and group select treatments that downgrade NRF habitat to “dispersal-only” habitat. These acres would no longer be suitable NRF due to the loss of potential nest trees and the reduction of canopy cover. Specific key habitat elements removed by thinning harvest prescriptions may include some of those removed during regeneration harvest, but occur to a smaller degree because more of the original stand remains intact. The rate at which the residual stands return to NRF habitat after treatment can vary considerably depending on the abiotic (e.g., aspect, slope position, average rainfall, soil type) and biotic (e.g., tree species composition, disease, tree ages) factors at the site. However, thinned stands are expected to return to NRF habitat much more rapidly in comparison to stands treated with a regeneration harvest prescription because more of the key habitat features are retained after a typical thinning operation (Zabel et al. 1992, Davis et al. 2007).

Approximately 214 acres would be thinned but would still function as NRF habitat (reduced quality) because a minimum of 60 percent canopy cover and key habitat features would be retained. Alternative 4 would treat but

maintain 935 acres of "dispersal-only" habitat. These treatments would reduce the canopy cover within the stand, but would still function (reduced quality) as spotted owl "dispersal-only" habitat.

Treatments proposed for downgrade and maintenance of NRF and dispersal habitat would provide long term beneficial effects to habitat. Treatments would improve ecological health of the stands, reduce the chance of tree loss due to suppression mortality, and would reduce the intensity and risk of wildfire by removing excess fuels. In the short term, treatments adjacent to NRF and dispersal habitat could provide potential protection as the stands are made more fire resilient.

Even though treatments would occur in NRF and dispersal habitat, the effects would be minimal because they would be short-term in nature; activities would be distributed both spatially and temporally across the Analysis Area; and seasonal restrictions listed as project design features would avoid adverse disturbance to nesting spotted owls within the Analysis Area. Additionally, approximately 11,365 acres of NRF habitat and 2,870 acres of "dispersal-only" habitat would not be treated within the Nedsbar Analysis Area. Therefore, 95 percent of the existing NRF in the Analysis Area would continue to provide NRF habitat throughout the Analysis Area for nesting owls in the future. The combined acres of untreated NRF and dispersal only habitat (14,235 acres) within the analysis area would continue to provide sufficient habitat for dispersal. These untreated areas are sufficient in area and configuration within the Analysis Area to continue to facilitate dispersal within and throughout the watershed.

Treatments proposed for downgrade and maintenance of NRF and dispersal habitat would provide long term beneficial effects to habitat. Treatments would improve ecological health of the stands, reduce the chance of tree loss due to suppression mortality, and would reduce the intensity and risk of wildfire by removing excess fuels. In the short term, treatments adjacent to NRF and dispersal habitat could provide potential protection as the stands are made more fire resilient.

Road and Landing Construction

General effects to spotted owls from the proposed road and landing construction described in Alternative 3 would be the same in Alternative 4, but more miles of new road and temporary road construction would occur. Alternative 4 would remove 13 acres (0.1 percent) of NRF and 28 acres (0.7 percent) of Dispersal for roads and landings.

The proposed yarding areas associated with timber harvest activities would affect (in addition to the roads, landings, and harvest acres) an additional 19 acres of 'Dispersal Only' habitat. This small amount of habitat modification is a short term trade-off for long term benefits. Approximately 74 percent of the Dispersal Only habitat within the Analysis Area will remain in the current spatial and temporal patterns for NSO use.

Therefore, road construction is not expected to diminish survival or recovery of the spotted owl due to the small percentage of habitat affected.

Northern Spotted Owl Sites

Under Alternative 4, there are 1,015 acres of proposed treatments in spotted owl habitat (NRF or dispersal) within the 13 owl home ranges: 205 acres of NRF and 685 acres of dispersal would be treated, but would be maintained and still function following treatment; 97 acres of NRF habitat would be downgraded to dispersal habitat; 9 acres of NRF habitat and 19 acres of dispersal would be removed for roads and landings (Appendix F).

The proposed habitat modification associated with Alternative 4 could affect individual adult spotted owls or young, such that their normal behavior, survival, and/or reproduction might be compromised if these sites were occupied. The loss of key habitat features would increase the likelihood of spotted owls in the Project Area to be subject to: displacement from nesting areas; increased competition of suitable nest sites; decreased survival due to increase predation and/or limited forage availability; reduction of future nesting opportunities; and reduction of dispersal capabilities (USDI FWS 2006). Home ranges composed entirely of pristine old forest may not be optimal for spotted owls in the Klamath province and Oregon Coast Range (Courtney et al. 2004).

Therefore, even with the proposed habitat modification, a mosaic of habitat types (nesting, roosting, and foraging, as well as non-habitat) would still exist within the home ranges of the known spotted owl sites within the Analysis Area.

The proposed treatments in Alternative 4 would not preclude spotted owls from nesting within the Analysis area, because NRF habitat would still be retained in untreated areas, including the three Northwest Forest Plan 100 acre core areas. Across the Wildlife Analysis Area, approximately 94% of existing suitable (NRF) northern spotted owl habitat would remain untreated. Therefore, only minimal negative effects are anticipated as a result of the proposed treatments.

Spotted Owl Prey Species

Proposed treatments in Alternative 4 would alter the current habitat conditions for spotted owl prey species in 1,668 acres of spotted owl habitat (NRF and dispersal-only) which may also provide foraging opportunities. Approximately 7 acres (0.8 percent) of the total potential foraging acres on BLM lands within the 0.5 mile core areas would be treated. Treatment implementation would be spread out temporally and spatially within the Analysis Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term effects at the project level.

Critical Habitat

Under Alternative 4, approximately 1,181 acres of spotted owl habitat would be treated within the designated NSO critical habitat. Of these treatment acres there are 8 acres of NRF removal, 220 acres of nesting, roosting and foraging (NRF) downgrade, and 188 acres of treat and maintain in NRF habitat. There are also 747 acres of dispersal treat and maintain and 18 acres of dispersal removal. The remaining 139 acres of proposed treatment are found in capable habitat, which currently does not function as suitable spotted owl habitat. The units proposed for NRF downgrade are actually Roosting/Foraging habitat, a sub-set of NRF. These stands are generally one-layered and lack a complex structure. The treatments are proposed where the habitat could be improved in the long term (i.e., proposed treatments in capable, dispersal, or roosting/foraging habitat within high habitat suitability according to the relative habitat suitability model; treatments would improve stand resiliency; or where the ecological needs of the stand outweighed the owl habitat needs. For example, pine restoration on a ridge that is in low habitat suitability according to the relative habitat suitability model. NRF and Roosting/Foraging habitat are not proposed for removal within critical habitat through vegetation treatments.

Fisher

Vegetation Management

The proposed treatments in Alternative 4 would occur in 1,668 acres of suitable denning and resting fisher habitat on BLM-administered lands. Of these acres providing habitat, 250 would be removed, 269 would have reduced quality post-treatment, and 1,149 acres would be maintained.

Selective thinning and structural retention treatments that would reduce the canopy cover below 40 percent would remove 250 acres of denning and resting habitat. Nedsbar thinning treatments proposed in Alternative 4 would reduce the quality of 269 acres of suitable denning and resting habitat due to the reduced canopy cover of 40 percent (NRF downgrade). Proposed treatments maintaining habitat and retaining 40 and 60 percent canopy cover (1,149 acres) would continue to provide cover and key habitat features (i.e., large overstory trees, snags, hardwoods, and CWD) essential for the life cycle of the fishers (NRF and dispersal treat and maintain).

Road and Landing Construction

Approximately 41 acres of denning and resting habitat would be removed from road and landing construction under Alternative 4. Only minimal effects to fishers are anticipated from the road because as mentioned above, fishers are highly mobile and have large home ranges, and would likely move to another part of their home range while the activity is ongoing, which would result in a minimal short-term impact. The proposed road and landing construction is not expected to affect fishers dispersing within the Analysis Area because the actions are

small in scope and would not be a barrier for dispersal. The proposed construction would affect 1.05 percent of the fisher denning and resting habitat within the analysis area. Therefore, road construction is not expected to diminish fisher occupancy and survival in the Analysis area due to the small percentage of habitat affected

Summary

The management actions in Alternative 4 would not contribute to the need to federally list the fisher as threatened or endangered because no known denning sites would be lost and suitable denning and resting habitat within the Analysis Area would be retained in untreated units. Habitat features, such as large snags and coarse woody material, would be retained throughout the Analysis Area, which would provide future habitat for denning and resting, and further reduce potential impacts. Fishers would not be precluded from dispersing or foraging in the Analysis Area because suitable habitat would still be retained, units with higher canopy retention would aid in dispersal, and key habitat features would be retained throughout the Analysis. Approximately 14,235 acres (89 percent) of suitable fisher denning and resting habitat would not be treated throughout the Analysis Area.

Siskiyou Salamander

Alternative 4 proposes the highest amount of forest stand treatments using different prescriptions (as described in Section 2.C.2.) for a total of 2,378 acres treated. The treatment objectives are to improve forest health by reducing stand densities and increase tree growth vigor.

There are two occupied SMS habitat areas that were located during mollusk surveys. These occupy approximately 20 acres of talus habitat within two proposed harvest treatment areas (Units 27-34 and 35-30). In addition, there is one proposed fuels treatment unit that overlap priority management sites identified in the Conservation Strategy. This is proposed fuels Unit F-30.

Harvesting timber from an active occupied SMS site provides an opportunity to monitor this site. With post-harvest monitoring and a PDF for retention of down wood and snags, impacts to this species would be reduced.

e. Alternative 5

Northern Spotted Owls

Vegetation Management

Vegetation treatments would not remove NRF or dispersal habitat under Alternative 5. Approximately 212 acres would be thinned but would still function as NRF habitat (reduced quality) because a minimum of 60 percent canopy cover and key habitat features would be retained. Alternative 5 would treat but maintain 668 acres of “dispersal-only” habitat. These treatments would reduce the canopy cover within the stand, but would still mostly function as spotted owl “dispersal-only” habitat.

Treatments proposed for maintenance of NRF and dispersal habitat would provide long term beneficial effects to habitat. Treatments would improve ecological health of the stands, reduce the chance of tree loss due to suppression mortality, and would reduce the intensity and risk of wildfire by removing excess fuels. In the short term, treatments adjacent to NRF and dispersal habitat could provide potential protection as the stands are made more fire resilient.

Even though treatments would occur in NRF and dispersal habitat, the effects would be minimal because they would be short-term in nature; activities would be distributed both spatially and temporally across the Analysis Area; and seasonal restrictions listed as project design features would avoid adverse disturbance to nesting spotted owls within the Analysis Area. Additionally, approximately 11,713 acres of NRF habitat and 3,274 acres of “dispersal-only” habitat would not be treated within the Nedsbar Analysis Area. Therefore, 98% of the existing NRF in the Analysis Area would continue to provide NRF habitat throughout the Analysis Area for nesting owls in the future. The combined acres of untreated NRF and dispersal only habitat (14,987 acres) within the analysis area would continue to provide sufficient habitat for dispersal. These untreated areas are sufficient in area and configuration to continue to facilitate dispersal within and throughout the Analysis Area.

Treatments would be designed to improve ecological health of the stand, reduce the chance of tree loss due to suppression mortality, and reduce the intensity and risk of wildfire by removing excess fuels.

Road and Landing Construction

Alternative 5 would remove 32 acres (0.02 percent) of NRF and 4 acres (0.10 percent) of dispersal for road (tractor swings and designated skids) and landing construction. This small amount of habitat modification for road and landing construction is not expected to diminish survival or recovery of the spotted owl due to the small percentage of habitat affected.

Northern Spotted Owl Sites

Under Alternative 5, there are 664 acres of proposed treatments in spotted owl habitat (NRF or Dispersal) within the 13 owl home ranges: 165 acres of NRF and 499 acres of dispersal would be treated. Of these acre, 135 acres of NRF would be treated but would be maintained and still mostly function the same following treatment; 30 acres of NRF habitat would be downgraded to dispersal habitat; 0 acres of NRF habitat and 3 acres of dispersal would be removed (Appendix F).

The proposed habitat modification associated with Alternative 5 could affect individual adult spotted owls or young, such that their normal behavior, survival, and/or reproduction might be compromised if these sites were occupied. The loss of key habitat features would increase the likelihood of spotted owls in the Analysis Area to be subject to: displacement from nesting areas; increased competition of suitable nest sites; decreased survival due to increase predation and/or limited forage availability; reduction of future nesting opportunities; and reduction of dispersal capabilities (USDI FWS 2006). Home ranges composed entirely of pristine old forest may not be optimal for spotted owls in the Klamath province and Oregon Coast Range (Courtney et al. 2004). Therefore, even with the proposed habitat modification, a mosaic of habitat types (nesting, roosting, and foraging, as well as non-habitat) would still exist within the home ranges of the known spotted owl sites within the Analysis Area.

The proposed treatments in Alternative 5 would not preclude spotted owls from nesting within the Analysis area, because NRF habitat would still be retained in untreated areas, including the three Northwest Forest Plan 100 acre core areas. Across the Wildlife Analysis Area, more than 98 percent of existing suitable (NRF) northern spotted owl habitat would remain untreated. Therefore, only minimal negative effects are anticipated as a result of the proposed treatments.

Critical Habitat

Under Alternative 5, there would be 34 acres of spotted owl habitat removed and/or downgraded within the 2012 CHU. Approximately 394 acres of spotted owl habitat would be treated, but maintained within the 2012 CHU. Of these acres, 172 would be in NRF habitat and 377 acres would be in Dispersal habitat. Long-term beneficial effects may be expected in this portion of the 2012 CHU, as these thinning treatments would improve the health of the stands and make them less susceptible to severe losses from wildland fire or suppression-related diseases.

Spotted Owl Prey Species

Proposed treatments in Alternative 5 would alter the current habitat conditions for spotted owl prey species in 941 acres of spotted owl habitat (NRF and dispersal-only), which may also provide foraging opportunities. Approximately 134 acres (15 percent) of the total potential foraging acres on BLM lands within the 0.5 mile core areas would be treated, but would still continue to provide foraging opportunities. Treatment implementation would be spread out temporally and spatially within the Analysis Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term effects at the project level.

Fisher

Vegetation Management

Proposed treatments in Alternative 5 would treat 916 acres of suitable fisher denning and resting habitat within the Analysis Area. A total of 30 acres would be downgraded from a higher canopy cover (at least 60 percent) down to a minimum of 40 percent canopy cover (reduced quality habitat). There would be 6 acres proposed for removal of habitat for roads (tractor swing and designated skids). The remaining 880 acres would be treated in a maintenance prescription, so primary components would be retained. These units would still meet fisher habitat needs for resting and foraging, and fishers would still be expected to use these stands.

Road and Landing Contruction

Approximately 6 acres of denning and resting habitat would be removed through road and landing construction under Alternative 5. Only minimal effects to fishers are anticipated from the road because as mentioned above, fishers are highly mobile and have large home ranges, and would likely move to another part of their home range while the activity is ongoing, which would result in a minimal short-term impact. The proposed road and landing construction is not expected to affect fishers dispersing within the Analysis Area because the actions are small in scope and would not be a barrier for dispersal. The proposed construction would affect 0.15% of the fisher denning and resting habitat within the analysis area. Therefore, road construction is not expected to diminish fisher occupancy and survival in the Analysis area due to the small percentage of habitat affected.

Summary

The management actions in Alternative 5 would not contribute to the need to federally list the fisher as threatened or endangered because no known denning sites would be lost and suitable denning and resting habitat within the Analysis Area would be retained in untreated units. Habitat features, such as large snags and coarse woody material, would be retained throughout the Analysis Area, which would provide future habitat for denning and resting, and further reduce potential impacts. Fishers would not be precluded from dispersing or foraging in the Analysis Area because suitable habitat would still be retained, units with higher canopy retention would aid in dispersal, and key habitat features would be retained throughout the Analysis. Approximately, 15,142 acres (91 percent) of suitable fisher denning and resting habitat would not be treated throughout the Analysis Area.

Siskiyou Salamander

Alternative 5 proposes forest stand treatments (as described in Section 2.C.3.) for treatments in 1,412 acres. This alternative would treat the fewest acres when compared to the other action alternatives. Therefore, it would have the least amount of impacts on SMS and their habitat.

f. Cumulative Effects

Northern Spotted Owls

When combined with these future foreseeable projects (See Table 3-33 and Figure 3-9), the low percentage of NRF removal at the Nedsbar project level would not preclude spotted owls or other late-successional forest species from nesting or dispersing within the Wildlife Analysis Area. Even though up to13 NSO sites could be affected by this project and future foreseeable treatments, untreated late-successional forest habitat would be retained throughout Analysis Area.

Even when treatments proposed in the Nedsbar project are added with the future foreseeable actions, it is unlikely the actions proposed in the Nedsbar project would appreciably reduce or diminish the survival or recovery of the spotted owl due to the small percentage of habitat this would impact compared to the untreated habitat at the provincial and the range-wide levels. Additionally, at the wildlife analysis level, approximately 11,557 (97 percent) to 11,903 acres (99 percent) of the existing NRF habitat would be maintained throughout the analysis area in all action alternatives (see Table 3-38). These areas would continue to provide suitable

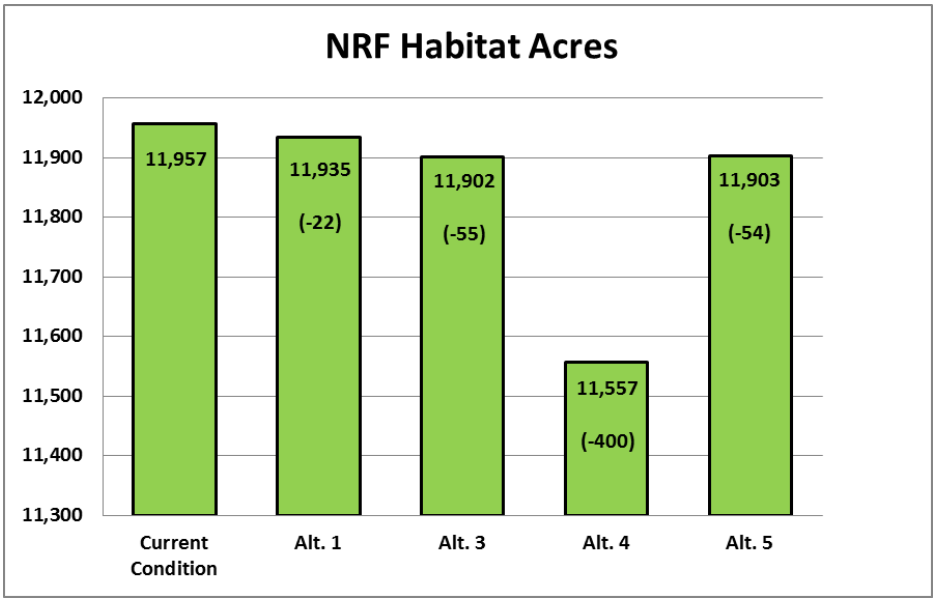
spotted owl NRF habitat, provide habitat for late-successional forest habitat dependent species, and would help maintain future connectivity throughout the watersheds and between KSOACs.

Cumulative effects to the current NSO population from implementing this project would be minimal. Late-successional forest, RA32 habitat, and 100-acre NSO activity centers would remain post-harvest, allowing opportunities for future dispersal and nesting. Table 3-38 and Figures 3-10 and 3-11 display the cumulative changes to the habitat baseline by each alternative.

Table 3-38. Summary of cumulative effects of all alternatives on spotted owl habitat on BLM lands within the wildlife Analysis Area.

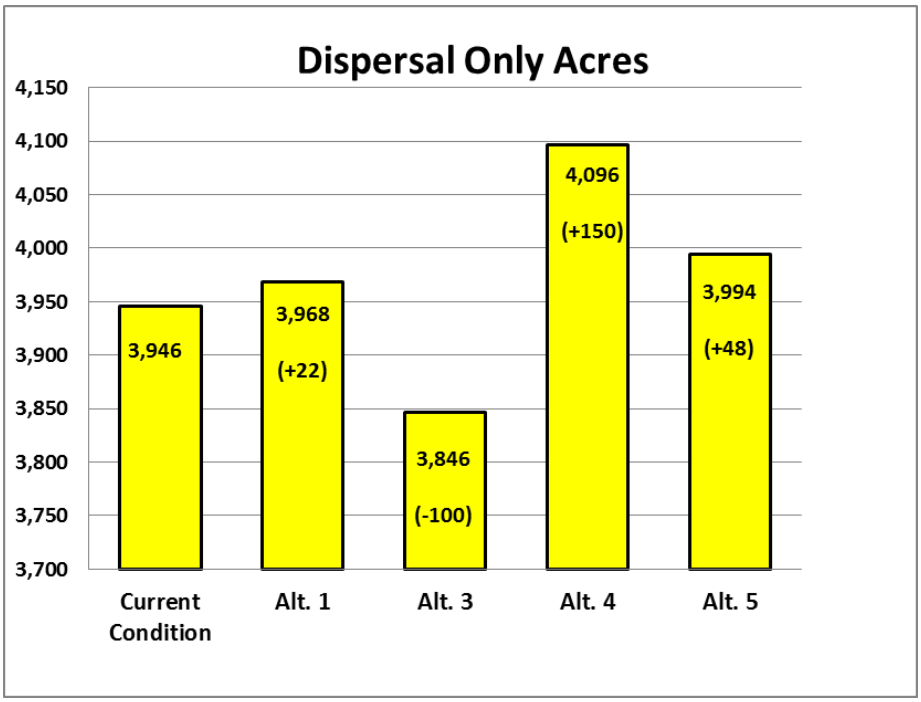
Habitat	Existing Environment	Alt. 1	Alt. 3	Alt. 4	Alt. 5
NRF	11,957	11,935 (- 0.18%)	11,902 (-0.46%)	11,557 (-3.4%)	11,903 (-0.46%)
Dispersal Only	3,946	3,968 (+0.6%)	3, 846 (-2.5%)	4,096 (+3.8%)	3,994 (+1.2%)
Capable	8,905	8,905 (0%)	9,060 (+1.7%)	9,155 (+2.8%)	8,911 (+0.07%)
Non-Habitat	3,425	3,425 (0%)	3,425 (0%)	3,425 (0%)	3,425 (0%)
Total	*28,233*	*28,233*	*28,233*	*28,233*	*28,233*

Figure 3-10. Post-treatment cumulative effects to spotted owl NRF habitat on BLM lands within the Nedsbar Analysis Area by action alternative.[1]



[1]Alternative 1 includes changes to the current condition from future foreseeable effects. Alternatives 3, 4, and 5 include changes to the current condition from Alternative 1 plus each action alternative.

Figure 3-11. Post-treatment cumulative effects to spotted owl dispersal-only habitat on BLM lands within the Nedsbar Analysis Area by action alternative.[1]



[1]Alternative 1 includes changes to the current condition from future foreseeable effects. Acres of NRF downgraded to dispersal show as in increase in dispersal-only habitat. Alternatives 3, 4, and 5 include changes to the current condition from Alternative 1 plus each action alternative.

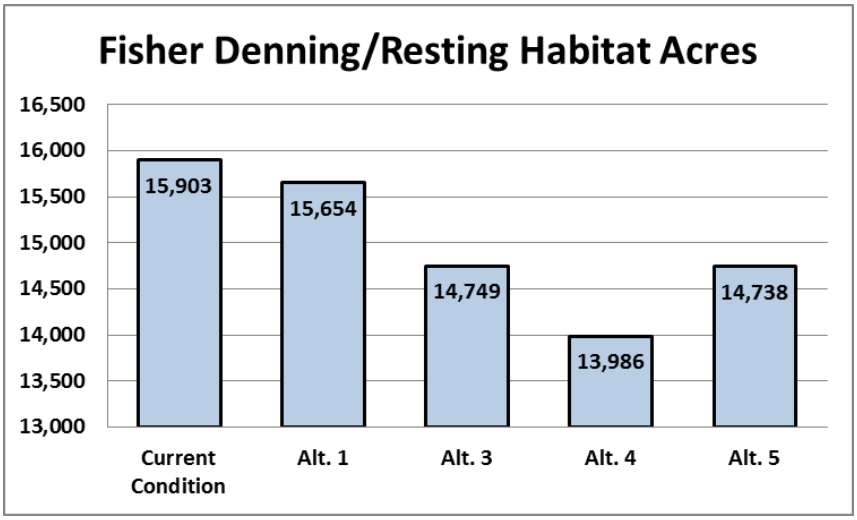
Fisher

Under the No Action Alternative, thinning treatments proposed in existing projects with at least 40 percent canopy cover retention would reduce the quality of 22 acres of suitable denning and resting habitat due to the reduced canopy cover. Table 3-39 below cumulatively adds the future foreseeable actions that would occur regardless of the Nedsbar project, to each Action Alternative. Figure 3-12 shows the total reduction of denning and resting habitat in the Analysis Area from each action alternative.

Table 3-39. Cumulative effects to fisher habitat on BLM-administered lands in the wildlife Analysis Area.

Alternative	Denning/Resting Habitat Remove	Denning/Resting Habitat Reduced Quality (Canopy cover 40-60%)	Denning/Resting Habitat Treat and Maintain	Total Habitat Proposed for Treatment	Denning/Resting No treatment
1	0	22	227	249	15,654 (98%)
3	155	22	977	1,154	14,749 (93%)
4	250	291	1,376	1,917	13,986 (88%)
5	6	52	1,107	1,165	14,738 (93%)

Figure 3-12. Post-Treatment cumulative effects to fisher denning/resting habitat on BLM lands within the Nedsbar Analysis Area by action alternative.[1]



[1]Alternative 1 includes changes to the current condition from future foreseeable effects. Alternatives 3, 4, and 5 include changes to the current condition from Alternative 1 and each action alternative.

Even when combining the future and foreseeable projects in the Analysis Area with the Nedsbar Project, the proposed actions would not preclude fishers from dispersing through or reproducing within the wildlife Analysis Area. The proposed actions would not incrementally reduce the amount of fisher denning and resting habitat in the wildlife Analysis Area. The proposed actions would not affect persistence of fishers within the Wildlife Analysis Area because no more than 3.4 percent of the existing denning and resting habitat would be removed or downgraded. Additionally, Riparian Reserves, NSO Recovery Action-32 habitat, and 100-acre Known Spotted Owl Activity Center owl core(s) would not be treated by the Nedsbar Project and would continue to provide undisturbed habitat for fishers throughout the 51,440-acre Wildlife Analysis Area.

The action alternatives would not contribute to the need to federally list the fisher as threatened or endangered because no known denning sites would be lost and suitable denning and resting habitat within the Analysis Area would be retained in untreated units. Habitat features, such as large snags and coarse woody material, would be retained throughout the Analysis Area, which would provide future habitat for denning and resting, and further reduce potential impacts. Fishers would not be precluded from dispersing or foraging in the Analysis Area because suitable habitat would still be retained, units with higher canopy retention would aid in dispersal, and key habitat features would be retained throughout the Analysis Area. Approximately 93 percent, 88 percent, and 93 percent of the fisher denning and resting habitat within the Analysis area would remain untreated in Alternatives 3, 4, and 5, respectively.

Siskiyou Salamander

Even though the proposed actions may potentially adversely disrupt local individual Siskiyou mountains salamanders in unbuffered talus, this project is not expected to affect long-term population viability the SMS known to be in the Analysis Area. Additionally, this project combined with other actions in the watershed would not contribute to the need to federally list the SMS, because of the small scope of the proposed action and because of the implementation of the Siskiyou Mountains Salamander Conservation Strategy.

H. RECREATION

1. Affected Environment

Recreational resources in the Nedsbar Planning Area are managed under the Medford District BLM's 1995 Resource Management Plan. Recreation use across the Medford District BLM is described in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI BLM 1994). BLM-administered lands fall into two recreation management categories; Special Recreation Management Areas (SRMA) and Extensive Recreation Management Areas (ERMA). ERMAs are all BLM-administered lands not included in SRMAs identified in the RMP (USDI BLM 1994, pp. 3-71) that provide for dispersed recreation opportunities across the Medford District BLM. SRMAs are those areas identified with high concentrations of recreation use and developed facilities.

a. Dispersed Recreation

The Nedsbar Planning Area encompasses an area of land in the Little Applegate and Upper Applegate River watersheds. The dispersed recreation occurring within the Nedsbar Planning Area includes hiking, horseback riding, mountain biking, driving for pleasure, hunting, target practice, dispersed camping, and some OHV use. A network of BLM system roads provides the recreation user opportunities to discover a multitude of recreation activities. Road densities are reported as low for lands in the Planning Area, providing access for some BLM-administered land parcels within the Planning Area. Most dispersed camping occurs in association with hunting (primarily deer season). OHV activity predominantly takes place north of the planning area, located around the Anderson Butte and Timber Mountain areas. There are user created routes in the planning area, but densities are reported as low.

An estimated 799,243 acres provide for dispersed recreation use across the Medford District (USDI BLM 1994, pp. 3-84). All of the Nedsbar Planning Area is described by the RMP as an ERMA. These areas are characterized as low use recreational areas where no developed or designated recreational sites or activities exist. Recreation in the Planning Area includes hiking, sightseeing, OHV activities, fishing, driving for pleasure, hunting, and opportunities for solitude.

Sterling Mine Ditch Trail

In 1877 miners built the Sterling Mine Ditch to redirect water from the upper reaches of the Little Applegate River to the Sterling Creek Mine. The water was used for hydraulic mining of gold from the 1870's until the mine discontinued operations in the 1930's. The 26.5 miles of the ditch became overgrown with vegetation until the early 1970's, when the BLM began to clear the vegetation and improve the ditch for use as a hiking trail. In

1988, the Medford BLM officially dedicated the trail for use as a non-motorized multiple use trail, open to hiking, equestrian use, and bicycles.

The trail receives a considerable amount of use throughout the year. Through recent developments the Sterling Mine Ditch Trail (SMDT) now has seven trailheads that offer access to the trail. Three are located along Little Applegate Road; 1) Bear Gulch, 2) Tunnel Ridge, and 3) Little Applegate. The other four are located on the Anderson Butte side, 4) Armstrong Gulch, 5) Deming Gulch, 6) Wolf Gap, and 7) Grub Gulch. Approximately 9.6 miles of the SMDT parallels the Little Applegate River. The SMDT gained status as an Oregon State Scenic Trail in October of 2014, the first trail is southern Oregon to gain this status. This is the eighth trail designated in Oregon as a State Scenic Trail since the state Recreation Trails Act began designations in 1971.

Sterling Mine Ditch Area of Critical Environmental Concern

The SMDT is managed in conjunction with the Sterling Mine Ditch ACEC. This 141-acre designation protects the historic mining ditch, the recreational trail, and special status species. This ACEC limits OHV use to existing roads, prohibits OHV use on the trail and historic ditch, and is excluded from timber harvest.

Dakubetede Area of Critical Environmental Concern

The BLM recently designated a portion of the proposed Dakubetede Area of Critical Environmental Concern (ACEC) under the *Southwestern Oregon Record of Decision and Resource Management Plan* (ROD/RMP) (USDI BLM 2016). The 1,781-acres Dakubetede ACEC is located on the north side of Little Applegate Road, between the Little Applegate River and Anderson Butte. The area is steep and rugged. Vegetation varies from dense mature mixed conifers and hardwood stands to open grass and shrublands. Major human uses and activities include hiking, mountain biking and equestrian use. The SMDT traverses in an East/West direction through the area. The relevant and important values associated with this designation are Gentner's fritillary (*Fritillaria gentneri*); western-most stands of western juniper, rare water birch (*Betula occidentalis*), intact native grasslands; and Gentner's fritillary recovery management area (USDI BLM 2016, p. 253). This ACEC limits OHV use to existing routes and trails. Vegetation is to be managed for fire resiliency and to maintain natural communities and habitat for Gentner's fritillary and other rare plants (USDI BLM 2016, p. 250).

Holton Creek Research Natural Area (RNA)

Located in T. 39 S., R 01 W, approximately 3 air miles to the northeast of the project area is the 423 acre Holton Creek Research Natural Area. This RNA was designated in the 1995 Resource Management Plan low-elevation old-growth forest, including a good example of white fir-Douglas-fir/dwarf Oregon-grape type. Site to be included in a national system of research natural areas set aside for scientific and educational purposes and where natural processes are encouraged.

2. Environmental Consequences

a. Alternative 1 - No Action

People who enjoy the use of the Nedsbar planning area for their outdoor recreation experiences would continue to use the area undisturbed from any timber sale operations on public lands.

b. Alternative 4

The greatest potential for impacts to recreation use from the implementation of the Nedsbar project is associated with the Sterling Mine Ditch Trail use, and dispersed recreation such as hunting and driving for pleasure. However, based upon the proximity of the project to the Sterling Mine Ditch Trail, it is unlikely that users will be adversely affected while using the trail. Trail hikers and hunters will likely hear noise from operations, including helicopter use, but it will be for intermittent durations that will not dominate the area.

Sounds from chainsaws, helicopters, and yarding equipment associated with timber operations occurring in the southern portions of the Nedsbar project area may be noticed by people recreating around the Wolf Gap to Little Applegate section of the Sterling Mine Ditch Trail (the section of the trail that is adjacent to the Little Applegate

River). However, these sounds would not be a significant impact to recreation as other ambient sounds such as vehicles using public roads, farm equipment operations, and private citizens utilizing chainsaws can all be heard in the project area. The addition of new haul routes, or the maintenance of overgrown roads could lead to the development of new OHV routes in the planning area. New OHV activity would be minimized through careful transportation management planning, route decommissioning, signage, and staff monitoring. Routes that would be temporarily opened for timber operations would subsequently be closed again using earthen berms and other barricading devices.

Special areas such as the Dakubetede ACEC, Sterling Mine Ditch ACEC and Holton Creek RNA will not be directly affected by operations in the area. However, users seeking quiet and solitude in these areas would likely experience noise from helicopter and logging operations. These disruptions to quiet solitude will be for short duration, seasonally, and intermittent. It is expected that any effects from the proposed action will affect these special management areas on a short term temporary basis.

Timber operations occurring intermittently in the Nedsbar project area could disrupt Extensive Recreation Use Areas in several ways: 1) timber sale units and landing areas could be closed or generally just avoided by the public while operations are taking place for public safety concerns; 2) noise disturbance from helicopters, logging trucks, and other timber harvesting equipment, 3) increased road congestion from logging trucks and timber operators. It is difficult to predict or quantify the degree of effect to each person as people may be affected differently depending on the values each person places on the various uses of public lands. Regardless of the degree each person may be affected, the loss of use of less than 5% of the Extensive Recreation Management Areas available across the Medford District, intermittently, would not be significant as the recreating public for the following reasons: 1) standard safety precautions such as signing and closures would be used to avoid conflicts between the recreating public and timber sale operations; 2) recreation use for extensive recreation management areas is considered relatively light across the Medford District; 3) the roughly 8 percent of the units within the planning area that are within observation range of the Sterling Mine Ditch Trail are anywhere from 1000 feet to 2 miles away from the trail and separated by the Little Applegate Road and River; and 4) timber sale operations would not take place on the entire area simultaneously, disruptions would last the life of the contracts only, would occur intermittently as seasonal operating restrictions would limit operation during certain time of the year.

c. Alternatives 3 and Alternative 5

Similar impacts are expected from Alternative 3 and 5, but to a lesser degree due to fewer acres treated for commercial harvest.

I. VISUAL RESOURCES MANAGEMENT

The BLM has a responsibility to manage the quality of the public lands visual environment and to reduce the visual impact of developed activities." (Visual Resource Inventory, Medford District, p., 13, 2014). The Medford ROD/RMP established VRM classifications for all BLM-administered lands in the Medford District. The proposed units of the Nedsbar Forest Management Project are within Visual Resource Class III and IV, all Key Observation Points (KOPs) analyzed were conducted adjacent to units within Class III objectives. The RMP specifies the visual quality objective as "partially retain the existing character of landscapes." The plan states that the management action and direction are to "manage Visual Resource Management [VRM] Class III lands for moderate levels of change to the characteristic landscape." Management activities may attract the attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements of form, line color, texture, and scale found in the predominant natural features of the characteristic landscape (USDI BLM 1995, p.70).

1. Methodology

The contrast rating system is a systematic process used by the BLM to analyze potential visual impact of proposed projects and activities. The degree to which a management activity affects the visual quality of a landscape depends on the visual contrast created between a project and the existing landscape. The contrast

rating is done from the most critical viewpoints, known as Key Observation Points (KOPs). The actual rating should be completed in the field from the KOPs. KOPs are usually along commonly traveled routes or at other likely observation points. KOPs may also be located at typical views encountered in representative landscapes, if not covered by critical viewpoints. Factors that should be considered in selecting KOPs are; angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions (USDI BLM n.d.; Bureau of Land Management Visual Resource Contrast Rating Manual 8431).

Three KOPs were selected in the Project Area (Map 3-5). Since County Road 859 (Eastside Road) is the main thoroughfare in the western side of the Project Area, a KOP (#3) was selected along this route where the units could be most visible to residents and those driving the road to access recreational areas or local businesses or wineries (Figure 3-13).

The SMDT is located directly across from a large portion of units in the central portion of the project area. Due to the elevation of the trail and the potential for observation points from recreationists using the trail, two additional KOPs were selected from it as well (KOPs #1 and #2, Figures 3-14 and 3-15).

An additional KOP was considered for analysis from Boaz Gulch Road (BLM 39-3-27 and BLM 39-3-27.1), but due to the extremely limited observations points available from vegetation screening, it was eliminated as a possibility.

Map 3-5. Nedsbar Visual Resource Management KOP Locations.

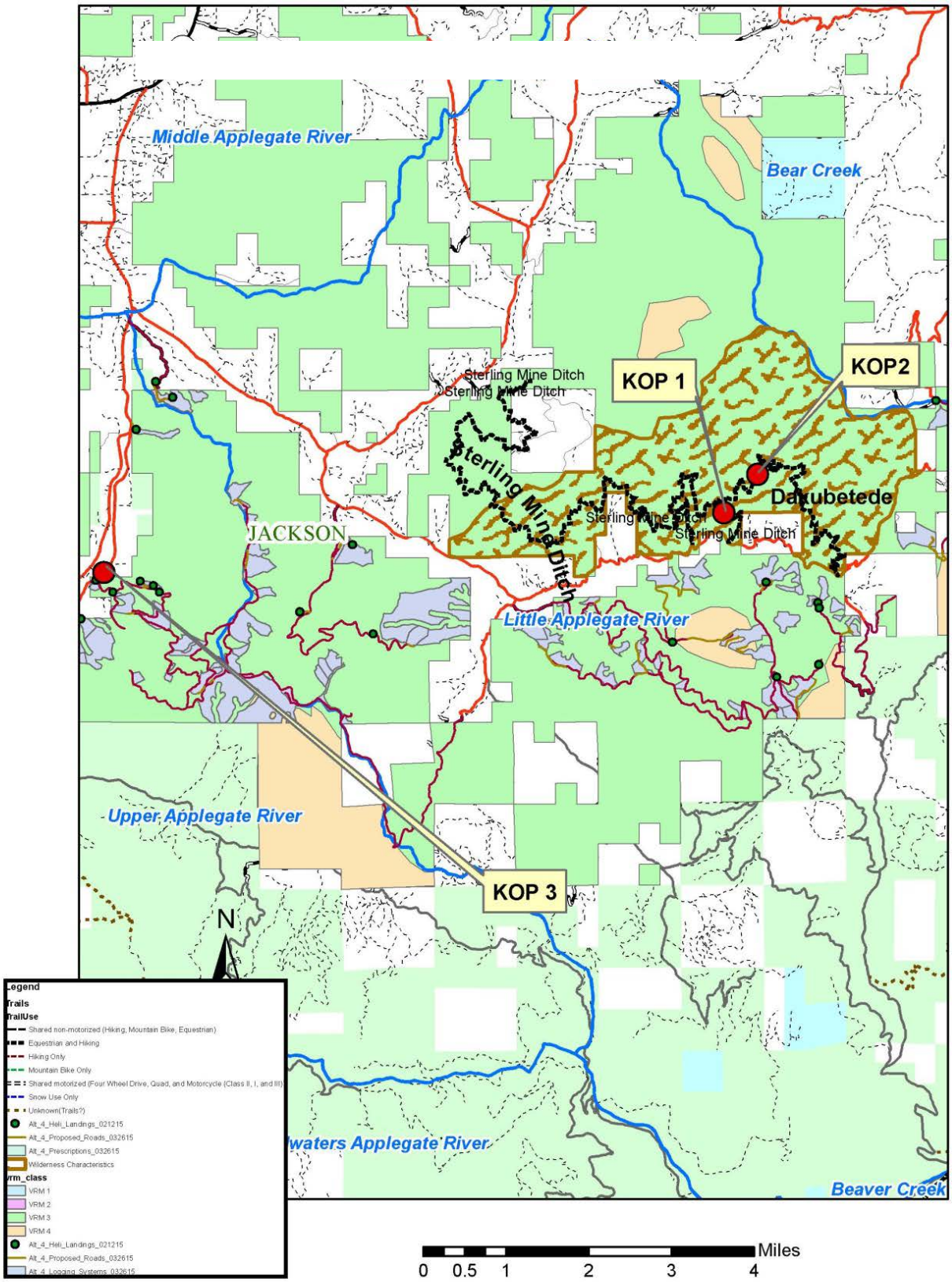


Figure 3-13. Photo from KOP #3 looking southeast toward the project area.

Figure 3-14. Photo from KOP #1 looking south into unit 2-26-2.

Figure 3-15. Photo from KOP #2 looking south toward unit 2-26.1.

2. Affected Environment

The characteristic landscape in the Planning Area can be described as variable. On the valley floors and lower slopes of the Planning Area, the landscape is modified by human alterations including roads, clearings, agricultural fields, homes and outbuildings, fences, and power and phone lines. The intermingled private lands with their associated developments provide a variety of visual contrast. Individual residences are scattered along the highway and other additional minor roads. The south facing slopes are dominated by grass and shrub vegetation while the north slopes be cooler have a higher proportion of conifer forest.

3. Environmental Consequences

a. Alternative 1 – No Action

The No Action Alternative is the existing condition and is described in Section 3.I.2.

b. Alternatives 3, 4 and 5

The Nedsbar Forest Management Project would meet the management guidelines for VRM III and IV and would result in low levels of change that would largely retain the existing character of the landscape. The landscape is covered by a variety of vegetation types, human development, colors and textures. The project would repeat the basic elements of form, line, color, texture, and scale found in the pre-dominant natural features of the characteristic landscape. The portions of the project that will be visible from existing roads will be thinning operations and will not result in large scale canopy gaps or openings. Portions of the proposed project would be visible to travelers for a few minutes as they travel at 35 mph road speeds, and 55 mph highway speeds but it would not dominate the view of the casual observer. There are numerous existing roads, utility lines, and structures which tend to dominate the view. Although proposed units of the project will result in low levels of change in color and texture, the change would be small compared to the scale of the surrounding landscape. The surrounding hillsides along Applegate Road, Little Applegate Road, SMDT, and East Side Road contain similar lines from existing roads, power lines, and other similar man-made facilities.

The project would be the most visible in the first three years after implementation, particularly during the winter months when the ground vegetation is dormant, but is expected to become less visible as the vegetation continues to fill in and becomes coarse over time. The project would be most visible where it faces directly towards East Side Road and the SMDT. However, taking into consideration the distance of the proposed units from the KOPs and the thinning prescriptions, it will result in a low level of change to the dominant color and texture of the dominant landscape.

J. LANDS WITH WILDERNESS CHARACTERISTICS AND COMMUNITY IDENTIFIED UNROADED AREAS

Beginning in the summer of 2012, the Medford District BLM began the Lands with Wilderness Characteristics (LWC) Inventory, as required by the Federal Land Management Policy Management Act (FLPMA) and current BLM policy. The inventories were completed in 2013. The BLM documented existing conditions as opposed to potential future conditions, as per our policy and guidelines. We utilized maps, photos, records, GIS, and monitoring data. Field checks were conducted to verify the data for accuracy. The BLM conducted the inventory process using the criteria from Section 2(c) of the Wilderness Act to determine the presence of wilderness characteristics, such as: sufficient size, naturalness, outstanding opportunities for either solitude or primitive and unconfined recreation, and supplemental values such as ecological, geological, or other features of scientific, educational, scenic or historical value.

To be eligible under sufficient size criteria, the following must apply:

1) Roadless areas with over 5,000 acres of contiguous BLM lands. State or private lands are not included in making this acreage determination.

2) Roadless areas of less than 5,000 acres of contiguous BLM lands where any one of the following apply:

- a. They are contiguous with lands which have been formally determined to have wilderness or potential wilderness values, or any Federal lands managed for the protection of wilderness characteristics. Such lands include:
  - i. designated Wilderness,
  - ii. BLM Wilderness Study Areas,
  - iii. U.S. Fish and Wildlife Service areas Proposed for Wilderness Designation,
  - iv. U.S. Forest Service Wilderness Study Areas or areas of Recommended Wilderness, and
  - v. National Park Service areas Recommended or Proposed for Designation.
- b. It is demonstrated that the area is of sufficient size as to make practicable its preservation and use in an unimpaired condition.
- c. Any roadless island of the public lands.

Based upon field data collected, and all other inventory standards used, the BLM concluded inventoried areas in the Applegate Valley that would meet these criteria for LWC include the Dakubetede (5,099 acres), Wellington (5,712 acres), and Burton Nine Mile (6,103 acres) inventoried areas. Dakubetede is the closest LWC inventoried area to the Nedsbar Planning Area. There are no activities associated with Nedsbar Forest Project proposed within the Dakubetede or any other LWC inventoried area.

The *Western Oregon Proposed Resource Management Plan/Final Environmental Impact Statement* (PRMP/FEIS) (USDI BLM 2016) determined that for the Dakubatede and Wellington inventoried areas, "the total acres of contiguous inventoried lands with wilderness characteristics remaining outside the Harvest Land Base or incompatible Recreation Management Areas would drop below 5,000 acres and would no longer meet the minimum requirements to be considered for allocation to the District-Designated Reserve – Lands Managed for their Wilderness Characteristics." (PRMP/FEIS, p. 468). The Burton Nine Mile inventoried area (6,103 acres) was allocated to a District-Designated Reserve – Lands Managed for their Wilderness Characteristics under the *Southwestern Oregon Record of Decision and Resource Management Plan* (ROD/RMP) (USDI 2016).

The CAWG identified several unroaded areas important to the local community including: Boaz, Buncom, Quartz/Lick, Trillium Mountain, and Bald Mountain. These areas do not meet the size criteria as defined in the Section 2(c) of the Wilderness Act to possess wilderness characteristics.

K. ECONOMICS OF TIMBER HARVEST OPERATIONS

1. Introduction

This section compares the relative differences in economic feasibility of the alternatives based on logging systems utilized, acres treated, estimated volume removed, and overall harvest cost. This project includes units identified as "stewardship" units. Stewardship units are typically those that have marginal product value or that have cost prohibitive access or logging systems requirements. In some cases, commercial units may be grouped with stewardship and fuels units in a stewardship contract wherein the commercial units subsidize treatment of the marginal or uneconomical stewardship units. For the sake of this analysis, stewardship units with marginal product value requiring subsidization by commercial units were not included in the comparison of the economic feasibility of alternatives, as doing so would have diluted the comparison.

Variables such as prescription, total volume and product type removed, type of logging system, and road construction costs affect the economic viability of the alternatives. Table 3-40 below lists the different amounts of acreage by logging systems for each of the action alternatives. Generally, tractor logging is the least expensive method, while helicopter logging is the most expensive and cable logging falls in between. Additionally, the following specific cost centers were analyzed to develop economic feasibility for the alternatives: helicopter search time related to canopy cover, ability to maximize payloads for helicopter logging, average skidding and yarding distances, move-in time, extra piece-handling for tractor swing roads to access cable logging areas, and the effect of seasonal restrictions on operability.

Table 3-40. Acres by logging system type per alternative.

Logging System	Alt. 3 (Acres)	Alt. 4 (Acres)	Alt. 5 (Acres)
Cable	280.25	823.72	287.02
Cable (DH)	2.36	2.36	2.36
Helicopter	371.63	448.61	122.41
Tractor	134.53	224.63	124.36
Total	788.77	1499.32	536.15

2. Roads

Alternative 4 is the only alternative with new (permanent or temporary) road construction costs. The other alternatives either dropped the units that would have been accessed by new roads, or have an alternate logging system (helicopter instead of cable, for example). Road costs may be amortized by the acres and volume they access or by allowing for a less expensive logging system to be utilized for harvesting a unit.

Table 3-41 examines the estimated logging costs for the units with proposed road construction and compares the logging costs if those units were harvested using helicopters.

Table 3-41. The estimated road construction cost by alternative.

Logging Cost for Units with New Road Construction Proposed						Logging Costs for Units Helicopter Yarded	
Unit	Logging Method	Yarding Cost	Road Cost	Total Unit Logging Cost		Logging Method	Total Unit Logging Cost
14-30	Cable	$45,086.67	$16,800.00	$61,886.67		Heli	$45,195.54
19-20	Heli	$99,169.26	$22,520.00	$121,689.26		Heli	$128,920.04
RT-19	Heli	$3,791.18	$2,280.00	$6,071.18		Heli	$4,928.53
23-30	Cable	$8,554.50	$840.00	$9,394.50		Heli	$46,419.53
23-31	Cable	$3,165.66	$560.00	$3,725.66		Heli	$17,522.24
23-32	Cable	$3,147.89	$420.00	$3,567.89		Heli	$11,236.83
26-30	Cable	$11,047.68	$980.00	$12,027.68		Heli	$45,428.04
25-20	Cable	$70,935.54	$6,300.00	$77,235.54		Heli	$198,249.38
26-20B	Cable	$4,286.08	$5,575.00	$9,861.08		Heli	$19,043.74
26-20B	Heli	$168,916.80	***			Heli	$168,916.80
26-21B	Tractor	$25,360.23	$14,025.00	$39,385.23		Heli	$73,544.68
27-20	Cable	$28,547.81	$50,175.00	$78,722.81		Heli	$126,934.29
27-32	Tractor	$2,460.05	$1,400.00	$3,860.05		Heli	$13,059.52
28-21	Tractor	$7,947.44	$3,400.00	$11,347.44		Heli	$22,373.26
30-20	Cable	$39,983.79	$900.00	$40,883.79		Heli	$34,358.71
34-24	Cable	3992.24	$1,900.00	$5,892.24		Heli	$19,253.58
36-20B	Tractor	$5,485.10	$2,475.00	$7,960.10		Heli	$26,934.87
36-23A	Cable	$12,449.55	$870.00	$13,319.55		Heli	$47,039.48
36-24	Cable	$34,040.73	$7,225.00	$41,265.73		Heli	$54,504.67
Total		$409,451.39	$138,645.00	$548,096.39		Total	$934,946.93

*** Helicopter access from 27-20 temporary road

The comparison in Table 3-41 does not include other road maintenance or renovation activities required. Trucking costs can be significant if roads need to be brought up to standards to allow for safe log truck traffic. Whether 5 loads or 25 loads are coming down a particular road system, the same initial level of road maintenance (e.g., grading, site distance vegetation clearing, drainage structure maintenance) may be needed. This cost may be amortized with a higher number of loads, but could be cost prohibitive if only a small number of loads are coming down the road system.

3. Productivity

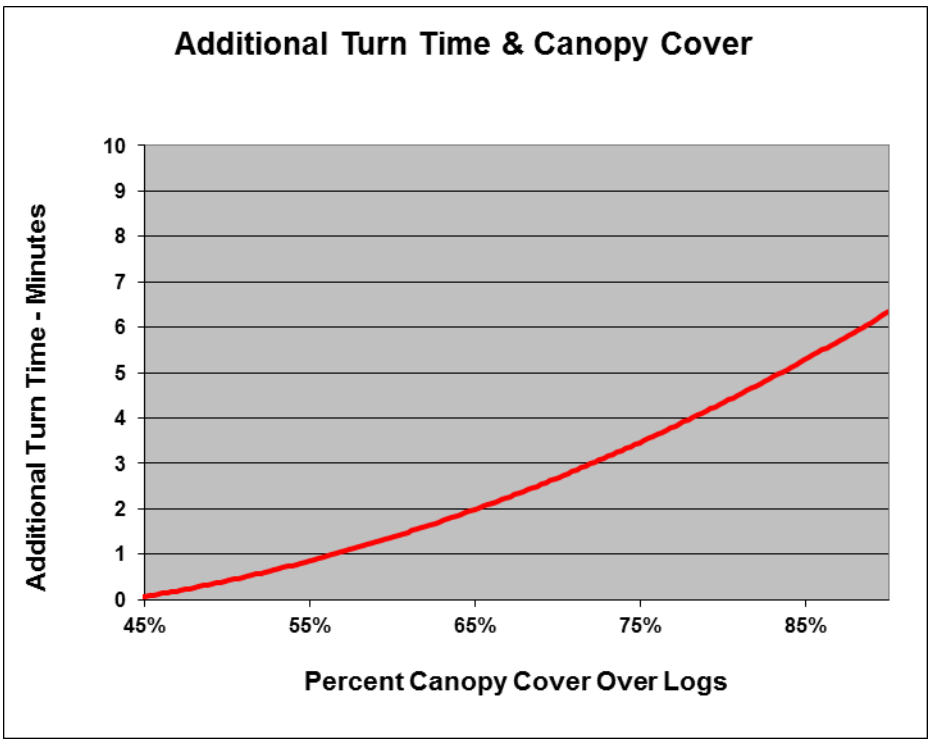
The longer the distance between the stump and the landing, the less productive and more expensive the logging cost will be; this is true for all logging systems. Helicopters become less feasible when turn time exceeds 3 minutes. Cable system feasibility is affected at longer distances both by the increased time in delivering logs to

the landing, and the potential for blind leads and deflection issues which may result in more technical layout and need for intermediate supports. Ground-based skidding machinery becomes less feasible when average skidding distances exceed 500 and 900 feet for tracked and rubber tire skidders, respectively. In some cases, a tractor swing system may be employed. This system uses a skidder to deliver logs from a cable landing not accessed by a road to a processing and log truck-loading landing elsewhere. This system increases equipment and operator costs as well as the piece handing of individual logs which decreases productivity.

For all logging systems, there are fixed costs including road access improvement, landing construction, and move-in time that remain relatively unchanged regardless of the amount of timber volume harvested. Helicopter logging is more expensive than cable or tractor logging, and requires operational and safety considerations which are much more elaborate, expensive, and involved than the other logging systems. The size of a crew required to support a helicopter logging project may also be relatively fixed regardless of the volume or product value removed.

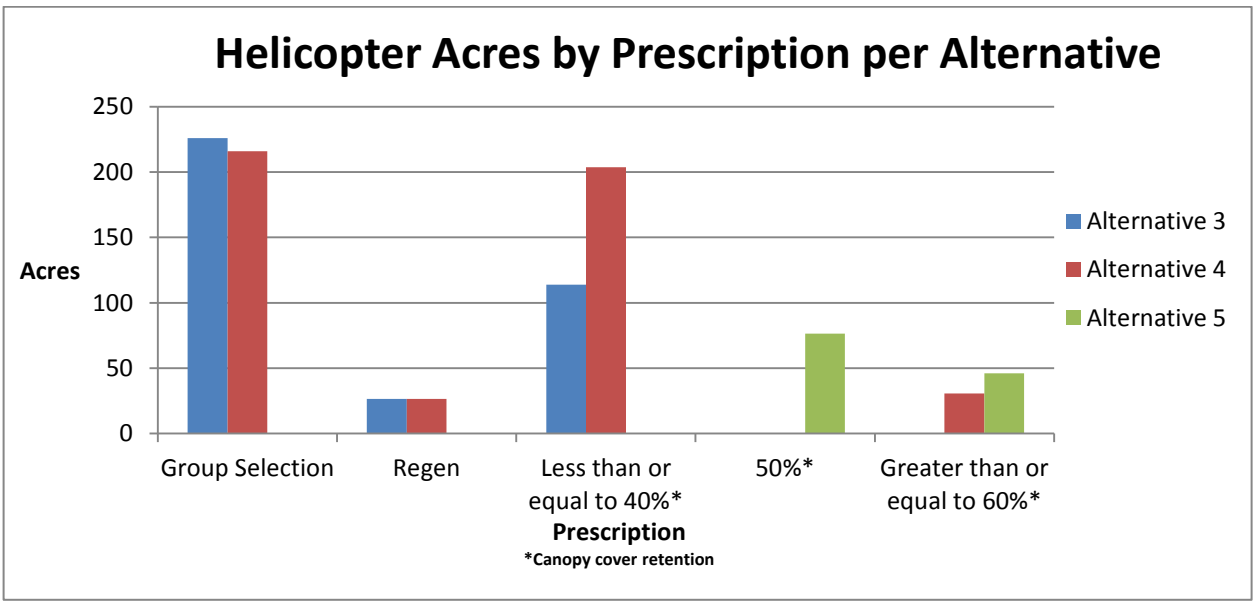
All types of logging equipment have specific operational costs and maintenance needs that are required even when the equipment is operating at less than maximum capacity. Helicopter logging is expensive and extremely specialized with high financial risks and operation costs. Therefore, helicopter logging projects have a smaller economic margin of viability than other logging systems. In order to operate safely and economically, helicopters must select flight paths that avoid obstacles and minimize ascent or decent to less than 30 percent. Both of these factors may affect the turn time of the helicopter. As canopy cover increases, the turn time increases, as displayed in Figure 3-16 below (USFS, SALHI, Toupin). To be economically feasible, helicopters typically require an average of 3 minutes or less for each turn of logs retrieved from the unit and delivered to the landing.

Figure 3-16. The relationship between canopy cover and turn time during aerial yarding operations (USFS Toupin SALHI).



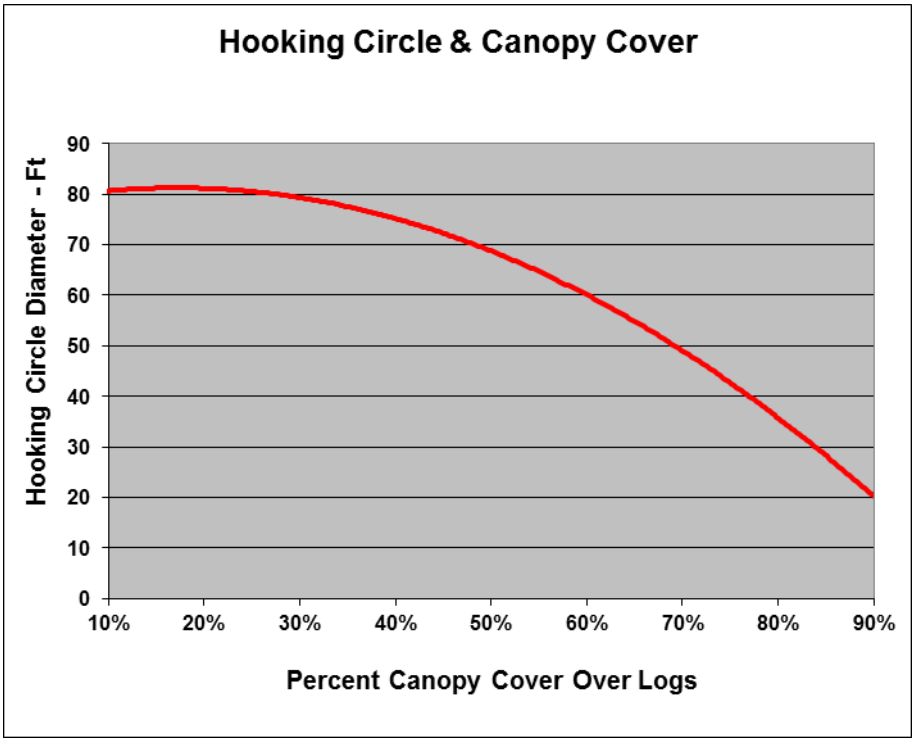
The additional turn time minutes due to an extended product search time in units with canopy cover greater than 40 percent can reduce the economic feasibility of helicopter logging. Figure 3-17 shows the acres of helicopter logging by prescription for each alternative.

Figure 3-17. Acres by prescription for each alternative.



In order to be economically feasible, a helicopter must be able to maximize its payload when it delivers each turn of logs to the landing. A hooking circle is the physical area on the ground from which logs can be packaged together to form a turn. Figure 3-18 displays the relationship between canopy cover and hooking circle diameter. As the percent canopy cover increases, the radius of the hooking circle decreases, which reduces the volume available for each turn and negatively affects economic feasibility of the system (forestrangeland.gov).

Figure 3-18. The relationship between canopy cover and hooking circle diameter (USFS Toupin SALHI).



4. Economic Summary of the Action Alternatives

Estimated volume was determined through stand exam data and verified by site visits which included transects through each unit. The cost per thousand board feet (MBF) was determined using the BLM Logging Cost program. This information is summarized in Table 3-42.

Table 3-42. The estimated acres treated, timber volume produced, and logging cost for each action alternative.

	Acres treated commercial[1]	Total Commercial MBF	Total Commercial Logging Cost	$/MBF[2]
Alt. 3	626.53	2713.70	$579,001.24	$213.36
Alt. 4[3]	1110.18	6019.99	$1,310,908.20	$217.76
Alt. 5	320.90	936.20	$481,276.31	$514.07

[1]Does not include stewardship treatments.
[2] Stump to truck cost only.
[3]New road construction cost is included in Alt 4 stump to truck cost.

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CHAPTER 4 – CONSULTATION AND COORDINATION

This section describes any public participation and consultation or coordination with agencies and organizations that occurred during the preparation of this project.

A. PUBLIC INVOLVEMENT AND INTERAGENCY COORDINATION

1. Scoping

The BLM promotes public involvement in the planning process by soliciting input to determine the scope of the issues to be addressed by the EA. This process, known as scoping, is also used to help identify impacts and potential alternatives that will be analyzed during the development of the project. Scoping input is both internal and external to the agency. Internal scoping uses an interdisciplinary team of resource specialists to identify issues, alternatives, and data needs. External scoping involves notifying other agencies, organizations, tribes, local governments, and the public of the proposed project and providing opportunity for feedback. See Chapter 1, Section 1.H. for more information on the scoping that occurred for this project and the issues that were identified.

2. ESA Consultation

Section 7 of the ESA requires the BLM to work with the US Fish and Wildlife Service (T&E plant and wildlife species) and NOAA Fisheries (T&E fish species) for actions the BLM funds, authorizes, or proposes to ensure the project is not likely to jeopardize the continued existence of listed plant, wildlife, or fish species, or destroy or adversely modify their designated critical habitat.

Before requesting consultation, the BLM determines whether or not the project may affect the listed species or critical habitat. If the project would affect the species, but the effect would be relatively minor, consultation is informal and the BLM submits a written request for informal consultation. If US Fish and Wildlife Service or NOAA Fisheries agrees with the BLM's determination, then informal consultation concludes with the US Fish and Wildlife Service or NOAA Fisheries issuing a letter of concurrence.

If the BLM determines a project is likely to adversely affect a listed species or critical habitat, then formal consultation is required and the BLM submits a written request, or biological assessment, for formal consultation to US Fish and Wildlife Service or NOAA Fisheries. During formal consultation, the US Fish and Wildlife Service or NOAA Fisheries reviews the project to determine if the project is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat. The agencies submit the results of the review to the BLM in a biological opinion.

a. Threatened and Endangered (T&E) Wildlife

The federally threatened northern spotted owl is the only threatened and endangered wildlife species within or near the Nedsbar Forest Management Project. The BLM has determined that the Nedsbar Project is likely to adversely affect the northern spotted owl and its critical habitat. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) for federally-listed wildlife species (northern spotted owl) began when the Biological Assessment (BA) is sent to the USFWS in April 2016 by the Medford District BLM. Meetings and field trips to proposed project units have already taken place as part of a more streamlined consultation process. A Biological Opinion (BO) from the USFWS is expected in July 2016. No Decision will be made until we receive the BO.

b. Threatened and Endangered (T&E) Plants

The Nedsbar Project is within the range of one threatened and endangered plant, the federally endangered Gentner's fritillary (*Fritillaria gentneri*). Suitable habitat for this species includes oak woodlands, chaparral shrublands, meadows, mixed hardwood-conifer woodlands, and the transition zones between these plant communities.

The BLM has a programmatic consultation for T&E plants that generically covers the activities proposed in this EA. The Biological Assessment and Letter of Concurrence (#01EOFW00-2014-I-0013) prescribe measures, called Project Design Criteria, to ensure that management actions will not likely adversely affect populations or habitat. One of the project design criteria for Gentner's fritillary for large-scale forest management projects is to conduct two years of surveys if the project is within the range of the species, contains suitable habitat, and the action would negatively impact the population. The BLM has completed surveys to protocol and five Gentner's fritillary sites were detected. The BLM will protect these sites through applying no treatment buffers.

c. Threatened and Endangered (T&E) Fish

There are no federally-listed fish species or habitat within the Nedsbar Planning Area. The resource area fisheries biologist determined there would be no-effect to federally-listed Southern Oregon Northern California Coast Coho (SONCC) Salmon or Coho Critical Habitat (CCH) and Essential Fish Habitat (EFH) in the Nedsbar Project; therefore, consultation with the NOAA Fisheries for this federally-listed fish species was not needed. There are no anticipated effects to stream channels, sediment and large wood routing, or stream shade resulting from timber harvest and road construction and renovation. Any mechanism for sediment delivery at stream crossings has been arrested or is minimal through the use of PDFs and BMPs.

3. Tribal Coordination

Letters describing the preliminary Nedsbar proposal initiating consultation with the local federally recognized Native American Tribes were sent in May 2014. Further consultation in the form of meetings and phone calls took place and did not identify any concerns.

4. State Historic Preservation Office

Consultation with the State Historic Preservation Office (SHPO) was not needed as the BLM determined that the project will have "no effect" to cultural resources.

B. DOCUMENT AVAILABILITY

A letter or email announcing the availability of the Nedsbar Forest Management Project EA for public review was mailed to those who submitted an Interest Response Form or provided scoping comments, and to grazing lessees, tribes, Rogue River-Siskiyou National Forest, Jackson County Commissioners, Association of O&C Counties, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the library at Southern Oregon University.

The Nedsbar Forest Management Project EA is available on the BLM ePlanning website:

https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=55341&dctmId=0b0003e880a55436

A notice of the EA availability published in Medford's *Mail Tribune* newspaper will begin the 30-day comment period for the Nedsbar Forest Management EA.

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APPENDICES

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Appendix A – Scoping Summary for Nedsbar Forest Management Project

Written comments received in response to the Nedsbar public scoping notice were reviewed by the Interdisciplinary (ID) Team and Ashland Resource Area Field Manager (Responsible Official), and substantive comments were identified.

Substantive comments are those that:

- Provide new information pertaining to the Proposed Action or an alternative;
- Identify a new relevant issue or expand on an existing issue;
- Identify a different way (alternative) to meet the purpose and need;
- Identify a specific flaw in the analysis;
- Ask a specific relevant question that can be meaningfully answered or referenced; and/or
- Identify an additional source of credible research, which if utilized, could result in different effects.

Non-substantive comments are those that:

- Primarily focus on personal values or opinions;
- simply provide or identify a preference for an alternative considered;
- Restate existing management direction laws or policies that were utilized in the design and analysis of the project (or provide a personal interpretation of such);
- Provide comment that is considered outside of the scope of the analysis (not consistent or in compliance with current laws and policies, is not relevant to the specific project proposal, or is outside of the Responsible Officials decision space); and/or
- Lack sufficient specificity to support a change in the analysis or permit a meaningful response, or are composed of general or vague statements not supported by real data or research.

Some comments may have been expressed by one person or organization, while other comments may have been received from more than one person or organization. The central points of comments, questions, and suggested actions/alternatives received are summarized (Table A-1) in manner to form one comment whether it was received from one or more sources. The table below provides a reference to a location in the Nedsbar Forest Management Project Environmental Assessment where information is provided regarding each comment, question, or suggested action/alternative. Commenters raised issues, posed questions, suggested actions/alternatives, or commented on the process. A comment is categorized as an issue when the comment expressed concern for effects to resources or human values, whether it is expressed as a statement or question. Process captures those comments/questions received in regard to how public is involved in the planning process, flow of information, length of comment periods, access to units behind gates, having units laid out and marked timely to allow the public to view prior to commenting, and concern for how the project is developed for consistency/compliance with existing land use plans, policies, regulations and laws.

Table A-1. Comments received on the Nedsbar Forest Management Project during scoping.

Comment	EA Reference
Reduce existing roads. Obliterate hydrologically and/or block road access to midslope and riparian reserve roads (especially road 39-3-27.0 (uppermost 0.7 mile), 39-3-24.0. (headwall first water gulch). When not feasible to obliterate roads, reduce the connectivity of the haul roads, OHV routes, non-system roads etc. to the natural stream system as identified by SONCC MRAR.81.6 sediment recovery action.	Chapter 1
Fell/kill trees in the Riparian Reserve to increase CWD and promote tree growth of remaining trees.	Chapter 1, 2 & 3
Remove suspected coho migration barriers to provide passage during all flow events.	Chapter 1
Maintain Pacific fisher habitat in Riparian Reserves.	Chapter 2 & 3
No new roads in the Quartz Fire Area.	Chapter 1 & 2
Reduce new road construction (temporary and permanent)	Chapter 2
Consider an upper diameter limit on tree harvest (one suggestion is 20 inches dbh)	Chapter 2
Monitor pre/post logging of trees >20" dhb.	Chapter 1 & 3
Estimate # of trees by diameter classes pre and post logging.	Chapter 3
How many board feet of timber is the Bureau of Land Management harvesting?	Project Description
What prescriptions are being considered for the various units?	Project Description
What time scale is being considered (start of work and duration of work)	Project Description
Thinning the forest canopy will increase sunlight to the forest floor and allow for increased wind penetration. This will promote shrub and grass growth and increase the drying of soils, vegetation, and dead and downed wood which will increase the intensity of wildfires.	Chapter 1 & 3
No regeneration harvesting	Chapter 2
No disease management	Chapter 1 & 2
Emphasize small diameter thinning in plantations and brushy areas to reduce fire hazard	Chapter 2
Do not cut large fire resistant trees.	Chapter 2
What area the effects of this project on water quality, including water quality limited streams?	Chapter 1 & 3
This project could cause soil compaction; what are the impacts of road construction and yarding on pore space, water and gas exchange and what is the efficacy of ameliorative mitigation.	Chapter 3
This project may affect sensitive wildlife species including Pacific fisher, bats, and spotted owls.	Chapter 1 & 3
Openings in northern spotted owl habitat should be restricted to one acre.	Chapter 1 & 2
No commercial logging in northern spotted owl nesting roosting and foraging habitat	Chapter 1 & 3
Consider aggressive roadside removal of dead, dying, and severely suppressed douglas fir 200 feet from road centerline or some variable distance to meet ASQ.	Chapter 2
No commercial harvest in Riparian Reserves	Chapter 2
Consider an alternative with no new roads (designated skid trails/swing roads ok)	Chapter 2
Consider an alternative that only allows new temporary road construction	Chapter 2
30-day EA comment period too short; need more time	
Allow access through gated roads so public can review units	Outside the scope of the project.
Project must be consistent with Applegate Adaptive Management	Chapter 1 & 3
EA must map unroaded areas consistent with O&C Lands.	Chapter 1, 2 & 3

Comment	EA Reference
Project must be consistent with Aquatic Conservation Strategy Objectives.	Chapter 1 & 3
Project should be consistent with SONCC Recovery Plan?	Chapter 1 & 3
How does Nedsbar project impact hydrologic flow (peak and low flow)? Logging could lead to flooding. Slow release of water from melting snow sheltered by canopy cover is crucial for a stable water supply. Canopy reduction contributes to drying of the forest floor.	Chapter 1 & 3
The Nedsbar project is will open up forest stands with forest thinning and road construction, which will lead to increased OHV use.	Chapter 1 & 3
What are the effects of the Nedsbar Forest Management Project on visually appealing stands?	Chapter 1 & 3
What are the effects of Nedsbar Forest Management Project on recreation use, use and enjoyment of forest trails, hiking areas, and potential future trail.	Chapter 1 & 3
How does Nesbar project (landings, skid trails, temporary and permanent road construction, potential increase in OHV use) contribute to cumulative effects when combined with effects of the existing road network?	Chapter 1 & 3
How will road construction increase soil erosion and compaction?	Chapter 1 & 3
What is the potential for Nedsbar project to increase off-highway vehicle use in the project planning area?	Chapter 1 & 3
What are the effects of roads on Salmonid decline (see National Marine Fisheries for Pacfish2)?	Chapter 1 & 3
What are the effects of the Nedsbar Forest Management Project on soil erosion, soil compaction, and sediment production to streams? What type of modeling will be used to assess this issue?	Chapter 1 & 3
What are the effects of the Nedsbar Forest Management Project on coho and their habitat? Sediment is a threat to coho recovery; consider best available science in the Final Coho Salmon Recovery Plan (2014).	Chapter 1 & 3
What are the effects of road construction on slope stability?	Chapter 1 & 3
What are the effects of the Nedsbar Forest Management Project, particularly road building and logging, on downslope residents (landslides, rolling debris)?	Chapter 1 & 3
What are the effects of the Nedsbar Forest Mangement Project on unroaded areas and primitive backcountry areas, including the Dakubedete area?	Chapter 1 & 3
What are the effects of structural retention regeneration prescriptions on fire hazard in Unit 28-22b (immediately adjacent to residences on 39-2-28 rd)?	Chapter 1 & 3
How with the Nedsbar Forest Management Project affect already simplified stream habitat?	Chapter 1 & 3
What are the effects to sensitive wildlife species such as Pacific Fisher, bats (including Townsends big-earred bat, Fringed myotis, pallid bats)?`	Chapter 1 & 3
What are the effects of the Nedsbar Project on Neotropical migratory birds?	Chapter 3
What are the effects to northern spotted owls listed under Endangered Species Act (ESA)?	Chapter 1 & 3
Helicopter noise will terrorize my horses (lives adjacent to proposed units)	Chapter 1 & 3
Will this project be economical such that it will draw bids at auction?	Chapter 2 & 3
Opening canopies contributes to increased shrub and grass response and the forest floor is drier which contributes to increased fire behavior.	Chapter 1 & 3
Consider Spies et al. in the analysis of Riparian Thinning and its effects to future dead trees and recruitment of dead wood to streams.	Chapter 1, 2 & 3
Consider June 6, 2013 BLM/NOAA Fisheries Memo attached.	Chapter 1, 2 & 3

Comment	EA Reference
How does the Nedsbar project contribute to cumulative effects to the northern spotted owl and their habitat when considering recent timber sale effects to spotted owl habitat (Bald Lick and O'Lickety)	Chapter 1, 2 & 3
New information suggesting rapid decline of the northern spotted owl population must be considered in your analysis. (Davis et al. 2014).	Chapter 1, 2 & 3
Describe specific conditions that warrant Riparian Thinning.	Chapter 2
Address the findings of the Upper and Little Applegate Watershed Analysis in the Nedsbar Environmental Assessment.	Chapter 1, 2 & 3
Consider 2010 Colombaroli and Gavin "highly episodic Fire and Erosion Regime over the past 2000 years in the Siskiyou Mountains OR when comparing roads and actions versus the no action alternative.	Chapter 1 & 3
What are the effects of temporary roads in comparison to permanent roads on soil compaction and hydraulic conductivity? Consider Luce CH 1997. Effectiveness of Road Ripping in restoring Infiltration Capacity of Forest Roads. Restoration Ecology. 5(3) 265-270.	Chapter 1 & 3
What are the effects of roads on terrestrial and aquatic habitats, fragmentation, edge effects, exotic species invasion, pollution and poaching, wildlife mortality, animal distribution and movement, sediment. (See Noss, Reed The ecological effects of Roads (p-10). www.eco-action.org/dt/roads.html and NDRC Report: End of the Road….. Also see USDA Forest Service. Forest Roads….PNW-GTR-509 May 2001 and Trombulak and Frissell, 2000.)	Chapter 1 & 3
What are the effects of roads on increased fire risk (risk of ignition) and increased fire size?	Chapter 1 & 3
What are the effects of roads on Gypsy Moth and tent caterpillar populations (Bellinger et al 1989 and Rolland J 1993).	Chapter 1 & 3
Commercially thin plantations	Chapter 2
Thin small diameter white fir and Douglas-fir encroachment in pine and mixed conifer stands.	Chapter 2
Retain late-successional forests and large diameter trees.	Chapter 1 & 3
Regeneration harvest, disease management, and salvage logging removes large mature fire resilient trees.	Chapter 1 & 3
Openings from regeneration harvest and disease management are replaced with dense understories increasing flammability.	Chapter 1 & 3
Opening up canopy increases sun penetration, drying, shrub and grass growth, thus increasing potential fire behavior if a fire starts or moves through the project area.	Chapter 1 & 3
There is concern that road construction, tractor logging, and canopy removal would have adverse cumulative effects when combined with past effects from logging, road construction, fire suppression, and mining and other ongoing timber harvest proposals.	Chapter 1 & 3
What are the effects of road construction on increasing use of off-highway vehicles, illegal trash dumping, introduction and spread of noxious weed, fire danger, shooting, and trespassing when considered cumulatively with the existing road network.	Chapter 1 & 3
Forest thinning cleans up the forest floor allowing for OHV intrusion.	Chapter 2
Manzanita provides food for a variety of animals; fuels treatment could lead to extinction.	Chapter 1 & 3
Determine whether special status species occupy or use the affected area and whether the proposed project impacts special status species habitat and determine the effects to special status species.	Chapter 1 & 3

Comment	EA Reference
What is the baseline Pacific fisher population dynamics and habitat in the planning area?	Chapter 1 & 3
What are the impacts of the Nedsbar project on Pacific fisher. According to the Sterling Sweeper EA, the Little Applegate is important for their dispersal. The Sterling Sweeper project represented a pinch point surrounded on three sides by agriculture and rural development.	Chapter 1 & 3
Quantify and qualify the impacts of the proposed mistletoe logging on NSO and their pray. 90% of known spotted owl nests in the Applegate are in dwarf mistletoe brooms in Douglas-fir trees (Marshall et al. 2003).	Chapter 2
What are the impacts of logging, snag removal, mistletoe logging, ground-based yarding and new road construction on the efficacy of critical habitat?	Chapter 1 & 3
Salvage dead material and stands that are in the process of being damaged by insect and disease before the value is lost.	Chapter 2
Proactively manage Riparian Reserves to reduce stocking in Riparian Reserves and increase tree growth; if not treated riparian areas act as a funnel for increased fire behavior. NOTE: See list of literature supplied for consideration in analysis.	Chapter 1 & 3
Consider road construction (including temporary roads) and appropriate harvest systems to ensure economic feasibility for as much of the project area as possible.	Chapter 1 & 3
Consider the ability for purchasers to operation throughout the year to keep a steady supply of wood to mills and in support of steady employment for workers.	Chapter 2
Place roads in storage to reduce their costs and effects when not needed for forest management.	Chapter 2
Mistletoe provides many forest stand and ecosystem benefits (snags, downed wood, gaps, irregularity, wildlife nesting, brooms provide nesting structure, food source, etc. etc…[spell out compilation of all mistletoe comments]; consider an alternative retaining rather than removing mistletoe infected trees. NOTE: Need to address the list of literature submitted and 35+ questions/comments on dwarf mistletoe…	Chapter 1 & 3
Will botanical buffers and survey and manage buffers be physically marked in harvest units.	Chapter 1 & 3
Logging practices can contribute to the spread of dwarf mistletoe	Chapter 1 & 3
Forest thinning as designed is likely to increase fire hazard; what is the incremental effect on fire hazard in the watershed.	Chapter 1 & 3
The use and burning of polyethylene sheets in thousands of piles will have human health impacts.	Chapter 1 & 3
Is this project in the range of the black salamander?	Chapter 1 & 3
BLM must complete and Environmental Impact Statement if impacts are unknown or significant.	Chapter 1
Utilize seasonal restrictions for neotropical migratory birds to avoid impacts during nesting season.	Chapter 3
Will equipment be allowed in riparian areas and draws?	Chapter 1 & 3
How many landings will there be and where will they be located?	Chapter 1 & 3
Is tractor yarding allowed on short pitches exceeding 35% slope?	Chapter 1 & 3
How does the Nedbar Forest Management Project affect wildlife habitat connectivity? The Sterling Sweeper EA described that planning area as a pinch point due to agricultural development on three sides.	Chapter 1, 2 & 3

Comment	EA Reference
Consider the role of dead wood in meeting ecosystem goals for Applegate Adaptive Management Area (AMA), key watershed, and Riparian Reserves.	Chapter 3
Consider the role of large trees and mature forests in restoration of old-growth forest ecosystems, protection of watersheds and water quality, recreation and quality of life, carbon storage, and habitat for wide variety of wildlife including northern spotted owl and its ability to co-exist with the barred owl.	Chapter 1 & 3
Thinning can have adverse effects on carbon storage; logging will transfer carbon from storage to the atmosphere and future growth is unlikely to make up for the effects of logging on carbon storage. Suggest carbon counting with and without logging.	Chapter 1 & 3
Adverse effects of forest thinning must be offset by beneficial effects such as reducing competition between trees and growing trees larger faster, increasing resistance to drought and insects, increasing species diversity, and possible fire hazard reduction.	Chapter 1 & 3
Thinning and regeneration harvest captures mortality by removing it from the forest preventing those trees from becoming snags and dead wood. (See 1993 SAT Report pp 146-152 and Feb 1991 Q&A, ICS report etc.-Oregon wild p.3)	Chapter 3
What are the effects of the project cumulatively on climate change. What are the greenhouse gas emissions of this project.	Appendix B; Issues considered but eliminated from detailed analysis
Harmonize goals of restoring young and old forest by including structure rich gaps in variable density thinning and variable regenin a portion of the young stem-exclusion stands.	Chapter 2
More young stands are not needed.	Chapter 2

APPENDIX B – ISSUES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following issues or concerns were raised by the public or the ID team during the development of the project. The BLM considered these issues and concerns but did not analyze them in detail, often because the project's design or implementation of Project Design Features (PDFs) would eliminate or reduce effects on the resource. In some cases, issues and concerns raised by the public or the ID team were not considered in detail as they were determined to be beyond the scope of this project. These issues or concerns, along with a rationale for their being "considered but not analyzed in detail" in this EA, are listed below.

Dakubatede Primitive Backcountry Area

Concern: Implementation of the Nedsbar Project would be injurious to Senator Ron Wyden's proposed Dakubetede Primitive Backcountry Area via altering the landscape character used to propose the designation.

Rationale: The BLM cannot manage lands based on proposed legislation, nor has the agency been directed to do so. However, the BLM has conducted a Wilderness Characteristics Inventory (WCI) in a portion of the area included in Senator Wyden's proposal, the Dakubetede WCI Unit (5,099 acres), which is was considered for designation as Lands with Wilderness Characteristics (LWC) in the *Western Oregon Proposed Resource Management Plan/Final Environmental Impact Statement* (USDI BLM 2016). The entirety of the Nedsbar Planning Area is located outside of the inventoried Dakubetede LWC and the area was dropped because "the total acres of contiguous inventoried lands with wilderness characteristics remaining outside the Harvest Land Base or incompatible Recreation Management Areas would drop below 5,000 acres and would no longer meet the minimum requirements to be considered for allocation to the District-Designated Reserve – Lands Managed for their Wilderness Characteristics." (PRMP/FEIS, p. 468), and therefore, further analysis of potential effect to this area is not required. The Record of Decision for the Western Oregon RMP was signed on August 5, 2016.

Late-Successional Reserves

Concern: Commenters raised the question: "What is the current condition of the nearby LSRs? Are they functioning?"

Rationale: There are no mapped BLM-administered Late-Successional Reserves (LSRs) in Applegate Watershed. Because the Nedsbar Forest Management Project does not affect any LSRs, NEPA does not require an analysis or discussion of the specific conditions of these LSRs as part of the Project EA. The role of LSRs, as identified under the Northwest Forest Plan, is to provide for the maintenance and enhancement of a well-distributed network of late-successional forests to provide habitat for populations of species associated with late-successional and old-growth forests (USDI 1994, p. B-5; USDI 1995, pp. 32 and Appendix A). The Northwest Forest Plan EIS (FSEIS) recognized that late-successional reserves are composed of a variety of vegetation classes; under Alternative 9 of the FSEIS (adopted and incorporated by the Medford District 1995 RMP), 42 percent of LSRs were covered by late-successional forests (USDI 1994, pp. 3- and 4-39). The ability of these reserves to meet the objectives of the Northwest Forest Plan was analyzed and disclosed in the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*.

Analysis of LSRs has taken place at broader scales, and is beyond the scope of analysis contained in this EA.

Climate Change

Issue: How would the proposed project affect carbon storage and greenhouse gas emissions?

Background Information: The Medford District BLM has conducted analysis on past projects to determine the effects of individual forest management projects on carbon storage and carbon dioxide emissions. These

individual BLM proposed actions showed changes in greenhouse gas levels far too small to provide much meaningful information. Recent EAs on the Medford District that included an analysis of effects on carbon storage and greenhouse gas emissions includes the Evans Creek Forest Management Project (2011) and the Twin Ranch Forest Management Project (2010) in the Butte Falls Resource Area, and the Howard Forest Management Project (2014) and the Heppsie Forest Management Project (2012) in the Ashland Resource Area. All projects had comparable treatments. In those documents, carbon storage and carbon emissions of the proposed actions were calculated to determine the net contributions of greenhouse gases resulting from potential treatments. Carbon emissions (carbon dioxide) were calculated from timber harvest activities (including fuel consumption) and post-harvest fuel treatments. These EAs found proposed actions would reduce carbon stores temporarily but it would result in net increases over time. For the Heppsie Project "within 10 years after harvest the carbon emission level (3.7 tonnes/acre) for the 20-year analysis period would be offset by carbon storage in tree growth" and "total live tree carbon would equal pre-treatment levels after about 75 years of tree growth" (p. 3-158). The total carbon dioxide emitted during the 20-year analysis periods is considered negligible in the context of total U.S. carbon dioxide emissions of 6 billion metric tons (Heppsie EA, p. 3-158, Evans Creek EA, p. 177, Twin Ranch EA, p. 111, Howard EA, p. 3-114).

Rationale: This issue was considered but eliminated from further detailed analysis because the Medford BLM has determined no further analysis of greenhouse gas emissions and carbon storage are warranted at the individual project level to make a determination of potential for significant effects. The analysis completed for other similar forest management projects showed that emissions were negligible in the context of total U.S. carbon dioxide emission, and proposed actions would reduce carbon stores temporarily but would result in net increases over time.

Botanical Resources and Noxious Weeds

Issue: How would soil disturbance and compaction from ground-based tractor and cable yarding; road and landing construction; reduction of canopy cover from timber harvest; and underburning, broadcast and pile burning affect the persistence of Bureau Sensitive and S&M plants and fungi in the Project Area?

Background Information: The BLM has completed botanical surveys following requirements and the appropriate protocols for federally listed Threatened & Endangered (T&E), Bureau Special Status (BSS), and Survey and Manage (S&M) plants and fungi in proposed project areas. Surveys were completed between spring 2007 and spring 2016. Surveys for this project completed prior to July 2015 targeted species on the 2011 State Director's BSS list, while those completed after July 2015 targeted species on the 2015 State Director's BSS list. No species were added to the 2015 list that were not already on the 2011 list.

The Nedsbar Analysis Area is within the range of one federally listed T&E plant, Gentner's fritillary (*Fritillaria gentneri* (FRGE)). Table B-1 lists the T&E, BSS, and S&M vascular and nonvascular plants and fungi discovered in and adjacent to Project Areas during surveys.

Table B-1. Threatened & Endangered (T&E), Bureau Special Status (BSS), and Survey and Manage (S&M) plants and fungi in or adjacent to units or haul routes (Alternative 4).

Scientific Name/Common Name	BLM Status	Survey & Manage Status	#Sites Nedsbar-inside units	# Sites Nedsbar-outside units (within 100' of units, haul routes, landings or skids)	#Sites Medford District BLM	# sites NWFP
VASCULAR						
Fritillaria gentneri Gentner's fritillary	Federally Endangered	none	3	2	218	218
Tetrapteron graciliflorum (Camissonia graciliflora) slenderflower suncup	SEN	none	3	1	53	53
Cypripedium fasciculatum clustered lady's slipper	SEN	C	2	3	931	990
NONVASCULAR						
Collema quadrifidum	STR	none	6	1	8	8
Chaenotheca ferruginea	none	B	2	0	498	673
Leptogium teretiusculum	STR	E	8	1	212	231
FUNGI						
Spathularia flavida	none	B	1	1	86	114

*Survey and Manage: as determined by the 2001 amendment to the 1994 Northwest Forest Plan Record of Decision for Survey and Manage, Protection Buffers and related mitigation measures.

A= Rare, and all known sites are managed. Current and future known sites will be managed according to the Management Recommendation for the species. Minimize inadvertent loss of undiscovered sites. Pre-disturbance surveys are practical.

B= Rare, and all known sites are managed. Pre-disturbance surveys are not practical.

C = Uncommon, and not all known sites or populations are likely to be necessary for reasonable assurance of persistence, as indicated by several factors. Pre-disturbance surveys are practical.

D= Uncommon. Manage all known sites until high-priority sites can be determined. Pre-disturbance surveys are not practical or not necessary.

E=Rare, status undetermined. Manage all known sites while category assignment is being determined.

F= Uncommon, or Concern for Persistence Unknown. Management of known sites NOT required because species are uncommon, not rare. Until reassignment of species to a new category or removal from list occurs, inadvertent loss of some sites is not likely to change the level of rarity.

SEN = Sensitive (USDI Oregon State Director's List)

STR = Strategic (USDI Oregon State Director's List)

The BLM would protect all known sites of T&E, BSS, and S&M plants and fungi by one or more of the following methods: a) distance from project units and associated activities, b) seasonal restrictions, or c) a no-treatment buffer. Project associated activities such as thinning, fuels treatments and burn piles, tail hold trees, skidding or other activities that may cause disturbance, soil compaction or alteration of canopy will not occur in no-treatment buffers. Buffer sizes vary depending on the species, proposed treatment, current canopy cover, canopy cover remaining after treatment, management recommendations, population size, and species rarity. No-treatment buffers and seasonal restrictions would be applied to proposed fuels treatments.

Rationale: This issue was considered but not fully analyzed in detail because the required surveys were completed and known sites would be protected. It was determined that the actions proposed under Alternatives 3, 4 and 5 would have "no effect" to T&E plants or their critical habitat. Protecting known sites for Bureau Sensitive and S&M plants and fungi from direct or indirect impacts would ensure those species' persistence in

the Nedsbar Project Area, prevent species from trending toward listing, and prevent adding cumulative effects to these species during implementation of Alternatives 3, 4 or 5.

Issue: How would the movement of vehicles and equipment on and off system roads; soil disturbance and vegetation removal during permanent and temporary road and landing construction; road decommissioning, renovation and maintenance; underburning, broadcast, or pile burning; and the removal of canopy cover during timber harvest affect the introduction and spread of noxious weeds in the Project Area?

Background Information: Noxious weeds are plants designated by the Oregon State Weed board that are a public menace and a top priority for weed control programs. They have the potential to cause negative impacts to agriculture, natural resources, and native flora and fauna, hamper full utilization of recreation areas or may be poisonous or harmful to humans or animals (ODA 2016).

The BLM has documented noxious weed species in the Project Area over many years of surveys and incidental sightings. Ten species of noxious weeds occur throughout the Project Area (Table B-2). All species are Category B on Oregon Department of Agriculture's Noxious Weed list (ODA 2015), and two species (rush skeletonweed and spotted knapweed) are also listed as Target (T) species. The BLM prioritizes treatment of Category A and T listed noxious weeds and treats Category B species as funding and time allows.

Table B-2. Noxious plant species in or adjacent to the units or haul routes (Alternative 4).

Common Name/ Scientific Name	ODA Status*	Relative Frequency and Abundance in Project Area	Inside or Outside Proposed Units/Habitat
Armenian (Himalayan) blackberry (*Rubus armeniacus*)	B	High abundance (avg. cover at infestations 29%), high frequency, widely distributed, likely under reported. (79 infestations, 12.8 acres total, within 100 meters of units, landings, skids, roads and haul routes).	Inside and outside units, mostly along edges of habitat types where tree canopy is low, previously disturbed areas and road systems.
Bull thistle (*Cirsium vulgare*)	B	Low abundance, high frequency, widely distributed, likely under reported. 116 infestations within 100 meters of units, landings, skids, roads and haul routes.	Inside and outside units, mostly in previously disturbed areas and along road systems.
Canada thistle (*Cirsium arvense*)	B	Low to moderate abundance, low frequency. Two infestations, 0.5 acres total, within 100 meters of units, landings, skids, roads and haul routes.	Outside units, along haul routes.
Spotted knapweed (*Centaurea stoebe)*	B, T	Low abundance, low frequency (three infestations, 0.3 acres within 100m of units, landings, skids, roads and haul routes).	Outside units, along haul routes between units.

Common Name/ Scientific Name	ODA Status*	Relative Frequency and Abundance in Project Area	Inside or Outside Proposed Units/Habitat
Rush skeletonweed (*Chondrilla juncea)*	B, T	Low abundance, low frequency (3 infestation <1 acre acres within 100 meters of project units, landings, skids, roads and haul routes).	Outside units, single known infestation within 100m of project areas along haul route between units.
Teasel (*Dipsascus laciniatus)*	B	Low abundance, low frequency (two infestations 0.2 acres) within 100 meters of units along a road that will not be used for project activities.	Outside units, along roads that will not be used for project activities.
Sulfur cinquefoil (*Potentilla recta)*	B	Low abundance, low frequency (one infestations within 100 meters of project areas along haul routes)	Outside units, along haul routes
Yellow star-thistle (*Centaurea solstitialis*)	B	Low to moderate abundance, high frequency (133 infestations, 43 acres within 100 meters of project areas	In and adjacent to units, along haul routes.
Yellow flag iris (*Iris psuedacorus)*	B	High abundance but low frequency two infestations within 100 meters of project areas.	Outside units and haul routes, along irrigation canal on private property next to paved road.
Medusahead rye (*Taeniatherum caput-medusae)*	B	Moderate abundance, moderate frequency, probably under reported but mentioned 22 times on species lists of contracted surveys.	Occasionally in units, not on haul routes.

-Abundance: (as given in BLM 9015.6) ; Low-<5% canopy cover, Moderate- 5-25% canopy cover, High->25% canopy cover
- Frequency: Number of infestations
- Oregon Department of Agriculture (ODA) Noxious Weed Control Program: provides a statewide leadership role for coordination and management of state listed noxious weeds.
- A = a weed of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent.
- B = a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties.
- T = a priority noxious weed designated by the Oregon State Weed Board as a target for which the ODA will develop and implement a statewide management plan. "T" designated noxious weeds are species selected from either the "A" or "B" list.

To reduce the risk of introducing noxious weeds into the Project Area, the BLM requires equipment that works off main roads to be cleaned of plant parts before entering BLM-administered lands. This reduces the possibility of bringing in weed seed or plant parts from outside the Project Area. Seed or plant parts could still be transported within the project boundary from infested to non-infested areas by vehicles or equipment when they move from one area to another. Areas that are particularly vulnerable to weed invasions are newly disturbed soil, such as skid trails, landings, new route construction, ripped roads, pump chances, burn pile scars, areas that are underburned; and areas where canopy cover is removed or reduced. Noxious weeds could invade these newly disturbed areas when seed or plant parts are transported by vehicles, equipment, or individuals during management actions; by the public or landowners using roads and lands within the Project Area; or by natural processes such as transportation by animals, wind, or water. PDFs such as seeding disturbed areas with native species and mulching with weed free straw would aid the establishment of desirable vegetation which can

then compete with noxious weeds on landings and routes that are ripped after use or during road decommissioning.

Weed populations occur throughout the Project Area on private as well as on public lands. The BLM will continue treating some noxious weed populations in the Project Area and will treat new populations of Category A and T species that are discovered and Category B species as feasible given limited funding and time. The BLM will continue to monitor and treat weed populations in areas where disturbance occurs. However, while some noxious weed populations will be eradicated or reduced, other populations will increase and new populations will become established whether or not the action alternatives are implemented. Weed management is an on-going process on BLM-administered lands throughout the Medford District. Cooperation with landowners and other agencies increases the success of these efforts.

Rationale: This issue was considered but not fully analyzed in detail because the implementation of PDFs and on-going treatments and monitoring before and after project implementation would reduce the possibility that actions proposed in Alternatives 3, 4, or 5 would introduce or spread noxious weeds in the Project Area. Further analysis of the issue would not lead to a more informed decision.

Cultural Resources

Issue: How would soil disturbance from timber management and road activities, and soil heating from fuels management affect cultural resources?

Background Information: In accordance with the 2015 State Protocol Between the Oregon-Washington State Director of the Bureau of Land Management (BLM) and the Oregon State Historic Preservation Officer (SHPO)and the National Historic Preservation Act of 1966 (specifically, section 106), as amended, a literature review and archaeological reconnaissance was conducted for the Nedsbar Project Area. Sites identified within the Project Areas of Potential Effect (APE) have been flagged for avoidance.

The Nedsbar Project was reviewed for the potential for adverse effects to recorded cultural resources. Site specific protection measures (flag and avoid) have been applied to protect cultural sites located within the Nedsbar APE (2015 Protocol VI.C.9) and would not be affected by the undertaking.

Rationale: This issue was considered but eliminated because known cultural resources within the project APE where soil disturbance and soil heating from project activities will take place have been flagged for avoidance.

Rangeland Resources/Grazing

Issue: How would proposed harvesting affect grazing and rangeland management in the Planning Area?

Background Information: There is one active grazing allotment within the 18,958-acre Nedsbar Forest Planning Area. Portions of the Lower Big Applegate Grazing Allotment are within the Planning Area boundary. There are 15,924 acres of BLM-administered lands within the Planning Area, of which 8,235 acres are within this active allotment. Therefore, 52 percent of BLM-administered lands and 43 percent of all lands in the Planning Area are available for grazing. There is one lessee who has one grazing lease within the Planning Area for authorization to graze 119 cattle, utilizing 258 animal unit months10 (AUMs). The 119 cattle authorized to graze 258 AUMs is calculated using entire allotment acreage, which includes use outside of the Planning Area.

Portions of the Sterling Springs and Tunnel Ridge Allotments are also within the Planning Area boundary, but are not active and are currently unavailable for grazing use. Approximately 7,756 of the 29,209-acre Sterling Creek Allotment and 1,291 acres of the 2,200-acre Tunnel Ridge Allotment exist within the Planning Area.

10 The amount of forage needed to sustain one cow/calf pair for one month.

Allotment information in Table B-3 includes active and non-active allotment acreage within the Planning Area. Authorized cattle numbers, authorized AUMs, and season of use in Table A-3 are calculated for the whole grazing allotment.

Table B-3: Grazing Allotments in the Nedsbar Planning Area.

Allotment Name (number of leases)	Allotment Acres in Project Area	Percent of Total Allot. Acres	Current. Authorized AUMs	Current Authorized (#cattle)	Season of Use
Lower Big Applegate (1)	8,643	58%	258	119	4/16 – 6/30
Sterling Creek (0)	7,756	27%	0	0	
Tunnel Ridge (0)	1,291	59%	0	0	

The forested portions of these grazing allotments are seldom accessed by livestock resulting in utilization levels that are generally none to slight (0-10%) within the forest plant community. The AUM rates/carrying capacities that are approved in a grazing lease account for the 0-10% use in forested areas.

Rationale: This issue was considered but eliminated from detail analysis because it would not lead to a more informed decision. Proposed timber harvest would decrease stand density which would increase forage production by allowing more light to the forest floor for understory growth of herbaceous vegetation. Harvest and hauling activities could influence known patterns of grazing use and distribution, but is not likely due to treatment locations and the amount of acres treated in comparison to the amount of acres that are available for grazing use. Annual compliance and utilization monitoring occurs within the Lower Big Applegate Allotment and would occur where timber harvest and hauling is proposed.

New forage availability may draw and spread livestock into harvested units that were previously unused. This may disperse grazing intensity in small portions of the allotment, which could result in reduced utilization and compaction on meadow and riparian resources as cattle move into upland areas where there would be little to no effects from the grazing.

Proposed new temporary road construction under Alternative 4 would not likely influence livestock distribution or use patterns in any considerable way because these roads are in grazing allotments that are not active and are likely to stay vacant. Alternatives 3 and 5 have no proposed new temporary or permanent road construction.

If the proposed harvest and fuels treatments are not implemented, forest stands would remain dense with no increase in forage production for livestock. Forest encroachment on meadows and other open areas that receive sunlight and produce grass species foraged by cattle, would continue to decrease in size and gradually decrease the availability of forage over time.

Off-Highway Vehicle Use

Issue: How would road and landing construction, and yarding corridors affect off-highway vehicle (OHV) use, illegal trash dumping, target shooting and trespass in the Planning Area?

Background Information: BLM-administered lands are designated as ‘open’ to off-highway vehicles most of the year. Treatments with direct access to roads have the potential to ‘open up’ land to off-highway vehicle intrusions.

Rationale: This issue was considered but eliminated from further detailed analysis as the potential for adverse effects from unauthorized OHV use would be greatly reduced through the implementation of the following Project Design Features:

- Place woody debris or other appropriate barriers (e.g., rocks, logs, and slash) on the first 100 feet of skid trails leading off system roads in all ground-based yarding units upon completion of yarding to block and discourage unauthorized vehicle use.

- Rip, seed, mulch with straw, water bar, and block new temporary routes and associated landings in the same season of use. Seed must be native species, site-specific, and approved by the resource area botanist. If hauling on a temporary route is not completed in the same year the route is constructed, the route would be storm-proofed and blocked by October 15th or when soil moisture exceeds 25 percent.

The BLM proposes to close and decommission roads that are not needed at this time but may be used in the future. Roads would be closed with a device similar to an earthen barrier or equivalent and would not be maintained in the future. Roads would be closed to vehicles on a long-term basis, but may be used again in the future. Closing and decommissioning roads in the Planning Area would help reduce OHV use and trail creation, illegal dumping, target shooting and trespass.

Polyethylene Plastic

Concern: What are the potential human health effects from the methane, ethane, aldehydes, keton and acrolein compounds emitted when polyethylene (PE) sheets (black plastic) used to cover logging slash handpiles are burned?

Background Information: Oregon is one of two states that allow burning of PE pile covers along with the slash pile. The use of polyethylene plastic sheeting would follow guidance from DEQ and Oregon Department of Forestry Smoke Management Plan (EA, p. 3-36). OAR 629-048-0210 "(a) Only polyethylene may be used. All other plastics are prohibited; (b) the size of each polyethylene cover must not exceed 100 square feet. For small piles, covering only an area necessary to achieve rapid ignition and combustion, instead of the entire pile, is encouraged; (c) the thickness of the polyethylene cover must not exceed 4 mil." On hand pile units the 4 mil polyethylene sheeting typically covers 90 percent of the surface of the pile, with a maximum of 100 square feet of coverage. Burning would occur after coordination with ODF on the smoke management forecast and instructions to minimize the likelihood of public health effects and visibility impairment.

The available literature does not support a contention that burning PE sheeting would produce unique chemicals or classes of chemicals that are not also found in emissions from burning wood debris (Wrobel and Reinhardt, 2003). The literature suggests that the emissions to the atmosphere contributed by the sheet of PE covering are chemically similar to the emissions from the underlying pile of silvicultural debris. For many of these emissions, such as CO, CO_2 and particulate matter, the amount emitted from the woody debris will overwhelm the contribution from the PE.

Scoping comments suggested using Kraft paper instead of PE plastic to cover slash piles. Combustion studies involving lignocellusosic materials suggest that uncoated Kraft paper may produce some of the same substances as PE plastic, although the amount of volatiles emitted by plastics is higher than that generated by lignocellusosic degradation (Garcia et al., 2003). However, the 2003 Garcia study was conducted in a preheated furnace which does not mimic the conditions of burning silvicultural debris with PE sheeting from ambient to approximately 1000°C.

Rationale: This concern was considered but eliminated from further detailed analysis as it is beyond the scope of this project. Analyzing the potential human health effects of compounds emitted from the burning of PE coverings is under the jurisdiction of Oregon Department of Environmental Quality. However, as identified in Chapter 2, *Alternatives*, Alternative 5 includes the use of Kraft paper to cover slash piles. The use and effectiveness of Kraft paper in place of PE is analyzed in Chapter 3.C., *Fire and Fuels*.

Air Quality

Issue: How would the smoke created from burning timber slash affect air quality?

Background Information: For all prescribed burning activities, the Medford District BLM is required to be in compliance with the Oregon Smoke Management Plan (OAR 629-048-0010). The Oregon Smoke Management Plan designates SSRA (Smoke Sensitive Receptor Areas), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. The SSRA closest to the Project Area is the Bear Creek Valley, as described in OAR 629-048-0160. The objective of the Smoke Management Plan is to prevent smoke from prescribed burns from entering the SSRA.

Medford District BLM is also required to be in compliance with the Oregon Visibility Protection Plan (OAR 340-200-0040, Section 5.2) which mandates that prescribed burning does not affect the visibility of Class I areas. Class I areas are defined in the Clean Air Act as Forest Service wildernesses and national memorial parks over 5,000 acres, National Parks over 6,000 acres, and international parks. Local Class I areas include Crater Lake National Park, Kalmiopsis Wilderness, and Rogue Wilderness. The Project Area is not within a Class I area.

Prior to conducting prescribed burning activities, the BLM must register prescribed burn locations with Oregon Department of Forestry. The specific location, size of the burn, fuel loadings, ignition source, time, and duration of ignition are reported prior to ignition. Smoke management advisories or restrictions are generated on a daily basis by the State Meteorologist. This information is used to determine the appropriate time to conduct the planned prescribed burn. Most prescribed burning on the Medford District is accomplished by hand-pile burning. Hand-pile burning generally occurs throughout the winter months during storm events when unstable atmospheric conditions are present in order to maximize mixing and lessen smoke impacts to localized areas. All piles would be covered with four millimeter thick polyethylene plastic sheeting to facilitate rapid ignition and consumption of fuels to minimize residual smoke.

Rationale: This issue was considered but eliminated from further analysis because there would be negligible direct or indirect effects on air quality within the Project Area and the SSRA. Effects on air quality from activity slash burning would be short-term and localized. All units are not burned at the same time or in the same year. A large portion of particulate matter emissions produced during prescribed burning is lifted by convection into the atmosphere where it dissipates by horizontal and downward dispersion. At distances greater than five miles, the air concentrations for these emissions are expected to be small. Under these conditions and by following the prescribed fire management guidelines in the Oregon Smoke Management Plan, there would be negligible direct or indirect effects on air quality within the Project Area and the SSRA.

Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan (OAR 340-200-0040, Section 5.2). As a result, prescribed burning emissions are not expected to adversely affect annual PM10 attainment within the Bear Creek Valley SSRA. In addition, the BLM does not expect prescribed burning to affect visibility within Crater Lake National Park and neighboring wilderness smoke sensitive Class I areas (Kalmiopsis and Rogue Wilderness Areas) due to the distance from the Project Area and implementation of smoke management guidelines. Therefore, this issue was not analyzed further.

Late-Successional Forest Condition

Concern: How would the proposed harvesting affect the retention late-successional forest in watershed where little remains as directed by the Northwest Forest Plan and the Medford District RMP?

Background Information: The Northwest Forest Plan (NFP) Record of Decision (ROD), pages C-44 and C-45 directs the retention of late-successional patches across the landscape where little late-successional forest persists.

> This standard and guideline will be applied in fifth field watersheds (20 to 200 square miles) in which federal forestlands are currently comprised of 15 percent or less late-successional forest. (The assessment of 15 percent will include all federal land allocations in a watershed). Within such an area, protect all remaining late-successional forest stands. Protection of these stands could be modified in the

future when other portions of a watershed have recovered to the point where they could replace the ecological roles of these stands.

In Adaptive Management Areas, less than 15 percent of federal forest land in fifth field watershed in late-successional forest should be considered as a threshold for analysis rather than a strict standard and guideline. A proposal to modify such stands should only be implemented following an analysis that considers the ecological function of the remaining later successional forest and its location on the landscape.

Late-successional forest is defined as forest seral stages which include mature and old-growth age classes. Four major structural attributes of old-growth Douglas-fir forests are: live old-growth trees, standing dead trees (snags), fallen trees or logs on the forest floor, and logs in streams. Additional important elements typically include multiple canopy layers, smaller understory trees, canopy gaps, and patchy understory. Structural characteristics of late-successional and old-growth forests vary with vegetation type, disturbance regime, and developmental stage. For example, in many Douglas-fir stands in western Oregon and Washington, the mature phase of stand development begins around 80 years and is characterized by relatively large live and dead trees, although multiple canopy layers may not yet be well developed. In some forest types subject to frequent, low-intensity fire, such as ponderosa pine, the late-successional and old-growth stages are typically characterized by relatively open understories and relatively few large fallen trees (in comparison to more moist Douglas-fir/western hemlock types). (BLM Instruction Memorandum OR-98-100).

Rationale: The NFP requires that at least 15 percent late successional forest (stands at least 80 years old) be retained in each fifth field watershed or analyzed if dropping below 15 percent in AMAs (NFP, p. C-44 and C-45, BLM Instruction Memorandum OR-98-100).

Using a classification system based on tree diameter and cover by biophysical setting (BpS) as described in Haugo et al. (2015), the BLM evaluated the mature and late-successional forests on federal lands in both the Upper and Little Applegate 5th field watersheds and determined that there are approximately 35,808 acres of late-successional forest in the Upper Applegate watershed and 38,747 acres in the Little Applegate watershed. Approximately 83 percent of the Upper Applegate and 81 percent of the Little Applegate watersheds contain late-successional forest on federal lands.

The prescriptions proposed for the Nedsbar Project typically will not reduce canopy below 40 percent and therefore, would not reduce a stand from late-successional forest condition as defined for this standard and guideline. The amount of remaining late-successional forest in the two watersheds will remain well above the 15 percent minimum (and threshold for further analysis in AMAs) following completion of this project. Therefore, this concern was considered but eliminated from detailed analysis.

Blowdown Risk

Issue: How would the proposed harvesting affect the risk for blowdown following harvest?

Background Information: It has been documented that post-logging blowdown or wind throw can be an undesirable side effect of thinning, especially during the first 3-5 years following treatment (Cremer et al. 1982). Two of the main factors that predispose stands to wind throw include high height to diameter ratios (large/long canopies) and the topographic position (ridge, mid slope, valley bottom) (Stephen 2000). The residual stands spatial arrangement of stems and where they sit on the landscape as well as the crown condition of leave trees can both be incorporated into a prescription and logging operation implementation to decrease the probability of a damaging wind event that could potentially lengthen the time for canopy cover to recover to the desired condition. Smith et al (1997) recommends that retaining the largest and most well developed trees because of their “thriftier crowns and stronger stems” can lower the potential for blowdown/windthrow.

Rationale: As a general rule the prescriptions designed for the Nedsbar project focus removals on subordinate crown classes and intermediate-sized trees, promoting the growth and structural development of the remaining

stand in response to the decrease in stand density (see prescription descriptions EA, pp. 2-13 to 2-17). It should also be noted that untreated stands are subject to blowdown as well. Lastly, wind events of sufficient magnitude to significantly modify the post treatment stands are inherently random in nature and occur chaotically across the landscape. Thus the effect mentioned is not certain but there is some level of risk depending on many biotic and abiotic influences and therefore, this issue was considered but eliminated from detailed analysis.

Recreation Economy in the Applegate Valley

Issue: How would the proposed harvesting, fuels/understory thinning, and road construction, renovation, and maintenance affect the recreation economy in the Applegate Valley?

Background Information: Recreation and tourism in the Applegate Valley continues to increase and diversify.

Rationale: Forest management on public and private land has been occurring in the Applegate Valley for more than 100 years. Over the last 100 years, recreation and tourism in the Applegate Valley has continued to increase and diversify, regardless of forest management activities conducted on private or public lands, therefore it is not anticipated that the Nedsbar Forest Management Project would adversely impact the recreation economy in the Applegate Valley. This concern was considered but eliminated from detailed analysis.

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APPENDIX C – PROPOSED PROJECT UNITS AND HAUL ROUTE TABLES

ALTERNATIVE 3

Table C-1. Alternative 3: Proposed commercial harvest units.

Unit	Commercial Harvest Prescription	Acres	T_R_SEC
34-32B	ST_PP_40%	4.45	39S-03W-34
35-32	DM_60%	27.32	39S-03W-35
35-33	ST_PP_40%	10.43	39S-03W-35
23-32	ST_DF_40%	17.37	39S-03W-23
26-31	ST_DF_40%	70.16	39S-03W-26
34-31	ST_DF_40%	9.27	39S-03W-34
36-30	GS_60%	10.77	39S-03W-36
34-32A	ST_PP_40%	2.36	39S-03W-34
27-30	GS	5.52	39S-03W-27
17-10	ST_PP_40%	15.15	39S-01W-17
17-11A	ST_DF_40%	12.97	39S-01W-17
20-11A	GS_40%	30.15	39S-01W-20
20-11B	GS_60%	38.61	39S-01W-20
20-12	ST_PP_40%	10.03	39S-01W-20
28-10A	ST_DF_40%	16.47	39S-01W-28
29-10	ST_PP_40%	7.68	39S-01W-29
29-11	ST_PP_40%	3.63	39S-01W-29
30-10A	ST_DF_40%	9.14	39S-01W-30
28-20	ST_DF	8.71	39S-02W-28
34-20	ST_PP	10.40	39S-02W-34
28-21	ST_PP	23.43	39S-02W-28
19-20A	DM_60%	35.56	39S-02W-19
14-30	ST_DF	41.87	39S-03W-14
15-30	ST_PP	19.15	39S-03W-15
34-23	ST_DF	23.15	39S-02W-34
17-13	ST_DF	5.31	39S-01W-17
25-30	DM_60%	13.91	39S-03W-25
27-31	ST_PP	2.82	39S-03W-27
34-22	ST_DF	8.22	39S-02W-34
30-10B	GS_60%	6.43	39S-01W-30
28-10C	DM_60%	11.50	39S-01W-28
28-10B	DM_60%	19.08	39S-01W-28

Unit	Commercial Harvest Prescription	Acres	T_R_SEC
28-11A	ST_PP_40%	6.75	39S-01W-28
28-11B	ST_PP	9.31	39S-01W-28
20-10	GS_40%	9.36	39S-01W-20
17-11B	ST_DF_40%	10.16	39S-01W-17
17-12A	ST_PP_40%	14.03	39S-01W-17
27-34	DM_60%	45.34	39S-03W-27
33-30	SR_REGEN	26.47	39S-03W-33
19-20B	ST_DF_40%	21.71	39S-02W-19
27-32	ST_DF_40%	7.25	39S-03W-27
RT-19	Riparian Thin	7.36	39S-02W-19
RT-27A	Riparian Thin	0.80	39S-03W-27
RT-27B	Riparian Thin	6.00	39S-03W-27
RT-28	Riparian Thin	1.13	39S-02W-28
RT-27C	Riparian Thin	1.28	39S-03W-27
34-30B	GS_60%	22.31	39S-03W-34
27-33	ST_DF_40%	0.84	39S-03W-27
34-30A	GS_40%	53.22	39S-03W-34
17-12B	GS_60%	9.55	39S-01W-17
29-12B	GS_40%	2.98	39S-01W-28
29-12A	GS_40%	1.80	39S-01W-29
	Total	788.71	

ALTERNATIVE 3

Table C-2. Alternative 3: Proposed non-commercial harvest units.

Unit	Non-Commercial Prescription	Acres	T_R_SEC
F-28	Fuels	50.81	39S-03W-28
F-33	Fuels	16.72	39S-02W-33
F-14	Fuels	14.06	39S-03W-14
F-29	Fuels	20.91	39S-01W-29
F-35	Fuels	306.46	39S-03W-35
F-30	Fuels	244.30	39S-02W-30
F-30	Fuels	50.98	39S-02W-30
F-28	Fuels	5.56	39S-03W-28
F-28	Fuels	18.01	39S-03W-28
F-28	Fuels	4.19	39S-03W-28
F-36	Fuels	9.89	39S-02W-36
F-29	Fuels	10.69	39S-01W-29
	Total	752.58	

ALTERNATIVE 4

Table C-3. Alternative 4: Proposed commercial harvest units.

Unit	Commercial Harvest Prescription	Acres	T_R_SEC
27-33	ST_DF_40%	27.05	39S-03W-27
35-31	ST_DF_40%	34.11	39S-03W-35
34-32B	ST_PP_40%	4.45	39S-03W-34
35-32	ST_DF_40%	27.32	39S-03W-35
35-33	ST_PP_40%	10.43	39S-03W-35
23-32	ST_DF_40%	17.37	39S-03W-23
30-20	ST_DF_40%	26.43	39S-02W-30
26-31	ST_DF_40%	71.18	39S-03W-26
34-31	ST_DF_40%	9.27	39S-03W-34
35-30A	ST_DF_40%	19.63	39S-03W-35
36-30	GS_60%	10.77	39S-03W-36
34-32A	ST_PP_40%	2.36	39S-03W-34
27-30	GS	5.52	39S-03W-27
26-30	ST_DF_40%	47.72	39S-03W-26
34-30	GS_40%	75.52	39S-03W-34
17-10	ST_PP_40%	15.15	39S-01W-17
17-11A	ST_DF_40%	12.97	39S-01W-17
20-11A	GS_40%	30.30	39S-01W-20
20-11B	GS_60%	38.61	39S-01W-20
20-12	ST_PP_40%	10.03	39S-01W-20
28-10A	ST_DF_40%	20.89	39S-01W-28
29-12	GS_40%	26.22	39S-01W-28
29-10	ST_PP_40%	11.15	39S-01W-29
29-11	ST_PP_40%	4.35	39S-01W-29
25-22	ST_DF_40%	15.52	39S-02W-25
30-10A	ST_DF_40%	9.14	39S-01W-30
36-24	DM_60%	29.33	39S-02W-36
26-20A	ST_DF	38.63	39S-02W-26
25-20	ST_DF_40%	54.81	39S-02W-25
25-23	GS_60%	6.43	39S-02W-25
27-20	ST_PP	29.53	39S-02W-27
34-21	ST_DF_40%	13.53	39S-02W-34
26-21	ST_PP_40%	53.89	39S-02W-26
36-20	ST_PP_40%	29.67	39S-02W-36
35-20	ST_PP	14.19	39S-02W-35
28-20	ST_DF	9.02	39S-02W-28

Unit	Commercial Harvest Prescription	Acres	T_R_SEC
34-20	ST_PP	10.40	39S-02W-34
28-21	ST_PP	23.43	39S-02W-28
14-30	ST_DF	41.87	39S-03W-14
15-30	ST_PP	19.15	39S-03W-15
34-24	ST_DF_40%	14.28	39S-02W-34
34-23	ST_DF	25.53	39S-02W-34
36-22	ST_PP_40%	21.04	39S-02W-36
36-23B	ST_PP_40%	29.11	39S-02W-36
36-21A	DM_60%	2.07	39S-02W-36
36-21B	GS_60%	2.52	39S-02W-36
17-13	ST_DF	5.35	39S-01W-17
23-31	ST_DF_40%	18.38	39S-03W-23
25-30	ST_DF_40%	13.91	39S-03W-25
27-31	ST_PP	2.82	39S-03W-27
34-22	ST_DF	8.22	39S-02W-34
30-10B	GS_60%	6.52	39S-01W-30
25-21B	GS_60%	10.17	39S-02W-25
28-10C	DM_60%	11.50	39S-01W-28
28-10B	DM_60%	19.08	39S-01W-28
28-11A	ST_PP_40%	6.75	39S-01W-28
28-11B	ST_PP	9.31	39S-01W-28
20-10	GS_40%	9.36	39S-01W-20
17-11B	ST_DF_40%	10.17	39S-01W-17
17-12A	ST_PP_40%	15.01	39S-01W-17
35-30B	ST_DF_40%	22.83	39S-03W-35
27-34	ST_DF_40%	45.34	39S-03W-27
23-30	ST_DF_40%	30.48	39S-03W-23
25-21A	GS_40%	6.40	39S-02W-25
33-30	SR_REGEN	26.47	39S-03W-33
19-20B	ST_DF_40%	57.32	39S-02W-19
27-32	ST_DF_40%	7.25	39S-03W-27
19-10B	ST_DF_40%	40.41	39S-01W-19
RT-19	Riparian Thin	7.36	39S-02W-19
RT-27A	Riparian Thin	0.80	39S-03W-27
RT-27B	Riparian Thin	6.00	39S-03W-27
RT-28	Riparian Thin	1.13	39S-02W-28
RT-27C	Riparian Thin	1.28	39S-03W-27
36-23A	ST_PP_40%	16.17	39S-02W-36
17-12B	GS_60%	11.10	39S-01W-17

Unit	Commercial Harvest Prescription	Acres	T_R_SEC
19-10A	GS_60%	13.77	39S-01W-19
27-21	ST_PP	0.00	39S-02W-27
26-20B	DM_60%	5.17	39S-02W-26
	Total	1497.70	

ALTERNATIVE 4

Table C-4. Alternative 4: Proposed non-commercial harvest units.

Unit	Non-Commercial Prescription	Acres	T_R_SEC
F-28	Fuels	50.81	39S-03W-28
F-25	Fuels	30.30	39S-02W-25
F-33	Fuels	30.18	39S-02W-33
F-28	Fuels	71.66	39S-02W-28
F-14	Fuels	14.06	39S-03W-14
FUELS/YARDING	Fuels_Potential_Yarding	4.68	39S-01W-20
F-29	Fuels	38.28	39S-01W-29
F-35	Fuels	306.46	39S-03W-35
F-30	Fuels	244.30	39S-02W-30
F-30	Fuels	50.98	39S-02W-30
F-28	Fuels	5.56	39S-03W-28
F-28	Fuels	18.01	39S-03W-28
F-28	Fuels	4.19	39S-03W-28
F-29	Fuels	10.69	39S-01W-28
	Total	880.16	

ALTERNATIVE 3

Table C-5. Alternative 3: Existing roads proposed for haul routes under Alternative 3.

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-1-18.00 A	1.03	AGG	BLM	A	3	
39-1-18.00 B	0.18	AGG	BLM	A	3	
39-1-18.00 C	0.17	AGG	BLM	A	3	
39-1-20.00 H	0.10	NAT	BLM	A	1	
39-1-20.00 I	0.04	NAT	PVT	A	1	
39-1-20.00 J	0.08	NAT	BLM	A	1	
39-1-20.00 K	0.62	NAT	PVT	A	1	
39-1-20.00 L	0.03	NAT	BLM	A	1	
39-1-21.03 A1	0.52	AGG	BLM	A	2	
39-1-21.03 A2	1.28	NAT	BLM	A	1	
39-1-28.02 A	0.44	NAT	BLM	A	1	
39-1-28.02 B	2.45	NAT	BLM	A	1	
39-1-28.03 A	0.38	NAT	BLM	A	1	
39-1-29.00	1.01	NAT	BLM	C	1	Open closed road. Water bar and barricade after use
39-1-29.01	0.17	NAT	BLM	A	1	
39-1-31.00 A	0.59	NAT	USFS	B	1	
39-1-31.00 B	0.87	NAT	BLM	B	1	
39-1-32.00 A	2.54	AGG	BLM	A	1	
39-1-32.00 B	0.52	NAT	BLM	A	1	
39-2-27.00 A1	0.76	AGG	BLM	A	3	
39-2-27.00 A2	1.75	AGG	BLM	A	3	
39-2-27.00 A3	1.23	AGG	BLM	A	3	
39-2-28.00 A1	1.06	AGG	BLM	A	3	
39-2-28.00 A2	0.54	AGG	BLM	A	3	
39-2-32.00 A	1.30	AGG	BLM	A	2	
39-2-32.00 B	0.79	AGG	BLM	A	2	
39-2-34.02	0.27	NAT	BLM	A	1	
39-2-35.01 A	0.66	AGG	BLM	A	1	
39-2-35.01 B	1.35	NAT	BLM	A	1	
39-3-10.00	1.15	AGG	PVT	B	1	
39-3-24.00 A	0.41	AGG	BLM	A	2	

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-3-24.00 B1	1.16	AGG	BLM	A	2	
39-3-24.00 B2	0.70	PRR	BLM	A	2	
39-3-24.00 B3	1.25	PRR	BLM	A	2	
39-3-26.00	1.01	GRR	BLM	A	3	
39-3-27.00 A	0.38	GRR	BLM	A	3	
39-3-27.00 B	0.57	PRR	BLM	A	3	
39-3-27.01 A1	0.28	GRR	BLM	A	3	
39-3-27.01 A2	0.21	GRR	BLM	A	3	
39-3-27.02 A	0.35	GRR	BLM	A	3	
39-3-27.02 B1	0.78	GRR	BLM	A	3	
39-3-27.02 B2	0.25	GRR	BLM	A	3	
39-3-27.02 B3	0.23	GRR	BLM	A	3	
39-3-27.02 B4	3.59	GRR	BLM	A	3	
39-3-27.02 C	0.25	GRR	BLM	A	3	
39-3-27.02 D	0.76	NAT	BLM	A	1	
39-3-27.02 E	0.37	NAT	BLM	A	1	Only using a portion of E
39-3-28.01	0.71	NAT	BLM	A	1	
39-3-28.02	0.10	NAT	BLM	A	1	
39-3-35.00	1.02	NAT	BLM	A	1	
39-3-36.00	0.61	GRR	BLM	A	3	
40-2-07.01 A	0.76	AGG	BLM	B	2	
40-2-07.01 B	1.20	AGG	BLM	B	2	
40-2-07.01 C	0.71	AGG	BLM	B	2	
USFS 2030	1.13	AGG	USFS	A	1	
USFS 2250	3.75	AGG	USFS	A	1	
USFS 850 Spur	0.59	NAT	USFS	B	1	
39-1-17 Spur 1	0.12	NAT	BLM	A	1	Non-system road
39-3-15 Spur 1	0.10	NAT	BLM	A	1	Non-system road
39-3-25 Spur 1	0.25	NAT	BLM	A	1	Non-system road bottom of Grouse Creek
39-3-35 Spur 1	0.39	NAT	BLM	A	1	Non-system road
39-3-36 Spur 1	0.22	NAT	BLM	A	1	Non-system road
Total	48.09					

Abbreviations:

Existing Surface: NAT = natural, GRR = Grid Rolled Rock, PRR = Pit Run Rock, ASC = Aggregate Surface Course, BST = Bituminous Surface Treatment

Control: BLM = Bureau of Land Management, PVT = Private

Possible Stabilizations or Drainage Improvements:

A = no road stabilization/drainage improvements. Road would be maintained to meet BLM standards.

B = spot rocking and/or drainage improvements. Road would be maintained to meet BLM standards.

C = Reshaping road and reestablishing drainage. Road would be maintained to meet BLM standards.

Seasonal Restrictions (for log hauling):

0 = no restrictions

1 = hauling restricted between 10/15 and 6/1

2 = Shoulder season haul allowed in accordance with Medford BMP's: R094, R096, R097, and R099

3 = Winter haul as weather permits and approved by Authorized Officer

ALTERNATIVE 4

Table C-6. Alternative 4: Existing roads proposed for haul routes under Alternative 4.

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-1-18.00 A	1.03	AGG	BLM	A	3	
39-1-18.00 B	0.18	AGG	BLM	A	3	
39-1-18.00 C	0.17	AGG	BLM	A	3	
39-1-20.00 E	0.26	NAT	PVT	A	1	
39-1-20.00 F	0.20	NAT	BLM	A	1	
39-1-20.00 G	0.33	NAT	PVT	A	1	
39-1-20.00 H	0.10	NAT	BLM	A	1	
39-1-20.00 I	0.04	NAT	PVT	A	1	
39-1-20.00 J	0.08	NAT	BLM	A	1	
39-1-20.00 K	0.62	NAT	PVT	A	1	
39-1-20.00 L	0.03	NAT	BLM	A	1	Open closed road. Water bar and barricade after use
39-1-21.00	0.48	AGG	BLM	A	2	
39-1-21.03 A1	0.52	AGG	BLM	A	2	
39-1-21.03 A2	1.28	NAT	BLM	A	1	
39-1-28.02 A	0.44	NAT	BLM	A	1	
39-1-28.02 B	2.45	NAT	BLM	A	1	
39-1-28.03 A	0.42	NAT	BLM	A	1	
39-1-29.00	1.01	NAT	BLM	C	1	Open closed road. Water bar and barricade after use
39-1-29.01	0.07	NAT	BLM	A	1	
39-1-31.00 A	0.01	NAT	BLM	A	1	
39-1-31.00 B	0.87	NAT	BLM	B	1	
39-1-32.00 A	2.24	AGG	BLM	A	1	
39-2-25.01	0.29	NAT	BLM	B	1	Water bar and barricade after use
39-2-27.00 A1	0.76	AGG	BLM	A	3	
39-2-27.00 A2	1.75	AGG	BLM	A	3	
39-2-27.00 A3	1.23	AGG	BLM	A	3	
39-2-27.00 B1	0.64	AGG	BLM	A	3	

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-2-27.00 B2	0.44	AGG	BLM	A	3	
39-2-27.00 B3	0.92	AGG	BLM	A	3	
39-2-28.00 A1	1.06	AGG	BLM	A	3	
39-2-28.00 A2	0.54	AGG	BLM	A	3	
39-2-28.00 B	1.21	NAT	BLM	A	2	
39-2-30.01	0.68	NAT	BLM	B	1	Water bar and barricade after use
39-2-32.00 A	1.30	AGG	BLM	A	2	
39-2-32.00 B	0.79	AGG	BLM	A	2	
39-2-34.01	0.47	NAT	BLM	B	1	Open closed road.Water bar and barricade after use
39-2-34.02	0.27	NAT	BLM	A	1	Open closed road.Water bar and barricade after use
39-2-34.03	0.24	NAT	BLM	C	1	Open closed road.Water bar and barricade after use.
39-2-35.01 A	0.66	AGG	BLM	A	1	
39-2-35.01 B	1.14	NAT	BLM	A	1	
39-2-36.00	0.81	AGG	BLM	A	1	
39-3-10.00	1.15	AGG	PVT	B	1	
39-3-24.00 A	0.41	AGG	BLM	A	2	
39-3-24.00 B1	1.16	AGG	BLM	A	2	
39-3-24.00 B2	1.03	PRR	BLM	A	2	
39-3-24.00 B3	1.25	PRR	BLM	A	2	
39-3-24.00 C	0.01	AGG	BLM	A	2	
39-3-26.00	1.01	GRR	BLM	A	3	
39-3-27.00 A	0.38	GRR	BLM	A	3	
39-3-27.00 B	0.57	PRR	BLM	A	3	
39-3-27.01 A1	0.28	GRR	BLM	A	3	
39-3-27.01 A2	0.21	GRR	BLM	A	3	
39-3-27.02 A	0.35	GRR	BLM	A	3	
39-3-27.02 B1	0.78	GRR	BLM	A	3	
39-3-27.02 B2	0.25	GRR	BLM	A	3	
39-3-27.02 B3	0.23	GRR	BLM	A	3	
39-3-27.02 B4	3.59	GRR	BLM	A	3	
39-3-27.02 C	0.25	GRR	BLM	A	3	
39-3-27.02 D	0.76	NAT	BLM	A	1	

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-3-27.02 E	0.53	NAT	BLM	A	1	
39-3-28.01	0.71	NAT	BLM	A	1	
39-3-28.02	0.10	NAT	BLM	A	1	
39-3-35.00	1.02	NAT	BLM	A	1	
39-3-36.00	0.81	GRR	BLM	A	3	
40-2-07.01 A	0.68	AGG	BLM	B	2	
40-2-07.01 B	1.20	AGG	BLM	B	2	
40-2-07.01 C	0.71	AGG	BLM	B	2	
USFS 600	0.51	AGG	USFS	A	2	
USFS 2200	0.11	AGG	USFS	A	2	
USFS 2030	1.13	AGG	USFS	A	2	
USFS 2250	3.75	AGG	USFS	A	2	
USFS 850 Spur	0.59	NAT	USFS	B	1	
39-1-17 Spur 1	0.12	NAT	BLM	A	1	Non-system road
39-1-20 Spur 1	0.41	NAT	PVT	A	1	Non-system road
39-1-20 Spur 2	0.14	NAT	BLM	A	1	Non-system road
39-2-34 Spur 1	3.23	NAT	BLM	A	1	Non-system road
39-2-36 Spur 1	0.80	NAT	BLM	A	1	Non-system road
39-2-36 Spur 2	0.07	NAT	BLM	A	1	Non-system road
39-2-36 Spur 3	2.23	NAT	BLM	A	1	Non-system road
39-3-25 Spur 1	0.25	NAT	BLM	A	1	Non-system road bottom of Grouse Creek
39-3-35 Spur 1	0.39	NAT	BLM	A	1	Non-system road
39-3-35 Spur 2	0.17	NAT	BLM	A	1	Non-system road
39-3-35 Spur 3	0.37	NAT	BLM	A	1	Non-system road
39-3-36 Spur 1	0.22	NAT	BLM	A	1	Non-system road
Total	61.95					

Abbreviations: Existing Surface: NAT = natural, GRR = Grid Rolled Rock, PRR = Pit Run Rock, ASC = Aggregate Surface Course, BST = Bituminous Surface Treatment

Control: BLM = Bureau of Land Management, PVT = Private

Possible Stabilizations or Drainage Improvements:

A = no road stabilization/drainage improvements. Road would be maintained to meet BLM standards.

B = spot rocking and/or drainage improvements. Road would be maintained to meet BLM standards.

C = Reshaping road and reestablishing drainage. Road would be maintained to meet BLM standards.

Seasonal Restrictions (for log hauling):

0 = no restrictions

1 = hauling restricted between 10/15 and 5/15

2 = Shoulder season haul allowed in accordance with Medford BMP's: R094, R096, R097, and R099

3 = Winter haul as weather permits and approved by Authorized Officer

ALTERNATIVE 5

Table C-7. Alternative 5: Proposed commercial harvest units.

Unit	Commercial Harvest Prescription	Acres	Diameter Limit (inches DBH)	T_R_SEC
27-33	DM_60%	27.05	18	39S-03W-27
35-31	DM_60%	34.11	16	39S-03W-35
34-32B	ST_PP_50%	4.45	18	39S-03W-34
35-33	DM_60%	10.43	20	39S-03W-35
26-31	DM_60%	71.18	20	39S-03W-26
34-31	DM_60%	9.27	20	39S-03W-34
34-32A	ST_PP_50%	2.36	18	39S-03W-34
27-30	GS	5.52	20	39S-03W-27
17-10A	ST_PP_50%	11.19	20	39S-01W-17
17-11A	DM_60%	12.97	18	39S-01W-17
20-11A	DM_60%	30.30	18	39S-01W-20
20-11B	ST_PP_50%	30.10	20	39S-01W-20
20-12	DM_60%	10.03	20	39S-01W-20
29-12	ST_PP_50%_Rx	26.22	20	39S-01W-28
29-10	ST_PP_50%	11.15	18	39S-01W-29
29-11	DM_60%	4.35	18	39S-01W-29
30-10A	DM_60%	9.14	18	39S-01W-30
F-25	DM_60%	30.30	16	39S-02W-25
35-20	ST_PP_50%	14.19	18	39S-02W-35
34-20	ST_PP_50%_Rx	10.40	20 DF/12 PP	39S-02W-34
28-21A	ST_PP_40%	19.87	18	39S-02W-28
36-22	ST_PP_50%	21.04	16	39S-02W-36
36-23B	ST_PP_50%	29.11	18	39S-02W-36
17-13	DM_60%	5.35	18	39S-01W-17
27-31	ST_PP_50%	2.82	20 DF/14 PP	39S-03W-27
F-29	ST_PP_50%_Rx	10.69	20	39S-01W-28
36-33	DM_60%	15.75	20	39S-03W-36
31-20	ST_PP_50%	6.23	20	39S-02W-31
17-10B	DM_60%	3.96	20	39S-01W-17
28-21B	DM_60%	3.56	18	39S-02W-28
29-13A	DM_60%	6.49	18	39S-01W-29
29-13B	DM_60%	15.22	18	39S-01W-29
27-34A	DM_60%	22.07	20	39S-03W-27
27-34B	ST_PP_50%	4.85	20	39S-03W-27
23-32	GS_50%	1.85	14	39S-03W-23
36-23A	ST_PP_50%	2.62	18	39S-02W-36
	Total	536.15		

ALTERNATIVE 5

Table C-8. Alternative 5: Proposed non-commercial harvest units.

Unit	Non-Commercial Prescription	Acres	Diameter Limit (inches DBH)	T_R_SEC
30-20	Fuels_Rx	26.43		39S-02W-30
26-30	Fuels	47.72		39S-03W-26
F-28	Fuels_Rx	50.81		39S-03W-28
25-22	Fuels	15.52		39S-02W-25
34-21	Fuels	13.53		39S-02W-34
F-33	Fuels_Rx	30.18		39S-02W-33
34-24	Fuels	14.28		39S-02W-34
34-23	Fuels	25.53		39S-02W-34
23-31	Fuels	18.38		39S-03W-23
F-35	Fuels	171.63		39S-03W-35
F-30	Fuels_Rx	244.30		39S-02W-30
34-22	Fuels	8.22		39S-02W-34
23-30	Fuels	30.48		39S-03W-23
19-10B	Fuels	40.41		39S-01W-19
F-30	Fuels_Rx	50.98		39S-02W-30
F-28	Fuels_Rx	5.56		39S-03W-28
F-28	Fuels_Rx	18.01		39S-03W-28
F-28	Fuels_Rx	4.19		39S-03W-28
19-10A	Fuels	13.77		39S-01W-19
F-36	Fuels	14.03		39S-03W-36
36-32	Fuels	19.53		39S-03W-36
F-28	Fuels	12.27		39S-02W-28
	Total	875.76		

ALTERNATIVE 5

Table C-9. Alternative 5: Roads.

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-1-18.00 A	1.03	AGG	BLM	A	3	
39-1-18.00 B	0.18	AGG	BLM	A	3	
39-1-18.00 C	0.17	AGG	BLM	A	3	
39-1-20.00 H	0.10	NAT	BLM	A	1	
39-1-20.00 I	0.04	NAT	PVT	A	1	
39-1-20.00 J	0.08	NAT	BLM	A	1	
39-1-20.00 K	0.62	NAT	PVT	A	1	
39-1-20.00 L	0.85	NAT	BLM	A	1	
39-1-28.02 A	0.44	NAT	BLM	A	1	
39-1-28.02 B	2.45	NAT	BLM	A	1	
39-1-29.00	1.01	NAT	BLM	C	1	Open closed road. Water bar and barricade after use
39-1-29.01	0.17	NAT	BLM	A	1	
39-1-31.00 A	0.01	NAT	BLM	A	1	
39-1-31.00 B	0.87	NAT	BLM	B	1	
39-1-32.00 A	2.54	AGG	BLM	A	1	
39-2-27.00 A1	0.76	AGG	BLM	A	3	
39-2-27.00 A2	1.75	AGG	BLM	A	3	
39-2-27.00 A3	1.23	AGG	BLM	A	3	
39-2-27.00 B1	0.64	AGG	BLM	A	3	
39-2-27.00 B2	0.44	AGG	BLM	A	3	
39-2-28.00 A1	1.06	AGG	BLM	A	3	
39-2-28.00 A2	0.54	AGG	BLM	A	3	
39-2-32.00 A	1.30	AGG	BLM	A	2	
39-2-32.00 B	0.79	AGG	BLM	A	2	
39-2-36.00	0.13	AGG	BLM	A	1	
39-3-26.00	1.01	GRR	BLM	A	3	
39-3-27.00 A	0.38	GRR	BLM	A	3	
39-3-27.00 B	0.57	PRR	BLM	A	3	
39-3-27.01 A1	0.28	GRR	BLM	A	3	
39-3-27.01 A2	0.21	GRR	BLM	A	3	
39-3-27.02 A	0.35	GRR	BLM	A	3	

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-3-27.02 B1	0.78	GRR	BLM	A	3	
39-3-27.02 B2	0.25	GRR	BLM	A	3	
39-3-27.02 B3	0.23	GRR	BLM	A	3	
39-3-27.02 B4	3.59	GRR	BLM	A	3	
39-3-27.02 C	0.25	GRR	BLM	A	3	
39-3-27.02 D	0.76	NAT	BLM	A	1	
39-3-27.02 E	0.28	NAT	BLM	A	1	
39-3-35.00	1.02	NAT	BLM	A	1	
39-3-36.00	0.81	GRR	BLM	A	3	
40-2-07.01 A	0.68	AGG	BLM	B	2	
40-2-07.01 B	1.20	AGG	BLM	B	2	
40-2-07.01 C	0.71	AGG	BLM	B	2	
USFS 2030	1.13	AGG	USFS	A	1	
USFS 2250	3.75	AGG	USFS	A	1	
USFS 850 Spur	0.59	NAT	USFS	B	1	
39-1-17 Spur 1	0.12	NAT	BLM	A	1	Non-system road
39-2-36 Spur 1	0.60	NAT	BLM	A	1	Non-system road
39-3-35 Spur 2	0.17	NAT	BLM	A	1	Non-system road
39-3-35 Spur 3	0.37	NAT	BLM	A	1	Non-system road
Total	39.29					

Abbreviations:

Existing Surface: NAT = natural, GRR = Grid Rolled Rock, PRR = Pit Run Rock, ASC = Aggregate Surface Course, BST = Bituminous Surface Treatment

Control: BLM = Bureau of Land Management, PVT = Private

Possible Stabilizations or Drainage Improvements:

A = no road stabilization/drainage improvements. Road would be maintained to meet BLM standards.

B = spot rocking and/or drainage improvements. Road would be maintained to meet BLM standards.

C = Reshaping road and reestablishing drainage. Road would be maintained to meet BLM standards.

Seasonal Restrictions (for log hauling):

0 = no restrictions

1 = hauling restricted between 10/15 and 6/1

2 = Shoulder season haul allowed in accordance with Medford BMP's: R094, R096, R097, and R099

3 = Winter haul as weather permits and approved by Authorized Officer

WINTER HAUL ROUTES

Table C-10. Winter haul routes for Alternative 4; Alternatives 3 and 5 would be a subset of these.

Road Number	Approximate Length (miles)	Existing Surface	Control	Possible Road Stabilization or Drainage Improvements	Seasonal Restriction for Log Haul	Comments
39-1-18.00 A	1.03	AGG	BLM	A	3	
39-1-18.00 B	0.18	AGG	BLM	A	3	
39-1-18.00 C	0.17	AGG	BLM	A	3	
39-2-27.00 A1	0.76	AGG	BLM	A	3	
39-2-27.00 A2	1.75	AGG	BLM	A	3	
39-2-27.00 A3	1.23	AGG	BLM	A	3	
39-2-27.00 B1	0.64	AGG	BLM	A	3	
39-2-27.00 B2	0.44	AGG	BLM	A	3	
39-2-27.00 B3	0.92	AGG	BLM	A	3	
39-2-28.00 A1	1.06	AGG	BLM	A	3	
39-2-28.00 A2	0.54	AGG	BLM	A	3	
39-3-26.00	1.01	GRR	BLM	A	3	
39-3-27.00 A	0.38	GRR	BLM	A	3	
39-3-27.00 B	0.57	PRR	BLM	A	3	
39-3-27.01 A1	0.28	GRR	BLM	A	3	
39-3-27.01 A2	0.21	GRR	BLM	A	3	
39-3-27.02 A	0.35	GRR	BLM	A	3	
39-3-27.02 B1	0.78	GRR	BLM	A	3	
39-3-27.02 B2	0.25	GRR	BLM	A	3	
39-3-27.02 B3	0.23	GRR	BLM	A	3	
39-3-27.02 B4	3.59	GRR	BLM	A	3	
39-3-27.02 C	0.25	GRR	BLM	A	3	
39-3-36.00	0.81	GRR	BLM	A	3	
Total	17.43					

Abbreviations:
Existing Surface: NAT = natural, GRR = Grid Rolled Rock, PRR = Pit Run Rock, ASC = Aggregate Surface Course, BST = Bituminous Surface Treatment
Control: BLM = Bureau of Land Management, PVT = Private
Possible Stabilizations or Drainage Improvements:
A = no road stabilization/drainage improvements. Road would be maintained to meet BLM standards.
3 = Winter haul as weather permits and approved by Authorized Officer

APPENDIX D –NEDSBAR MARKING GUIDELINES

A. SILVICULTURAL OBJECTIVES AND PRESCRIPTIONS

The marking guidelines will guide the implementation of the silvicultural prescriptions for the Nedsbar Forest Management Project. Proposed treatments would put stands on trajectories towards the development of structural complexity, tree age and size variability, and an assortment of canopy configurations (Medford District RMP; USDI BLM 1995). The prescriptions take into account changes in the potential vegetation based on factors such as aspect, slope, available moisture, and soil type, in addition to species composition, stem density, and habitat considerations for late-successional forest dependent species, particularly the northern spotted owl (NSO). For some stands, silvicultural objectives were superseded by NSO habitat considerations and thus do not address objectives pertaining solely to forest health.

1. General Guidance Applicable to <u>all</u> Silvicultural Prescriptions

To encourage the maintenance and establishment of drought tolerant and fire resilient species, emphasize leaving sugar pine, ponderosa pine, incense-cedar, Douglas-fir, and white fir, respectively.

Do not try to create uniformity/evenness in stand conditions in marking; do try to encourage creation of spatial heterogeneity. Retain clusters of trees where appropriate; do consider preserving existing clusters of healthy trees.

Mark so as to maintain or create diverse vertical and horizontal stand structure by leaving trees of all crown classes with crown ratios of ≥ 30%. Strive for stand diversity in regard to diameter classes, species composition, tree heights (crown classes), and trees per acre. See the Appendix D Glossary (Section D.1.1) for characteristics of low vigor trees.

Retain trees with the old-growth characteristics as described below:

- Size and age greater than the second-growth trees currently in the stand. This indicates that the tree may be one of the seed trees of the present-day stand. These trees may have a bottle-brush shape (non-symmetrical crown). This characteristic applies to all conifer species
- Large-diameter limbs indicating that the tree was once open-grown and had a large crown. Limbs (live or dead) are usually heavy and gnarled, are covered with mosses and lichens, and are close to the ground. This characteristic applies to all conifer species.
- Douglas-fir with thick bark, deep fissures and a chocolate brown color, second-growth trees have more gray color in the bark. Ponderosa pines with thick bark, plate-like and yellow or orange in color.

The intent of retaining trees with the aforementioned characteristics is to retain and/or promote structural complexity within treated stands. There may be situations where trees with the aforementioned characteristics may be harvested if determined by OSHA health and safety guidelines to present a risk to people or due to logging system operations.

REDUCE competing vegetation from around healthy pine, oak, and incense-cedar to ensure their survival without compromising the prescribed canopy cover and/or basal area targets for the stand.

Protect large hardwoods, particularly unique trees for stand diversity, structure, and wildlife habitat. Leave conifers that have their crown entangled in a hardwood tree or pose a threat of potential damage if felled. Unless determined to be a safety hazard by OSHA health and safety guidelines or interfering with logging system operations, all hardwoods greater than 12" DBH should be reserved.

Trees with bird nests, wildlife cavities, and wide forks with flat nesting spots, or loose bark (which function as bat roosts) would generally not be removed. Additionally, clumps of trees adjacent to snags or wildlife trees may be retained for stand diversity. When available, leave some broken, forked top, and deformed trees that are greater than 20"DBH. Retain some trees of this size with mistletoe infections on the tree bole, specifically those that currently provide a structure or platform for wildlife habitat.

In Structural Retention Regeneration units, maintain 120 linear' of Coarse Woody Debris (CWD) (see Appendix D Glossary [Section D.1.2]). Green trees that show signs of imminent mortality may be left in place for CWD that is not present and serve as future recruitment of CWD. Large deformed or unique green trees are most desirable as a substitute for future CWD recruitment.

Retain all snag stages 1-5 and CWD of various size and decay classes, unless determined by OSHA health and safety guidelines to present a risk to people. Snags felled for safety within units will be left as CWD to further contribute towards key habitat Avoid cut marking trees that may damage snags from the process of timber falling.

In draws which are not designated as Riparian Reserves, retain additional trees in the center of the draw bottoms for soil stability (10' on each side is recommended).

Do not mark identified seed trees to be cut. Do not cut mark any tree, that if felled, would endanger a seed tree.

Where mistletoe is encountered, target heavily infected trees for removal first, then, focus on leaving resistant species (sugar pine, ponderosa pine, incense cedar, and white fir), followed by uninfected or the least infected Douglas-fir trees with infections confined to the lower third of the tree (see the Appendix D Glossary [Section D.1.3]). Dwarf mistletoe infected trees may be marked for treatment if prescribed canopy cover retention and/or the target trees per acre for the stand is not compromised.

2. Commercial Prescriptions

These marking guides were prepared for Alternative 4, recognizing that marking for Alternative 3 would be similar, but scaled down in terms of acres treated and Alternative 5 would generally require higher basal area and canopy cover retention, as well as the application of unit-specific diameter limits.

a. Selective Thinning

There are two types of selective thinning prescriptions proposed in the Nedsbar Project based on the vegetation type. The general silvicultural objectives for all selective thinning prescriptions include:

1) Reduce stand density to increase tree growth, quality, and vigor of the remaining trees;
2) Create and maintain diversified stand structure (height, age, and diameter classes);
3) Develop spatial heterogeneity within stands (e.g., fine-scale structural mosaic);
4) Increase resilience/resistance of forest stands to wildfire, drought, insects, etc. by reducing stand density and ladder fuels;
5) Increase growing space and decrease competition for large and/or legacy pine, oak, and cedar.
6) Maintain critical components of nesting, roosting, and foraging owl habitat.

Selective Thinning will be a combination of thinning with groups or openings to the extent or amount recommended by vegetation type and/or plant series that currently exists. These stand treatments would generally target low vigor trees over healthy trees (proportional thinning and low thinning) to reduce stand density and improve stand resiliency and individual tree health. This prescription would be used to accelerate the growth of remaining trees while promoting desired species that are best adapted to site conditions. Spatial distribution of leave trees should be based on tree condition (live crown ratio and crown form), as opposed to leaving trees based on a distance grid. Trees would be removed singly or in groups (openings) and stands will have a wide range of basal area or tree spacing targets based on stand types and conditions. The amount and size of openings created will depend on vegetation types (PP, DF) and current stand development stages. Opening size will range from 0.10-0.25 acre where fire resilient and drought tolerant species need release to reduce competition. Opening size will range from 0.25-0.50 acre where regeneration will be encouraged or where poor crown conditions exist (weakened and suppressed trees). The extent or amount of openings permitted will range from 5-15% of the total treatment unit area. Openings should be no closer than 100 feet to the next opening. Trees may be marked in patches (e.g., groups of trees with poor crowns) and left in clumps (e.g., groups of old trees) where necessary. Unique stand features such as snags, coarse woody debris, large hardwoods, and trees exhibiting older characteristics will remain to maintain desired structural components for wildlife. Components with these characteristics that need to be felled for operational or safety purposes will be left on site as where feasible to meet CWD. In addition to such stand features, rock outcrops, special status species sites, and seeps/wet areas will be protected. Refer to Tables D-1 and D-2 for recommended prescription targets for each unit.

b. Selective Thinning —Douglas-fir (ST/DF)

Stands that are predominantly Douglas-fir and have low-moderate productive site conditions would be treated to a relative density range of 0.30-0.40. Stands will be harvested to a range of 40-50% canopy cover and will be thinned using guidelines to reduce basal area between 100 and 140 ft^2 per acre. These stands are lacking suitable natural regeneration of drought tolerant and fire resilient species in the understory, while the overstory is greater than 90% Douglas-fir with scattered legacy ponderosa pine, incense cedar, and black oak.

c. Selective Thinning—Ponderosa Pine (ST/PP)

Stands that are predominantly composed of ponderosa pine or have the lowest productive site conditions will be treated to a relative density range of 0.25-0.35. Stands would be harvested to a range of 35-45% canopy cover and will be thinned using guidelines to reduce basal area between 80 and 120 ft^2 per acre. These sites may have suitable natural regeneration of drought tolerant and fire resilient species in the understory; however more shade tolerant species (Douglas-fir) have restricted growth in the overstory (dominant and co-dominant trees).

Table D-1. Selective Thinning- Douglas-fir Units

Unit Number	Target CONIFER Basal Area (square feet/acre)	Unit Acres
14-30*	100	42
23-30	120	30
23-31	100-120	18
23-32	100-120	17
25-30	120	14
26-30	110-120	48
27-32	90-110	7
27-33	100-120	27
27-34	120-140	45
35-30	120-140	43
35-31	100-120	34
35-32	120-140	27
19-20	120	57
25-20	100-120	55
25-22	120	16
26-20*	100-120	39
28-20*	80-100	9
30-20	100-120	26
17-11A/B	100-120	23
28-10A	140	21
30-10A	120	9

*Units 14-30, 28-20, and 26-20A are outside of any known NSO sites and outside of the NSO Critical Habitat Unit (CHU) and do not require an average canopy cover retention of 40%

Table D-2. Selective Thinning -Ponderosa Pine Units

Unit Number	Target Basal Area (square feet/acre)	Unit Acres
15-30*	100	19
27-31*	80	3
26-21	100-120	54
27-20*	80-100	30
28-21*	80-100	23
34-20*	80	10
36-20	110	30
36-22	120	21
36-23A	100	16
36-23B	110	29
17-10	100-120	15
17-12	100-120	15
20-12	100	10
28-11A	100-120	7
28-11B*	Thin through patches	9
29-10	100	11
29-11	100	4

*Units 15-30, 27-31, 28-21, 34-20, and 27-20 are outside of any known NSO sites and outside of the NSO Critical Habitat Unit (CHU) and do not require an average canopy cover retention of 40%. Unit 28-11B is typed as capable NSO habitat and does not require an average canopy cover retention of 40%.

d. Group Selection

The principal purpose for a group selection treatment is to create structural diversity among stands that are homogenous in appearance, or have a one-layer overstory. Residual trees will have improved health, vigor, and growth from the added growing space, water, and nutrients that they receive. Group selection will create small openings, allowing regeneration establishment and release, will preserve most of the existing legacy trees within the stand, and will remove trees of low vigor. There are two types of retention levels for group selection listed below to increase spatial heterogeneity. Refer to Tables D-3 and D-4 for recommended prescription targets for each unit.

Group Selection >40% (GS-40)

Stands will be harvested to a range of 40-50% canopy cover and will be treated using guidelines to reduce basal area between 100 and 140 ft² at the stand level. The size of patches or openings should be no greater than 0.50 acre and should not exceed 25% of the total treatment unit area. Opening size will range from 0.10-0.25 acre where fire-resilient and drought-tolerant species need release to reduce competition. Opening size will range from .25-.50 acre where regeneration is encouraged or where poor crown conditions currently exist (weakened and suppressed trees). Openings should be no closer than 100 feet to the next opening.

Group Selection >60% (GS-60)

Stands will be harvested to a range of 60-70% canopy cover and will be treated using guidelines to reduce basal area between 160 and 180 ft² at the stand level. The size of patches or openings should be no greater than 0.25 acre and should not exceed 20% of the total treatment unit area. Opening size will range from 0.10-0.25 acre where fire resilient and drought tolerant species need release to reduce competition. Opening size will be no larger than 0.25 acre where regeneration is encouraged or where poor crown conditions currently exist (weakened and suppressed trees). Openings should be no closer than 100 feet to the next opening.

Table D-3. Group Selection 40% Units

Unit Number	Target Basal Area (square feet/acre)	% of unit in group select	Unit Acres
34-30	No thin in matrix	15-18	75
27-30*	No thin in matrix	20	6
25-21A	No thin in matrix	18	6
20-10	No thin in matrix	14	9
20-11A	No thin in matrix	18	30
29-12	No thin in matrix	20	26

*Unit 27-30 is type as capable NSO habitat and does not require an average canopy cover retention of 40%

Table D-4. Group Selection 60% Units

Unit Number	Target Basal Area (square feet/acre)	% of unit in group select	Unit Acres
25-21B	No thin in matrix	19	11
25-23	No thin in matrix	12	6
36-21B	No thin in matrix	20	3
20-11B	No thin in matrix	9	39
36-30	No thin in matrix	11	11

e. Group Select Openings

There are two types of group select openings prescribed here: Group Select and Modified Group Select.

Group Select

Openings created in small areas (<.50 acre) in a stand where the forest canopy contains several trees of low or poor vigor (see the Appendix D Glossary [Section D.1.1]). Openings should be arranged where drought related stress occurs in stands or where insects and/or disease indicators are observed. For example, such areas could be patches of even aged Douglas-fir trees with poor crown ratios or crown condition. These sites are usually found on south, southwest or west aspects and located on mid to upper slopes and ridge tops. Openings should be no closer than 100 feet to the next opening. Refer to Table D-5 to determine allowable opening size by radii distance in feet.

Modified Group Select

Openings created in small areas (<.25 acre) in a stand where trees need release to reduce competition. At a minimum, these openings should be created around individual trees or groups of trees twice the distance of the trees drip-line (distance from tree bole to drip-line of crown). These openings should be arranged in the stand where drought tolerant and/or fire resilient conifer and hardwood trees greater than 18" DBH are present. These sites are usually found on south, southwest or west aspects and located on mid to upper slopes and ridge tops. These trees should not be of low vigor (see Appendix D Glossary Section D.1.1) and show signs that it once was open-grown. To further increase spatial heterogeniety, Pacific madrone, incense cedar, and Douglas-fir could be selected to create openings around. However, species that require more sunlight for optimal growth should be selected first (e.g., ponderosa pine, sugar pine or black oak). Leave all trees in a group if they exhibit old-growth characteristics or if for example a cluster of pine have overlapping drip-lines. Trees that exhibit old-growth characteristics should be preferred over tree size when selecting an individual or group to protect. Openings should be no closer than 100 feet to the next opening. Refer to Table D-5 to determine allowable opening size by radii distance in feet.

Table D-5. Opening Size Measurement Conversion.

Acreage of Opening	Radius of Opening in Feet
1/10	37.2
1/5	52.7
1/4	58.9
1/2	83.3

f. Density Management (DM)

The primary objective of the density management prescription is to reduce stand density in order to promote the growth and structural development of the remaining stand. Density management is prescribed in stands that are currently providing northern spotted owl roosting and foraging habitat. Based on the unit location (within 0.5 mile core areas), the objective for spotted owl management will be to treat and maintain the habitat. Spacing of the residual (leave) trees will involve crown spacing of the

healthiest dominant and co-dominant trees to achieve a canopy cover of 60% or greater at the stand level. Stands will be treated to a relative density range of 0.50-0.60 as a result and will be thinned using guidelines to reduce basal area between 160 and 180 ft^2 per acre. Unique stand features such as snags, coarse woody debris, large hardwoods, and trees exhibiting older characteristics will remain to maintain desired structural components for wildlife. Components with these characteristics that need to be felled for operational or safety purposes will be left on site as where feasible to meet CWD.

Smaller trees would be targeted for removal over larger trees. Trees targeted for removal will include those exhibiting crown decline, narrow crown widths, and those that contribute the least to the canopy layer or structural components. Trees that demonstrate these characteristics will be individually selected for removal, unless it compromises the required minimum canopy cover of 60%. Trees may be marked in small patches (i.e., groups of trees with poor crowns) and left in clumps (i.e., groups of old trees) to create hiding cover for wildlife species and increase spatial heterogeinity. The size of patches or openings should be no greater than 0.20 acre and should not exceed 5% of the total treatment unit area. Refer to Table D-6 for recommended prescription targets for each unit.

Table D-6. Density Management Units

Unit Number	Target Basal Area (square feet/acre)	Unit Acres
26-20B	160-180	5
36-21A	180	2
36-24	180-200	29
28-10B	180-200	30
30-10B	160-180	2

g. Structural Retention (SR) - Regeneration Harvest

Regeneration harvest is proposed in stands with declining growth rates or experiencing deterioration from high stand density levels, insects, disease, or other factors. The silvicultural objectives in these stands are as follows:
1) Create growing space for a new cohort of trees and/or increase the growth of existing understory trees.
2) Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long term survivability.
3) Create regeneration opportunities for species that are shade intolerant and provide long term success or survival of less prominent species (e.g., sugar pine).

This prescription applies to stands primarily dominated by mature Douglas-fir, have poor annual stand growth, and/or have limited conifer regeneration. Thinning these stands would not provide the desired growth and increase in productivity. As directed by the Medford District RMP, structural retention as proposed under this project would leave at least 16 to 25 large green conifer trees per acre, provided structural objectives are met. Large green conifer trees are described as those greater than 20 inches diameter at breast height (DBH). Stands would be harvested to a range of 30-40% canopy cover. Refer to Table D-7 for recommended prescription targets for each unit.

Table D-7. Structural Retention Units

Unit Number	Target Trees per acre ≥ 20" DBH	Unit Acres
33-30	16-25	26

h. Riparian Thinning (RT)

The objectives of riparian thinning treatments are similar to the objectives of density management (DM), primarily to enhance and accelerate the production of healthy trees in riparian areas. This prescription is used to implement management within specified Riparian Reserves consistent with Aquatic Conservation Strategy (ACS) objectives, while meeting site specific silvicultural objectives. Treatments would be designed to maintain or improve aquatic systems, achieving consistency with short and long term ACS objectives. The proposed treatment areas are overstocked, even-aged stands lacking structural complexity and stagnant in growth. These vegetation treatments will increase species diversity and tree vigor within dry Douglas-fir and ponderosa pine stands that exhibit uncharacteristic stand structure and species composition. Trees would primarily be thinned from below to remove the suppressed component of the stand, followed by the thinning of the main canopy to reduce density and to remove trees infected by disease or insects or otherwise declining (based on crown ratio and form). The healthiest Douglas-fir, ponderosa pine, and sugar pine would be retained. Stands will be treated to a relative density range of 0.35-0.45 as a result and will be thinned using guidelines to reduce basal area between 120 and 160 ft^2 per acre. Stands will be thinned to a canopy cover range of 50-60%. This will remove fuel accumulations in patches while thinning lower and middle tree layers to accelerate development of a mature multi-layered stand structure. Vegetation will be treated in designated Riparian Reserves outside of a no treatment buffer (50 ft.). Refer to Table D-8 for recommended prescription targets for each unit.

Table D-8. Riparian Thin Units

Unit Number	Target Basal Area (square feet/acre)	Unit Acres
RT-27B	120	6
RT-19	140-160	7

i. Small Diameter Thin (SDT)-Stewardship

The objectives of the small diameter thinning treatments combine the objectives of selective thinning (a commercial treatment), and understory reduction (a noncommercial treatment). This prescription is implemented with the tool of stewardship (goods for services), where the goods (merchantable material) help offset the services of understory reduction. Stewardship contracting is a treatment tool that provides a means to treat stands that may otherwise go untreated due to marginal economic feasibility. Refer to the objectives of selective thinning and understory reduction.

Dry-Douglas-fir stands will be treated to a relative density range of 0.30-0.40 as a result and will be thinned using guidelines to reduce basal area between 100 and 130 ft^2 per acre. Ponderosa pine stands will be treated to a relative density range of 0.25-0.35 as a result and will be thinned using guidelines to reduce basal area between 80 and 110 ft^2 per acre. Stands will be thinned to a canopy cover range of 35-50%. Understory reduction consists of cutting small trees (generally less than 8 inches DBH for conifer and less than 12 inches DBH for hardwood) and vegetation with chainsaws and disposing of the material by hand-piling and burning or use of a lop and scatter method in lighter fuels. Small diameter thinning

increases tree growth rates and promotes horizontal and vertical structural heterogeneity in stands. Small diameter thinning is also used in stands where pines and shade-intolerant hardwood species are diminishing in vigor and numbers because of overcrowded stand density conditions. Refer Table D-9 for recommended prescription targets for each unit.

In post-harvest stands that have a dense conifer understory, thin trees less than 8″ in diameter to leave approximately 200 trees per acre (16-foot by 16-foot spacing). Favor healthy ponderosa pine, sugar pine, incense cedar, and Douglas-fir over white fir. Uniform grid spacing is not necessary; consider the crown class, species, and vigor of leave trees. Favor healthy sugar pine, ponderosa pine, Douglas-fir, and incense cedar over white fir.

Table D-9. Small Diameter Thin Units

Unit Number	Target Basal Area (square feet/acre)	Unit Acres
17-13	110	5
19-10A	110	14
19-10B	160	40
26-31	110	71
34-21	110	14
34-22	120	8
34-23	110	26
34-24	110	14
35-20	110	14
34-31	120	9
34-32A	110	2
34-32B	110	4
35-33	110	10

*Units 34-22 and 34-23 are outside of any known NSO sites and outside of the NSO Critical Habitat Unit (CHU) and do not require an average canopy cover retention of 40%. Unit 35-20 is typed as capable NSO habitat and does not require an average canopy cover retention of 40%.

3. Non-Commercial Prescriptions- Alternative 4 Only

a. Understory Reduction (UR)

The silvicultural objectives here are as follows:

1) Reduce stand density to increase tree growth, quality, and vigor of existing understory trees.

2) Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long term survivability.

Understory reduction is used to accomplish pre-commercial thinning and fuels reduction treatments for even and uneven-aged conifer stands. Understory reduction consists of cutting small trees (generally less than 8 inches DBH for conifer and less than 12 inches DBH for hardwood) and vegetation with chainsaws and disposing of the material by hand-piling and burning or use of a lop and scatter method in lighter fuels. Understory reduction increases tree growth rates and promotes horizontal and vertical structural diversity in stands. Understory reduction is also used in stands where pines and shade-intolerant hardwood species are diminishing in vigor and numbers because of overcrowded stand density conditions. This prescription may be applied to understories and/or areas of high stocking of small trees in commercial stands proposed for harvest.

In stands that have a dense conifer understory, thin trees less than 8″ in diameter to leave approximately 200 trees per acre (16-foot by 16-foot spacing). Favor healthy ponderosa pine, sugar pine, incense cedar, and Douglas-fir over white fir. Uniform grid spacing is not necessary; consider the crown class, species, and vigor of leave trees. Favor healthy sugar pine, ponderosa pine, Douglas-fir, and incense cedar over white fir.

APPENDIX D GLOSSARY

A. CHARACTERISTICS OF LOW VIGOR TREES

Trees meeting the following criteria:

- Crown ratios <30%
- Crowns are ragged and thin (thin appearance when viewed against the sky).
- Crown top is rounded, and the crown width is narrow or flat on one or more sides.
- Needle color very poor, yellowish.
- Mistletoe infected, with a rating of 4, 5, or 6.

B. COARSE WOODY DEBRIS (CWD)

Trees designated for CWD should have the characteristics of decay class 1 and 2 (e.g., bark intact, limbs intact, texture mostly sound, round shape). To meet the ROD/RMP guidelines, leave a minimum of 120 linear' of logs per acre greater than or equal to 16" DBH and 16' long (120 linear' is equivalent to 7.5, 16'logs) (Information Bulletin OR-97-064 and Instructions Memorandum OR-95-028).

Table D-10. Coarse Woody Material Decay Classes

Log Characteristics	Decay Class				
	1	2	3	4	5
Bark	Intact	Intact	Trace	Absent	Absent
Twigs <3 cm.	Present	Absent	Absent	Absent	Absent
Texture	Intact	Intact to partly soft	Hard, large pieces	Small, soft blocky pieces	Soft and powdery
Shape	Round	Round	Round	Round to oval	Oval
Color of wood	Original color	Original color	Original color to faded	Light brown to reddish brown	Red brown to dark brown
Portion of log on ground	Tree elevated on support points	Tree elevated on support points but sagging slightly	Tree is sagging near ground	All of tree on ground	All of tree on ground
Invading roots	None	None	In sapwood	In heartwood	In heartwood

Table D-11. Logs Produced by Tree Diameter Class.

Tree DBH	Number of logs **per tree 16" by 16'**	Number of trees retained per acre
16"	1	7.5
20"	1	7.5
22"	2	3.8
24"	3	2.5
26"	4	1.9
28"	4	1.9
30"	5	1.5
32"	5	1.5
34"	6	1.3
36"	6	1.3
38"	6	1.3
40"	6	1.3
42"	7	1.1
44"	7	1.1
46"	7	1.1

Table D-12. Physical Characteristics of Snags by Deterioration Stage

Stage	Characteristics
1	• Limbs and branches all present • Pointed tree top • Tight bark • Recently dead
2	• Few limbs • No fine branches • Pointed or broken tree top • Variable level of bark remaining
3	• Limb stubs only • Decay in upper bole • Some decay at base of bole • Variable level of bark remaining
4	• Few or no stubs • No fine branches • Broken top • Loose or no bark
5	• No limbs or branches • No sapwood present • Broken top • 20% or less of bark remaining

C. DOUGLAS-FIR MISTLETOE INFESTED TREES

Target the removal of Douglas-fir trees with a mistletoe rating of 4, 5, or 6.

To determine the mistletoe rating for individual trees use the 6 class rating system.

Step 1: Divide the live crown into thirds.

Step 2: Rate each third separately. Each third should be given a rating of 0, 1, or 2.

"0" - no visible infections

"1" - light infection (one-half or less of total number of branches are infected)

"2" - heavy infection (more than one-half of the total number of branches is infected)

Step 3: Add ratings of each third together to obtain a rating for the tree.

APPENDIX E – COMMUNITY ALTERNATIVE AS SUBMITTED BY THE COMMUNITY ALTERNATIVE WORKING GROUP (CAWG)

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Community Alternative for the Proposed Nedsbar Timber Sale

By letter dated May 14, 2014, the Medford District of the Bureau of Land Management, Ashland Resource Area, proposes a timber sale commonly referred to as "Nedsbar." The Nedsbar project is proposed in the Applegate Adaptive Management Area. The Ashland Resource Area Manager asked a representative group of citizens living in the Nedsbar area to submit a Community Alternative (CA) for the project.

INTRODUCTION: The Proposed Nedsbar Timber Sale in Context.

The driving force for the Nedsbar Timber sale is the *Swanson* decision ("Court Order") issued in 2013 by a federal judge in Washington D.C. requiring the BLM to "sell or offer to sell" a specific number of board feet of timber within the BLM's Medford and Roseburg districts (See Nedsbar Scoping Notice). The Nedsbar Sale is one of a series of timber sales that must be offered if the Court Order is upheld on appeal.

The Court Order comes at a time of unprecedented drought and fire danger in southern Oregon's dry forestlands. During the 2013 fire season, Oregon experienced 1,134 fires burning 103,778 acres statewide, requiring the Oregon Department of Forestry to spend $122 million fighting fires across the state. In 2014, in southern Oregon alone there were 280 wildfires covering almost 10,000 acres both within and adjacent to the geographic area addressed in the Court Order, again costing millions of federal and state dollars. Our proposal will reduce fire danger and restore forest health, consistent with the best available science, the Applegate AMA direction, and the language of the Court Order and with other applicable law.

Our community supports a sale that will help meet a portion of the volume required by the Court Order. However, the specific areas proposed for management at this time and the prescriptions must be appropriate for this project area. Primary considerations in the Little and Upper Applegate Valleys are: 1) a robust and growing agricultural and recreational economy, 2) the dry forestlands with their high fire hazards, 3) the steep topography, and 4) the special environmental characteristics of the Nedsbar area.

After the Medford BLM issued the Nedsbar initial scoping document in May of 2014, the BLM made significant changes to respond to concerns raised by the US Fish and Wildlife Service. The community is pleased with the direction BLM is taking in terms of deferring logging in selected units and reducing new road construction in Alternative 3. The revised approach to the sale brings the scope and approach of the BLM's proposed Nedsbar Timber Sale closer to an appropriate level, but more adjustments are needed. Our CA presents a viable timber sale that addresses the remaining problems with the BLM proposal and that meets all environmental laws and takes into consideration what local timber companies can realistically be expected to bid on.

Goals of the Community Alternative:

a. A level of combined economic, legal, environmental, social and scientific/technical viability that is equal to or greater than either BLM Alternative 3 (BLM A3) or BLM Alternative 4 (BLM A4).
b. Reduction of fire hazards and fuel loads and building long-term forest resilience.
c. Production of a sustainable level of commercial forest products.
d. Protection and enhancement of the economic values of the affected geographic area, including burgeoning commercial agricultural activities, regional property values, tourism, and recreation.
e. Enhancement of watershed health and of forest vigor.
f. Preservation of the unique habitat connectivity corridor extending from the Rogue Valley into the Nedsbar Planning Area, up the Applegate River, the surrounding ridges to the Siskiyou Crest and well into California.[i]
g. Collaboration among the BLM, local residents and other agencies to achieve a successful timber sale offering without legal challenges.
h. Achieving the goals of the Applegate AMA described in the Northwest Forest Plan and Medford BLM RMP.

Objectives of the CA:

The CA will achieve the following results and allow the BLM to successfully offer for sale a volume of timber appropriate for this region and in compliance with the Court Order:

- **The CA recognizes the Nedsbar area's unique characteristics and sustainability challenges.** The dry forests in the proposed Nedsbar sale require a different set of forest management practices than those applied in other parts of Oregon or elsewhere in the west. Forest regrowth in southern Oregon is dramatically slower than in wetter Oregon forests north and west of Nedsbar. Both the BLM and the US Forest Service recognize these unique forest conditions as reflected in the Applegate Adaptive Management Guide. The combination of increasingly dry local climate and steep, highly erodible terrain severely limits the rate of timber regrowth. The CA ensures that the Nedsbar prescriptions accommodate these characteristics. Unlike the type and extent of logging outlined in the BLM's Scoping Letter, the CA will help preserve the sustainability of timber harvests for generations to come.

- **The CA enhances forest resiliency**. Combined, the Nedsbar site conditions and the local climate create extremely high fire hazards necessitating forest management practices that place top priority on sustained forest health and forest resilience from fire and other disturbance agents. Extracting a sustainable level of timber volume is constrained by the challenging conditions of this region. The BLM, in documents for the upcoming planning process for the Resource Management Plans for Western Oregon, acknowledges these much drier, less favorable forest growing conditions in Southern Oregon. The CA addresses the extreme fire hazards already present in this vulnerable area by focusing on the removal of timber in a manner and at a volume level that will lessen, not exacerbate, the existing fire hazards in this area. By focusing on forest management practices that address thinning and

fuels reduction (particularly adjacent to residential areas), the timber sale in the CA will not only stimulate the local economy, but also will save money in firefighting costs over the short and long term. The CA is designed to address fuel concerns within the Wildland Urban Interface (WUI) in both the Upper Applegate and Little Applegate Valleys. It is also designed to focus thinning and fuel treatments on strategic ridgetop and roadside locations. This is the best strategy to reduce the hazards – on a landscape scale – of uncharacteristic fire effects that could degrade and/or impact important economic, ecological, and social values. The CA prescriptions for different units also recognize the budget realities facing BLM that constrain their ability to perform timely thinning in units where BLM logging prescriptions would result in a flush of high-density fuels in logged-over areas. A community goal is to reduce fire hazards and improve the resiliency of the remaining forests.

- **The CA supports the growing local economy.** The Nedsbar area and surrounding parts of southern Oregon, as they recover from the recent recession, are seeing significant positive economic indicators in new commercial businesses, burgeoning agriculture, and recreation and tourism dollars directly resulting from the wealth of natural resources, including our rivers and remaining public forests.[ii] In fact, most of the rural jobs available in the Applegate Valley are associated with agriculture, horticulture, vineyards, tourism, recreation, and visitor amenities. The CA proposes forest management activities that will provide jobs, contribute to the total amount of timber required by the Court Order, and bolster the growing economic values associated with this area while protecting the local environment.

- **The CA protects Nedsbar watersheds**. Preserving the clean water supply that supports agriculture, other small and large businesses, individual wells, community water supplies and local wildlife is essential. Logging activities on steep slopes near riparian areas such as the Little Applegate River corridor must be carefully planned to prevent erosion while allowing for fuel reduction activities. Other activities such as road building that would increase sediment loads in local streams and rivers and put the affected aquifers at risk would be deferred.

- **The CA sustains species diversity.** The CA preserves mature fire-resistant trees (both conifers and hardwoods), especially those over one hundred years old, in order to help maintain healthy, fire-resistant forests and maintain the exceptional ecological diversity found in this region. The CA also proposes amendments to fuel reduction prescriptions in non-forest plant communities that will reduce fuel loading while sustaining species diversity and habitat complexity. These prescription adjustments are based on research that was partially funded by the BLM and conducted in the Applegate and Little Applegate Valleys. To date this regionally specific information has not been incorporated into Medford District BLM fuel reduction projects. We urge that this omission be corrected by incorporating the best available science and these regionally specific findings into fuel reduction units in the Nedsbar area.[iii]

- **The CA protects lands with wilderness characteristics.** Preservation of existing roadless areas within the geographic area of the proposed Nedsbar sale is an important component of the CA. While the community recognizes these are working forests, prescribed management practices should ensure that the wildland characteristics and ecology in these areas are

maintained, while protecting the growing economic value of surrounding land uses, including agriculture and recreational tourism. As a measure of the unique qualities of this particular area, much of the area being proposed for logging under the BLM's Nedsbar Timber Sale was identified for protection as the Dakubetede Primitive Backcountry Area in 2014 Congressional legislation.

- **The CA defers the construction of new roads**. Using only the existing road network to conduct logging, thinning, and fuels reduction projects is an important component of the CA. The CA recommends that new roads be deferred on the particularly vulnerable, steep terrain in the Little and Upper Applegate Watersheds. Moreover, preserving the remaining blocks of open, contiguous space will not violate the Court Order and will assure compliance with the other statutes and related governing documents addressing the characteristics of our region.

- **The CA meets the Letter and Intent of the Applegate Adaptive Management Area Guide (Applegate AMA).** According to the BLM, one of the key features of an AMA is to "encourage" "[i]nnovation in community involvement [,] including approaches to implementation of initial management strategies and perhaps, over the longer term, development of new forest policies."[iv] Moreover, the Applegate AMA is specifically designed to "provide for a broad range of forest values, including late-successional forests and high quality riparian habitat."[v] By putting forward a land management project created through community involvement and that includes a viable timber sale recognizing a broad range of forest values, the CA is the alternative most consistent with the directives of the Applegate AMA.

- **The CA contemplates collaboration among the community, the BLM, and other affected agencies.** For several decades our community has actively participated in shaping the future of the forests, rivers, wildlife, and other natural resources in this area. These efforts have resulted in, among other positive developments, the establishment of the Applegate AMA. Nonetheless, our public forest landscape has been controversial from a timber management perspective for decades. Portions of our community have often opposed the timber sales proposed by the BLM. More recently, however, the community and the BLM worked cooperatively to turn around the twice-failed Bald Lick sale. The recent collaboration in offering a portion (White Hat) of that sale to bidders resulted in a successful sale for nearly triple its appraised value and was done without protest. The CA builds off this collaborative effort and proposes to allow for further collaboration in regards to prescription development and implementation. Our community is committed to working with the BLM to implement the CA, or otherwise incorporate it as modifications to one of the BLM alternatives, as another example of successful collaboration.

- **The CA minimizes the cumulative impacts of the Nedsbar Timber Sale and will not trigger the legal requirement for an environmental impact statement (EIS).** As proposed by the Medford BLM, the Nedsbar Timber sale would trigger the legal requirement to prepare a full EIS in order to provide a sufficiently in-depth assessment of the complex cumulative impacts of the proposed sale. Our CA will reduce the cumulative impacts sufficiently to allow BLM to produce an environmental assessment (EA) and still meet the requirements of NEPA.

What the CA Does Not Include:

- **BLM logging beyond the requirements of the Court Order**. It is important to bear in mind what the Court Order requires and what it does not. It does not specify or even suggest any specific volume that must be sold or offered from any particular location. The entire area encompassed by the BLM's Medford and Roseburg Districts is available to meet the volume required to be offered. Nor is there anything in the Court Order to suggest that the BLM must, or is authorized to, violate other portions of the O&C Act, NEPA, and other federal laws in order to meet the required volume. And there certainly is nothing in the Court Order requiring the BLM to further degrade the already challenged and high fire hazard geographic area encompassed by the proposed Nedsbar sale. Accordingly, the CA is placed squarely within the parameters of the Court Order. In fact, the CA proposes a significant amount of timber be offered using methods that are consistent with the realities of our dry, at-risk forests. In doing so, the CA is in compliance with the language of both the Court Order and other statutes and regulations.

CA Response to BLM's Stated Nedsbar Timber Sale Objectives

Note: In addition to the CA objectives, this CA strives to meet the same eight objectives listed by the BLM in its May 14, 2014, scoping letter for the Nedsbar Sale, with revisions and qualifications as noted. The BLM objectives are set forth below, followed by our revisions proposed in this CA. These revised objectives are specifically designed to minimize cumulative effects.

The eight BLM objectives are listed in bold, CA comments and revisions in *italics*:

1) **Reduce stand density to increase the growth, quality, and vigor of the remaining trees.**

   The CA has been developed to address stand density issues and the declining growth, quality, and vigor in forested stands throughout the Nedsbar Planning Area. The concerns are addressed in both proposed commercial harvest units and fuel reduction units within the Nedsbar Planning Area. The objective will be achieved by focusing all proposed treatments on reducing competition and fuel loading in proposed treatment areas. Emphasis is placed on reducing understory density by removing excessive regeneration and/or young understory trees, either pole sized or mature.

   The thinning proposed in our prescription outline will reduce stand basal area and trees per acre, especially in understory trees that are often overabundant and tend to create the most volatile ladder fuels (i.e., fire hazards) and excessive competition to existing overstory trees proposed for retention. Focusing density reduction on the understory trees will increase individual tree vigor, growth, and quality in not only the understory,

but also in larger, overstory trees that will be retained.

2) **Create diversified stand structure (height, age, and diameter classes).**

We fully support this objective and have developed prescriptions that address the need for diverse stand structures and a balanced distribution of age, height and diameter classes. The Little Applegate watershed has been subject to a drastic decline in late successional forest conditions. In 1947, 48% of the landscape was forested in late successional stands totaling 35,000 acres. Currently less than 15% of this late successional habitat remains, totaling less than 10,000 acres. Of this current total, less than 3,700 acres are considered suitable habitat that can sustain species dependent on late successional conditions. This is due to habitat fragmentation largely created by historic logging practices.[vi]

Given the current deficit of late-seral habitat outlined above, the retention of large diameter trees and the deferral of Nedsbar units in older forest habitat is warranted, especially in light of the need to improve fire resiliency in this area. The current overabundance of early-seral habitat within the watershed should also be acknowledged by retaining the largest trees on the landscape and instituting a reasonable diameter limit of 20"DBH to protect and encourage late successional conditions and maintain older, larger trees for habitat and fire resiliency. In the Little Applegate watershed it is late-seral forests that are currently underrepresented; thus, our CA strives to address the uneven distribution of seral stages and encourage diversified stand structures by retaining the remaining late-seral forests and large, fire-resilient trees. The CA also proposes to thin stands of early-and mid-seral habitat to diversify stand structures and encourage fire-resistant, old-growth[vii] *characteristics.*

3**) Increase resilience/resistance of forest stands to wildfire, drought, insects, etc. by reducing stand densities and ladder fuels.**

The resilience of forest stands to natural disturbances such as wildfire, drought and insects is the central focus of the CA prescriptions. The CA proposes fuel reduction treatments in all stands proposed for thinning, including timber sale units. Fire has historically been the major driver of forest structure and mosaic across the landscape. Resiliency to fire is vital to sustaining forest conditions and habitats in the Nedsbar Planning Area. Our prescriptions focus on retaining existing fire-resilient stands and trees across the landscape. They also focus on reducing understory density and ladder fuel, which constitutes the most severe fire hazard in the region. The CA will also maintain levels of canopy closure in forested stands that will help to suppress understory growth, therefore reducing wildfire hazards in both the short and long term with minimal levels of fuel maintenance. Canopy closure levels prescribed in the CA will also help to retain adequate levels of soil and fuel moisture as late in the fire season as possible, reducing the potential impact of uncharacteristic wildfire and drought stress. The CA proposes more fuel reduction treatments than either the BLM's proposed Alternative 3 or Alternative 4. The CA also proposes prescribed fire treatments that will create greater levels of fire resilience than any form of mechanical or manual tree removal treatment.

4) Increase growing space and decrease competition for large and/or legacy pine, oak, and cedar.

The retention of large legacy trees is a major focus in CA prescriptions; however, the CA does not simply call for retention of large, legacy trees, but also proposes treatments that will encourage their survivability. The CA proposes to increase growing space and decrease competition for large pine, oak, and cedar, by favoring these species in areas that support viable populations of these shade-intolerant species. The south, southwest, and west-facing slopes, on the upper two-thirds of the slope position are prioritized for unit selection in the CA. This is consistent with historic species composition patterns and fire-regulated patterns associated with slope position and aspect.

5) Create growing space for a new cohort of trees and/or increase the growth of existing understory trees.

Increased growth of understory trees will be achieved in many forest stands, especially in stands that are currently young, overly dense, or where there are few dominant overstory trees. The CA does not reduce canopy closure to the extent proposed in BLM thinning and structural retention regeneration harvest units, especially in stands that are currently supporting late-seral, fire-resistant conditions. The BLM's proposed reduction in canopy closure in late-seral forest stands would decrease fire-resiliency, increase fuels, and create greater fire hazards over time. Numerous forest stands are found within the WUI and the increase in fuel hazards associated with significant canopy removal will increase fuels hazards, placing homes and communities at risk.

6) **Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long-term survivability.**

The reduction of understory stem density is a significant objective in all units proposed for treatment in the CA. The CA prescriptions will not only provide for long-term survivability by reducing fuels and understory competition, but will also contribute to fire-resiliency in forests and woodlands throughout the area. The treatment of dense understory fuels will significantly reduce the threat of uncharacteristic fire in the Nedsbar Planning Area.

7) Create regeneration opportunities for species that are shade-intolerant and provide long-term success or survival of less prominent species (e.g. sugar pine and white oak);

The alternative prescriptions outlined will further this objective by creating appropriately-sized openings in dense patches of young fir saplings and poles in proximity to existing pine, incense-cedar, and white oak. These objectives will also be met in fuel reduction units that are located mostly on arid slopes particularly adapted to pine and oak regeneration. The use of prescribed fire would also prepare bare mineral seed beds to encourage germination and establishment of shade-intolerant species such as pine, cedar, and oak.

8) Reduce the long-term effects of forest disease by reducing the spread of disease to existing overstory and understory trees.

Often the spread of disease, such as heart rots and fungus infestations can be associated with logging activities, most commonly damage resulting from careless yarding techniques. It is unclear how BLM prescriptions will address this objective. The CA will increase the vigor of treated stands and open up conditions enough to allow for increases in solar radiation and air circulation that will in turn reduce the risk of certain bacterial and fungal infestations. Likewise, the practice of sensitive yarding techniques during project implementation will reduce physical damage to trees to be retained, reducing the potential for disease spread. Mistletoe infestations have been identified in numerous agency documents as supporting the majority of northern spotted owl (NSO) nesting sites in the Applegate Watershed. However, the presence of mistletoe is sometimes viewed by BLM as a reason to log in specific areas. Cleansing stands of mistletoe on trees would have significant impacts to the NSO, especially in suitable NSO habitat such as NRF and dispersal.

Proposed CA Prescriptions and Community Monitoring

The prescriptions proposed in the CA have been developed to address the community concerns and ecological needs of the Nedsbar Planning Area, while remaining in compliance with the Court Order and applicable statutes. In general the CA places a premium on the retention of fire-resilient plant communities and ecological values. The prescriptions identified in the CA strive to achieve a balance among fuel concerns, ecological values, commercial timber outputs, and visual impacts. Treatments have been designed to maintain old, large, and fire-resistant trees, encourage habitat and species diversity, reduce impacts to the Pacific fisher and northern spotted owl, reduce fuel loads, maintain existing roadless areas, and protect adequate mid- and late-seral forest to allow for the development of stands with old-growth characteristics throughout the watershed.

Due to recent over-cutting of suitable spotted owl habitat in the watershed and immediate region, the CA takes a relatively conservative approach towards both canopy closure and large tree retention. The minimum number of trees per acre and canopy closure percentages have been adjusted upwards to reflect the circumstance that in recent BLM sales, the percent canopy closure and trees per acre in the actual cut have been significantly lower than the minimums allowed in the prescriptions (EA). Thus, the CA adjusts for the over-cutting that the BLM acknowledges has happened in recent timber sales. A 10% buffer has been incorporated into canopy closure requirements to ensure that targets are met following BLM marking, contract felling, the creation of yarding corridors, and the removal of trees identified as safety risks to contract workers. The CA also strives to meet large tree retention targets by retaining all trees over 20” in diameter as a general rule, although specific prescriptions rely on a flexible upper diameter limit to reflect site conditions. The precedent for the proposed diameter limit is validated by the use of a 21” diameter limit on federal forestlands east of the Cascades Mountains, incorporated in what is known as the Eastside Screens. Similar measures should be

taken to protect the uniquely dry forest communities in the Applegate Valley of southwestern Oregon.

The CA also strives to protect vital ecological values and scenic/viewshed values that support the growing local recreation, tourism, agriculture such as wineries, and visitor amenity-based economy of the Applegate Valley. This includes the retention of natural landscape patterns, viewsheds from popular trails such as the Sterling Mine Ditch Trail and the proposed Jack-Ash Trail, and the retention of closed canopy forest habitats especially in view of the Little Applegate and Upper Applegate Valleys.

The region's ecological and scenic values are driving the local economy and quality of life that in turn brings resources and money into our region. No Nedsbar units located outside currently roaded areas are proposed in the CA; thus, no new roads are proposed to be constructed in the CA. As noted throughout this document, the region's roadless areas, Lands with Wildland Characteristics, primitive areas and other areas with wildland characteristics will not be adversely impacted by the proposed thinning and fuel reduction treatments set out in the CA's prescriptions. Moreover, no units are proposed for logging that currently supports high quality, late-seral habitat and fire-resilient stand conditions. The goal would be to maintain all NRF and dispersal habitat for the northern spotted owl in compliance with applicable law.

Prescriptions have been specifically tailored to address the needs of this unique and diverse region. Prescriptions are designed to reduce fuel hazards both inside and outside the Wildland Urban Interface of the Little and Upper Applegate Valley. Prescriptions are also designed to maintain biodiversity on the landscape scale by maintaining existing landscape patterns and heterogeneity already expressed through the variety of habitat conditions and plant communities spread across the landscape.

The CA meets all the needs of the Nedsbar landscape and the Court Order while encouraging community collaboration and innovation as is directed in the Applegate AMA.

1. Unit Prescriptions:

The prescriptions proposed are set out by unit in Appendix 1.

2. Older, Late-Seral Forests

For decades the most contentious debate in federal lands management has revolved around the logging of old-growth forests and trees. Although this debate still rages, a new debate has ensued around the definition of "old-growth" and how we might identify trees and stands with old-growth characteristics. Many have deemed the term "old-growth" too divisive and controversial and have opted to use the terms "old" or "complex" forest. In the CA we utilize the terms *older* or *late-seral* to refer to those forests in the Nedsbar Planning Area that exhibit

old-growth characteristics.

In defining old-growth characteristics, one must take a regional approach, with emphasis placed on climatic influences and disturbance patterns. In the CA we define older conifer trees as those with thick, deeply furrowed bark, large diameter trunks and branches, complex branch structure, broken tops and expressions of decadence. An older forest in the dry forest sites of the Applegate Valley could be defined as a forest stand that supports a significant canopy layer of trees defined as older, as well as the presence of large old snags, large downed trees, complex canopy structure, uneven aged stand structure, and in all but the driest Douglas fir and pine sites, multi-layered canopies, including hardwoods.

Although the science of forestry and ecology have definitions of "old forest" based on measurable, quantitative characteristics, much of the debate revolves around societal values that identify old trees and forests as increasingly rare, complex and beautiful. Qualitative and subjective values such as perceived wildness, naturally appearing landscapes, and the archetypical view of timeless old-growth are also very influential and have significantly impacted the debate. These definitions, although less specific and scientific, are no less important to society.

We propose the retention of all older stands and trees in the Nedsbar Timber Sale. This design feature has heavily influenced both our prescriptions and unit selection. We also believe the most practical way to identify and retain the largest number of older trees is through the use of a flexible upper diameter limit based on site conditions, stand age and seral stage. In general, all trees over 20" are reserved from cutting in commercial timber sale units. Older trees and stands should be deferred from removal at this time to provide important wildlife habitat and societal needs.

3. <u>Roads and roadless areas.</u>

The CA does not contemplate the construction of new roads for the reasons stated elsewhere in the document. Further rationale for this critical component of the CA is provided here.

As demonstrated in several recent no-bid sales, the Nedsbar sale will be more profitable to prospective bidders if no new roads are required.

Part or all of seven significant roadless areas are included in the BLM's scoping document for the proposed Nedsbar sale. As most of the Little Applegate watershed has already been heavily impacted by development and by road construction and timber harvest, the remaining significant roadless areas serve as anchors for intact natural functions and processes necessary for the stability of ecosystem health and productivity, including the vulnerable Little Applegate River, its tributaries, springs contributing to its flow, and the underlying aquifers. On a watershed scale, these roadless areas help mitigate cumulative effects from developed portions of the landscape, including residential development and logging.

Roadless areas generally contain no roads that are regularly maintained in drivable condition. The overall composition of these roadless areas is undeveloped, wild, and with high levels of integrity of natural ecosystem functions. The CA places a high priority on maintaining the integrity of the plant and wildlife characteristics of these areas: River Canyon, Bald Mountain, Trillium Mountain, Cinnabar-Boaz, Quartz Lick, Buncom, and Dakubetede. The specific location, scope, and particular characteristics of these seven areas have been well documented in a number of publicly available documents and are not repeated here.

4. <u>Community Monitoring.</u>

Community monitoring is an essential element of the CA. Effective community monitoring of the Nedsbar sale to track project activity before work begins, as well as during project implementation, is essential if a collaborative and legal sale is to be achieved. Monitoring must include, at a minimum, community review once the mark is established, oversight during logging operations, including review of yarding corridors, helicopter pad and landing locations, stream and sensitive species buffers, hardwood retention, and in-process community review as units are completed to ensure proper slash removal, and to allow for adaptive management as per the AMA. The recent O'Lickety sale, in which the community was not present to monitor the implementation of the sale, demonstrates the need for such monitoring. For example, the recorded differences between the percent canopy closure identified in the EA and the percent canopy closure observed post-logging are dramatic and resulted in significant degradation of protected habitat.[viii] We would like to work with the BLM to establish the community monitoring program to address project and unit design, layout, logging systems and mitigation measures.

5. <u>Mitigating the impact of proposed logging activities on the community.</u>

In order to balance the demonstrated needs of timber contractors to complete their work with the potential negative impacts of their activities on people living within or close to the areas designated for logging, clear guidelines requiring reasonable measures should be included — in both the final proposal documents and the logging contracts themselves — to mitigate safety issues and other impacts that degrade the quality of life. Such measures should include:

a. Restricting helicopter logging to Monday through Friday 7 am to 5 pm, 8 am to 5 pm on Saturdays.
b. Requiring meetings between residents on unpaved haul routes and truck drivers to develop workable solutions to dust and noise issues. A similar measure was successful during the USFS Little Applegate timber sale, when drivers met with Yale Creek residents.
c. Prohibiting use of log truck engine brakes except in areas where there are no adjacent residences.
d. Requiring successful bidders, and those with whom they contract for the work, to apply dust abatement to BLM roads except in areas where there are no adjacent residences, and to arrange for county application of dust abatement on unpaved county roads except in areas where there are no adjacent residences.

CONCLUSION

BLM staff have stated repeatedly on past projects and on this proposed sale that any alternative offered must be a viable alternative, and we agree. We were specifically asked to demonstrate what social, environmental, or economic benefits offset the lesser volumes set out in our CA. Past discussions also indicate that viability may be viewed from at least four perspectives: scientific, economic, social, and legal. This CA meets the test for viability from all four perspectives:

Scientific: Extensive scientific support exists for both the approach and details of this CA regarding unit locations, prescriptions, and reserved areas. The group that drafted the CA stands ready to meet with the BLM to respond to any concerns on the part of the BLM on this issue.

Economic: The concept of economic viability of a timber sale should include a full cost/benefit analysis of the impacts of a proposed forest management activity. This would include not just the board feet harvested or temporary timber jobs generated, but also such criteria as the impact on the economic vibrancy of the affected communities and region. Assessing economic viability of different alternatives must include consideration of the impact on the large and growing sources of regional jobs in commercial agriculture, recreation, tourism and support services. It should also include the avoided costs associated with the various alternatives. For example, a key assessment for the Nedsbar sale should include comparing alternatives for future fuels reduction costs over the next decade, potential fire suppression costs in such steep terrain or the potential cost of a catastrophic fire that spreads onto private lands bordering the Nedsbar units and the full economic impact of such a fire on local businesses and residences. The short- and long-term impacts of different approaches to logging must also include an assessment of the impacts on air and water quality, local property values and the quality of the environment — an amenity that draws new taxpaying residents and tourists to this region. While timber sales may provide short-term payments to Jackson and Josephine Counties, pursuing logging activities that create much more serious long-term costs to the region fails to pass the economic viability test. Our CA would meet an economic viability assessment by providing a net long-term benefit to the region.

In examining timber sales put up for auction by BLM over the last few years, several projects were apparently not economically viable because they drew no bids, including recent sales offered in the Applegate portion of the Ashland Resource Area, leading some in the community to question the economic viability of those projects. As presented in this CA, the Nedsbar project could be offered in smaller sales, either as ground-based or helicopter projects, or some combination of the two. This will enhance economic viability by tailoring each smaller sale to whatever potential purchasers (from small operators to large helicopter companies) have the business models and equipment to attract them to the projects. The recommended fuels reduction units would also provide local jobs while achieving much-needed fire hazard reduction.

Social: Social viability refers to, among other things, a reasonable likelihood that the affected constituencies, applying community standards, will embrace or at least tolerate the proposed

Nedsbar sale. The Little Applegate and adjacent communities have decades of experience as active participants in whatever actions undertaken in our community have the potential to affect our forests, rivers, wildlife, and other natural resources. The community's involvement spans the entire political spectrum. Input from across this wide spectrum of perspectives on natural resources has guided the creation of this CA, with no single voice, no single organization, and no single subgroup controlling its content.

Legal: Viability in the legal realm focuses on the ability of a project to meet the requirements of applicable laws, including both environmental statutes and the Court Order. We have demonstrated throughout this document how the CA comports with the Court Order and other court decisions regarding cumulative effects. In addition, the CA is in compliance with all other applicable laws and regulations.

* * * *

On behalf of our community, we thank you for your consideration of this CA. Members of the group that put pen to paper look forward to discussing our proposal once BLM staff has had the opportunity to review it. We submit our proposal in the spirit of language taken from the *Adaptive Management Areas in the Northwest Forest Plan,* namely that working together, the BLM and the community may achieve

> *[t]he primary social objective of provi[ding] flexible experimentation with policies and management [by providing] opportunities for land managing and regulatory agencies, other government entities, nongovernmental organizations, local groups, landowners, communities, and citizens to work together to develop innovative management approaches.*
>
> *[Together, we can] learn how to manage on an ecosystem basis in terms of both technical and social challenges, and in a manner consistent with applicable laws. It is hoped that localized, idiosyncratic approaches that may achieve the conservation objectives of these standards and guidelines can be pursued. These approaches rely on the experience and ingenuity of resource managers and communities rather than traditionally derived and tightly prescriptive approaches that are generally applied in management of forests.*

Respectfully submitted,

Signatories:

Endnotes:

[i] The map included in the May 14, 2014, scoping letter shows several dozen potential logging units in black, suggesting the adjacent areas not shown in black are not "part of" this proposed project. But of course, no such bright line can be drawn between the "units" and the surrounding lands. They are all interconnected and of a piece.

The proposed units are located mostly in the Little Applegate watershed, which serves as a crucial corridor of connectivity where the eastern Siskiyous are pinched into a narrow range between the Bear Creek and Shasta valleys. The connectivity corridor extends from the Rogue Valley into the Nedsbar Planning Area, and up the Applegate River and surrounding ridges to the Siskiyou Crest near the Red Buttes Wilderness and Condrey Mountain Roadless Area. The connectivity corridor continues into northern California, linking the Siskiyou Mountains to the Marble Mountains, Salmon Mountains, Scott Mountains and Trinity Alps. This connectivity relies on the low-elevation corridor in the Nedsbar Area, which is particularly important as it provides linkage between habitats that support some of the west coast's only native populations of Pacific fisher, which is currently being proposed as threatened under the Endangered Species Act. The Nedsbar Planning Area is vital to facilitate genetic exchange between fisher populations in northern California and southern Oregon. The quality of terrestrial and aquatic habitat necessary for effective connectivity has been extensively degraded by logging and road building over the last 60 years, as documented in the Little Applegate River Watershed Analysis, jointly authored by the BLM, USFS, and USFWS. Connectivity suffered a more recent blow in 2001 when the Quartz Fire burned over 6,000 acres in the middle of the watershed, followed by approximately 2,000 acres of clear-cut salvage logging.

This CA employs habitat connectivity across the landscape as a guiding rationale by reserving the roadless areas from new road construction, and by retaining forest canopy through understory thinning. Our community believes these two measures will greatly assist in mitigating cumulative effects from past and future events, including logging activity and fire.

[ii] Two recent studies of non-metropolitan counties in the eleven western states where over half the lands are managed by the federal government indicate that protected lands provide a greater level of economic growth and stability than lands managed primarily for commercial resource extraction. In the Applegate watershed, protections offered by designations such as Lands with Wilderness Characteristics and Primitive Backcountry Areas will provide for more sustainable local economic growth than committing marginal timberlands to questionably sustainable resource extraction and the deleterious environmental impacts of such activity.

"The presence of protected lands is correlated with relatively rapid population growth and with relatively rapid income and employment growth."(p. 1) "The counties most able to rebound from the loss of extractive industries are typically those that have the environmental amenities needed to support growth in the service sector and to attract new residents who bring income derived from dividends, interest, rent, and social security payment." (pp. 13-14). In counties where the shift to services is most advanced, the relationship between the environment and local economic security has fundamentally changed. Economic security no longer depends on exporting raw materials. Instead, the presence of natural amenities --pristine mountains, clean air, wildlife, and scenic vistas--stimulates employment, income growth and economic diversification by attracting tourists (and their credit cards), small business owners (and their employees), and retirees (and their stock portfolios)."(p. 5). Lorah & Southwick: *Environmental Protection, Population Change and Economic Development in the Western United States***.** http://www.southwickassociates.com/wp-content/uploads/2011/10/Env-prot-pop-change-in-western-us-RLPAreas.pdf

"The study finds that, on average, counties with national parks, wilderness, and other forms of protected public lands benefit through increased economic performance."(Abstract). "*One reason for these positive relationships may be that in today's economy a premium is placed on the ability of communities to attract talented workers, and the environmental and recreational amenities provided by national parks and other protected lands serve to attract and retain talented people who earn above average wages, and have above average wealth, such as investment*

income. This explanation would be consistent with the non-metro West's transition into a service-based economy, which constitutes 61 percent of all employment. It is also consistent with the rapid growth of non-labor income in the non-metro West, including retirement and investment income, which comprised 65 percent of net total personal income growth in the last decade." (p. 120). Rasker, Gude, & Delorey: *The Effect of Protected Federal Lands on Economic Prosperity in the Non-metropolitan West.* J. Regional Analysis & Policy, vol. 43(2): 110-122 (2013).

See also, http://people.oregonstate.edu/~muirp/FuelsReductionSWOregon/index.html

[iii] The CA relies on, among other expert references, the analyses and conclusions contained in Ecosystem Health Assessment to guide forest management in the Applegate Adaptive Management Area, including its recommendation on page 58: "Plan at the landscape scale by identifying areas needing protection. There may be areas in which activities should not occur or should be restricted, including tree cutting, grazing, etc."

[iv] Northwest Forest Plan Standards and Guidelines, Section D. Adaptive Management Areas, p. D-2.

[v] Id. p. D-12.

[vi] Broyles, Matt. 1995. Wildlife Report. Little Applegate Watershed Analysis. Jackson County, Or. Medford BLM and Rogue River National Forest.

[vii] See discussion of "old growth" at pp. 9-10, "Older, Late-Seral Forests."

[viii]See memorandum dated November 5, 2014, addressing O'Lickety Post Logging Owl Habitat Status, attached as Appendix 2.

Appendix 1: Community Alternative Recommended Prescriptions

As the Medford BLM provides the requested documentation (i.e. critical habitat information) necessary to finalize our prescriptions and unit selection, we will submit them to the Medford BLM to complete this CA.

Appendix 2: Memorandum - O'Lickety Post Logging Owl Habitat Status

O'Lickety Post Logging Owl Habitat Status

To: Interested Parties
From: Rich Nawa, KS Wild
Subject: O'Lickety BLM Timber Sale Post-Logging Owl Habitat Status
Date: November 5, 2014

On October 20, 2014 and November 3, 2014 I field checked O'Lickety Timber Sale units to assess compliance with maintaining spotted owl habitat class as described in the Decision Record. The November 2011 BALD LICK LANDSCAPE PROJECT DECISION RECORD #2 for the LICK STEW STEWARDSHIP PROJECT & O'LICKETY TIMBER SALE states on p.2 that:

> *The silvicultural prescriptions are based on those prescriptions analyzed under the Bald Lick Environmental Assessment except that the target basal area per acre was modified in order to maintain canopy cover for the maintenance of existing northern spotted owl nesting, roosting, foraging (NRF) and dispersal habitat. This resulted in a determination that the Lick Stew Stewardship Project and the O'Lickety Timber Sale is "Not Likely to Adversely Affect" the northern spotted owl.*

Table 1.

Project Units Acres	EA Unit #	Logging System	Prescription is to Maintain:	Vegetation Type	Project
5	B43-2	Tractor	Dispersal	Pine Site	Lick Stew
31	B46-2	Cable	NRF	Dry Douglas-fir	Lick Stew
6	B46-3	Tractor	Dispersal	Dry Douglas-fir	Lick Stew
8	B48	Cable	Dispersal	Pine Site	Lick Stew
6	B49-1	Cable	Dispersal	Dry Douglas-fir	Lick Stew
2	B49-2	Tractor	Dispersal	Dry Douglas-fir	Lick Stew
4	B52-4	Cable	NRF	Dry Douglas fir	Lick Stew
5	B52-8	Cable	Dispersal	Dry Douglas-fir	Lick Stew
12	B61-2	Cable	Dispersal	Dry Douglas-fir	Lick Stew
10	B70-4	Cable	Dispersal	Moist Douglas-fir	Lick Stew
2	B45	Cable	Dispersal	Dry Douglas-fir	O'Lickety
6	B46-1	Cable	NRF	Dry Douglas-fir	O'Lickety
13	B52-1	Tractor	Dispersal	Dry Douglas-fir	O'Lickety
2	B52-9	Tractor	Dispersal	Dry Douglas-fir	O'Lickety
1	B53	Tractor	Dispersal	Pine Site	O'Lickety
3	B54	Cable	Dispersal	Pine Site	O'Lickety
4	B57-1	Tractor	Dispersal	Pine Site	O'Lickety
2	B59	Tractor	Dispersal	Pine Site	O'Lickety
12	B61-1	Cable	Dispersal	Dry Douglas-fir	O'Lickety
10	B64-1	Cable	NRF	Dry Douglas-fir	O'Lickety
7	B64-2	Tractor	Dispersal	Dry Douglas-fir	O'Lickety
12	B70-1	Cable	NRF	Dry Douglas-fir	O'Lickety
7	B70-5	Tractor	NRF	Moist Douglas-fir	O'Lickety
24	B71-1	Cable	Dispersal	Moist Douglas-fir	O'Lickety
194	**Total Acres**				
NRF =Nesting, Roosting, and Foraging					

The EA page 3-31 states:

Suitable habitat includes nesting/roosting and foraging habitat and generally has the following attributes: high degree of canopy closure (approximately 60 %+), multilayered canopy, large snags, and coarse woody debris. Dispersal-only habitat provides spotted owls some degree of protection and some foraging opportunity during dispersal and other activities, and generally has the following attributes: conifer stands with an average diameter of approximately 11 inches and 40-60 percent canopy closure.

I estimated canopy closure within units with ocular estimates. Where canopy closure appeared to be below standards for suitable spotted owl habitat I made at least 4 unbiased measurements within the unit with a spherical densitometer. The measurements from these locations were averaged to estimate canopy closure. I believe my measurements are within 5% of the actual canopy closure value.

Table 2. O'Lickety Timber Sale Post-Logging Canopy Closure.

Unit	Habitat Class	% Canopy Closure identified in EA	Estimated Post Logging % Canopy Closure	Method	Comment
B45	Dispersal	40-60	40	Ocular estimate	Habitat maintained
B46-1	NRF	60+	40	Ocular estimate	Habitat maintained
B52-1	Dispersal	40-60	No data		
B52-9	Dispersal	40-60	40		
B53	Dispersal	40-60	40	Ocular estimate	Habitat maintained
B54	Dispersal	40-60	28	Densiometer	Habitat eliminated
B57-1	Dispersal	40-60	28	Densiometer	Habitat eliminated
B59	Dispersal	40-60	47	Densiometer	Habitat maintained
B61-1	Dispersal	40-60	40	Ocular estimate	Habitat maintained
B64-1	NRF	60+	44	Densiometer	Habitat downgraded
B64-2	Dispersal	40-60	40	Ocular estimate	Habitat maintained
B70-1	NRF	60+	No data		
B70-5	NRF	60+	No data		
B71-1	Dispersal	40-60	37	Densiometer	Habitat probably maintained

Unit 54 was logged to 28% canopy. Dispersal habitat was downgraded to "non-habitat".
Unit 57-1 was logged to 28% canopy. Dispersal habitat was downgraded to "non-habitat".
Unit 64-1 was logged to 44% canopy. NRF habitat was downgraded to dispersal habitat.
Unit 71-1 was logged to 37% canopy. Since margin of error is estimated 5% this unit remains "borderline" for dispersal habitat.

Assertions that canopy closure will increase in the short term (next 5-10 years) due to tree growth are false because many trees will die or blow down during the next 5-10 years. Some trees had very low crown base ratios and some were damaged from the logging.

Units 57-1, 64-1 and possibly unit 54 do not meet the NWFP standard for retaining 16 large >20"dbh trees/acre. The NW Forest Plan p.C42 states: "For lands administered by the BLM in Oregon south of Grants Pass, retain 16 to 25 large green trees per acre in harvest units." I observed that several large trees were cut from these units.

Photo 1. O'lickety Unit 64-1 was logged to 44% canopy which downgraded it to dispersal habitat. Many large trees >20" dbh were logged (foreground). Photo by R. Nawa on November 3, 2014.

Photo 2a 2b O'Lickety Unit 71-1 (lower photo) was logged down to 37% canopy. Upper photo is unlogged forest from above the logged unit and illustrates the high pre-logging canopy closure (estimated 85%). Photos by R. Nawa on November 3, 2014.

Photo 3. O'Lickety unit 57-1 was logged down to 28% canopy closure which eliminated it as dispersal habitat. Photos by R. Nawa on October 20, 2014.

Photo 4. O'Lickety unit 54 was logged down to 28% canopy closure which eliminated it as dispersal habitat. Photos by R. Nawa on October 20, 2014.

Aaron Ferschke	Jacksonville
Alan Journet	Jacksonville
Alfred Hanan	Ashland
Alice DiMicele	Medford
Alison Miller	Jacksonville
Amanda Smith	Ashland
Amber Bishop	Jacksonville/Applegate
Ami C Evergreen	Ashland
Amy	Ashland
Andrew Simmons	Talent
Andrew Taylor	Jacksonville
Anita Covey	Grants Pass
Anna Laca	Ashland
Anne Clay	Williams
Arthur Sherman	Grants Pass
Ashley Grandkoski	Jacksonville/Applegate
Audrey	Jacksonville
Audrey Hulstrom	Medford
Audrey Shapiro	Medford
Autumn MacIvor	Jacksonville/Applegate
Avona	Jacksonville
Barbara Kostal-Calahan	Jacksonville
Barry Martin	Williams
Becky Schilling	Ashland
Ben Yohai	Jacksonville/Applegate
Bernhard Masterson	Oak Grove
Bjorn Everson	Jacksonville/Applegate
Brad Smith	Williams
Braxton Reed	Meford
Brooke Nuckles Gentekos	Jacksonville
Bruce Campbell	Jacksonville/Applegate
Bryan della Santina	Jacksonville
C. Carlson	
Carla David	Jacksonville
Carl Schwab	
Carly Salant	Jacksonville/Applegate
Carol	Medford
Carol Ingleson	
Cary Manning	Jacksonville/Applegate
Cassidy Geppert	Applegate
Cat Gould	Ashland
Catherine Cogdill	Central Point
Cathy Moore	Ashland
Cecile Everson	Jacksonville/Applegate
Chad Derosier	Ashland
Chant Thomas	Jacksonville/Applegate

Charla Hathaway	
Cherie Savoie Tintary	Forest Grove
Cheryl Bruner	Williams
Cheyenne Poole	Ruch
Chris Cain	Grants Pass
Chris Keefe	Ashland
Chris Reynolds	Jacksonville
Christina Strelova	Williams
Claude Aron	Jacksonville
Clint Driver	Jacksonville
Cody Holliday	Medford
Coenraad Rogmans	Jacksonville
Connor Powell	Andover
Conny Lindley	Williams
Constance Murphy	Jacksonville
Corbin Brashear	Williams
Courtney Rogmans	Jacksonville
Dan Beausoleil	Williams
Daniel Frankfort	Williams
Daniela Arnon	
David Calahan	Jacksonville
David Levine	Williams
David Taylor	Williams
David Franklin	Jacksonville/Applegate
David Ralph Reynolds	Jacksonville/Applegate
Dawn Jones-Redstone	Portland
Dawn Strickmeyer	Jacksonville
Devin Boyle	Portland
Diana Coogle	Applegate
Don	Williams
Donna & Edgar Doleman	Heathsville
Dot Fisher-Smith	Ashland
Drew Mebane	Ashland
Eden Luz	Jacksonville
Edgar Doleman	Heathsville
Elaina Brown	Sausalito
Elise Higley	Applegate/Grants Pass
Elizabeth Bretko	Grants Pass
Elizabeth Tobey	Ashland
Ellen J Fineberg	Williams
Eric Spivak	Medford
Erin Volheim	Jacksonville
Evelyn Roether	Williams
Evelyn Hardesty	Rohnert Park
Faun Parliman	Williams
Forest Stroud	

Fran Hopkins	Jacksonville/Applegate
Frank Garrotto	Grants Pass
Fred Hall	Grants Pass
Friends of the Kalimiopsis	Grants Pass
Gail Betaglia	Jacksonville/Applegate
Gary O'Neal	Gold Hill
Gay Bradshaw	Jacksonville
Gayle Lewis	Jacksonville
George Peat	Jacksonville
Grace	Jacksonville
Greg Brown	Jacksonville/ Ruch
Gregory Boehm	Williams
Gypsy	Grants Pass
Harlan Young	Jacksonville
Harold Hopkins	
Harrison Leep	Jacksonville
Heather Wamsley	Williams
Heidi Remington	Jacksonville
Helon Howard	
Hope Robertson	Jacksonville/Applegate
Howard Powell	
Ian Snesrud	Williams
Inka Rein Jungwirth	Williams
J Davis Bartholomew	Applegate
Jack Duggan	Jacksonville
Jacob Friedman	Brooklyn
James Grauer	Ashland
James Kraemer	Jacksonville/Applegate
James Lewis	Jacksonville
James Sartorio	Jacksonville/Applegate
Jamie Ford	Applegate
Jan Wright	Talent
Janelle Cossey	Grants Pass
Janet Kerr	Medford
Jannalee Smithey	Talent
Jared Smith	Jacksonville
Jason Patton	Corvallis
Jaymie Exley	Jacksonville
Jean Mount	Grants Pass
Jeanne Chouard	Ashland
Jeff Higley	Applegate/Grants Pass
Jeffrey Judkins	
Jen Hardin-Tietjen	
Jenny Van Winkle	Williams
Jessica Fergus	

Jessie Brockl	
Jim Bieg	Jacksonville
Jim Reiland	Jacksonville
Jim Freeberg	Ashland
Jim Perkins	Jacksonville
Joanna Lynden	Jacksonville/Applegate
Joe Vaile	Ashland
Joe Ruskin	
John Adams	Jacksonville
John Galloway	San Fransisco
John Hutton	Ashland
John Fisher-Smith	
John Galego	Jacksonville
John Schinnerer	Ashland
John Wieczorek	
Jon Steiger	Jacksonville
Jon Adams	Medford
Jonathan Major	Jacksonville
Joseph Lian	Williams
Josh Klein-Kuhn	Portland
Josh Weber	Williams
Joy Trevey Lowell	Talent
Joy Rogalla	Jacksonville/Applegate
Judi Stratton	Jacksonville
Judith A Maxwell	Grants Pass
Julie Norman	
Karen Giese	Jacksonville
Karen Black	Williams
Kari Rein	Williams
Kate Morse	
Kathleen Horner	Jacksonville/Applegate
Robert Cremins	Williams
Kathy Conway	Jacksonville
Keeley Bittner	Jacksonville
Keet Beck-Brattin	jacksonville
Keira Harrison	Ashland
Kelley Leonard	Jacksonville
Kelsey Bigelow	Jacksonville
Kenneth Smith	Williams
Ken Schiff	Jacksonville
Kim Williams	Jacksonville
Kim Nachbur	Jacksonville
Krista Hagman	Ashland

Kristen Lyon	Jacksonville
Kristina Porter	Jacksonville/Applegate
Kristy Newell	Talent
Kyle Cameron	Jacksonville/Applegate
Kyler Grandkoski	Jacksonville
Lauren Kelley	Jacksonville/ Ruch
Lee Showerman	Jacksonville/Applegate
Leigha Perry	Williams
Leslie Primus	Talent
Leslie Perkins	Jacksonville
Linda Ford	Applegate
Linda Schaeff	Jacksonville
Lindea Kirschner	Ashland
Lisa Matthews	Medford
Lorie Ruskin	
Louann Faist	Williams
Louis B. Smith	Medford
Louise Nicholson	Applegate
Louise Rouse	Applegate
Luke Ruediger	Jacksonville/Applegate
Lydia Doleman	Jacksonville
Lynn M Henry	Williams
Madeleine Murphy	Jacksonville
Madeline Schwartz	Jacksonville
Mard iMastain	Ashland
Margaret Perrowdella Santina	Jacksonville
Marianne Powell	Medford
Marie Galego	Jacksonville
Marijke Weaver	Portland
Marina L. Walker	Jacksonville
Marion Hadden	Jacksonville/Applegate
Mary Carr	Phoenix
Mary Driver	Jacksonville
Mary McDermott	Williams
Matt Epstein	Jacksonville
Matt Musselwhite	Jacksonville
Matt Stern	Williams
Matthew Palmquist	Jacksonville
Matt Tietjen	
Megan Fehrman	Jacksonville
Merridy Cross	Williams
Meyera Robbins	Jacksonville
Michael Moss	Jacksonville

Michael Rios	
Michele Scherer	Williams
Michelle Goldfeder	Applegate
Michelle Adams	Jacksonville
Michelle Calascibetta	Medford
Michelle LaFave	Applegate
Michelle Bienick	Williams
Mike Smith	Applegate
Mike Guest	Medford
Milian Gonzalez Lopez	Jacksonville
Montgomer Zukowski	Jacksonville
Mouna Wilson	Ashland
Nance Sledge	Williams
Natalia Newman	Scott bar
Neal Anderson	Jacksonville
Nicholas Nachbur	Jacksonville
Nick Jacobson	
Nicole Kraft	Williams
Nina Kiskadden	Jacksonville/Applegate
Olivia Doty	Ashland
Park Walker	Jacksonville
Paula Harten	Jacksonville/Applegate
Peggy Martin	Jacksonville
Peter Dittler	Grants Pass
Peter Gentekos	Jacksonville
Peter Salant	Jacksonville/Applegate
Peter Sturm	
Priscilla Weaver	Jacksonville/Applegate
Rachael C Barats	Forestville
Rachelle Manning	Jacksonville/Applegate
Ramona Bennett	Grants Pass
Rea Clute	Seattle
Ren Mier	Ashland
Renee Miereanu	Ashland
Rev. Fred Keip	Grants Pass
Rich Rohde	Ashland
Richard Mikula	Jacksonville
Richard Schaeff	Ashland
Robert Kingsnorth	Central Point
Robert Harkness	Medford
Robert Powell	Jacksonville/Applegate
Robin Gossett	Williams
Ross Bennett	Portland

Ruth Coulthard	Ashland
Ryan Sweesy	Williams
Sabina Schilling	Ashland
Samuel Becker	Talent
Sandra Baker	Medford
Sandra Brown	Williams
Sandra Park	Jacksonville/Applegate
Sandy Tracy	Medford
Sara Hamilton	Jacksonville
Sara Katz	Williams
Scott Stamp	Medford
Sean	Grants Pass
Shawn Freedman	Ashland
Stacie Brink	Applegate
Stephanie Gould	Ashland
Stephanie Graham	Grants Pass
Steven Rouse	Applegate
Steven Weaver	Jacksonville, Applegate
Stuart O'Neill	Ashland
Susan Delles	Rogue River
Susan Bondesen	Williams
Susanna	
Susan Shaffer	Jacksonville/Applegate
Suzie Savoie	Jacksonville
Tamara Stuebing	Grants Pass
TamaraRousso	Jacksonville/Applegate
Tamra Bokal	Ashland
Ted Shaffer	Jacksonville/Applegate
Teri Adams	Medford
Tess Wier	Jacksonville/Applegate
Todd Shangold	Portland
Tom Block	Jacksonville
Tom Papp	Jacksonville
Tom Powell	Jacksonville
Tracy Harding	Ashland
Tracy Lamblin	Jacksonville
Tressi Albee	Williams
Troy Higgins	Medford
Tucker Teutsch	Talent
Tyson Fehrman	Jacksonville
Vanessa Renwick	Portland
Walter Lindley	Williams
Wayne Joseph Doty	Gresham

Wayne Slawon	Talent
Wendy Reordan	Williams
William Carroll	Talent
William Childress	Jacksonville/Applegate
Will Sears	
Claudia Beausoleil	Williams
Rita Grauer	Ashland
Kathy Escott	Williams

Nedsbar Community Alternative Prescription

General Guidelines

- Maintain all existing fire-resilient stands on the landscape. This would include complex, late-seral forests with open understories and relatively closed-canopy conditions, pine stands with open, fire-adapted stand structures, and healthy oak woodlands. Areas supporting fire-resilient conditions are not in need of manual thinning treatments.
- Maintain natural groupings of dominant trees, both pine and fir. Groupings can consist of 2, 3, 4 or more trees and are characteristic forest structures in all natural stands, especially those influenced by fire during stand development. Leave all trees in a grouping if the grouping exhibits "legacy" characteristics (e.g. large diameter trunks, thick corky bark, large diameter branches, broken-tops, large reiterations, complex branching structure, and non-symmetrical crowns).
- Retain the largest trees in all treated stands.
- Maintain 60%-70% canopy closure in Douglas-fir stands considered nesting, roosting and foraging habitat (NRF) for the northern spotted owl (NSO).
- Maintain existing canopy closure (40%-60%) in Douglas-fir stands considered dispersal habitat for the NSO.
- Maintain all overstory trees in Douglas-fir stands considered non-suitable habitat for the NSO.
- Maintain at least 50% canopy closure in ponderosa pine stands.
- No removal of overstory pine trees in any units.
- Maintain quality snag and Large Woody Debris (LWD) habitat. Maintain at least 6-10 snags per acre of various ages, decay classes, and species. Special consideration should be given to snags with the following characteristics: large hardwood species with internal cavities, large conifers with furrowed bark, broken tops, complex branch structure, and internal cavities. Groupings or clumps of snags can also be maintained for wildlife habitat.
- Maintain all large hardwoods in mixed conifer stands. Thin young and competing conifer and/or hardwood species from within the dripline of large, remnant hardwoods. The CA defines large hardwoods as 12" DBH and larger.
- Avoid large snags, conifers, hardwoods, and LWD when designing cable-yarding corridors.
- In some commercial units "skips" can be utilized in order to protect hardwood patches, shrubby areas, snag patches, seeps, springs, wildlife habitat, etc.
- Utilize a flexible upper diameter limit based on site conditions, stand age and seral stage. In general, all trees over 20" are reserved from cutting in commercial units. Diameter limits can be adjusted downward if site conditions merit the retention of smaller trees to achieve desired canopy closure and large tree per acre requirements. Diameter limits can also be adjusted upward in situations involving legacy pines and oaks. The exception will apply to historic oak/pine woodland, adjacent to upland prairie habitat, and savanna-form stands.
- Utilize clean-burn Kraft paper instead of black plastic for covering burn piles.

- Burn all activity slash within two years of pile creation. Utilize a "no pile left behind" strategy.
- Retain small, isolated islands of shrubby or young vegetation for wildlife habitat rather than leaving burn piles unburned for wildlife.
- Treat all commercial units for non-commercial fuels after logging and before slash removal. This will reduce ladder fuels, understory stem density competition and encourage healthy stand structure. An exception can be made for those units that have been recently treated with fuel reduction thinning.
- Activity slash from fuel reduction and commercial logging should be burned in dispersed slash piles made by hand, as opposed to tractor piles or large piles created adjacent to roadsides and landing areas. Whole tree logging would be discouraged to avoid the creation of overly large slash piles that, when burned, damage the trees and canopy identified for retention in logging units. Numerous recent BLM sales have included whole tree logging and the creation of large roadside slash piles. When burned these piles damage many trees identified for retention, including many large pines.
- In prescribed fire units; maintain a maximum fuel profile of 3.2 tons per acre in the 0-3" size class before burning. Fire behavior modeling has show this level of fuel loading will produce low severity fire effects in 95th percentile weather conditions.
- Utilize burn windows with a relative humidity reading of 30%-60% and 50%-80% duff moisture when conducting prescribed fires. Maintain large woody debris by burning when 100- and 1000-hour fuels retain high moisture levels.

Unit 17-10 BLM Prescription: Selective Thinning Ponderosa Pine

Community Alternative Prescription

17-10A Ponderosa Pine Treatment

It is proposed that unit 17-10 be broken up into two units: 17-10A and 17-10B. Unit 17-10 is a highly diverse stand in terms of both composition and structure. The unit sits high on the ridge near Section Line Gap and is adjacent to a broad upland prairie that reaches to the ridgeline. The southern boundary of the unit is road 39-1-18. The unit consists of a conifer stringer supporting large, open-grown ponderosa pine. The largest ponderosa pine trees are likely old-growth trees due the presence of large branches, girthy trunks, broken tops and large reiterations. Large Douglas-fir are also scattered about the stand. Big, old black oaks line the margins of the unit, especially near the adjacent prairie habitat. Young juniper have recently colonized the site, acting as an understory tree beneath pine and oak.

Unit 17-10A is higher on the slope and surrounded on three sides by upland prairie. 17-10A is a helicopter yarding unit. Much of the upper portion is dominated by large, old-growth ponderosa pine and a few large black and white oaks. The largest trees are found in the small, grassy openings in the forest canopy and are slowly closing in due to Douglas-fir encroachment. Large, old trees, including oak (> 20") and old-growth pine (>30"), should be favored during thinning operations. The stand should be thinned to 50%-60% canopy closure where groves of trees are present, removing mostly intermediate fir trees from beneath the driplines of large, old pine, fir, and oak. All trees over 20" in diameter should be retained in the closed portions of this stand.

In the small and grassy openings that support open-grown pine, and at the margin of the upland prairie, treatments should focus on encouraging open-grown conditions and vigor in large, old pine and oak. Some of the stand's largest pine trees would create an exception to the project's diameter limit of 20" DBH. Use of a percentile approach would be recommended beneath the large, old pine and oak trees — within the two times the crown radius of large, old-growth trees — allowing for the removal of Douglas-fir trees over 20" DBH. The approach would allow for the removal of Douglas-fir trees that are up to 50% the size of adjacent ponderosa pine trees. For instance, a 25" Douglas-fir could be removed from beneath the dripline of a 50" Ponderosa pine tree. All pine trees over 16" DBH should be retained with emphasis placed on the retention of groupings of trees.

Juniper trees over 6" DBH should be retained, while young reproduction (under 6") that are creating highly flammable ladder fuel and competition for overstory trees could be removed. All mountain mahogany and oak species should be reserved from removal

17-10B Douglas-fir Selective Thinning 60%

The CA has identified the lower portion of unit 17-10, directly above road 39-1-18, as unit 17-10B. The unit is proposed for tractor yarding due to the gentle terrain and proximity to the road. Unit 17-10B is dominated by Douglas-fir with a few ponderosa pine and black oak. The stand's southeast corner and southwest corner, adjacent to road 39-1-18, should be thinned to encourage black oak and/or pine, by thinning competing Douglas-fir stems away from the dripline (one and a half times the crown radius) of healthy, tree-form black oak and pine.

The dominant forest type in unit 17-10B is Douglas-fir forest, including some large trees over 20" in diameter. The stand should be treated to maintain and promote healthy stand conditions for dry Douglas-fir. Trees over 20" should be retained and 60%-70% canopy closure should be maintained. Groupings of large Douglas-fir trees should also be retained, encouraging a patchy and diverse stand structure. Radial thinning should be conducted beneath existing large pine and oak to favor diverse composition and stand structure. Juniper trees over 6" DBH should be retained and all oak species should be reserved from removal.

Unit 17-11A BLM Prescription: Selective Thinning Douglas-fir 40%

<u>Community Alternative Prescription</u>

17-11A Douglas-fir Selective Treatment 60%

Unit 17-11A is a Douglas-fir dominated plantation stand. The unit lies east of Section Line Gap near the summit of the ridgeline. Previous fuel reduction treatments have already been implemented in this stand, including small diameter non-commercial thinning and pile burning. The stand is overly-dense and very homogenous in nature due to site and management history.

The Community Alternative prescription would be to thin the stand to 60%-70% canopy closure, including some "skips" and "gaps." Neither skips nor gaps should be implemented in more than 10% of the stand, leaving roughly 80% of the stand to be thinned to increase tree vigor, reduce fuels, and increase heterogeneity. Skips and gaps should be no larger that 50' in circumference and no closer than 200' from each other. Gaps should be focused on groves of low vigor Douglas-fir, and/or could include the retention of shade-intolerant species such as ponderosa pine and black oak. Skips should focus on retaining small and dense sections

for wildlife habitat at the lower portion of the stand so that they will not interfere with cable yarding operations.

A small portion of the stand lies on a south-face with interspersed ponderosa pine. Douglas-fir trees should be thinned aggressively from within the dripline of ponderosa pine trees to encourage diverse stand structure and composition. An upper diameter limit of 18" should be implemented in this stand due to the preponderance of young forest structure. The retention of all trees larger than 18" would facilitate the development of mid-seral forest patterns in this young plantation stand.

17-13 BLM Prescription: Structural Retention

Community Alternative Prescription

Unit 17-13 Douglas-fir Treatment 60%

Unit 17-13 is a plantation stand of nearly exclusively Douglas-fir directly adjacent to road 39-1-18. The stand is very homogenous, even-aged and supports little diversity of species. Fuel loads within this plantation stand are extreme and the overly-dense conditions constitute a severe fire and bark beetle risk. A few old, remnant pine are found at the stand's margin and should be favored through radial thinning (one and a half times the crown radius).

The Community Alternative prescription thins the stand to 60%-70% canopy closure, including some "skips" and "gaps." Neither skips nor gaps should be implemented in more than 10% of the stand, leaving roughly 80% of the stand to be thinned to increase tree vigor, reduce fuels, and increase heterogeneity. Skips and gaps should be no larger that 50' in circumference and no closer than 200' from each other. Gaps should be focused on groves of low-vigor Douglas-fir and/or could include the retention of shade-intolerant species such as ponderosa pine and black oak. Skips should focus on retaining small and dense sections for wildlife habitat at the lower portion of the stand so that they will not interfere with cable yarding operations. An upper diameter limit of 18" should be implemented in this stand due to the preponderance of young forest structure. The retention of all trees larger than 18" would facilitate the development of mid-seral forest patterns in this young plantation stand.

Unit 20-11A BLM Prescription: Group Selection 40%

Community Alternative Prescription

Unit 20-11A Douglas-fir Treatment 60%

Unit 20-11A is a dense pole stand of predominantly Douglas-fir and a few madrone on the west face of Bald Mountain. All dominant overstory trees should be retained. Thinning should focus on removing low-vigor understory Douglas-fir trees. Canopy closure should be maintained at 60-70%. Leave trees should be left in groupings and at varying densities. Madrone and pine should be favored over Douglas-fir. An upper diameter limit of 18" should be implemented in this stand due to the preponderance of young forest structure. The retention of all trees larger than 18" would facilitate the development of a mid-seral forest pattern.

Unit 20-11B BLM Prescription: Group Selection 40%

Community Alternative Prescription

Unit 20-11B Ponderosa Pine Treatment

Unit 20-11B is very diverse and variable. The entire unit has been identified as NRF habitat and this habitat should be maintained through the retention of >60% canopy closure and large tree retention. The unit consists of dense pole stands, open groves of pine, fir, and black oak surrounded by upland prairie and mountain mahogany, patches of old, complex forest, and significant populations of madrone. The Community Alternative proposes to deferred the northeast portion of the unit to protect a large pocket of late-seral forest. The Community Alternative would also propose to break the unit into 20-11B and 20-11C.

Unit 20-11B is the northernmost portion of unit 20-11B in Alternative 4. Unit 20-11B was divided into two units due to differing site conditions. The habitat in unit 20-11B is much more adapted to pine than 20-11C directly below. The unit is surrounded on three sides by non-forest plant communities, including grasslands, chaparral and pine/oak groves. Unit 20-11C is a conifer stringer within an upland prairie on the western flank of Bald Mountain. The unit extends from the draw, north into pine and fir stands surrounded by grassy openings and mountain mahogany/oak habitats. Old-growth ponderosa pine can be found at the margins of the stand, amongst mature, yet less girthy ponderosa pine and Douglas-fir. The stand is currently roughly half Douglas-fir. Canopy conditions are fairly open with patches of Oregon grape dominating the understory. Canopy conditions should be maintained at 50-60% to reduce the likelihood of shrub development and excessive conifer regeneration that would drastically increase fuel hazards in this currently relatively open stand. Emphasis should be placed on favoring pine, yet all large trees over 20" DBH should be retained. Groupings of fir trees could be removed where they compete with Ponderosa pine and black oak. Fuel treatments are necessary to reduce fuel loading and laddering within the stand and should be conducted following logging treatments, but before slash removal.

Community Alternative Prescription

Unit 20-11C Douglas-fir Treatment 60%

20-11C consists of the main body of the unit. It includes dense stands of pole-sized Douglas-fir and some mid-seral habitat supporting larger trees. Madrone is well represented in the stand and should be protected during felling and ground-based yarding operations. Large, dominant trees should be radially thinned to reduce competition and ladder fuels. Canopy closure should be maintained at 60-70%. A 20" diameter limit should be instituted to protect and maintain pockets of large trees and late-seral characteristics. The entire unit is NRF habitat.

Unit 20-12 BLM Prescription: Structural Retention Ponderosa pine 40%

Community Alternative Prescription

Unit 20-12 Douglas-fir Treatment 60%

Unit 20-12 consists of dense pole stands of Douglas-fir with the occasional larger overstory trees west of Bald Mountain. A few large ponderosa pine are found in groupings at the upper portion of the unit. Pine habitat can also be found in a small strip at the northern end of the

unit, on a southwest exposure. In general, the stand is not a ponderosa pine site and should be treated with a Douglas-fir Treatment 60% prescription. Canopy closure should be maintained at 60%-70%. Larger, more dominant trees should be thinned radially to reduce ladder fuel and competition between trees. Pine, madrone, and black oak should be favored over Douglas-fir, but the majority of the stand supports groves of Douglas-fir that should be thinned to decrease fuel loads and competition between trees, while retaining canopy closure, and the stand's large tree component. No trees over 20" diameter should be cut.

Unit 23-32 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

23-32 Mortality Salvage

Unit 23-32 is an east-facing Douglas-fir stand high on the crest of Cinnabar Ridge. The stand is suffering high levels of Douglas-fir mortality. Understory composition consists of native grasses and shrub-form live oak, long suppressed beneath a Douglas-fir canopy. Canopy closure has been reduced due to mortality and many remaining trees appear drought and beetle stressed. Prescriptions in this unit should include mortality salvage of standing snags with retention of the largest diameter snags and those with complex branching or broken tops for wildlife. Snag retention should include a minimum of 6-10 snags per acre. Emphasis should be placed on treating snags within 100' of the road prism to facilitate safe and effective fire suppression in future wildfire events or for prescribed fire treatments.

All live trees over 14" DBH should be retained due to large levels of mortality within the stand. Canopy closure should be maintained at roughly 50%. Thinning should be conducted around large, legacy ponderosa pine, Douglas-fir and tree-form live oak. The stand's desired future condition would be an open stand of large and medium sized pine and fir with a developing live oak component in the understory.

Non-commercial snags could be retained on-site for large woody debris and/or stacked in small landings to be located on the ridgeline and created by simply removing dense fir regeneration in small ridgeline flats. Local residents could utilize non-commercial snags as a firewood harvesting area. Road 39-3-27.2 should be decommissioned within one year of treatment implementation to protect and enhance wildlife values, roadless values in the Buncom Roadless Area, and to protect the area from inappropriate motorized vehicle use. The closure should take place near proposed unit 26-30 at the intersection of roads 39-3-27.2 and the adjacent ridgeline road.

Unit 25-25 BLM Prescription: Selective Thinning 40%

Community Alternative Prescription

25-25 Douglas-fir Treatment 60%

Unit 25-25 is located in Owl Gulch and is dominated by stands of pole-sized Douglas-fir trees. Stem density is very high. Fuel loads and laddering are of concern within this unit. The stand should be treated using a Douglas-fir Treatment 60%, meaning canopy closure should be retained at 60%-70% and all trees over 16" in diameter must be retained. Pine and madrone should be favored by radial thinning to reduce competition and fuel laddering. The stand

currently does not support the RMP recommendation of 16-25 large trees per acre, thus a 16" diameter limit has been proposed to allow for large tree recruitment and retention.

The Community Alternative prescription thins the stand to 60%-70% canopy closure, including some "skips" and "gaps." Neither skips nor gaps should be implemented in more than 10% of the stand, leaving roughly 80% of the stand to be thinned to increase tree vigor, reduce fuels, and increase heterogeneity. Skips and gaps should be no larger that 50' in circumference and no closer than 200' from each other. Gaps should be placed in groves of low-vigor Douglas-fir and/or could include the retention of shade-intolerant species such as ponderosa pine and black oak. Skips should focus on retaining small and dense sections for wildlife habitat at the lower portion of the stand so that they will not interfere with cable yarding operations.

Unit 26-31 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

26-31 Douglas-fir Treatment 60%

Unit 26-31 is located on the east-facing slope of Cinnabar Ridge and consists mostly of dense Douglas-fir stands ranging from 12"-20" DBH. Scattered old, overstory pine (>20" DBH) can also be found occasionally in the otherwise Douglas-fir dominated stand. A few areas within the stand still support groupings of large, old trees and open-spaced conditions, but these are the exception rather than the rule. The northern portion of the unit supports slightly more open conditions and considerably more hardwoods, namely large, multi-stemmed live oak. Shrub-form live oak can be found throughout the stand in the understory.

The CA proposes to commercially log unit 26-31, retaining all large trees over 20" in diameter and 60%-70% canopy closure. The retention of this level of canopy closure will reduce the likelihood of a vigorous understory shrub response by the existing live oak understory. Live oak is highly volatile, flashy fuel, especially when growing in low statured shrub-form. Large, "legacy" pine trees should be treated by thinning all excessive competition under 20" DBH from one and a half times the crown radius of legacy trees. Groupings of trees in both the large overstory canopy layer and in the understory should be retained to enhance structural heterogeneity and recreate historic fire-adapted clump formation. Groupings of trees in the 16"-18" diameter class of both ponderosa pine and Douglas-fir should be considered for retention. All tree-form live oak should be reserved from cutting and protected during yarding and contract felling operations.

Unit 27-21 BLM Prescription: Selective Thinning Ponderosa Pine

Community Alternative Prescription

27-21 Ponderosa Pine Treatment

Unit 27-21 is located on the lower end of Little Lick Gulch. The site is mostly east-facing, although a narrow section of the unit reaches over a low ridgeline and faces northwest. Much of the unit is dominated by well-spaced, overstory pine trees mixed with pole stands of Douglas-fir and madrone. The area is bordered by oak woodland and stands treated during the BLM's Lick Stew Project. The Community Alternative prescription would emphasize radial

thinning around existing overstory pine trees and large, multi-stemmed madrone. Pine, oak, and madrone should be favored over Douglas-fir.

Canopy closure should be maintained at 50%-60%, while all trees over 20" DBH should be protected from cutting. Leave trees should be protected during felling and heli-yarding operations, especially wide branching, multi-stemmed madrone trees that are particularly susceptible to physical damage sustained during logging operations. The treatment calls for the retention of all oak trees, snags over 12" DBH, tree-form madrone over 6" DBH, and the retention of all pine trees over 12" DBH. Ponderosa pine should be maintained in groupings and as isolated individual trees in a mosaic across the unit. Some groupings of pine and fir should also be maintained for structural diversity.

Prescribed fire should be utilized to maintain stand conditions within 3-5 years following implementation.

Unit 27-30 BLM Prescription: Group Selection

Community Alternative Prescription

27-30 Mortality Salvage

Unit 27-30 consists of a very low-elevation ponderosa pine stand directly adjacent to private residential land on Eastside Road. The site is well-suited for ponderosa pine and hardwoods, but has experienced significant encroachment by Douglas-fir. Much of the encroaching fir is now suffering from mortality or extremely low-vigor growth. As fir trees die off, dense madrone thickets have regenerated from seed, increasing understory fuels. A large amount of downed wood from fir mortality is also creating an increase in fuels.

The CA proposes to thin unit 27-30 to favor existing overstory pine and hardwood trees. Although some snags should be retained (6-10 per acre), many dead or dying fir trees should be removed, especially dead or low-vigor Douglas-fir that have encroached upon the dripline of overstory pine and hardwoods. A radial thinning prescription should be employed, removing competing young trees within one and a half times the crown radius of live, healthy overstory trees.

All pine trees should be retained except young, skinny, whip-like pines to 8" DBH. Tree-form hardwoods should be reserved from cutting and maintained on site. All trees over 20" DBH should also be retained. Canopy closure is currently minimal due to high levels of mortality. To reduce impacts associated with further canopy reduction, all healthy trees in the overstory canopy layer should be retained, *even if under 20" DBH*. Current mortality-induced canopy reductions have already begun to encourage dense ingrowth and regeneration. Fuel reduction treatments following logging and preceding slash removal and pile burning should be employed to address these fuel concerns. This is of particular concern due to the location of the unit within the WUI in the Upper Applegate Valley off of Eastside Road.

Non-commercial snags could be retained for downed wood requirements with the excess stacked along road 39-3-27 and opened to the public as a residential firewood cutting area.

Unit 27-31 BLM Prescription Selective Thinning Ponderosa Pine

Community Alternative Prescription

27-31 Ponderosa Pine Treatment

Unit 27-31 is a small Ponderosa Pine stand directly adjacent to a large white oak flat. The stand is north-facing and supports nearly all ponderosa pine with a small amount of encroaching Douglas-fir. The stand should be treated to favor pine and oak. An upper diameter limit of 20" should be utilized, with a 14" diameter limit for ponderosa pine. All tree-form oak and madrone should be retained. Groupings of overstory trees should be retained. Young understory growth developing in response to the last thinning treatment should be removed with fuel reduction treatments. Canopy closure should be maintained at 50% to encourage vigor in pine and oak trees.

Unit 27-33 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

27-33 Douglas-fir Treatment 60%

Unit 27-33 consists of very dense pole stands of Douglas-fir. Much of the unit is extremely uniform and even-aged. The upper end of the unit reaches to a low ridgeline above Boaz Gulch and supports a narrow band of open-grown ponderosa pine, sugar pine, madrone, and oak. Pine and hardwoods should be favored and treated with radial thinning of competing understory trees. Open-grown pine and hardwoods should be protected from yarding impacts associated with cable yarding. Much of the eastern half of the unit is NRF habitat. Canopy closure in the stand should be retained at 60%. All trees over 18" diameter should be retained. Currently the stand does not support the RMP recommended 16-25 large trees per acre, thus a 18" diameter limit has been proposed to allow for large tree recruitment.

Unit 27-34 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

27-34A Douglas-fir Treatment 60%

Unit 27-34 is a large, north-facing Douglas-fir stand with scattered dominant overstory trees and a dense understory of regenerating Douglas-fir and live oak. Much of the stand is mid-seral and supports fairly vertical structure. Much of the unit is also NRF habitat and lies adjacent to a nesting area identified in the BLM's Nedsbar McKelvey map. The unit supports two separate forest communities requiring slightly different thinning treatments. The Community Alternative recommends dividing the unit into two treatment areas: 27-34A and 27-34B. Unit 27-34A consists of the area below road 39-3-27. Unit 27-34A supports dense pole stands of Douglas-fir with a scattering of large, dominant trees. Most of these trees exist as individual trees towering above the understory cohort of pole-sized fir. In other cases, groupings of dominant trees can be found, and where present, groupings and individual dominant trees should be retained.

Understory conditions in unit 27-34A have become dense with regenerating Douglas-fir and live oak. The regeneration has created heavy fuel loads and extensive fuel laddering. Fuel

reduction treatments reducing understory density and fuels should follow selective logging and precede slash removal. Canopy closure should be maintained at 60%-70%. All trees over 20" in diameter should be retained.

Community Alternative Prescription

27-34B Ponderosa Pine Treatment

A narrow strip of forest above road 39-3-27 supports stands of pine, fir and hardwood species growing from a low ridgeline. In this upper portion of the stand thinning treatments should favor pine and hardwood species over Douglas-fir. Large pine and open-form hardwoods should be radially thinned to reduce competition and fuel hazards. Hardwood species over 6" DBH should be retained. Canopy closure should be maintained at 50%-60%. All trees over 20" DBH should be retained.

Unit 28-21 BLM Prescription: Selective Thinning Ponderosa Pine.

Community Alternative Prescription

28-21A Ponderosa Pine Treatment

It is proposed in the Community Alternative that Unit 28-21 is broken up into two separate units. The upper portion of unit 28-21 should be considered unit 28-21A, and the lower portion unit 28-21B. Unit 28-21A faces east and is colonized by a significant population of remnant ponderosa pine. Thinning prescriptions should include the retention of groupings or clumps of dominant trees. The goal would be to create a more open stand to encourage the growth and vigor of shade-intolerant and fire-resilient pine.

The unit consists mostly of ponderosa pine and Douglas-fir on a relatively arid east-facing slope. Unit 28-21, as a whole, is mostly mid-seral with a significant population of dominant ponderosa pine trees growing in natural clump formation. These residual groupings, or clumps of pine, should be retained and encouraged by thinning out competing Douglas-fir trees up to 18" DBH. Emphasis should be placed on thinning Douglas-fir within one crown radius of the dripline around pine trees and tree groupings. In general, ponderosa pine should be favored over Douglas-fir, but healthy fir trees isolated from pine groupings, should be retained as well. No thinning of large pine trees (16" DBH) should take place within groupings of dominant ponderosa pine. The retention of all larger ponderosa pine within these groupings will maintain clumpy, fire-adapted stand conditions and more complex habitat structure.

Canopy closure levels should be maintained at 40%-50% post treatment. The unit's few hardwoods should be retained to encourage structural diversity and resilience. Retention of snags can be variable, depending on site conditions, but should be at least 6-10 per acre. Priority for snag retention should include larger diameter snags (14" DBH +), hardwood snags, broken topped snags and those with complex branching. If inadequate snags currently exist to reach the 6-10 per acre target, consider snag creation (e.g. girdling, wounding or fungal inoculation) of larger diameter fir trees (14"-16" DBH), or simply the retention of some larger diameter (14"-16" DBH) trees of low-vigor to allow for the retention or recruitment of this necessary structural element to the stand. Take into account the following characteristics when deciding which trees are snag candidates: thick bark, complex branching, something difficult to fall (i.e. a tree piercing the canopy of a large hardwood), "wolfy" characteristics or broken top.

Prescribed fire should be utilized to maintain stand conditions 3-5 years following implementation.

Community Alternative Prescription

28-21B Douglas-fir Treatment 60%

It is proposed in the Community Alternative that Unit 28-21 is broken up into two separate units. The upper portion of unit 28-21 should be considered unit 28-21A, and the lower portion unit 28-21B. Unit 28-21B is a north-facing stand of Douglas-fir with a few scattered madrone. Large, dominant Douglas-fir trees grow in groupings of similarly aged trees, creating a distinct canopy layer. A younger canopy layer of 8-16" DBH fir trees and madrone reproduction grows beneath the groupings of dominant fir. This portion of the stand should be thinned from below, maintaining all the largest trees on site and at least 60% canopy closure. This would include a provision to maintain all groupings of dominant Douglas-fir trees over 18" DBH. The clumpy nature of the dominant trees in the stand is indicative of historic structural conditions and should be retained. The retention of at least 60% canopy closure will reduce the potential for shrub response following logging treatments. This is especially important as chaparral and dense early-seral vegetation surround the unit. By mitigating shrub response with adequate canopy coverage, long-term fire risks will be greatly reduced.

Retention of snags can be variable, depending on site conditions, but should be at least 6-10 per acre. Priority for snag retention should include larger diameter snags (14" DBH +), hardwood snags, broken topped snags and those with complex branching. If inadequate snags currently exist to reach the 6-10 per acre target, consider snag creation (e.g. girdling, wounding or fungal inoculation) of larger diameter fir trees (14"-16" DBH), or simply retention of some larger (14"-20") diameter trees of low-vigor to allow for retention or recruitment of this necessary structural element to the stand. Take into account the following characteristics when deciding which trees are snag candidates: thick bark, complex branching, something difficult to fall (i.e. a large tree surrounded by an old-growth hardwood), "wolfy" characteristics or broken tops.

Unit 29-10 BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

Unit 29-10 Ponderosa Pine Treatment

Unit 29-10 is located on a southwest-facing slope. Ponderosa pine dominates the overstory with an understory of dense Douglas-fir, madrone, and manzanita. Thinning treatments should focus on releasing overstory pine from excessive competition by radial thinning around dominant pine and madrone trees. Manzanita should be reduced to allow for more moderate fire behavior. Some islands of manzanita should be maintained to provide habitat and structural diversity. Emphasis should be placed on reducing physical damage to leave trees during tractor yarding operations. Maintain 50-60% canopy closure. Retain all trees over 18" DBH.

Unit 29-11: BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

Unit 29-11 Douglas-fir Treatment 60%

Unit 29-11 is located on a west-facing slope. The unit consists of dense Douglas-fir poles, tree-form madrone, and widely scattered overstory pine and fir. Thinning treatments should focus on removing overly dense fir poles in the smaller diameter classes. Dominant pine, fir and madrone should be radially thinned to reduce competition and fuel laddering. Emphasis should be placed on reducing physical damage during yarding operations. Canopy closure should be maintained at a minimum of 60%. An upper diameter limit of 18" should implemented in this stand due to a lack of large diameter trees over 20" in diameter. The stand currently does not meet the RMP standard of 16-25 large trees per acre.

Unit 29-12 BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

29-12 Ponderosa Pine Treatment

Unit 29-12 consists of dense pole stands of Douglas-fir, mixed with hardwoods and scattered overstory pine. The unit is south-facing and relatively arid. A few cedar, madrone, oak, and patches of manzanita also colonize the slope, breaking up the closed canopy of young, low-vigor fir trees. The unit is steep and is dissected by numerous small, dry gulches.

The CA proposes to commercially thin unit 29-12. The goal would be to reduce the current density of pole sized Douglas-fir in an effort to reduce competition and hazardous fuels, and push species composition towards more fire-resilient, shade-intolerant species such as pine, oak, and madrone. The emphasis should be placed on not only the retention of overstory ponderosa pine trees, but also their sustainability on site. Competing vegetation should be thinned away from the dripline of existing overstory pine. The CA recommends radial thinning one and a half times the crown radius around dominant pine trees, fir trees over 20" DBH, and tree-form hardwoods, including black oak and madrone. Islands of manzanita should be retained for habitat and berry production. Treatments would encourage a diverse pattern of tree retention, including individual trees, groupings of trees, skips including manzanita and hardwood stands, and a mosaic of density throughout the site. Cedar trees would be favored for retention to encourage species diversity including drought hardy, fire-adapted tree species.

Tree species should be favored in the following order of species preference: Ponderosa pine, black oak, incense-cedar, madrone, and fir.

Prescribed fire should be utilized to maintain stand conditions 3-5 years following implementation.

Unit 29-13 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

Unit 29-13 Douglas-fir Treatment 60%

Unit 29-13 consists of two small thinning units: one a south face, the other a west face. Much of the unit is a dense, closed-canopy forest of Douglas-fir poles with pockets of mature madrone and widely scattered overstory pine and fir. Much of the understory fir is of low vigor and is very susceptible to insect mortality due to stand densities and low site productivity. The

stand should be treated to increase vigor in the few dominant overstory pine or fir and reduce hazardous fuel loads. Thinning treatments should favor pine and madrone over fir, but all dominant overstory trees should be retained. Canopy closure should be maintained at 60%. Care should be taken to reduce yarding and felling impacts to mature madrone and other overstory trees. All trees over 18" should be retained. The stand currently does not meet the RMP requirement of 16-25 large trees per acre.

Unit 30-10A BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

30-10A Douglas-fir Treatment 60%

Unit 30-10A borders a heavily thinned unit cut in the O'Lickety Timber Sale. The stand is located on an east- and northeast-facing slope. The stand consists of dense fir stands with scattered old pine and fire in the overstory. Understory stem density has reached extreme levels, creating high levels of competition as fir pole stands encroach upon the stand's few large, overstory trees. Woody fuel and dense reproduction in the understory has been suppressed by closed-canopy conditions and little grows on the forest floor.

The CA proposes treatments to address the extreme density of understory pole stands by removing small pole-sized fir, especially adjacent to large overstory pine and fir. The stand's largest trees should be radially thinned to encourage release and increased vigor. Young understory trees should be removed within one and a half times their crown radius. Thinning should be fairly aggressive within proximity of overstory trees, removing nearly all pole-sized fir trees. In areas not in proximity to these overstory trees, thinning should be less aggressive.

The stand should be thinned to 60-70% canopy closure with a site-specific diameter limit of 18". All trees over 18" should be retained on this site to preserve the scattered overstory that currently exists. Leave trees can be left in groups or as individual trees. Due to a lack of important snag habitat and large woody debris on the forest floor, snags over 14" should be retained at 6-10 snags per acre.

Unit 31-20 BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

31-20 Ponderosa Pine Treatment

Unit 31-20 is only 6 acres and is located directly adjacent to road 40-2-7. The unit begins on the ridge and drops onto a northeast-facing slope. Numerous 12"-16" ponderosa pine grow across the upper portion of the unit with madrone and dense young fir. The unit should be thinned to favor pine and hardwoods. Young, low-vigor Douglas-fir would be targeted for removal. Retention of hardwoods would be an important objective when felling and when identifying yarding corridors. Maintain 50%-60% canopy closure and retain all trees over 20" DBH. Emphasize radial thinning around leave trees, especially pine trees and hardwoods within one and a half times the crown radius.

Unit 34-20 BLM Prescription: Selective Thinning Ponderosa Pine

Community Alternative Prescription

34-20 Ponderosa Pine Treatment

Unit 34-20 is a pine/oak site on relatively gentle slopes. Fuels work has already been completed in this unit and fuel concerns are relatively minimal. Logging treatments could be implemented to encourage healthy pine/oak plant communities. Much of the stand consists of groupings and groves of mid-seral ponderosa pine with oak openings and mature madrone. Douglas-fir is also present in the stand and would be targeted for removal. All pine trees over 12" DBH should be retained with an emphasis on maintaining groupings and relatively open stands of pine. Douglas-fir should be removed up to 20" DBH, retaining scattered Douglas-fir trees throughout the stand, while encouraging pine and oak dominance. Canopy coverage should be maintained at 50% in pine stands.

Oak and madrone should be reserved from cutting to encourage healthy hardwood populations and diverse stand structures. All leave trees should be protected from physical damage during felling and yarding operations. Tractor yarding corridors should be minimized to reduce the need for clearing of vegetation, soil compaction, soil damage, the spread of noxious weeds, and the potential for widespread damage to leave trees.

Prescribed fire should be utilized to maintain healthy structural, compositional, and fuel conditions. Prescribed fire should be considered within three to five years after completion of logging treatments to maintain stand conditions.

Unit 34-31 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

34-31 Douglas-fir Treatment 60%

Unit 34-31 consists of a relatively dense stand of mature Douglas-fir trees supporting the occasional very large, old overstory tree. Much of the stand is even-aged and has likely regenerated following a mixed severity fire, likely over a hundred years ago. A small gulch divides the unit in two. The gulch, although very ephemeral, supports multi-stemmed bigleaf maple and scattered old fir. Located on a north slope, the stand is relatively moist compared to many Nedsbar Timber Sale units. Large, overstory fir trees are very widely dispersed throughout the stand, but some of the existing overstory trees are quite large and still appear relatively healthy. Hazel and Oregon grape grow in the understory with dense patches of the native bunchgrass, blue wild rye.

The CA prescription for unit 34-31 would include the retention of all trees over 20" in diameter. Groupings of fir trees should be radially thinned to within one and a half times the crown radius of large overstory trees. Intervening mid-seral portions of the stand should be thinned to 60-70% canopy closure. Hardwood species should be retained and favored over Douglas-fir, especially in the more even-aged portions of the stand. Snags should be retained at 6-10 per acre. A narrow "skip" should be incorporated along the draw to protect bigleaf maple trees, the topographical profile of the gulch, and to reduce erosion.

Small openings already present in the stand can be accentuated by no more than one quarter of an acre; artificial openings should not be created. Small openings in this stand usually include a few well-spaced overstory fir trees of very large stature. These trees should be retained and openings managed to sustain this large tree component. Small statured black oak is often

found in these openings and should be retained. Care should be taken to retain black oak and maple trees during felling and yarding operations. Large, old trees should be protected during yarding operations to insure no damage is done to this important stand component. The stand is north-facing and pine regeneration should not be prioritized in this stand.

Unit 34-32A BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

34-32A Ponderosa Pine Treatment

Unit 34-32A consists of a small pine/oak site with a mixed growth of young pine and pole sized fir. The Community Alternative recommends favoring pine and oak, while retaining the stand's largest conifer trees in groupings and as individual trees. No oak should be cut and remaining leave trees should be protected from yarding damage. All trees over 18" DBH should be retained and a 50-60% canopy closure maintained.

Unit 34-32B BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

34-32B Ponderosa Pine Treatment

Unit 34-32B consists of a small pine/oak site with a mixed growth of young pine and pole sized fir. The Community Alternative recommends favoring pine and oak, while retaining the stand's largest conifer trees in groupings and as individual trees. No oak should be cut and remaining leave trees should be protected from yarding damage. All trees over 18" DBH should be retained and a 50-60% canopy closure maintained.

Unit 35-20 BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

35-20 Ponderosa Pine Treatment

Unit 35-20 lies at the headwaters of Lick Gulch. The stand is a pine site that is currently overstocked with young understory trees and heavy fuel loads. Overstory mortality is evident due to heavy competition for available resources such as nutrition, water, and sunlight. The stand supports some large, old pine and fir with a sparse understory of black oak and madrone. Dense fir encroachment has developed in the understory, threatening the survivability of the stand's hardwoods and pine trees.

The stand should be treated by retaining all overstory trees over 18" in diameter. Canopy closure and the large tree component have been reduced by mortality and currently do not meet the BLM's RMP requirements of 16-25 large trees per acre; thus, no large trees should be removed. The commercial treatment should focus on removing trees between 8" and 18" DBH with 18" being the upper diameter limit. The stand should be thinned to 50-60% canopy closure. Commercial logging must be followed by fuel treatments to address the overly-dense understory conditions. Trees targeted for retention should be favored in the following order of species preference: Ponderosa pine, black oak, live oak, madrone, and Douglas-fir. Snag habitat,

especially the largest snags, should be retained if possible. Large downed wood and trees targeted for retention should be protected during yarding and felling operations to minimize or eliminate damage to these important habitat features. No black oak, live oak, or madrone over 4" in diameter should be cut.

Unit 35-31 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

35-31 Douglas-fir Treatment 60%

Unit 35-31 lies on the ridgeline dividing Boaz Gulch from Armstrong Gulch. Much of unit 35-31 was recently commercially thinned in the Boaz Stewardship Project and currently does not need treatment. The portions of the unit that have not been treated are in need of thinning. This would include a small portion of the unit on the ridgeline and the southern portion of the unit. Both sections include forests dominated by mid-seral, relatively even-aged fir, with scattered oak and madrone. The southern portion of the unit is NRF habitat. A small section of the unit is located along a seasonal gulch that should be buffered to reduce impacts associated with yarding and felling operations.

The majority of the stand supports a fairly low average diameter; thus, no trees over 16" DBH should be removed from this stand. Groupings of overstory conifers should be retained and competition should be reduced around the entire grouping, thinning younger and smaller diameter trees to within one and half times the crown radius. Canopy closure should be maintained at 60-70% and all large snags and downed wood should be retained to the extent possible. Oak and madrone should be reserved from cutting and protected during felling and yarding operations. All trees over 18" DBH should be retained on site.

The unit would be yarded to a landing above on road 39-2-27.1. This landing is infested with star thistle and noxious weed treatment is necessary before any yarding activities take place.

To encourage fire-adapted tree species and increase resilience to drought stress and beetle infestation, retain leave trees in the following order of species preference: ponderosa pine, black oak, live oak, madrone, and Douglas-fir.

Unit 35-33 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

35-33 Douglas-fir Treatment 60%

Unit 35-33 is located on the eastern face of Cinnabar Ridge. The stand consists of mostly Douglas-fir, with remnant populations of pine and live oak. A few small clearings supporting live oak and pine lie at the units upper margin and have been encroached upon by young and mature Douglas-fir, ranging from 12"-20". Much of the stand is dominated by Douglas-fir in closed-canopy stands of mature forest. A small portion of the unit at the southern end of the stand, is more open, and has larger Douglas-fir trees, some with complex structure and "wolfy" form.

The majority of the unit supports closed stands of mature and mid-seral Douglas-fir. These areas should be treated by maintaining canopy closure at 60-70%, and all trees over 20" in

diameter should be retained. Large, dominant trees should be radially thinned, with an allowance for maintaining groupings of larger trees. The southern portion of the stand that supports more open-spaced fir groves needs very little thinning; all trees over 20" should be retained with an emphasis on retaining "wolfy" wildlife trees. Canopy closure should be maintained at 60-70%. All live oak should be retained and protected from yarding and felling damage during logging operations.

A small section of the stand supports clearings that were no doubt larger and more developed at one point. With the influence of fire suppression these small openings have begun to close. Remnant groves of widely spaced pine and live oak are found in and at the margin of these clearings. Younger Douglas-fir have begun to dominate these once more open stands. The clearings could be accentuated by thinning canopy levels to roughly 50%, but only in small, isolated areas, no more than 1/3 of an acre in size. No more than two openings can be treated in this fashion, totaling 2/3 of an acre. Live oak and overstory pine should be retained in these small openings, providing some structural retention. All trees over 20" diameter should be maintained on site.

Snag habitat and large woody debris is also lacking and should also be retained and protected from yarding and felling damage.

Unit 36-22 BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

36-22 Ponderosa Pine Treatment

Unit 36-22 is a dense, overstocked stand of pine and fir on a western-face above Lick Gulch. The stand contains a fairly even distribution of pine and fir with a significant component of hardwood trees. The stand has been previously high-graded of commercial timber, leaving small and suppressed trees.

The CA prescription for 36-22 would favor ponderosa pine and hardwood species. The goal would be to maintain ponderosa pine and hardwood species as dominant species in the stand. All tree-form oak and madrone should be reserved from cutting to encourage compositional and structural diversity. Snags and large downed wood should be retained whenever possible at a rate of 6-10 per acre. Due to a lack of large overstory trees, the proposed upper diameter limit should be reduced in this stand to 16" in diameter and canopy closure should be maintained at 50-60%. Shrubby understory growth should be thinned away from leave trees to reduce fuel loads and encourage survivability and decrease potential fire severity in future fire events.

Unit 36-23 BLM Prescription: Selective Thinning Ponderosa Pine 40%

Community Alternative Prescription

36-23 Ponderosa Pine Treatment

Unit 36-23 is located directly above unit 36-22 and supports very similar structural and compositional conditions. At the southern end of the stand some large overstory trees exist at the margin of unit 36-25.

The CA prescription for 36-23 would favor ponderosa pine and hardwood species. The goal would be to maintain ponderosa pine and hardwood species as dominant species in the stand. All tree-form oak and madrone should be reserved from cutting to encourage compositional and structural diversity. Snags and large downed wood should be retained whenever possible at a rate of 6-10 per acre. Due to a lack of large overstory trees, the proposed upper diameter limit should be reduced in this stand to 18" in diameter and canopy closure should be maintained at 50-60%. Shrubby understory growth should be thinned away from leave trees to reduce fuel loads and encourage survivability and decrease potential fire severity in future fire events.

The southern portion of the stand should be managed to maintain the existing large, overstory trees by not only retaining the trees, but also radial thinning within one and a half times the crown radius. Emphasis should be placed on removing pole sized Douglas-fir in groupings beneath and adjacent to overstory trees. Tree-form hardwoods, including oak and madrone, should be reserved from cutting. Groupings of large overstory trees should be retained and treated by thinning around the grouping rather than around individual trees.

Unit 36-33 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

36-33 Douglas-fir Treatment 60%

Unit 36-33 is a narrow roadside unit directly adjacent to road 40-2-7.1. The unit straddles both sides of the road and supports a grove of large overstory trees at its eastern margin. The stand has been treated for fuel reduction and activity slash has been disposed of by pile burning in the northern and eastern portion of the stand. Sections of the unit above road 40-2-7.1 have not been thinned and maintain high levels of density.

Treatments in unit 36-33 should focus on maintaining existing large trees over 20" in diameter. Groupings of overstory trees should be maintained in clumps of 2,3,4,5, or more trees to encourage structural diversity. No trees over 20" in diameter should be removed and canopy closure should be maintained at 60-70% throughout the stand. All large snags and large downed wood should be maintained. All tree-form oak and madrone should be reserved from cutting and maintained on site.

The southern most section of unit 36-33, directly above road 40-2-7.1, has received no fuel treatment. This section of the stand is a dense ridge top forest dominated by Douglas-fir trees, from 12"-20" in diameter. Given the stand's ridge top location, tree species retention should be maintained in the following order of preference: ponderosa pine, black oak, madrone, live oak, and Douglas-fir. Large, formerly open-grown hardwoods and existing pine trees should be retained and encouraged by releasing them from competing Douglas-fir. Stand densities and fuel loads are currently high and should be significantly reduced. Canopy closure in this portion of the stand could be reduced to 50% to allow for hardwood and pine dominance.

Fuel Reduction Treatments: Conifer Habitats

All fuel reduction treatments proposed in the CA have been developed to reduce excessive fuel loads and competition while retaining habitat values.

Fuel reduction treatments proposed for conifer stands would be conducted in the fuel reduction prescriptions identified below; however, fuel reduction treatments would also take place in all commercial logging treatments, following logging, but preceding slash removal and pile burning. Similar fuel treatments would be implemented within commercial logging units and would follow the general fuel reduction guidelines for conifer stands.

Unit 19-10A BLM Prescription: Selective Thinning Douglas-fir 60%

Community Alternative Prescription

19-10A Fuel Reduction Treatment

Unit 19-10A was proposed by the BLM for commercial logging, but was deferred from commercial entry in the CA due to the need to construct new road and the stand's relatively poor economics. Although commercial timber harvest has been deferred in this unit, fuel reduction treatments are needed to reduce fuel loads and restore sustainable stand conditions.

The unit consists of dense pole stands of Douglas-fir, madrone, and oak. The unit is arid and presents a difficult site for Douglas-fir growth. Large portions of the stand, at the upper end of the unit, are suffering from drought and beetle-induced mortality and are reverting to hardwood dominance.

The CA would propose fuel reduction treatments focused on removing excessive Douglas-fir competition, fuel ladders, small diameter snags, and heavy concentrations of downed fuel. Leave trees should be retained in the following species preference: Ponderosa pine, black oak, white oak, madrone, and Douglas-fir.

Unit 19-10B BLM Prescription: Group Selection 40%

Community Alternative Prescription

19-10B Fuel Reduction Treatment

Unit 19-10B was proposed by the BLM for commercial logging, but was dropped from commercial entry in the CA, due to the need to construct new road, poor economics, and a lack of large, commercial sized trees available for removal. The unit is located directly adjacent to unit 19-10A on a dry, south-facing slope. The upper end of the unit is arid and is suffering from beetle and drought-induced mortality. The upper portions of the stand are reverting to hardwood dominance.

The unit supports some overstory pine and fir; these trees should be retained and treated with radial thinning one and a half times the crown radius of each tree. Emphasis should be placed on removing encroaching fir. Hardwoods such as oak and madrone should also be favored. Leave trees should be retained in the following species preference: Ponderosa pine, black oak, white oak, madrone, and Douglas-fir.

Unit 23-30 BLM Prescription Douglas-fir Treatment 60%

Community Alternative Prescription

Unit 23-30 Fuel Reduction Treatment

Unit 23-30 lies within the Buncom Roadless Area and was dropped from commercial entry in the Community Alternative due to major road renovation and new road construction. Although commercial timber harvest has been deferred in this unit, fuel reduction treatments are needed to reduce high fuel loads on this strategic ridgeline. Community Alternative prescriptions call for treating the upper 150' of the unit for fuel reduction, including the removal of young, dense pole sized fir trees and underbrush. The majority of trees targeted for removal would be low-vigor and overly-dense Douglas-fir. Given the ridgetop location, pine species and various hardwoods — namely live oak, black oak, and madrone — should be favored over Douglas-fir trees. Treatments should focus on radial thinning around existing overstory tree species to reduce competition and fuel hazards. Ridgeline thinning to reduce fuels is a strategic and important objective of the Community Alternative, and unit 23-30 fits in very nicely with this concept.

Unit 23-31 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

23-31 Fuel Reduction Treatment

Unit 23-31 consists of dense Douglas-fir stands with a few scattered Ponderosa pine at the edge of the Buncom Roadless Area. Major road renovation would be needed to commercially log this stand. In fact, much of the road near unit 23-31 is not passable to anything but an OHV and has likely never been a designated system road. The road could be more accurately described as an OHV track, which would need major renovation in order to bring it to a standard that would include commercial log hauling. Due to this road renovation and the impact this renovation would have on wildlife and roadless area values, the unit has been deferred from commercial entry in the Community Alternative.

Stand density is highest near the ridgeline where fuel treatments are proposed within 200' of road 39-3-27.2. Treatments should favor pine and hardwood species while reducing understory stem density in low-vigor fir stands. Young shrubby live oak should also be removed to reduce fuel ladders. Tree-form hardwoods should be retained.

Road 39-3-27.2 is proposed for decommissioning in the CA to protect important habitat values including roadless values, wildlife values, to reduce the spread of noxious weeds, OHV use and the potential for human caused ignitions during wildfire season. This would close the unauthorized OHV route currently providing access to unit 23-31 and this portion of Cinnabar Ridge.

Unit 26-30 BLM Prescription: Douglas-fir Treatment 40%

Community Alternative Prescription

26-30 Fuel Reduction Treatment

Unit 26-30 is located on the eastern flank of Cinnabar Ridge in the Buncom Roadless Area. The unit consists of a mid- to late-seral stand of Douglas-fir with a dense understory of live oak. Although the site is marginal, the stand has supported a relatively closed-canopy condition providing thermal cover with dense understory growth for protective cover. The stand has high

wildlife values, especially as deer winter range habitat due to adjacent open slopes on the western face of Cinnabar Ridge. The unit also provides NRF habitat for the spotted owl.

The CA prescription would call for thinning within 200' of road 39-3-27.2 as part of a strategic fuel break on Cinnabar Ridge, the high divide between Little Applegate Valley and Upper Applegate Valley. The treatment would focus on canopy retention and the removal of understory fuels. This is especially important due to the presence of dense, suppressed live oak in the understory. Canopy thinning should be avoided because it would "release" this understory live oak leading to a significant increase in understory and ladder fuels.

Thinning should focus on thinning understory fir trees under 8" in diameter as well as reducing understory fuel created by shrubby live oak. By reducing understory density and highly volatile fuel loads in the understory, the ridgeline and adjacent road 39-3-27.2 could be more effectively utilized to manage both wildland fires and future prescribed fires.

The CA prescription calls for decommissioning and adequate road closure on road 39-3-27.2 at the intersection with the adjacent ridgeline road at the top of unit 26-30. The decommissioning and road closure would be effective within one year of timber sale completion. The road is recommended for closure to protect and enhance wildlife values, roadless values in the Buncom Roadless Area, protect native vegetation, eliminate inappropriate OHV use, while reducing the potential for noxious weed spread and human caused fire ignition. The road should be decommissioned with tank traps and/or gates at the road junction on the unit's southwest boundary. These structures could be easily reopened by fire crews in the event of wildland fire.

Unit 28-22 A, B, & C BLM Prescription: Selective Thinning Douglas-fir 40% and Structural Retention Regeneration Harvest

<u>Community Alternative Prescription</u>

28-22 Fuel Reduction Treatment

Unit 28-22 A, B, and C were proposed by the BLM for commercial timber harvest. The prescriptions called for would drastically increase fire hazards by reducing overstory canopy layers, increasing solar infiltration and, in turn, generating an increase in understory fuels and regenerating conifers. Such an increase directly adjacent to homes and residential properties is unacceptable. Significant new road construction and road renovation was also proposed to allow access to the units by logging equipment and log trucks. The stands are mid- to late-seral and unit 28-22B supports all the characteristics of old-growth forest. They are also generally open and very fire-resilient stands, having already sustained a moderate understory fire in 1987. Stand conditions are open and healthy. The CA proposes to deferred these units from commercial entry, and instead, treat the upper 200' of the stand with non-commercial fuel reduction.

The upper portion of these units identified for fuel reduction are located on the long, dry ridgeline dividing Yale Creek from the Little Applegate River. The CA has proposed fuel treatments on many portions of this ridgeline and hope to see a non-motorized trail and fire break along the ridgeline to facilitate fire suppression and prescribed fire use, if needed in the future. The upper portions of units 28-22A, 28-22B, and 28-22C are proposed for inclusion on the initial stage of shaded fuel brake development.

The fuel reduction portions of these units support dense pole stands of fir, oak woodlands, and shrub fields regenerating from the 1987 fires. Fuel reduction would strive to release and favor hardwood species such as white oak, black oak, and madrone, as well as

ponderosa pine. Tree-form hardwoods would be reserved from cutting and encouraged by thinning back competing brush and Douglas-fir trees to within one and a half times the crown radius. Ponderosa pine would also be favored over Douglas-fir. In small stands of younger, more uniform fir habitat, maintain canopy closure and thin from below to 8" DBH.

Isolated groupings of tree-form manzanita could be maintained, while highly decadent manzanita fuels from dead or fallen bushes should be cut and pile burned. Care should be taken to clean up excessive ground fuels while maintaining larger downed wood for soil resources and habitat.

Unit 30-20 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

30-20 Fuel Reduction Treatment

Unit 30-20 lies within the Buncom Roadless Area. The unit was proposed by the BLM to be commercially thinned to 40% canopy closure. The unit consists of Douglas-fir forest on a north-facing slope. The stand supports open-spaced groves of large, old fir and wide branching, formerly open-grown madrone. Numerous Douglas-fir trees ranging from 21" to 26" diameter were dated using an increment borer and were found to be between 150 and 200 years old. The stand supports large, old trees in groupings and groves that include historic spacing and structural conditions yet, a younger cohort of pole sized Douglas-fir, between 4-10" DBH, has developed in the understory creating fuel ladders and competition. A small section of new road construction was also proposed by the BLM to provide access for logging equipment on the ridge above.

The CA proposes the unit be deferred from commercial entry to protect the historic structure of overstory trees, retain adequate canopy to suppress understory growth and maintain the area's unroaded condition. If the stand were to be treated for fuel reduction to remove excessive understory trees, the stand would gain significant fire-resilience, as the remaining forest structure would support large, old trees with thick bark, high canopies, and adequate canopy closure to reduce shrub development. The CA proposes that unit 30-20 be treated to reduce understory fuel and that the stand should be placed within the prescription guidelines developed for unit F-30B Dry Conifer Habitat.

Prescribed fire should be utilized to maintain stand conditions following implementation.

Unit 33-20 BLM Prescription: Structural Retention

Community Alternative Prescription

33-20 Fuel Reduction Treatment

Unit 33-20 is located on the long, dry ridgeline dividing Yale Creek from the Little Applegate River. The unit was proposed by the BLM for commercial harvest. The unit is located in the Lick/Quartz Roadless Area, a small unroaded area that provides connectivity between the Dakubetede and Buncom Roadless Areas. New road construction would be necessary to log the western portion of the stand, and major road renovations, on a currently decommissioned road, would be required to access the remainder of the unit. The upper 200' of the unit, reaching from

the ridgeline down into the forested north-slope, supports dense, young understory Douglas-fir trees. These dense stands of understory Douglas-fir are drought stressed and beginning to succumb to beetle infestations. The dense understory growth also creates heavy fuel laddering and competition that is affecting the large pine, oak and madrone found on the ridgeline.

Lower on the north-facing slope grow fire-adapted late-seral forests of fir, pine, and madrone that underburned in 1987. The lower portion of the stand supports fire-resilient, late-seral stands, with relatively wide spacing, and diverse species composition. The CA proposes that the lower portion of the stand be deferred in the CA, however, the upper portion of the unit would benefit from fuel reduction.

CA prescriptions would call for non-commercial thinning within 200' of the ridgeline. Emphasis should be placed on reducing understory Douglas-fir density and ladder fuels. Large pine and existing hardwoods should be radially thinned to one and a half times the crown radius of overstory leave trees. Groupings of overstory trees should be retained. Encroaching brush, expanding from the adjacent south-face, should also be thinned to reduce fire hazards to existing overstory trees. No tree-form oak or madrone should be cut. Only skinny, whip-like pine trees to 6", with low crown ratios should be removed.

It is proposed that unit 33-20 be treated for fuel reduction with the goal of creating a shaded fuel brake that can be used in the event of wildland fire, and also to aid in the use of prescribed fire to maintain low fuel loads and contribute to community protection needs. The fuel brake could be extended across the ridgeline into units 34-23, 34-24, and the upper 200' of units 28-22A, 28-22B, and 22-22C. The goal would be to start in the development of a shaded fuel break and non-motorized trail system across this strategic ridgeline that could aid in future fire protection and fire suppression objectives. Refer to "Future Fuel Reduction Recommendations" at the end of this Appendix for more information.

Prescribed fire should be utilized to maintain stand conditions within 3-5 years of implementation.

Unit 34-21 BLM Prescription: Selective Thinning Douglas-fir 40%

<u>Community Alternative Prescription</u>

34-21 Fuel Reduction Treatment

Unit 34-21 was proposed by the BLM for commercial harvest, yet access to the unit by logging equipment would necessitate new road construction. The unit supports numerous distinct forest types and plant communities.

The CA is proposing that this unit be treated for fuel reduction, focusing on fire-resiliency and stand enhancement by reducing excessive understory Douglas-fir trees. The upper portion of the unit is very similar to unit 34-24, which abuts unit 34-21 on its southern margin. Treatment should follow the same guidelines as described for unit 34-24.

A small portion of the unit also sits on a west-facing slope and supports a more pine influenced stand condition; Ponderosa pine, Douglas-fir, madrone, oak and dense patches of manzanita. This portion of the unit should be thinned to favor pine, oak and madrone over Douglas-fir. Manzanita density should be reduced within one and a half crown radius of larger overstory trees. Patches of mature manzanita should be retained to provide cover habitat, nectar for pollinators, and berry production for wildlife. Oak trees should be reserved from cutting, while only low-vigor pine with poor crown ratios should be removed.

At the unit's eastern margin, the forest is more mature with a relatively open mid-seral pine and fir plant association. These stands should be treated to reduce understory fuel while retaining all dominant overstory trees, including hardwoods. Oak trees should be reserved from cutting and oak openings treated as "skips" unless Douglas-fir encroachment is evident; in which case, young Douglas-fir trees competing with oak trees should be removed.

Unit 34-22 BLM Prescription: Structural Retention

Community Alternative Prescription

34-22 Fuel Reduction Treatment

Unit 34-22 was proposed for commercial logging by the BLM, however, the CA proposes only fuel reduction. The unit has previously been commercially thinned and currently does not support a density of overstory trees that would justify commercial removal. The stand is relatively open and diverse and is dominated by large, relatively fire-resilient trees. The main body of the unit supports little to no understory growth, minimal fuel laddering, and adequate spacing. Although much of the unit requires no treatment whatsoever, a few sections of the unit are in need of fuel reduction. This would include areas that experienced heavy canopy reduction in past timber sales and a small oak opening at the northeast portion of the unit.

Areas that are in need of fuel reduction include three main areas: The first area consists of dense Douglas-fir thickets that developed following overstory removal and canopy reduction at the upper (southern) portion of the stand. Past timber sales removed large overstory trees towards the top of the unit, allowing low-vigor, suppressed-growth trees to dominate the stand. These areas should be thinned to enhance species diversity and to reduce the density of existing understory Douglas-fir. Remaining overstory trees should be treated with radial thinning up to one and a half times the width of the crown radius. This will reduce fuel loads and competition for the benefit of larger, more fire-resilient trees. Ground fuels will also need to be treated in these areas due to the presence of logging slash and mortality in low vigor fir trees.

The second area containing dense fuel hazards was also created through BLM logging practices and needs treatment to reduce dangerous fuel loads. This area would consist of a small, 0.35-acre opening created in the last BLM thinning project. The area is located at the western margin of the unit. In this section of the unit the BLM removed nearly all overstory trees, creating a small canopy gap. This canopy gap responded by developing excessive and hazardous levels of regeneration that are currently extremely dense, generating mortality and excessive fuel loads. The canopy gap has been colonized by hundreds of little madrone and fir trees in a dense thicket. This canopy opening created by BLM silvicultural practices is the most hazardous fuel load within unit 34-22 and is in need of fuel reduction. Nearly the entire patch of reproduction should be removed, leaving a few scattered madrone seedlings to create structural and compositional diversity.

The last portion of the unit in need of treatment is a small oak opening that should be treated by removing encroaching young fir. All young fir should be removed and no oak should be cut.

Fuel treatments in unit 34-22 should focus only on these three areas, as the majority of the unit currently supports low fuel loads due to adequate canopy retention in past thinning treatments. The adjoining portions of the stand are not proposed for treatment.

Unit 34-23 BLM Prescription: Structural Retention

Community Alternative Prescription

34-23 Fuel Reduction Treatment

Unit 34-23 is located on the long, dry ridgeline dividing Yale Creek from the Little Applegate River. The unit was proposed for commercial harvest by the BLM and major road renovations would be required to provide access to logging equipment on this currently fairly undeveloped ridgeline. The CA proposes that unit 34-23 be deferred from consideration as a commercial timber sale unit and fuel reduction treatments be employed that will address the forest health and fuel/fire needs.

The unit consists of dry Douglas-fir, ponderosa pine, madrone, and oak habitat that was underburned in the 1987 Lick Fire. Portions of the stand are relatively open due to the effects of the 1987 fire, while other portions are growing thick with young fir reproduction. The fire did trigger reproduction of black oak and small, open-statured black oak are developing throughout the site. These important developing structures would be badly damaged in yarding and felling operations if commercial treatments were allowed. These same structures could be encouraged and enhanced during fuel reduction treatments.

Thinning should focus on removing competition and fuel ladders beneath larger overstory trees, intermediate pine trees, and existing hardwoods. Douglas-fir sapling and poles would be the majority of vegetation removed, along with understory brush species such as deer brush and manzanita. Numerous old skid trails exist within the western portion of the unit and create unnatural fuel loads due to heavy regeneration following soil disturbance. These dense pockets of reproduction should be removed, retaining only a handful of trees within each dense grouping.

No tree-form madrone or black oak should be cut. All black oak, including young trees regenerating from the 1987 fires, should be retained. Only skinny, whip-like pine trees with low crown ratios should be removed. Tree species should be retained in the following order of species preference: Ponderosa pine, black oak, madrone, and Douglas-fir.

O'Lickety Timber Sale unit 52 lies directly below unit 34-23. The O'Lickety Timber Sale unit below was overcut, leaving very minimal canopy closure. Large amounts of slash were also left untreated on the forest floor, even after "slash removal" and pile burning. The O'Lickety thinning will encourage dense regeneration and shrub development due to heavy canopy reduction. The impact will be to increase fuel hazards directly below unit 34-23. Unit 34-23 should be treated with prescribed fire 3-5 years after pile burning operations have been completed. The proposed prescribe fire should be allowed to burn into O'Lickety unit 52 to decrease fuel hazards and clean up activity slash that remains following commercial logging treatments.

Unit 34-24 BLM Prescription: Structural Retention

Community Alternative Prescription

34-24 Fuel Reduction Treatment

Unit 34-24 was proposed by the BLM for commercial harvest, yet this harvest is predicated on new road construction. The stand is also generally young and supports mostly

young, small diameter trees. The economics of logging this site are poor at best. The CA proposes to treat the stand with a fuel reduction treatment.

Fuel conditions in unit 34-24 are perhaps the worst of any unit in the Nedsbar Timber Sale. The stand was heavily logged and a dense new cohort of Douglas-fir trees has colonized the site, along with stump sprouting, multi-stemmed madrone trees. The density of fuels has created a hazard that must be addressed. The lower portion of the stand is less volatile and supports early- to mid-seral stands of fir and madrone.

The CA proposes fuel reduction treatments that would focus on reducing stem density, ladder fueling, and competition between trees. Pine trees should be protected and enhanced with not only a no- cut policy, but also by radial thinning to increase vigor and survivability. Only, skinny, whip-like pine trees with low crown ratios can be removed. Madrone trees should be treated with the same retention and release policy. Maintain multi-stemmed-form on madrone trees. The majority of cutting should focus on the removal of excessive Douglas-fir density in the understory.

Unit 36-32 BLM Prescription: Selective Thinning Douglas-fir 40%

Community Alternative Prescription

36-32 Fuel Reduction Treatment

Unit 36-32 is located on the ridgeline dividing Yale Creek and Grouse Creek at the headwaters of Grouse Creek. The stand was proposed for commercial harvest, yet supports relatively healthy closed forest habitat that provides important NRF habitat. The canopy reduction proposed in BLM logging prescriptions will increase fuel hazards in this stand, putting the mid-to late-seral habitat conditions at risk.

The CA proposes treating the stand for fuel reduction. Although the stand supports a fairly closed canopy with large overstory trees, understory regeneration has reached densities that constitute a severe fire hazard and must be addressed. Fuel loads are nearly entirely created by dense pockets of regeneration. The CA would propose that most of these pockets of regenerating Douglas-fir be removed to reduce fuel loads and laddering. A few scattered pockets of regeneration could be maintained in the moist draw that dissects the unit to provide cover habitat and structural diversity.

A small section of west-facing ridgeline is also present within the unit. This section should be treated to reduce competition and fuel loads in proximity to dominant hardwoods and overstory conifers. In this section of the unit pine, black oak, and madrone should be favored over Douglas-fir.

Fuel Reduction Treatments: Non-Forest Plant Communities

Fuel reduction treatments proposed in non-forest plant communities have been altered to incorporate the best available science regarding the ecological management in these important woodland and chaparral systems. Located at the northern range of chaparral and California oak habitats, the area is transitional and unique. The mosaic of plant species provides important habitat and represents a regional hotspot for biodiversity. All fuel management in these important ecosystems should be ecologically based and restorative in nature.

Research conducted within these plant communities by BLM staff, Oregon State University staff and students, along with regional ecologists, has been incorporated to protect the region's exceptional biodiversity, while encouraging healthy fuel conditions and characteristic habitat mosaics. Links to these studies are listed in the reference section following fuel prescriptions and unit descriptions.

Community Alternative Prescription

F-28 Fuel Reduction Treatment

Unit F-28 consists of a diverse patchwork of ecosystems, each needing its own fuel prescription and restoration strategy. Most of the unit is relatively gentle and rolling with conifer, oak woodland and oak savannah habitats. Located within the Boaz Mountain Roadless Area, the region supports high habitat values and relatively intact plant communities. Both native and non-native grasses and forbs are well represented throughout the site. Prescriptions for this unit should put an emphasis on maintaining the stand's diversity and high habitat values while reducing fuel loads. The prescription will be broken into two separate treatment areas to address the diverse needs of this large fuel reduction unit.

F-28A Mixed-Conifer Habitat

Unit F-28A consists of a large stand of mixed-conifer forest on relatively gentle terrain. The area has been logged, but continues to be dominated by large, old trees on fairly wide spacing. The unit supports large, old, overstory ponderosa pine, sugar pine, and Douglas-fir trees. Mature black oak and madrone grow amongst the large conifers and a few pockets of pole sized fir. In response to past timber harvest a dense, young cohort of madrone has developed in the understory, creating heavy fuel loads that, if left untreated, will create dangerous fuel laddering and competition.

The prescription calls for removing most of the understory madrone that has become established since the last timber harvest. This young, shrubby cohort should be drastically reduced while tree-form hardwoods, including oak and madrone, should be retained to create horizontal structure and complexity. Cut material will be piled and burned well away from leave trees, especially the large, old pine and fir scattered across the site.

Being a stump-sprouter, the cut madrone will respond with vigorous new growth. It is recommended that the BLM follow up fuel treatments with prescribed burning in the 3 to 5 years following manual fuel reduction treatments. Prescribed fire could be used to maintain healthy fuel loads throughout unit F-28.

F-28B Oak Habitat

Unit F-28B consists of oak woodland and oak savannah sites on gentle, rolling terrain. Although much of this unit has been thinned by the BLM, other portions have not been thinned to reduce fuels. In the more open areas where past thinning projects have taken place, the stand is mostly oak savannah with many large, old white oak trees. The area supports savannah-form oak trees and islands of decedent buckbrush. Many of the oak trees are likely hundreds of years old.

Young and vigorous buckbrush shrubs have colonized the areas opened in the last fuel reduction treatment.

The CA prescription recommends removing roughly 60% of the young regenerating buckbrush bushes to reduce fuels and maintain the appropriate mosaic of oak and brush created during the last treatment.

In areas not yet treated for fuel reduction, the conditions tend more towards oak woodland with large scattered oak trees. Brush has encroached upon what appears to historically have been grassy oak woodland. Much of the brush should be removed to reduce fuel loads and allow for the use of prescribed fire. Oak trees should be reserved from cutting and pine favored over fir in nearly all situations. Buckbrush and manzanita should be removed from one and an half times the crown radius of large, old oak trees.

Prescribed fire should be utilized 3-5 years following treatment to encourage healthy stand conditions.

Community Alternative Prescription

F-30 Fuel Reduction Treatment

Unit F-30 is a unique and diverse ecosystem supporting some of the most intact oak woodland habitat in the Applegate Valley. It also lies within a small roadless area, known as the Buncom Roadless Area, that provides connectivity across the foothills of the lower Little Applegate drainage. The unit supports a large population of old-growth white and black oak, small dry meadow openings, scattered ponderosa pine, clumps of buckbrush and manzanita habitat, and two separate habitat types including conifer species. Both native and non-native grasses and forbs are well represented throughout the site. Prescriptions for this unit should put an emphasis on maintaining the stand's diversity and high habitat values while reducing fuel loads. The prescription will be broken into four separate prescriptions and treatment areas to address the diverse needs of this large fuel reduction unit.

F-30A Intact oak woodland habitat

F-30A consists of a large and ecologically valuable stand of white and black oak woodland at the unit's northeast corner. Many of the oak trees in unit F-30A are likely hundreds of years old. The unit contains many large, old-growth oak trees, high quality wildlife snags, scattered ponderosa pine, and widely dispersed patches of buckbrush. The occasional living Douglas-fir tree (saplings, poles, and intermediate trees) can also be found, competing with the site's oaks and pines. For the most part Douglas-fir trees are not making it on these arid south-facing slopes and can, more often, be found as old snags. By and large the habitat is open, fire resilient, and provides an example or reference condition that can be used to define healthy oak woodland characteristics in the Applegate Valley.

The proposed prescription in unit F-30A consists of maintaining the existing habitat and utilizing the area as a large "skip" within the unit. Fuel loads in the unit are very minimal, stand structure is ideal, habitat values are high, and unique environmental characteristics, including old-growth oak woodland habitats, should be maintained by deferring all manual treatment in unit F-30A at this time.

Thinning the existing oak canopy would impact woodland values, opening oak canopies and allowing for the spread of non-native grasses and forbs in the understory. Most

native grasses on site — or at least the highest density of native grass — are found beneath a filtered oak canopy in woodland stands. This unique characteristic must be retained by maintaining oak woodland conditions and deferring manual treatments at this time.

Following fuel reduction and pile burning treatments implemented elsewhere in unit F-30, the area could be treated with the use of prescribed fire to reduce fir encroachment, maintain minimal fuel loads, and reintroduce the process of fire to a stand that has little recent fire history. Prescribed fire could be implemented within a few years of fuel reduction treatment in the surrounding habitats. The goal would be to utilize prescribed fire as a maintenance tool throughout the entire F-30 fuel reduction unit. Fire could be allowed to burn through the otherwise untreated oak woodland habitat at this time. The recommendation is to utilize fire as a maintenance and restoration tool within 3 to 5 years following the implementation of adjacent manual fuel treatments.

F-30B Dry conifer habitat

A ring of dry conifer habitat abuts unit F-30A to the south and west. Much of this habitat type consists of dry conifer stands supporting ponderosa pine, Douglas-fir, madrone, and woodland groves of deciduous oak. These dry conifer habitats appear to have historically supported a relatively open woodland structure. The spacing and configuration of overstory conifer trees and old snags demonstrates the historic condition and provides insight into prescription development. Much of the habitat is found on relatively gentle sites, yet on the southern end of the unit these plant communities can be found on steeper north-facing slopes.

Currently, much of the stand is dominated by widely dispersed overstory pine, Douglas-fir, and wide branching open-grown madrone and oak. The historic stand conditions appear very open and structurally diverse. A younger cohort of Douglas-fir 4”-12” DBH has established itself in the understory, creating excessive stand density and impacting the historically open fuel conditions.

Some areas in this habitat type have already been treated for fuel reduction and are currently in need of fuel maintenance. CA prescriptions include removing the majority of encroaching fir trees up to 8” DBH. Whole patches of young fir can be removed if existing overstory trees create groves or groupings with interlocking canopy. Emphasis should be placed on the aggressive thinning of young fir, within one and a half times the crown radius of existing overstory, pine, fir, oak, and wide branching madrone. Skinny, whip-like ponderosa pine supporting low crown ratios could also be targeted for removal, especially when developing into thickets of young trees.

All oak and madrone should be reserved from cutting and retained on site to encourage a woodland structure, retain diversity, and enhance wildlife habitat conditions. Brush species, including buckbrush and manzanita, should be retained in groupings where appropriate. This would include isolated islands of large bushes supporting cover habitat, and also in small patches where young shrubs have regenerated following past fuel treatments. These young shrubs, especially buckbrush, provide high quality browse for ungulate species. Large, mature manzanita shrubs should also be retained to provide adequate berry crops for wildlife species.

Excessive concentrations of downed wood could also be cut, piled, and burned, while large downed wood and nurse logs should be retained. Emphasis should be placed on downed woody fuels between 0”-5” in diameter.

All material cut should be piled and burned on site. Follow-up prescribed fire treatments should be implemented unit-wide 3-5 years following manual fuel reduction.

F-30C Dense conifer habitat along major draws

This habitat is similar to the stand's identified in unit F-30B; the main distinction is that the conifer habitat along the area's small draws is much more dense and slightly more productive due to the presence of more available groundwater. Treatments in this habitat type would entail the removal of most live fir trees from 0-8" DBH. This would include removing whole groupings or stands of understory trees wherever a patchy canopy of overstory trees currently exists. Large overstory pine, fir, oak, and madrone should be treated with radial thinning one and a half times the distance of the dripline.

The prescription would also call for removing skinny, young, whip-like pine trees with low crown ratios. The retention of oak trees and most madrone is also warranted. Madrone trees that are currently heavily suppressed, top heavy, whip-like, and support low crown ratios could be conservatively removed. Young thickets of seed-generated madrone should also be removed.

All material cut should be piled and burned on site. Follow-up prescribed fire treatments should be implemented unit-wide 3-5 years following manual fuel reduction treatments.

F-30D Dry meadow

F-30D is the smallest subunit within fuel reduction unit F-30. The unit consists of a large meadow opening surrounded by subunit F-30A, a large area of intact, old-growth oak woodland. The large dry meadow is a unique and important habitat feature that should be maintained and restored to historic composition and structure. Much of the oak woodland surrounding the meadow supports a significant population of native grass habitat, yet here in the open meadow — without the protective canopy of oak — non-native plant species have overtaken the understory layer.

Manual thinning treatments within this subunit would be fairly minimal and would focus on retaining open-grown structural conditions at the meadow's margins. On the southwest meadow margin small stands of healthy pine reproduction has developed creating a few isolated young stands of trees in what was formerly meadow habitat. These small, young stands should be thinned aggressively to reduce stem density and encourage open-grown form. The CA treatment entails removing the majority of pine reproduction, with dispersed retention of a few trees to enable and encourage open-grown form, and to reduce encroachment on the dry meadow system. A small patch of Himalayan blackberry in the meadow's center should be cut and burned. Scattered buckbrush islands should be retained for cover habitat and reserved from cutting. All oaks should also be reserved from cutting and retained at the meadow margin. At the eastern margin the meadow fades into open stands of pine and oak, supporting large mature trees. These small groves should be thinned to maintain open-grown form through the removal of understory pine and Douglas-fir.

All material cut should be piled and burned on site. Follow-up prescribed fire treatments should be implemented unit-wide 3-5 years following manual fuel reduction treatments. A fall burn, followed by direct seeding of the meadow with native grasses appropriate to the site, is highly recommended.

F-30E Manzanita/chaparral habitat

A few sections of manzanita and mixed chaparral habitat can be found high on the slopes and on exposed ridges near the northwest portion of unit F-30. These areas are being proposed for treatment under the prescription outlined for F-30E.

Unit F-30E meets all the characteristics outlined by Paul Hosten in "Restoring the Pacific Northwest" (Island Press 2006), as a natural chaparral site that may not be in need of restoration treatments or fuel reduction; thus, treatments should maintain important chaparral habitat values. Prescriptions in F-30 should focus on the retention of large islands of untreated chaparral. Chaparral stands could be thinned back from the margin of the conifer stringers adjacent to large chaparral patches. This will facilitate more effective prescribed fire treatments at a future date.

Small gaps could be created within chaparral patches around large pine or open-grown white oak. Care should be taken to maintain chaparral dominance to reduce noxious weed spread, OHV use, impacts to birds and wildlife, and site conversion to annual grasses. High-density chaparral in this unit is located a sufficient distance from homes and residential development to allow retention without impacts to community fire protection needs. Large retention islands should include numerous acres of untreated chaparral punctuated by isolated openings to protect high value leave trees. High-density shrub patches should be maintained at the western margin of the unit, near road 39-2-30.3, in order to discourage OHV use. The prescription for unit F-30E has been developed utilizing current scientific research on chaparral ecology, restoration, and fuel reduction strategies within the Little Applegate watershed. The following link provides access to this research:
http://people.oregonstate.edu/~muirp/FuelsReductionSWOregon/index.html

Community Alternative Prescription

F-35 Fuel Reduction Treatment

Unit F-35 is a large, highly variable fuel reduction unit located on the south-facing flank of Cinnabar Ridge. The unit is located within the Boaz Mountain Roadless Area and supports high levels of diversity and habitat values. Much of the unit surrounds a large south-facing grassland habitat, I will referred to here as upland prairie. The large prairie is bordered by a diverse assemblage of plant communities, mostly predicated by slope position and aspect. The prairie is bordered by conifers on the southern end near the ridgeline, with a band of buckbrush, white oak groves, and scattered ponderosa pine. To the west of the prairie are dense manzanita slopes colonized by scattered trees and small groupings of conifers and hardwoods. The lower end of the prairie supports stands of relatively open black and white oak, with black oak being unusually well represented. Scattered open form pine and groupings of pine are also found mixed into the oak woodland habitat. Native grasses can be found more abundantly under the canopy of these oak woodland habitats.

The grassy upland prairie and the surrounding mosaic of plant communities should be reserved from thinning and this portion of the unit deferred from treatment at this time. The unit does not currently create an uncharacteristic fuel load and supports high levels of both heterogeneity and high quality wildlife habitat. Located within the Boaz Mountain Roadless Area, the area's natural mosaic and naturally appearing landscape features should be retained.

Past fuel treatments throughout the Applegate Valley have failed to provide the encouragement and invigoration of native grass communities in oak woodland habitats. It is recommended that no treatment be implemented in the non-forest plant communities on this site to protect native understory composition, natural oak woodland structure, characteristic landscape patterns and wildland values.

On the other hand, the eastern portion of the unit consists of mostly dense young stands of conifers, namely pine and fir. These stands should be thinned to reduce fuel and between tree competition. Located on south-facing slopes, the stand should be thinned to favor ponderosa pine and oak. Thinning should be conducted in a mosaic fashion, creating a diverse pattern of leave trees retained as individual trees or as groupings of trees. The goal should be a patchy landscape where young trees have been released, fuels are significantly reduced, and competition reduced as well.

All cut material should be piled and burned on site to reduce fuel loads created by activity slash.

Community Alternative Prescription

F-36 Fuel Reduction Treatment

Unit F-36 is a dense plantation stand that is located directly in between units 36-31 and 36-32, both of which provide important roosting and foraging habitat for the northern spotted owl. The CA proposes deferred unit 36-31 and treating unit 36-32 as a fuel reduction unit. Both stands support mid- to late-seral mixed conifer stands dominated by large, overstory Douglas-fir. The stands provide high quality wildlife habitat and have begun to express old-growth characteristics. These stands should be protected from uncharacteristic fire by thinning the overly dense plantation stand in between, identified as unit F-36.

Treatments should focus on creating a patchy distribution of trees and canopy conditions. Some small gaps could be created in otherwise even-aged portions of the stand. Hardwood trees should be retained and favored by reserving tree-form trees from cutting and thinning around hardwoods to encourage health, vigor, resilience and survivability. Canopy closure should be maintained at 60%, but left in an uneven distribution pattern. The largest trees in the stand should be retain along with all snags over 15” in diameter and all large downed wood. Pile burning should be conducted as to reduce crown scorch by placing piles away from leave trees.

A small section of unit 36-31 that lies directly adjacent to road 39-2-30.0 should also be included in unit F-36. This would include only a narrow swath of plantation-like forest within 100’ of the road. Thinning this dense roadside thicket will increase survivability and resilience in the surrounding forest habitats.

Future Fuel Reduction Recommendations and Strategies

The CA has proposed a series of commercial and non-commercial vegetation management, fuel reduction and forest restoration treatments aimed at addressing social, ecological, economic, and local community needs. This approach to land management is consistent with the directives and intent of the Applegate Adaptive Management Area (AMA).

The prescriptions identified represent “localized, idiosyncratic methods that will best reflect the needs of the land and the communities” as outlined in the 1995 Medford District RMP

ROD. The prescriptions also satisfy the mandate of the Northwest Forest Plan Record Of Decision directing the BLM to "work with other organizations, government entities and private landowners in developing and testing new management approaches to integrate and achieve ecological, economic, social and other community objectives" (pg.6). The prescriptions also address the main objectives of the AMA including the "development and testing of forest management practices including partial cutting, prescribed burning and low-impact (e.g. aerial systems) that provide a broad range of forest values including late successional forest and high quality riparian habitat" (pg. D-12).

The CA proposal provides a bioregional approach to ecosystem management and incorporates the needs of the surrounding rural residential community in the Applegate Valley. First and foremost, we are addressing the critical issue of fire in the dry forests, woodlands, and chaparral of the Applegate region. Our approach reduces fuel loads while maintaining high habitat values. We have identified fuel reduction and forest restoration priorities that will not only make the forests more resilient and adapted to periodic fire, but also the surrounding human community. Many in the Applegate Valley are proactively managing their private lands to prepare for the next wildfire. Our fuel reduction recommendations for the Nedsbar Planning Area would build off the efforts of private landowners and manage those areas most strategically important to protect the local community from property damage, loss of life, and the effects of uncharacteristic fire behavior.

Our recommendations are built on the concept of creating anchor points for fire suppression crews to not only defend the community from fire, but also safely utilize the use of prescribed fire to create defensible fuel management areas on strategic ridgelines, agency roads, and private property boundaries that might be in need. Overtime ingress and egress, major roads, and strategic ridgelines could be treated, greatly aiding in developing more fire-wise and fire-adapted rural communities.

We have identified the following ridges and roads as anchor points:

- Cinnabar Ridge: The community proposes Cinnabar Ridge as a strategic ridgeline for community fire protection needs. The community proposes that future treatments build off the units proposed in Nedsbar Timber Sale to support fire-resiliency. Portions of the area are included in the Buncom Roadless Area and should be maintained in a primitive condition. In the fall of 2010 The BLM implemented a large and successful prescribed fire in a portion of the Buncom Roadless Area. The use of fire on this slope was appropriate. A similar use of prescribed fire and the suppression of fire could be facilitated through the implementation of a large shaded fuel brake along the spine of Cinnabar Ridge. The fuel brake would maintain 60% canopy closure in conifer stands, but greatly decrease understory fuels adjacent to road 39-3-27.2. Treatments could be tied together across the ridgeline and extend 200' downslope on either side of the ridge. Non-forest plant communities dominate the ridge's western-face. These areas could be treated with a combination of prescribed fire and manual thinning to maintain more open, fire-adapted conditions. The conditions proposed would significantly increase fire resilience. Important features such as owl cores, NRF habitat, Siskiyou salamander habitat, currently fire-resilient stands, late-seral stands, and rare plant sites should be buffered with no treatment areas or "skips," and/or treated with adequate design features to reduce impacts to target species.

- The Yale Creek/Little Applegate Divide: The community proposes the Yale Creek/Little Applegate Divide ridge as a strategic anchor for community fire protection needs. The community proposes the creation of a shaded fuel brake to facilitate fire suppression and prescribed fire treatments. A non-motorized hiking/biking/equestrian trail could be developed within this shaded fuel brake, utilizing the decommissioned roadbed of Skate Gulch Road. A shaded fuel brake should be created across the ridgeline and extending 200' downslope on both the north and south exposure. The southern exposure is dense manzanita and the north-slope is mostly forested. Located within an important connectivity corridor and the Lick/Quartz Roadless Area treatments should be focused on fire management needs and ecological concerns.
- Lick Gulch Road: The community has identified Lick Gulch Road, especially the lower reaches of it adjacent to private residential land, as an important anchor point for fire suppression efforts and prescribed fire use. Treatments should focus on making the area directly upslope of Lick Gulch Road (within at least 200') more fire safe and fire resilient.
- Cinnabar/Beaver Road: The Cinnabar/Beaver Road is proposed as a strategic ridgeline and road that could contribute to community fire protection needs. A ridgeline fuel brake adjacent this road would allow fire crews to connect firelines, fuel reduction, and prescribed fire treatments into the strategic ridgeline of Cinnabar Ridge and the Yale/Beaver Road.
- Yale/Beaver Road: Much of the Yale/Beaver Road has been previously thinned and burned. The area should be maintained in a healthy fuel condition through the use of manual thinning and prescribed fire. Treatments should be timed to maintain minimal fuels, allowing the area to serve as a safe and effective fireline for fire suppression efforts and prescribed fire use. The road provides ingress and egress, as well as a potential escape route for many residents in the Yale Creek drainage and the upper portions of the Little Applegate Canyon.
- Rush Creek Road: Rush Creek Road provides ingress and egress as well as a potential escape route for residents of the Little Applegate Canyon in the case of wildfire. Much of the area borders the Dakubetede Roadless Area and non-commercial treatments should be allowed in this area, however, non-commercial fuel reduction would only be appropriate within 200' of the road. The area could be manually thinned and maintained in a healthy fuel condition with either prescribed fire or additional manual treatments.

Unit By Unit Stand Treatments

Douglas-fir 60%
17-10B
17-11
17-13
20-12
20-11A
20-11C
25-25
26-31
27-33
28-21B
30-10A
34-31
35-33
36-33

Ponderosa Pine
17-10A
20-11B
27-21
28-21A
29-10
29-11
29-12
31-20
34-20
34-32A
34-32B
35-20
36-22
36-23

Mortality Salvage
23-32
27-30

Fuel Reduction
19-10A
19-10B
23-30
23-31
26-30
28-22A
28-22B
28-22C
30-20
33-20
34-21
34-22
34-23
34-24
36-32
F-28A
F-28B
F-30A
F-30B
F-30C
F-30D
F-30E
F-35
F-36

New Unit #	Logging System	T-R-SEC	Acres	Alternative 4 Prescriptio	Commercial	Deferred	Fuels	RX burn	Diameter limit	Community Comments
		39S-02W-19	2.467092	ST_PP						
14-30	CABLE/HELI	39S-03W-14	27.86553	ST_DF		x				Late-seral forest; Buncom Roadless Area; minimal fuels. East portion NRF habitat.
14-30	GB/HELI/CABL	39S-03W-14	14.0095	ST_DF		x				Late-seral forest; Buncom Roadless Area; minimal fuels. Mostly dispersal habitat.
14-31	HELI	39S-03W-14	14.06364	ST_DF		x				Buncom Roadless Area. Dispersal habitat.
15-30	HELI	39S-03W-15	19.14513	ST_PP		x				Buncom Roadless Area; upper end late-seral; minimal fuels. All NRF habitat.
17-10	HELI	39S-01W-17	11.18948	ST_PP_40%	PP			x	20" DBH & percentile approach	Juniper retention; hardwood retention.
17-10	TRACTOR	39S-01W-17	3.956713	ST_PP_40%	DF 60 %			x	20" DBH	Juniper retention; hardwood retention.
17-11A	CABLE	39S-01W-17	12.97346	ST_DF_40%	DF 60%				18" DBH	Plantation stand; even-aged; mostly Douglas-fir.
17-11B	CABLE	39S-01W-17	10.17485	ST_DF _40%		x			18" DBH	Low volume per acre; very few overstory trees; currently does not meet RMP standard of 16-25 large trees per acre.
17-12	CABLE	39S-01W-17	26.1077	DM_GS_60%		x				Chelsea Spring; historic site; old-growth pines; minimal understory fuel. All NRF adjacent to nesting area.
17-13	CABLE	39S-01W-17	5.311297	ST_DF	DF 60%		x			Plantation stand; heavy fuel loads; even-aged; single species stand of Douglas-fir.
19-10A	CABLE	39S-01W-19	13.84875	DM_60%			x			Low volume per acre; low productivity site; new road construction; currently does not meet RMP standard of 16-25 large trees per acre.
19-10B		39S-01W-19	40.44084	ST_DF_40%			x			Low volume per acre; low productivity site; new road construction; currently does not meet RMP standard of 16-25 large trees per acre.
19-20A	HELI	39S-02W19	26.56435	SR_REGEN		x				
19-20A	TRACTOR	39S-02W-19	6.530085	SR_REGEN		x				
19-20B	HELI	39S-02W-19	11.16472	ST_DF_40%		x				
19-20B	TRACTOR	39S-02W19	9.741662	ST_DF_40%		x				
20-10	HELI	39S-01W-20	9.356981	Group selection		x				Nice late-seral stand of pine and fir, surrounded by young, logged-over stands. Likely NRF.
20-11A	HELI	39S-01W20	23.21661	ST_GS_40%	DF 60%		x		18" DBH	Dense pole stand of previously logged Douglas-fir; needs thinning. Largest trees in stand are mostly ponderosa pine on the ridge.
20-11A	TRACTOR	39S-01W-20	6.934083	ST_GS_40%	DF 60%		x		20" DBH	Dense pole stands of previously logged Douglas-fir; needs thinning.
20-11B	HELI	39S-01W-20	30.34404	DM_GS_60%	PP		x		20" DBH	Unit is variable: Lower end dense poles; upper portion more open; northern portion pine dominant. All NRF habitat. Drop southeastern corner due to intact late-seral stand and minimal fuels.
20-11B	HELI	39S-01W-20	0.031823	DM_GS_60%	PP		x		20" DBH	Unit is variable: Lower end dense poles; upper portion more open; northern portion pine dominant. All NRF habitat. Drop southeastern corner due to intact late-seral stand and minimal fuels.
20-11C	TRACTOR	39S-01W-20	8.235034	DM_GS_60%	DF 60%		x		20" DBH	Dense pole stand of Douglas-fir with scattered overstory pine, fir and madrone. Retain madrone and protect from yarding damage.
20-12	TRACTOR	39S-01W-20	5.161814	ST_PP_40%	DF 60%		x		20" DBH	Not a pine site, mostly fir with a few pine at margins and a thin strip of pine habitat on northern margin. Dense pole stand of fir in small draw.
20-12	CABLE	39S-01W-20	4.871208	ST_PP_40%	DF 60%		x		20" DBH	Not a pine site, mostly fir with a few pine at margins and a thin strip of pine habitat on northern margin. Dense pole stand of fir in small draw.
23-30	CABLE	39S-03W-23	30.47842	ST_DF _40%			x			Buncom Roadless Area. New road construction and major road rennovation. New road would impact large hardwoods and conifers. Treat 150' from ridge for fuels. Nearly all NRF adjacent to nesting area.
23-31	CABLE	39S-03W-23	18.37793	ST_DF_40%			x			Major road rennovations on old mine road that should be decommissioned. Mid-seral, high canopy, minimal understory fuel. Treat 150' from ridge for fuels. All NRF habitat.
23-32	CABLE	39S-03W-23	17.37433	ST_DF_40%	MS		x		14" DBH on live trees	High mortality levels. Retain largest trees. Retain largest snags and those with structural diversity. Thin to 14" in dripline of legacy hardwoods, pines and firs. Dispersal habitat.
25-20	CABLE	39S-02W-25	57.04603	ST_DF_40%		x				Dakubetede Roadless Area, late-seral and old-growth stands in eastern portion. Dispersal? Eastern portions seems NRF. Adjacent to large block of NRF. New roads and landings required both in roadless area.
25-21A	HELI	39S-02W25	6.401207	ST_GS_40%		x				Dakubetede Roadless Area. mid-seral, minimal fuels, new road and helipad construction required. Dispersal adjacent to NRF.
25-21B	HELI	39S-02W-25	10.17496	DM_GS_60%		x				Dakubetede Roadless Area, mid-seral, minimal fuels, new road and helipad construction required. All NRF habitat.
25-22	HELI	39S-02W-25	15.51955	ST_DF_40%			x			Eastern protion more dense with scattered overstory trees, western portion late-seral adjacent to old-growth along river. Dispersal habitat surrounded by nesting area.New road and heli landing .
25-23	HELI	39S-02W-25	6.4041	DM_GS_60%		x				Mid- to late-seral; minimal fuels. All NRF habitat with connectivity into NRF. New road and helipad required.
25-24	HELI	39S-02W-25	16.16168	ST_GS_40%		x				Diverse late-seral; some old-growth trees; within river corridor; very steep; poor access. Dispersal habitat with connectivity to nesting area.
25-25	CABLE	39S-02W-25	30.29589	ST_DF_40%	DF 60%		x		16" DBH	Dense stand of fir dominated by young trees with good road access from top of unit.
25-30	CABLE	39S-03W-25	13.90777	ST_DF_40%		x				Nice mature mid- to late-seral stand with little understory fuel; relatively open conditions; fire resiliency, and high canopy. Plantation stand on one side, grassy bald on the other. All NRF habitat.
26-20	HELI/CABLE	39S-02W-26	43.77815	ST_DF_40%		x				DakubetedeRoadlessArea; late-seral forest; open stand; minimal fuels. All NRF habitat. Extensive new road construction in roadless area proposed.
26-21	TRACTOR	39S-02W-26	37.13938	ST_PP_40%		x				Dakubetede Roadless Area. Cancel due to new road construction proposed within the riparian area of Lick Gulch; the stand also supports NRF habitat.
26-21	CABLE	39S-02W-26	16.75506	ST_PP_40%		x				Dakubetede Roadless Area. Cancel due to new road construction proposed within the riparian area of Lick Gulch; the stand also supports NRF habitat.
26-30		39S-03W-26	47.71655	ST_DF_40%		x	x			Mature stand of fir with live oak understory. Good wildlife habitat. Nearly all NRF habitat. According to 11/4/14 McKelvey map new road construction required.
26-31	CABLE	39S-03W-26	71.17542	ST_DF_40%	DF 60%		x		20" DBH	Mostly dense 12-20"DBH Douglas-fir with scattered old dominant trees in groupings. Retain all large trees and treeform live oak. Protect when felling and yarding.
27-20	CABLE	39S-02W-27	29.53345	ST_PP_40%		x				Dakubetede Roadless Area; upper end very open, old stand; new road construction. All NRF habitat.
27-21	HELI	39S-02W-27	15.6984	ST_PP	PP		x	x	20" DBH/ Pine 12" DBH	Pine stand with madrone, oak, and fir. Mid-seral; underburned in 1987.
27-30	TRACTOR	39S-03W-27	5.519434	ST_GS	MS		x		20" DBH	High levels of mortality. Dense fir poles mixed with scattered large pine and fir. Lots of madrone reproduction and heavy fuel load.
27-31	TRACTOR	39S-03W-27	2.815619	ST_PP	PP				20" DBH/Pine 14" DBH	Piney with some fir understory adjacent to oak woodland. Decommission road 39-3-27.1
27-32A	TRACTOR	39S-03W-27	1.576508	ST_DF	?					Mixed stand of fir and oak with a few pine. Must be tractor yarded across riparian reserve. Could it be a heli unit?
27-32B	TRACTOR	39S-03W-27	3.408215	ST_DF_40%	?					Mixed stand of fir and oak with a few pine. Must be tractor yarded across riparian reserve. Could it be a heli unit?
27-33	TRACTOR	39S-03W-27	14.99545	ST_DF_40%	DF 60%		x		20" DBH	Very dense pole stand; some pine and nice hardwoods at lower end where unit meets oak woodland. Favor pine and hardwoods near ridge. Protect from yarding impacts.
27-33	CABLE	39S-03W-27	12.05313	ST_DF_40%	DF 60%		x		20" DBH	Very dense pole stand; some pine and nice hardwoods near landing. Favor pine and hardwoods near ridge. Protect from yarding impacts. Half NRF habitat adjacent to nesting area.

New Unit #	Logging System	T-R-SEC	Acres	Alternative 4 Prescriptio	Commercial	Deferred	Fuels	RX burn	Diameter limit	Community Comments
27-34A	CABLE	39S-03W-27	26.91909	ST_DF_40%	DF 60%		x		20" DBH	Dense pole stand with scattered dominant trees. Understory reprod. is creating fuel hazard. Needs treatment. Favor pine and hardwoods on ridge. Maintain 60% canopy. Nearly all NRF adjacent to nesting area.
27-34B	HELI	39S-03W-27	18.41787	ST_DF_40%	PP		x		20" DBH	Dense pole stand with scattered dominant trees. Understory reprod. Is creating fuel hazard. Needs treatment. Favor pine and hardwoods on ridge. Maintain 60% canopy. Nearly all NRF adjacent to nesting area.
28-10A	HELI	39S-01W-28	20.88553	ST_DF_40%		x				Old-growth in Bald Mountain Roadless Area. Large old Douglas-fir trees. Proposed Jack-Ash Trail within unit on ridgeline.
28-10B	HELI	39S-01W-28	19.08148	ST_DF_40%		x				Old-growth in Bald Mountain Roadless Area. Large old Douglas-fir trees. Proposed Jack-Ash Trail within unit on ridgeline. All NRF habitat.
28-10C	HELI	39S-01W-28	11.4973	ST_DF_40%		x				Old-growth in Bald Mountain Roadless Area. Large old Douglas-fir trees. Proposed Jack-Ash Trail within unit on ridgeline. All NRF habitat.
28-11A	HELI	39S-01W-28	6.747217	ST_PP_40%		x				Old-growth in Bald Mountain Roadless Area. Large old Douglas fir trees. Proposed Jack-Ash Trail within unit on ridgeline.
28-11B	HELI	39S-01W-28	9.313946	ST_GS		x				Old-growth in Bald Mountain Roadless Area. Large old Douglas fir trees. Portion of intact forest that provides connectivity in Bald Mountain Area.
28-20	CABLE	39S-02W-28	8.71306	ST_DF		x				Drop due to visual impacts to adjacent homesteads and location of unit in Little Applegate River Canyon.
28-21	TRACTOR	39S-02W-28	23.42952	ST_PP	PP		x	x	18" DBH/ Pine 16"	Relatively open, piney unit. Some sections underburned in 1987. Favor pine and oak.
28-22A	CABLE	39S-02W-28	9.83214	ST_DF		x				Late-seral; minimal fuels; new road construction required. Dispersal? Owl determination seems off-base.
28-22B	CABLE	39S-02W-28	33.96645	SR_REGEN		x				Old-growth stand; minimal fuels; fire resilent (underburned 1987); new road construction. Dispersal? Owl determination seems way off-base.
28-22C	CABLE	39S-02W-28	27.19694	ST_DF		x				Late-seral; minimal fuels; fire resilent (underburned 1987); new road construction. Dispersal? Owl determination seems way off-base.
29-10	HELI	39S-01W-29	6.424267	ST_PP_40%	PP		x		18" DBH	Pine site with dense fir understory; lots of madrone and manzanita at margins. Maintain 50-60% canopy closure.
29-10	TRACTOR	39S-01W-29	4.721535	ST_PP_40%	PP		x		18" DBH	Pine site with dense fir understory; lots of madrone and manzanita at margins. Maintain 50-60% canopy closure.
29-11	TRACTOR	39S-01W-29	4.345794	ST_PP_40%	PP		x		18" DBH	Dense pole stand of fir and madrone. Maintain 60-70% canopy closure.
29-12	HELI	39S-01W-28	36.91949	ST_PP_40%	PP		x	x	20" DBH	Dense Douglas-fir poles with scattered overstory pine. Dominated by small trees. South facing slope; manzanita higher on the ridge, conifers below.
29-13	HELI	39S-01W-29	21.70943	ST_DF_40%	DF 60%		x		18" DBH	Dense pole stand of Douglas-fir with madrone and pine. Some nice pockets of mature madrone, protect these stands during logging. Arid site with low productivity.
30-10A	HELI	39S-01W-30	9.142478	ST_DF_40%	DF 60%		x		18" DBH	Dense pole stand beneath scattered old pine and fir. 18" DBH limit in this stand to achieve 60-70% canopy closure. Radial thin pine.
30-10B	HELI	39S-01W-30	6.519921	DM_GS_60%		x				Mid-seral with large tree component; mostly Douglas fir; currently closed canopy; retain 60-70% canopy coverage.All NRF habitat. Refugia and thermal cover habitat with non-forest and recent O'lickety units adjacent.
30-20	CABLE	39S-02W-30	26.06936	ST_DF_40%			x	x		Late-seral; minimal fuels; within unroaded area; NRF
31-20	CABLE	39S-02W-31	6.228995	ST_PP_40%	PP		x		20" DBH	Roadside unit; young forest; retain pine and hardwoods.
33-20	CABLE	39S-02W-33	28.53943	ST_DF		x	x	x		Late-seral; minimal fuels; fire resilient (underburned 1987); upper section 200' from ridge treated for fuels.
33-30	HELI	39S-03W-33	26.47072	SR_REGEN		x				Late-seral; Boaz Mountain Roadless Area; minimal fuels.
34-20	TRACTOR	39S-02W-34	10.40285	ST_PP	PP			x	20" DBH/ Pine 12" DBH	Relatively open pine/oak site. Gentle slopes, not far from road. Retain all oak. Favor pine and maintain groupings of trees.
34-21	CABLE	39S-02W-34	13.531	ST_DF_40%			x			Dense pole stand at top of unit. Relatively open mid-seral stands of fir at lower end of unit. Cancel due to new road development. Steep slopes; no road access from above.
34-22	CABLE	39S-02W-34	8.221531	ST_DF			x			Drop commercial harvest. Mostly open, pine and fir with oak opening. Focus on fuel treatment cleaning up dense reprod. from past logging.
34-23	TRACTOR	39S-02W-34	23.15344	ST_DF			x			Drop commercial harvest. Relatively open pine,madrone, and fir on west end. Underburned in 1987. Some dense areas; mostly young growth and pole stands.
34-24	CABLE	39S-02W-34	14.27216	ST_DF			x			Drop commercial due to new road development. Dense fir poles and madrone. Heavy fuel loading.
34-30	HELI	39S-03W-34	38.25358	ST_GS_40%		x				Boaz Mountain Roadless Area. Variable stand; many large, old trees. NRF and dispersal adjacent to nesting area.
34-30	TRACTOR	39S-03W-34	37.2715	ST_GS_40%		x				Boaz Mountain Roadless Area. Variable stand; many large, old trees.
34-31	CABLE	39S-03W-34	9.272359	ST_DF_40%	DF 60%		x		20" DBH	Some very large and very widely spaced Douglas-fir amongst dense pole stand. Maintain 60% canopy coverage.
34-32A	CABLE(DH)	39S-03W-34	2.358703	ST_PP_40%	PP		x		18" DBH	Pine stand with dense pole stand of fir. Retain large pine and fir in groupings and as individual trees. Cut no oak, protect oak from yarding impacts.
34-32B	CABLE	39S-03W-34	4.451417	ST_PP_40%	PP		x		18" DBH	Pine/oak stand with fir encroachment. Retain pine and oak; protect from yarding impacts. Cut no oak. Maintain 50%-60% canopy.
35-20	CABLE	39S-02W-35	14.18893	ST_PP	PP		x		18" DBH	Favor pine; retain large trees. Thin around existing large pine component. Retain hardwoods and encourage existing pine and black oak reprod.
35-21	CABLE	39S-02W-35	7.656554	ST_DF		x				Relatively open and diverse stand of mid-seral fir at lower end of unit. NRF with good structure and low fuel loads. Moderate severity underburn from Quartz Fire adjacent.Upper end of unit borders plantation; overstory lacking; more dense with younger growth.
35-30A	CABLE	39S-03W-35	24.68543	ST_DF_40%		x				Old-growth trees at the top of the unit. Diverse variable stand. Mid- to late-seral. All NRF habitat.
35-30B	CABLE	39S-03W-35	17.0114	ST_GS_40%		x				Diverse variable stand; some very large trees; rock outcrop; oak openings. Very steep. All NRF habitat.
35-31	CABLE	39S-03W-35	34.11041	ST_DF_40%	DF 60%		x		18" DBH	Ridgeline stand of Douglas-fir. Dense, even-aged on ridgeline. Mid-seral stands at lower end, adjacent to gulch. Southwest section NRF
35-32	CABLE	39S-03W-35	27.32402	ST_DF_40%		x				Late-seral, headwaters of Grouse Creek. All NRF adjacent to nesting area. Relatively moist, productive site. Could log the ridgeline portion above the road with minimal impact.
35-33	CABLE	39S-03W-35	10.42883	ST_PP_40%	DF 60%		x		20" DBH	Dense fir at north end; south end more open. Retain large trees and live oak; protect when yarding and felling. Retain wolfy wildlife trees.
36-20	TRACTOR	39S-02W-36	16.37417	ST_PP_40%		x				Dakubetede Roadless Area; new road construction; dispersal habitat adjacent to an nesting area.
36-20	CABLE	39S-02W-36	13.29275	ST_PP_40%		x				Pine site with significant mortality above road. Fuel loads high, scattered older pine and fir. Often dense with pole sized fir. Favor pine and hardwoods, especially above road.
36-21A	CABLE	39S-02W-36	2.072885	DM_GS_60%		x				Surrounded by grassy balds on two sides; public and private land plantation stands and Quartz Fire high severity patch. Provides thermal cover and refugia.
36-21B	CABLE	39S-02W-36	2.524327	DM_GS_60%		x				Surrounded by grassy balds on two sides; public and private land plantation stands and Quartz Fire high severity patch. Provides thermal cover and refugia.
36-22A	CABLE	39S-02W-36	21.03971	ST_PP_40%	PP		x		16" DBH	Pine site with dense pine and fir poles. Predominantly young and even-aged. Needs thinning. Retain 50%-60% canopy coverage.
36-22B	CABLE	39S-02W-36	0.030497	DM_60%	PP		x		16" DBH	Pine site with dense pine and fir poles. Predominantly young and even-aged. Needs thinning. Retain 50%-60% canopy coverage.
36-23	CABLE	39S-02W-36	31.93212	ST_PP_40%	PP		x		18" DBH	Dense pine and fir stand. Favor pine and hardwoods. Some big trees on border with 36-25, otherwise logged-over with high fuel density and heavy competition.

New Unit #	Logging System	T-R-SEC	Acres	Alternative 4 Prescriptior	Commercial	Deferred	Fuels	RX burn	Diameter limit	Community Comments
36-23	CABLE	39S-02W-36	0.000222	ST_PP_40%	PP		x		18" DBH	Dense pine and fir stand. Favor pine and hardwoods. Some big trees on border with 36-25, otherwise logged-over with high fuel density and heavy competition.
36-23	CABLE	39S-02W-36	0.016957	ST_PP_40%	PP		x		18" DBH	Dense pine and fir stand. Favor pine and hardwoods. Some big trees on border with 36-25, otherwise logged-over with high fuel density and heavy competition.
36-23	TRACTOR	39S-02W-36	13.32649	ST_PP_40%	PP		x		18" DBH	Dense stands of fir and pine. Favor pine and hardwoods.
36-24	CABLE	39S-02W-36	29.32545	DM_GS_60%		x				Drop due to new road construction. Dense fir stand directly above O'Lickety unit. All NRF habitat.
36-25	CABLE	39S-02W-36	14.2992	DM_GS_60%		x				Late-seral habitat including large, old trees as well as pole stands. Steep slopes at headwaters of Lick Gulch. Contigous with late-seral, fire-adapted forest on USFS. All NRF habitat with connectivity to nesting area.
36-30	CABLE	39S-03W-36	10.76807	ST_DF_40%		x				All NRF habitat. IN proximity to two nesting areas. Good for connectivity. Mature stand.
36-31	CABLE	39S-03W-36	13.50789	ST_DF_40%		x				Late-seral forest; minimal understory fuels; relatively closed canopy. All NRF habitat adjacent to nesting site with connectivity to others. Large pine and fir dominant, scattered shrub-form live oak in understory.
36-32	CABLE	39S-03W-36	19.52885	ST_DF_40%			x			Mid to late seral forest, closed canopy stand. Dense thickets in the understory should be manually removed to reduce fuels. Non-commercial. All NRF habitat with connectivity to nesting area.
36-33	TRACTOR	39S-03W-36	15.68588	ST_DF_40%	DF 60%		x		20" DBH	Roadside unit. Retain all large trees and clump formations. Southern section thin 36-33A; northern section "group select-modified" 36-33B.
FUELS		39S-03W-36	14.01498	Fuels			x			Reconsider Fuels approach.
FUELS		39S-03W-28	78.5777	Fuels			x	x		Break into two prescriptions according to plant communities. RX fire following treatment. Oak flats with previous fuels treatments should be RX burned. Conifer stands with heavy madrone in-growth from previous logging should be manually thinned
FUELS		39S-01W-29	16.57536	Fuels						Reconsider Fuels approach.
FUELS		39S-01W-29	19.13525	Fuels						Reconsider Fuels approach.
FUELS		39S-01W-28	11.07563	Fuels			x	x		Break into two prescriptions according to plant communities. RX fire following treatment. Oak flats with previous fuels treatments should be RX burned. Conifer stands with heavy madrone in-growth from previous logging should be manually thinned
FUELS		39S-01W-20	4.68346	Fuels						Reconsider Fuels approach.
FUELS		39S-03W-35	306.4598	Fuels			x			Boaz Mtn. Roadless Area. Cancel the western half consisting of grass balds, pine groves, chapparal, and oak woodland. High habitat values. Treat the eastern half in young conifer stands.
FUELS		39S-02W-30	50.97635	Fuels			x	x		Reconsider Fuels approach. Break unit into five separate prescriptions according to plant communities. RX fire following treatement.
FUELS		39S-02W-30	244.2995	Fuels			x	x		Reconsider Fuels approach. Break unit into five separate prescriptions according to plant communities. RX fire following treatment.
YARDING	YARDING	39S-03W-35	4.307078	Potential_Yarding						
YARDING		39S-02W-25	4.462233	Potential_Yarding						
YARDING		39S-02W-25	1.220062	Potential_Yarding						
YARDING		39S-03W-35	6.302359	Potential_Yarding						

Nedsbar Community Alternative
Deferred Units

14-30

- Buncom Roadless Area.
- Late-seral forest with open fire-resilient conditions.
- Eastern portion NRF.
- Surrounded by non-forest plant communities and brushy fuel loads.

14-31

- Buncom Roadless Area.
- Mostly dispersal habitat.

15-30

- Buncom Roadless Area
- Upper end open, fire-resilient, late-seral forest that underburned in 1987.
- Surrounded by non-forest plant communities and brushy fuel loads.

17-11B

- Poor economics, low volume per acre.
- Very few overstory trees, does not currently support RMP requirement of 16-25 large trees per acre.
- Fuel reduction thinning already completed.

17-12

- Chelsea Spring has historic and recreational value.
- Late-seral forest with old-growth pine.
- Entire unit is NRF habitat and is adjacent to nesting area.

19-20B

- Canopy reduction to 40% as proposed by BLM would increase fuel hazards in the WUI on Little Applegate Road.
- Road renovation to facilitate logging of unit 19-20B would badly impact a spring/water right serving an adjacent residential property on Little Applegate Road.
- Visual impacts to Little Applegate Valley.
- East half is NRF habitat.

20-10

- Late-seral stand of pine and fir supporting fire resilient conditions.
- All dispersal habitat.
- Surrounded by upland prairie, chaparral, and logged over forest.

25-20

- Dakubetede Roadless Area.
- New road and landing construction in roadless area.
- Portion of the stand are complex, late-seral habitat.
- Dispersal habitat? Owl habitat determination for eastern portion of the unit is questionable.
- Adjacent to large areas of roosting and foraging habitat.

25-21A

- Dakubetede Roadless Area.
- Mid-seral uncut forest, in conifer stringer.
- Dispersal habitat adjacent to roosting and foraging habitat.
- New road and landing construction in roadless area.

25-21B

- Dakubetede Roadless Area.
- Mid-seral uncut forest, in conifer stringer.
- Roosting and foraging habitat.
- New road and landing construction in roadless area.

25-23

- Dakubetede Roadless Area.
- Mid- to late-seral uncut forest. Open, fire-resilient conditions.
- New road and landing construction in roadless area.
- High quality thermal cover in conifer stringer surrounded by non-forest plant communities.

25-24

- Older forest with variable stand structure.
- Dispersal habitat with connectivity to nesting area.
- Directly above the Little Applegate River.

25-30

- Entire unit is NRF habitat.
- Mid- to late-seral, uncut stand between plantation and upland prairie.
- High quality thermal cover.

26-20

- Dakubetede Roadless Area.
- Extensive new road construction in roadless area.
- Open, fire-resilient, uncut, mid-seral forest.

26-21

- Dakubetede Roadless Area.
- New road construction in roadless area and the riparian reserve of Lick Gulch
- Inconsistent with prior management direction in the 2011 Lick Gulch and Max Gulch Road Decommissioning Project ROD. The ROD states that the road proposed to be re-opened and extended "is poorly located in the Riparian Reserve of Lick Gulch, and poses a high risk to deliver sediment from the road surface and road fill during large and small rain events. During flood events, erosion of the road prism occurs, resulting in the transportation of fine sediment into Lick Gulch and ultimately the Little Applegate River." The roads have been decommissioned due to poor location in a riparian reserve and documented water quality impacts. New road should not be constructed in this area.

26-30

- Buncom Roadless Area.
- Most of unit is NRF habitat, with small portion of dispersal at western margin.
- Provides excellent wildlife habitat with quality protective cover habitat and thermal cover for local ungulate populations.
- Late-seral forest with numerous large trees over 30" DBH, appears to be uncut forest.
- Dense understory of suppressed live oak would be "released" by canopy thinning, increasing fuel hazards on this strategic ridgeline.

27-20

- Dakubetede Roadless Area.
- Extensive new road construction proposed in roadless area.
- Late-seral, fire-resilient stand.
- Entire unit is roosting and foraging habitat.
- Surrounded on three sides with non-forest plant communities.

28-10A

- Bald Mountain Roadless Area.
- Late-seral forest with large, old trees.
- Proposed route for Jack-Ash non-motorized trail.

28-10B

- Bald Mountain Roadless Area.
- Late-seral forest with large, old trees.
- Proposed route for Jack-Ash non-motorized trail.
- Entire unit is NRF habitat.

28-10C

- Bald Mountain Roadless Area.
- Late-seral forest with large, old trees.
- Proposed route for Jack-Ash non-motorized trail.
- Entire unit is NRF habitat.

28-11A

- Bald Mountain Roadless Area.
- Late-seral forest with large, old trees.
- Proposed route for Jack-Ash non-motorized trail.

28-11B

- Bald Mountain Roadless Area.
- Late-seral forest with large, old trees.
- Proposed route for Jack-Ash non-motorized trail.

28-20

- Visual impacts in Little Applegate River Canyon.
- Sedimentation concerns due to logging on steep slopes directly above the Little Applegate River.

28-22A

- Significant new road construction
- Mid- to late-seral, minimal fuels, relatively fire-resilient.
- Dispersal habitat? Owl habitat determination for this unit is questionable.
- Visual impacts to Little Applegate Valley.
- Canopy closure recommendations would increase fuel loads adjacent to residential property in the WUI.
- Nearby fisher sightings documented on Yale Creek Road adjacent to the unit.

28-22B

- Significant new road construction
- Late-seral/old-growth habitat, minimal fuels, very fire-resilient. Underburned in 1987 fire.
- Dispersal habitat? Owl habitat determination for this unit is extremely questionable.
- Visual impacts to Little Applegate Valley.
- Canopy closure recommendations would increase fuel loads adjacent to residential property in the WUI.
- Nearby fisher sightings documented on Yale Creek Road adjacent to the unit.

28-22C

- Significant new road construction
- Late-seral/old-growth habitat, minimal fuels, very fire-resilient. Underburned in 1987 fire.
- Dispersal habitat? Owl habitat determination for this unit is extremely questionable.
- Visual impacts to Little Applegate Valley.
- Canopy closure recommendations would increase fuel loads adjacent to residential property in the WUI.
- Nearby fisher sightings documented on Yale Creek Road adjacent to the unit.

30-10B

- Small 6.5-acre unit provides thermal cover and refugia habitat adjacent to heavily thinned O'Lickety Timber Sale unit and logged over private lands.
- Entire unit is NRF habitat.
- Mid- to late-seral habitat with minimal understory fuels, fuel hazards may increase with canopy thinning.
- On very steep slopes within Little Applegate River canyon.

30-20

- Buncom Roadless Area.
- Stand maintains historic structure, including open-spaced groupings of large, old trees.
- Late-seral, relatively fire-resilient forest.
- Commercial harvest would be dropped in CA, but fuels treatment implemented to reduce understory fuels and competition.
- New road construction required to facilitate commercial harvest.

33-20

- Lower 2/3 of unit is late-seral with diverse species composition
- Stand underburned in 1987, very fire-resilient.
- New road construction and major road renovation on currently closed road would be required to facilitate commercial harvest.

33-30

- Boaz Mountain Roadless Area
- The unit is proposed for structural retention/regeneration harvest, canopy closure levels recommended will increase fire hazards adjacent to private residential land in the WUI.
- Late-seral, fire-resilient habitat.
- Dispersal habitat? Owl habitat determination for this unit is extremely questionable.

- Visual impacts to Upper Applegate Valley.
- Cypripedium fasciculatum site within the stand.

34-30

- Boaz Mountain Roadless Area
- Canopy closure levels recommended will increase fire hazards adjacent to private residential land in the WUI.
- Late-seral, fire-resilient habitat.
- Some roosting and foraging and some dispersal habitat directly adjacent to nesting area to the northeast.
- Visual impacts to Upper Applegate Valley.

35-21

- Previously thinned, variable stand with large, well-spaced trees. Mid– to late-seral habitat, lower 2/3 very fire-resilient.
- Listed as "potential" habitat, appears to be roosting and foraging at lower end.
- Upper 1/3 of unit is dense with undergrowth and supports few overstory trees.

35-30A

- Groves of large, old structurally complex forest at upper end of unit.
- Entire unit is identified as NRF habitat.
- Diverse stand structure, mid- to late-seral throughout stand.

35-30B

- Diverse variable stand; some very large trees; rock outcrop; oak openings.
- Very steep.
- Entire unit identified as NRF habitat.
- Siskiyou Mountain salamander habitat.

35-32

- Late-seral forest at the headwaters of Grouse Creek.
- Entire unit is NRF habitat adjacent to nesting area.
- Relatively moist, productive site.

36-20

- Dakubetede Roadless Area
- New road construction in roadless area and the riparian reserve of Lick Gulch
- Inconsistent with prior management direction in the 2011 Lick Gulch and Max Gulch Road Decommissioning Project ROD. The ROD states that the road proposed to be re-opened and extended "is poorly located in the Riparian Reserve of Lick Gulch, and poses a high risk to deliver sediment from the road surface and road fill during large and small rain events. During flood events, erosion of the

road prism occurs, resulting in the transportation of fine sediment into Lick Gulch and ultimately the Little Applegate River." The roads have been decommissioned due to poor location in a riparian reserve and documented water quality impacts. New road should not be constructed in this area.

- Dispersal habitat adjacent to owl core.

36-21A

- Surrounded by grassy balds on two sides; public and private land plantation stands and Quartz Fire high severity patch.
- Provides thermal cover and refugia.

36-21B

- Surrounded by grassy balds on two sides; public and private land plantation stands and Quartz Fire high severity patch.
- Provides thermal cover and refugia.

36-24

- Significant new road construction required for commercial harvest.
- Entire unit is NRF habitat.

36-25

- Late-seral habitat including large, old trees as well as pole stands.
- Steep slopes at headwaters of Lick Gulch.
- Contiguous with late-seral, fire-adapted forest on USFS. All NRF habitat with connectivity to nesting area.

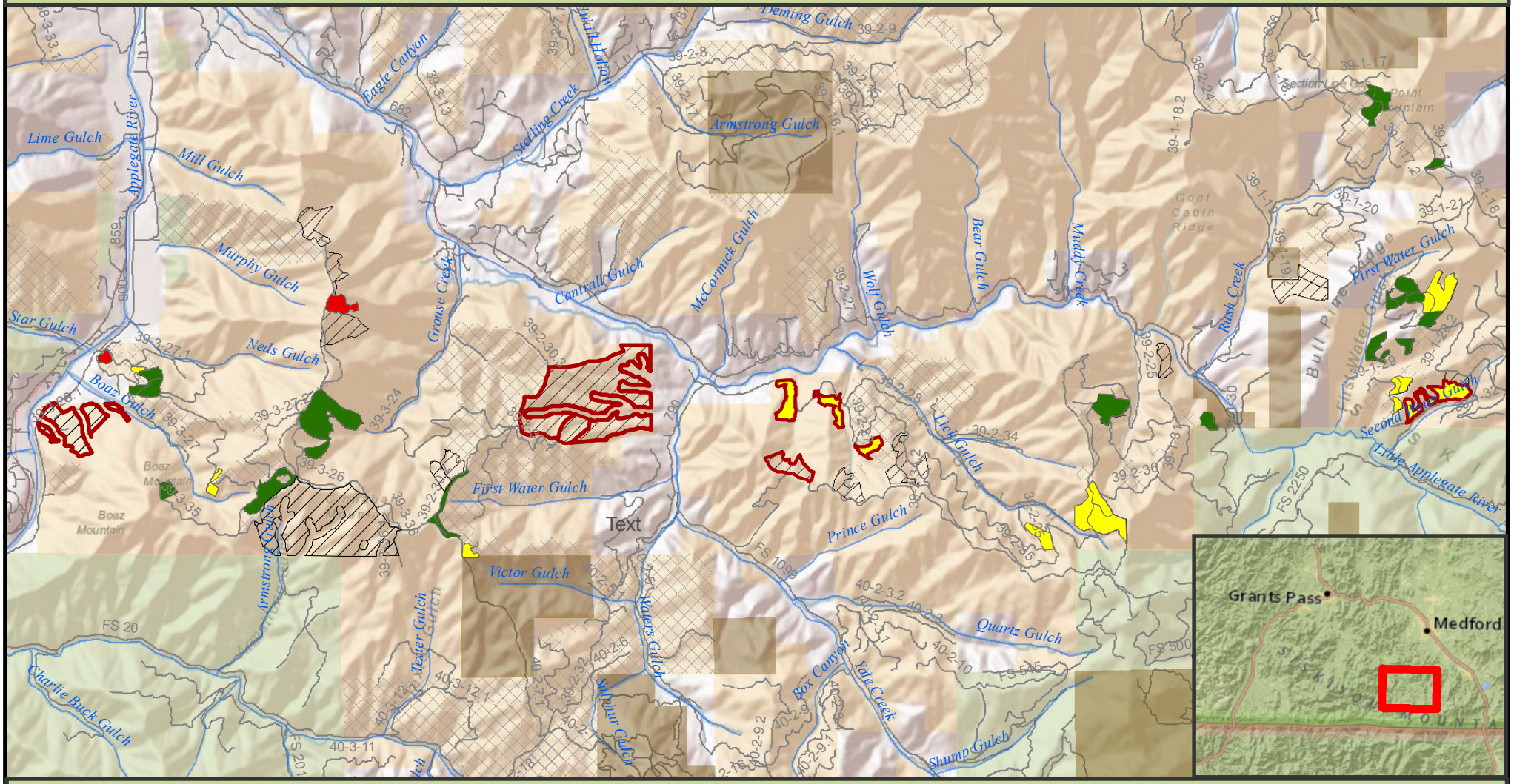
36-30

- Unit is entirely NRF habitat within proximity of two nesting areas.
- Mid- to late-seral forest with connectivity to other NRF habitats and late-seral habitats.

36-31

- Late-seral forest; minimal understory fuels; relatively closed canopy.
- All NRF habitat adjacent to nesting site with connectivity to other nesting areas in section 31.
- Large pine and fir dominant, scattered shrub-form live oak in understory.

Nedsbar Timber Sale Community Alternative



Community Alternative

- Fuels Reduction
- Prescribed Fire
- Mortality Salvage
- Commercial Dougals Fir
- Commercial Ponderosa Pine

Nedsbar Forest Management Project

The Community Alternative to the Nedsbar Timber Sale was developed over the course of several months by community members in the Little Applegate Valley. This alternative emphasizes the reduction of density in forests on BLM land in the Nedsbar planning area. The CA was limited by the units that were described by BLM in the Nedsbar Scoping Notice released in 2014.

Miles
0 0.5 1 2 3 4

E-76

N W E S

Land Ownership/History

- BLM Land
- Forest Service Land
- Timber Industry
- Recent Thin/Fuels BLM Units

Map Created 2/15
Environmental Assessment
Community Alternative Team

APPENDIX F – EFFECTS TO NSO SITES

	Alternative 3		Alternative 4		Alternative 5	
Site # and Effects (Priority)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)
0097O (HIGH)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	42	0	57	1	24	0
Dispersal Removed	1	0	2	0	1	0
Dispersal Maintained	92	0	117	1	58	0
0875O (HIGH)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	59	0	59	0	14	0
Dispersal Removed	0	0	1	0	1	0
Dispersal Maintained	22	0	48	0	28	4
0957O (LOW)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	0	0	0	0	0	0
Dispersal Removed	0	0	2	0	1	0
Dispersal Maintained	10	0	50	0	51	0
0973O (LOW)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	10	0	11	0	0	0
Dispersal Removed	1	0	1	0	1	0
Dispersal Maintained	51	0	38	0	27	0

	Alternative 3		Alternative 4		Alternative 5	
Site # and Effects (Priority)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)
1836O (HIGH)						
NRF Removed	0	0	8	0	1	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	0	0	42	0	0	0
Dispersal Removed	1	0	11	4	2	0
Dispersal Maintained	10	0	222	0	94	0
1836A (HIGH)						
NRF Removed	0	0	7	1	1	1
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	6	0	47	5	0	0
Dispersal Removed	1	1	11	1	3	1
Dispersal Maintained	19	0	263	41	103	30
2232O (HIGH)						
NRF Removed	0	0	1	0	0	0
NRF Downgrade	0	0	97	0	0	0
NRF Maintained	119	0	47	0	14	0
Dispersal Removed	1	0	4	0	1	0
Dispersal Maintained	132	0	165	1	134	1
2401O (HIGH)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	43	0	58	0	0	0
Dispersal Removed	1	0	2	0	1	0
Dispersal Maintained	86	0	159	15	134	15
3648O (LOW)						
NRF Removed	0	0	0	0	0	0

	Alternative 3		Alternative 4		Alternative 5	
Site # and Effects (Priority)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	69	0	69	0	30	0
Dispersal Removed	1	0	1	0	0	0
Dispersal Maintained	86	0	122	26	36	22
3941O (LOW)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	10	0	11	0	0	0
Dispersal Removed	1	0	1	0	1	0
Dispersal Maintained	52	0	39	0	28	0
4066A (HIGH)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	69	0	69	0	30	0
Dispersal Removed	1	0	1	0	0	0
Dispersal Maintained	69	0	71	0	36	0
4066O (HIGH)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	29	0	29	0	0	0
Dispersal Removed	1	0	1	0	0	0
Dispersal Maintained	0	0	0	0	0	0
FS1993 (LOW)						
NRF Removed	0	0	3	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	0	0	31	0	0	0

	Alternative 3		Alternative 4		Alternative 5	
Site # and Effects (Priority)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)	Home Range (acres)	0.5 Mile Core (acres)
Dispersal Removed	1	0	3	1	2	0
Dispersal Maintained	10	0	83	0	64	1
FS2001 (LOW)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	0	0	0	0	0	0
Dispersal Removed	0	0	0	0	0	0
Dispersal Maintained	9	0	9	0	9	0
FS2002 (LOW)						
NRF Removed	0	0	0	0	0	0
NRF Downgrade	0	0	0	0	0	0
NRF Maintained	0	0	0	0	0	0
Dispersal Removed	0	0	0	0	0	0
Dispersal Maintained	34	0	60	0	35	0

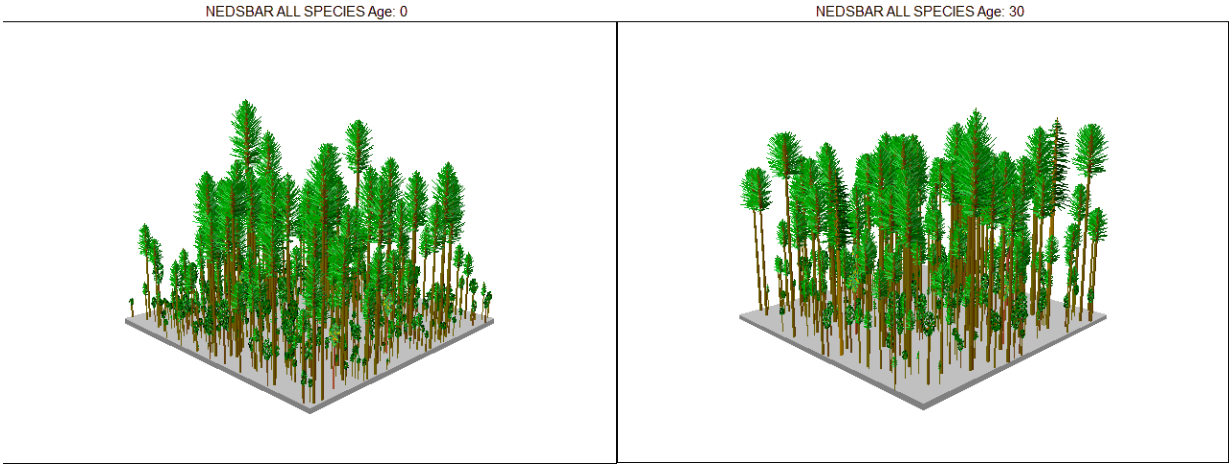
APPENDIX G – STAND VISUALIZATION SYSTEM (SVS) MODELING

Unit # 35-31

Treatment Unit	QMD (inches)	Basal Area (ft^2)	Trees Per Acre	Live Crown Ratio (%)	Canopy Cover (%)	Relative Density	Species Proportion (%)	Scribner Volume (bd ft/ac)
Current Condition	7.4	178	599	36	70	0.69*	DF-85 PP-2 HW-13	
30 years No Action	11.2	221	322	33	70	0.73*	DF-90 PP-2 HW-13	
Alt 3-Dropped from Alternative 3: Refer to No Action								
Alt 4. Selective Thinning DF: Post Treatment	10.8	130	205	39	50	0.44	DF-82 PP-3 HW-15	5762
Alt 4. 30 years Post Treatment	14.6	164	142	37	52	0.49	DF-85 PP-2 HW-13	
Alt 5. Density Management: Post Treatment	10.9	163	250	38	60	0.54	DF-86 PP-2 HW-12	461
Alt 5. 30 years Post Treatment	14.8	204	172	34	62	0.61*	DF-89 PP-2 HW-9	

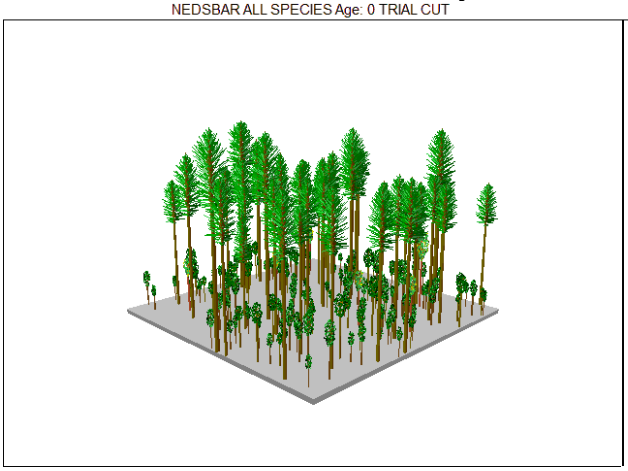
*Relative Density (Curtis 1982) indices above 0.55 = zone of occurrence of suppression mortality. Without stand treatments that reduce trees per acre, RDIs that remain above the 0.55 RDI threshold leaves stands more vulnerable to drought, insect, and disease mortality. Reducing stand density is critical in meeting the stated purpose and need of the Nedsbar Forest Management Project.

Current Condition vs 30-year No Action Projection

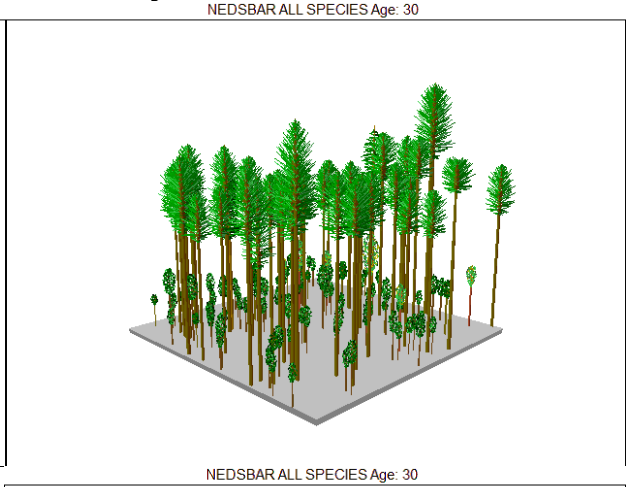


Alternative 4: Post Treatment vs 30-year Post Treatment Projection

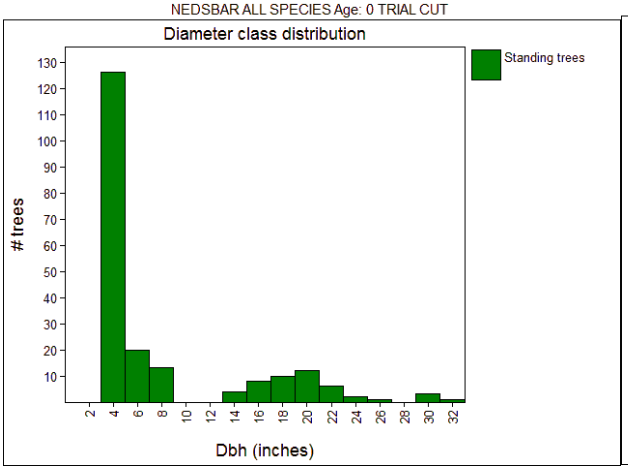
NEDSBAR ALL SPECIES Age: 0 TRIAL CUT



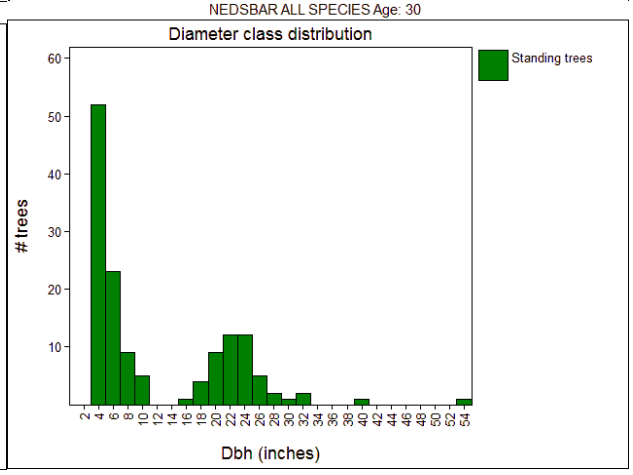
NEDSBAR ALL SPECIES Age: 30



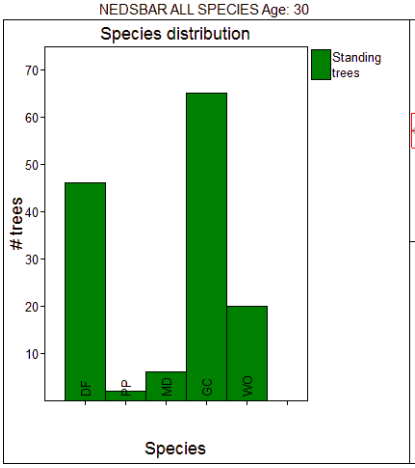
NEDSBAR ALL SPECIES Age: 0 TRIAL CUT



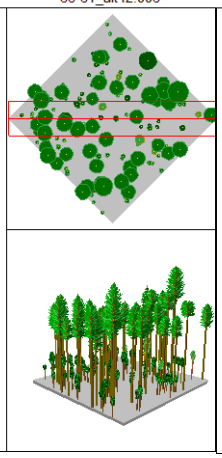
NEDSBAR ALL SPECIES Age: 30



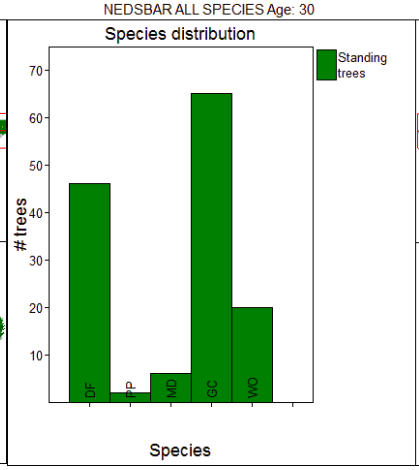
NEDSBAR ALL SPECIES Age: 30



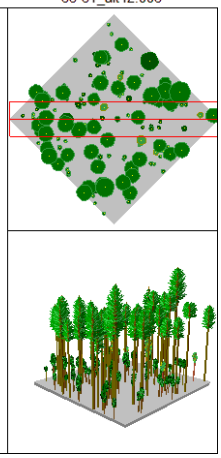
35-31_alt42.003



NEDSBAR ALL SPECIES Age: 30

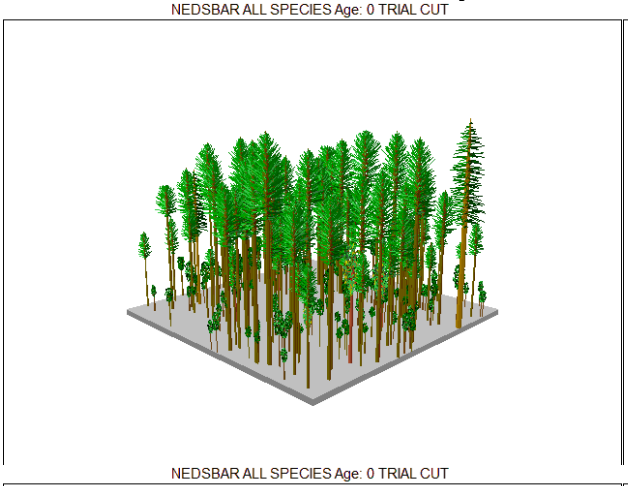


35-31_alt42.003

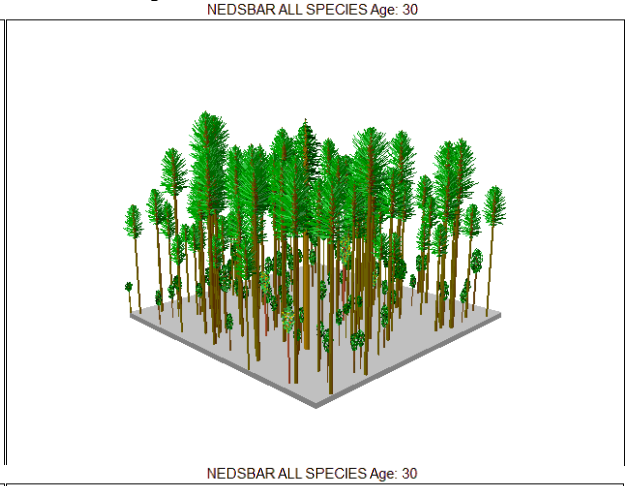


Alternative 5: Post Treatment vs 30-year Post Treatment Projection

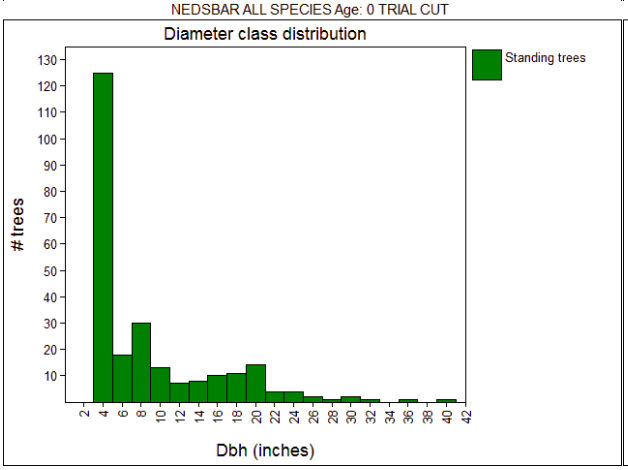
NEDSBAR ALL SPECIES Age: 0 TRIAL CUT



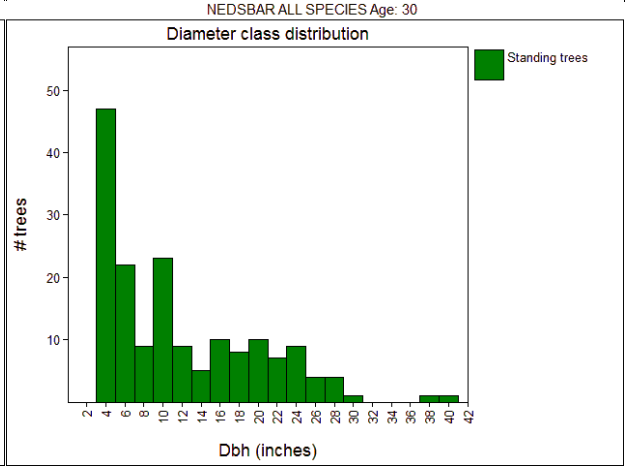
NEDSBAR ALL SPECIES Age: 30



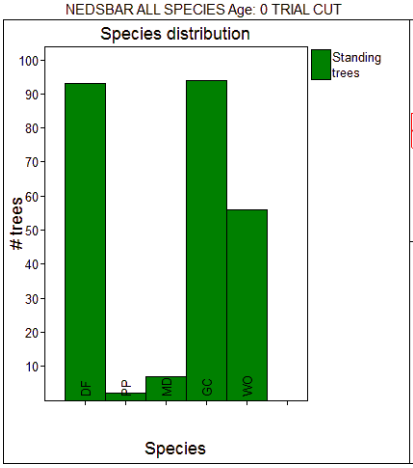
NEDSBAR ALL SPECIES Age: 0 TRIAL CUT



NEDSBAR ALL SPECIES Age: 30



NEDSBAR ALL SPECIES Age: 0 TRIAL CUT



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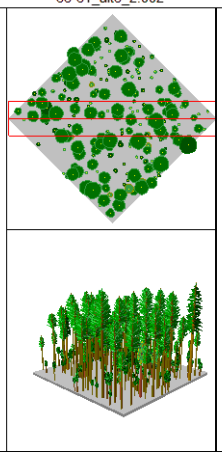
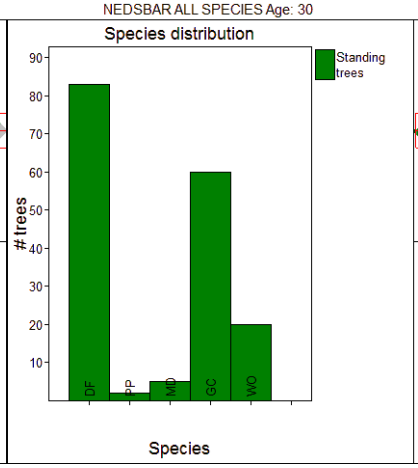
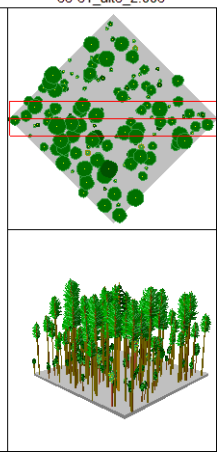


NEDSBAR ALL SPECIES Age: 30



35-31_alt5_2.003



Unit # 20-12

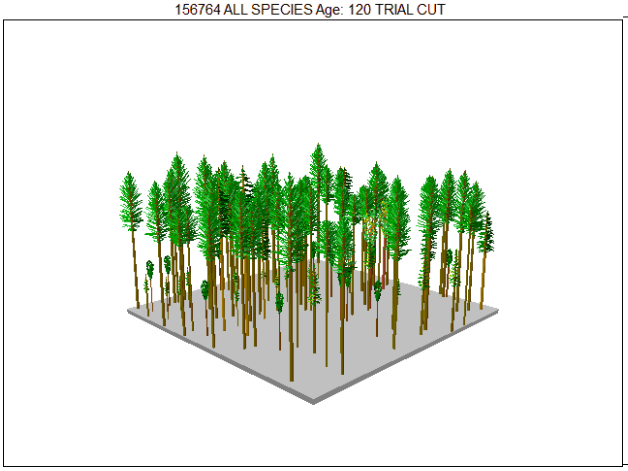
Treatment Unit	QMD (inches)	Basal Area (ft^2)	Trees Per Acre	Live Crown Ratio (%)	Canopy Cover (%)	Relative Density	Species Proportion (%)	Scribner Volume (bd ft/ac)
Current Condition	9.0	168	382	41	67	0.61*	DF-81 PP-9 IC-5 HW-5	
30 years No Action	11.6	217	294	35	70	0.71*	DF-83 PP-8 IC-5 HW-4	
Alt 3- Selective Thinning-PP: Refer to Alternative 4								
Alt 4- Selective Thinning PP: Post Treatment	15.3	122	96	40	48	0.36	DF-74 PP-12 IC-7 HW-7	7296
Alt 4 30 years Post Treatment	18	160	91	35	53	0.44	DF-75 PP-11 IC-7 HW-7	
Alt 5- Density Management: Post Treatment	14.4	162	143	38	61	0.48	DF-81 PP-9 IC-5 HW-5	641
Alt 5 30 years Post Treatment	16.8	208	136	32	65	0.59*	DF-82 PP-8 IC-5 HW-5	

*Relative Density (Curtis 1982) indices above 0.55 = zone of occurrence of suppression mortality. Without stand treatments that reduce trees per acre, RDIs that remain above the 0.55 RDI threshold leaves stands more vulnerable to drought, insect, and disease mortality. Reducing stand density is critical in meeting the stated purpose and need of the Nedsbar Forest Management Project.

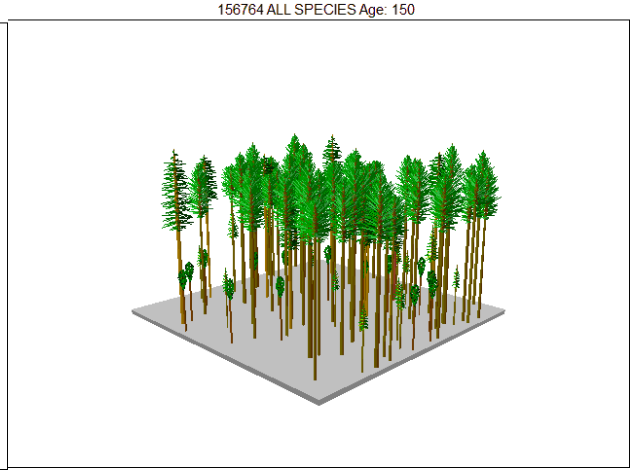
Current Condition vs 30-year No Action Projection

Alternative 4: Post Treatment vs 30-year Post Treatment Projection

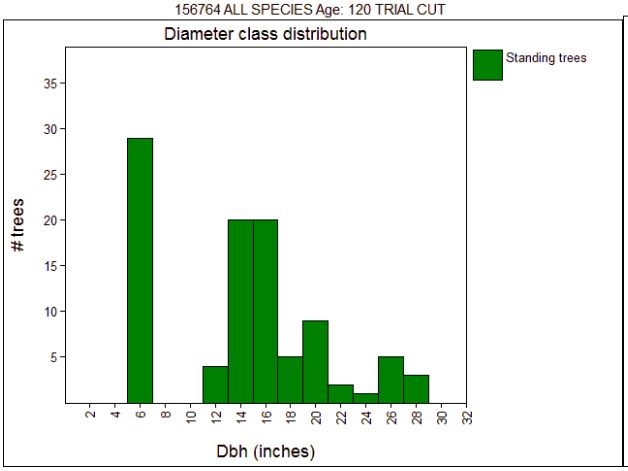
156764 ALL SPECIES Age: 120 TRIAL CUT



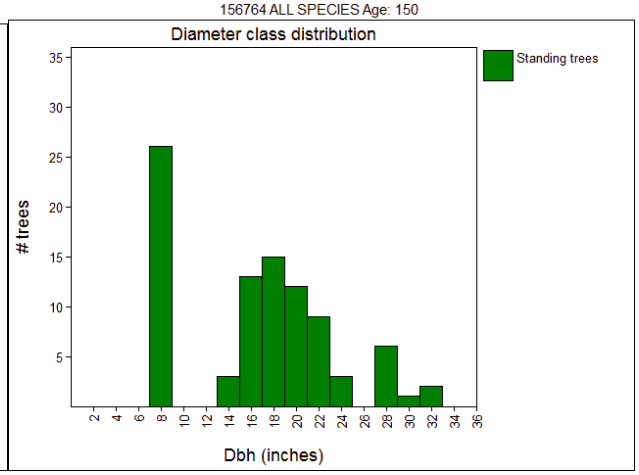
156764 ALL SPECIES Age: 150



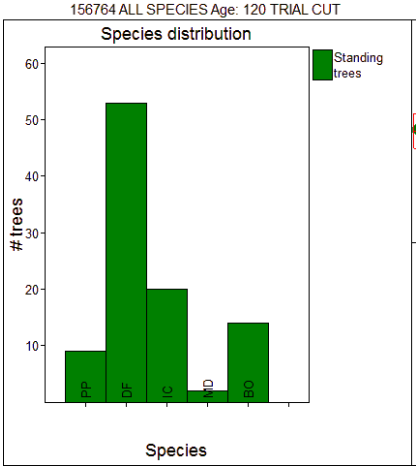
156764 ALL SPECIES Age: 120 TRIAL CUT



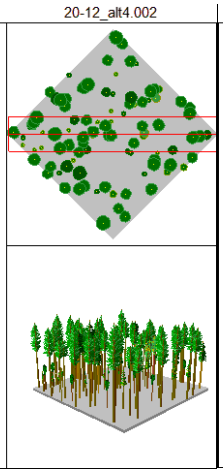
156764 ALL SPECIES Age: 150



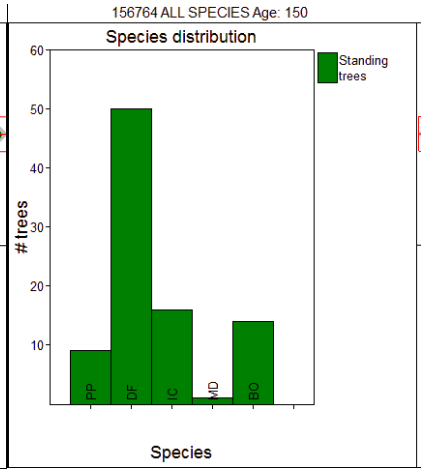
156764 ALL SPECIES Age: 120 TRIAL CUT



20-12_alt4.002



156764 ALL SPECIES Age: 150



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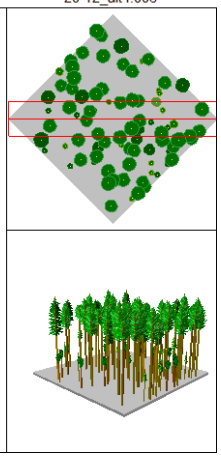
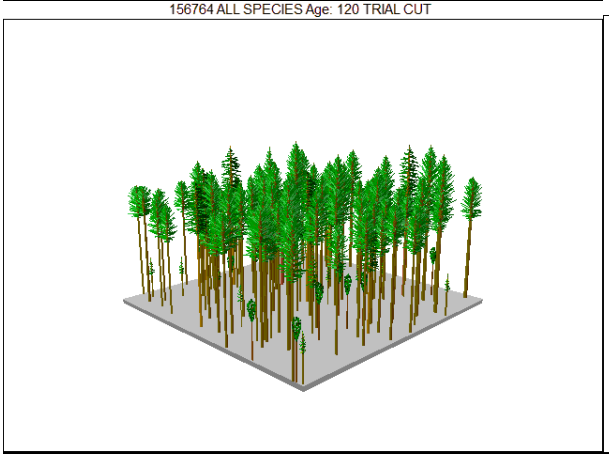
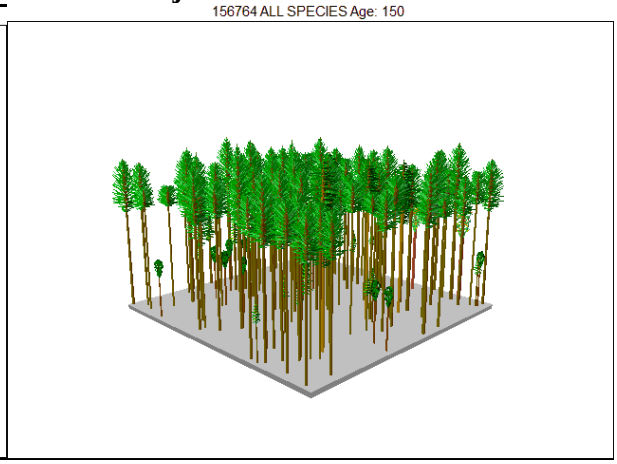


Alternative 5: Post Treatment vs 30-year Post Treatment Projection

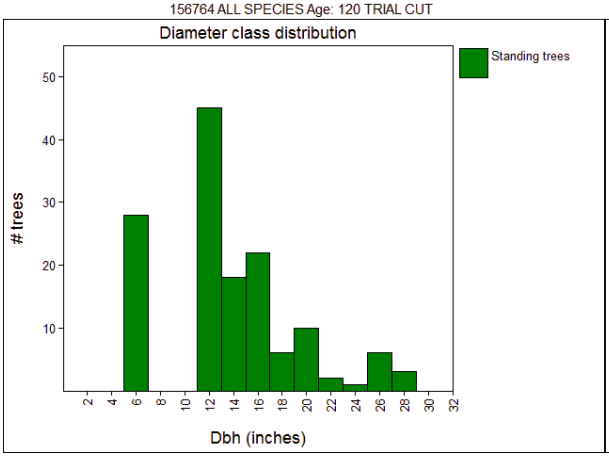
156764 ALL SPECIES Age: 120 TRIAL CUT



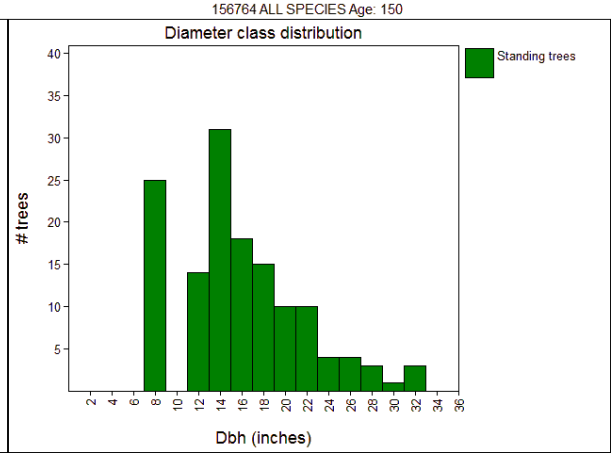
156764 ALL SPECIES Age: 150



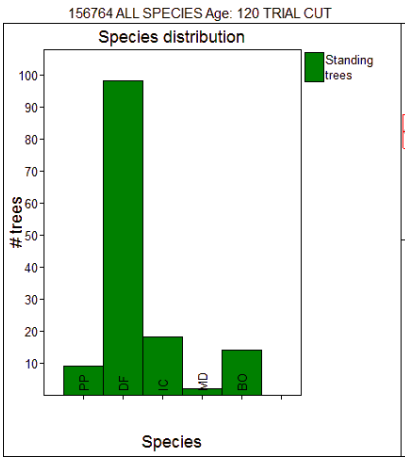
156764 ALL SPECIES Age: 120 TRIAL CUT



156764 ALL SPECIES Age: 150



156764 ALL SPECIES Age: 120 TRIAL CUT



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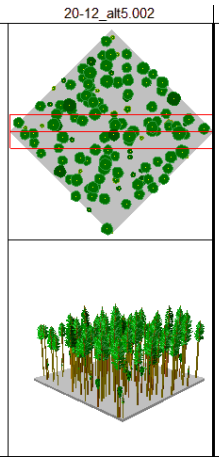
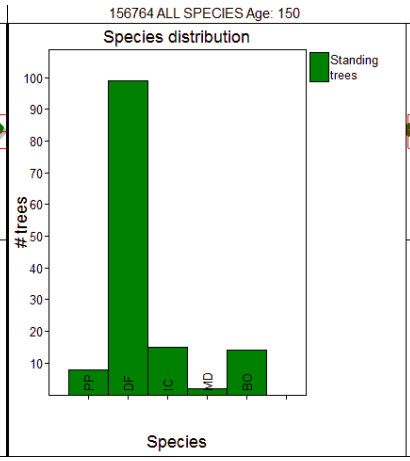


156764 ALL SPECIES Age: 150



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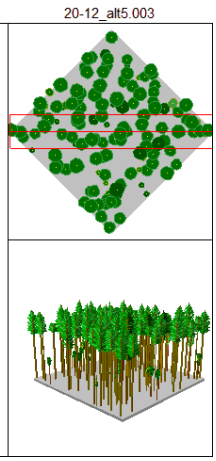
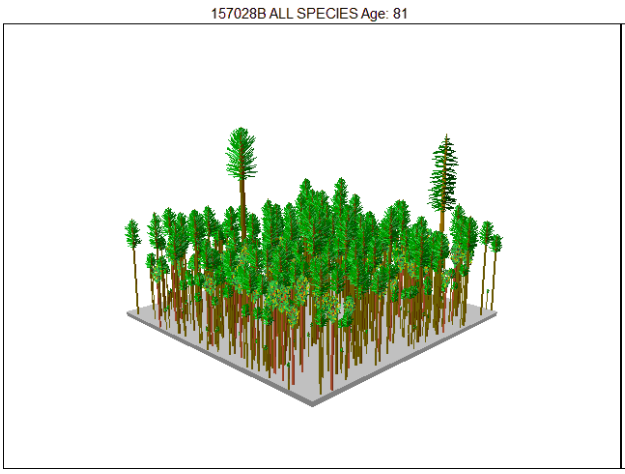


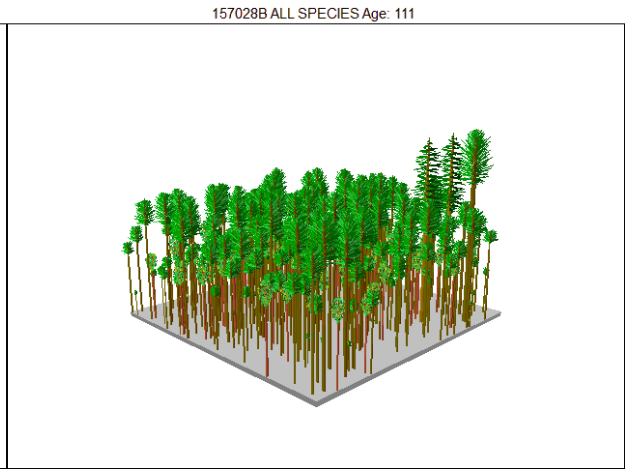
Unit # 29-10

Treatment Unit	QMD (inches)	Basal Area (ft^2)	Trees Per Acre	Live Crown Ratio (%)	Canopy Cover (%)	Relative Density	Species Proportion (%)	Scribner Volume (bd ft/ac)
Current Condition	9.6	255	513	22	83	0.90*	DF-79 PP-3 HW-18	
30 years No Action	11.8	295	387	21	82	0.96*	DF-78 PP-2 HW-20	
Alt 3-Selective Thinning PP: Refer to Alternative 4								
Alt 4- Selective Thinning PP: Post Treatment	12.8	143	159	28	55	0.45	DF-63 PP-5 HW-32	10117
Alt 4 30 years Post Treatment	14.8	186	156	25	61	0.55*	DF-63 PP-4 HW-33	
Alt 5- Selective Thinning PP (50%CC) : Post Treatment	13.1	163	175	29	60	0.51	DF-67 PP-4 HW-29	7056
Alt 5 30 years Post Treatment	15	209	170	25	65	0.62*	DF-68 PP-3 HW-29	

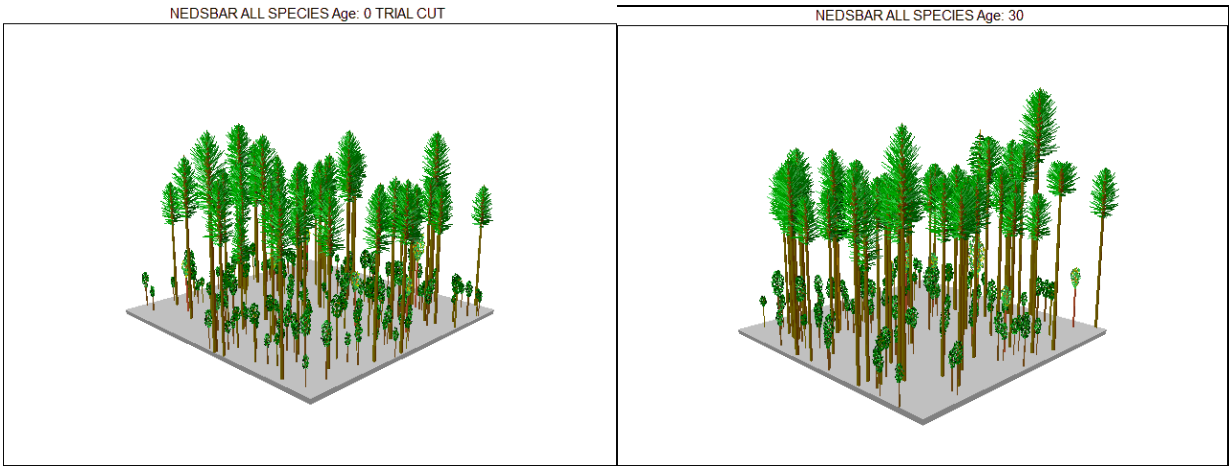
*Relative Density (Curtis 1982) indices above 0.55 = zone of occurrence of suppression mortality. Without stand treatments that reduce trees per acre, RDIs that remain above the 0.55 RDI threshold leaves stands more vulnerable to drought, insect, and disease mortality. Reducing stand density is critical in meeting the stated purpose and need of the Nedsbar Forest Management Project.

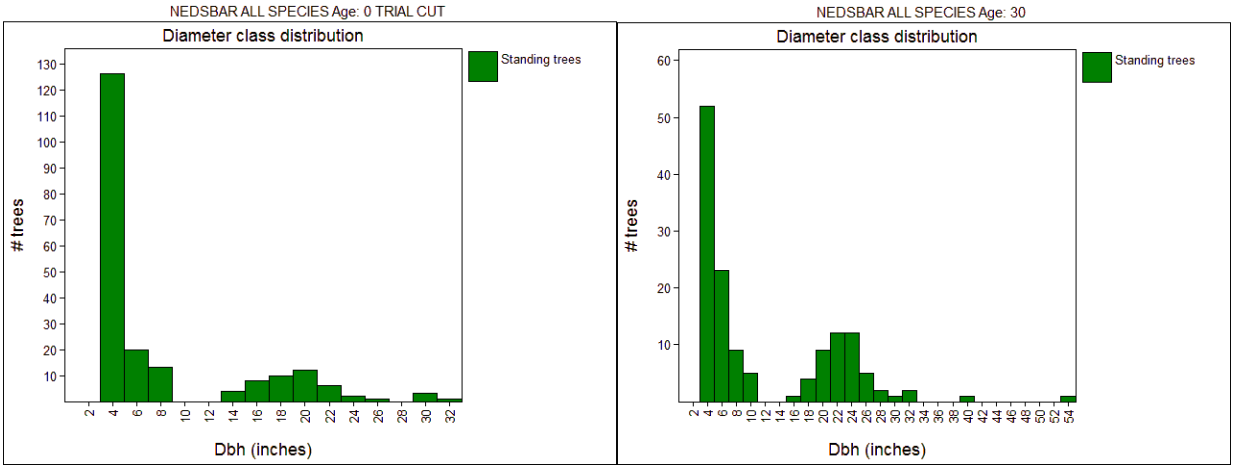
Current Condition vs 30-year No Action Projection

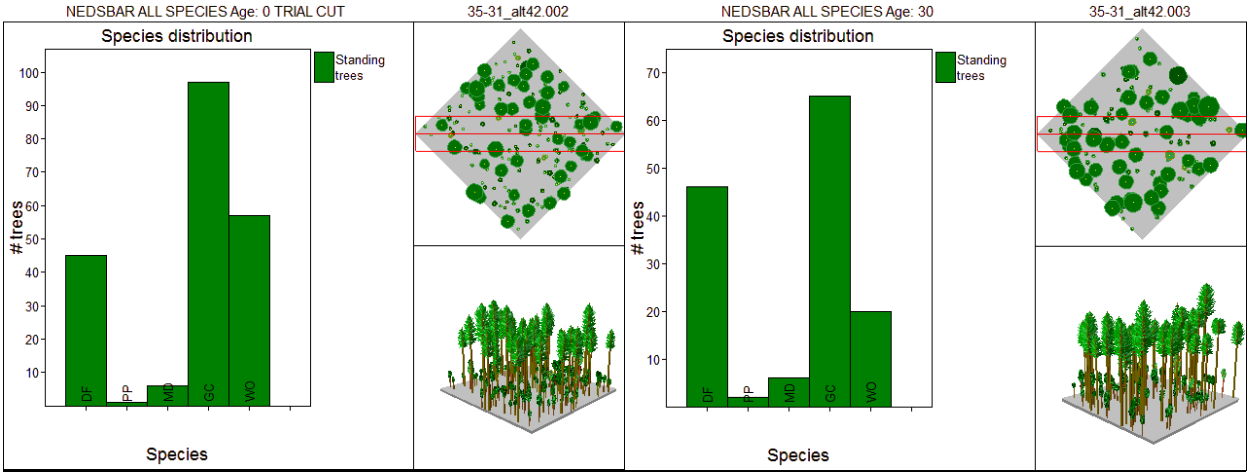




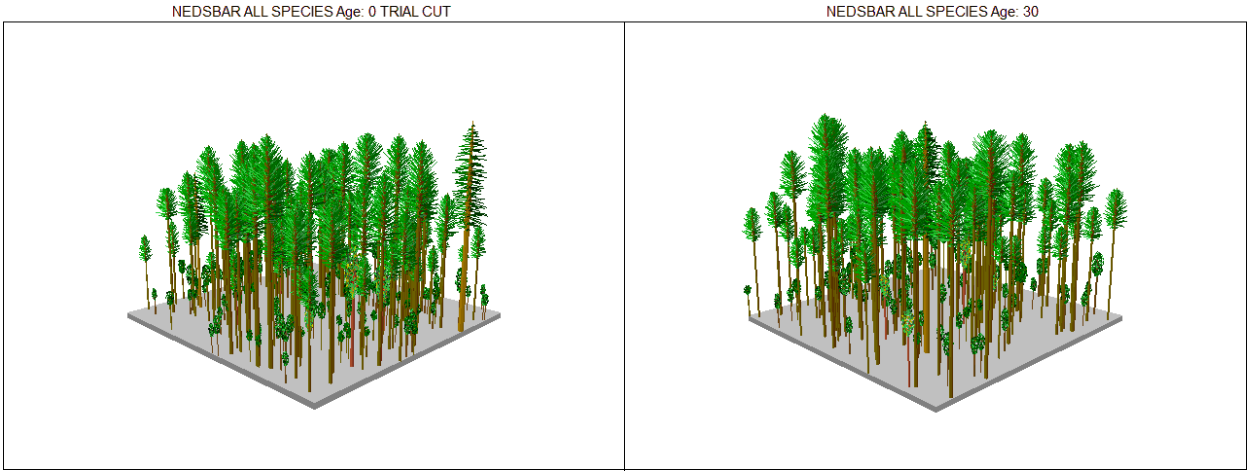
Alternative 4: Post Treatment vs 30-year Post Treatment Projection

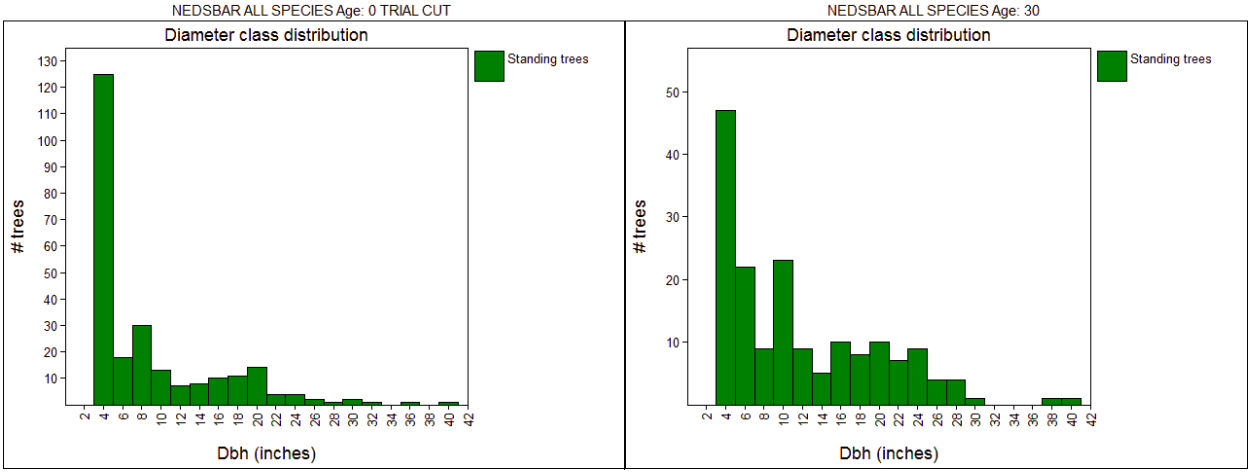


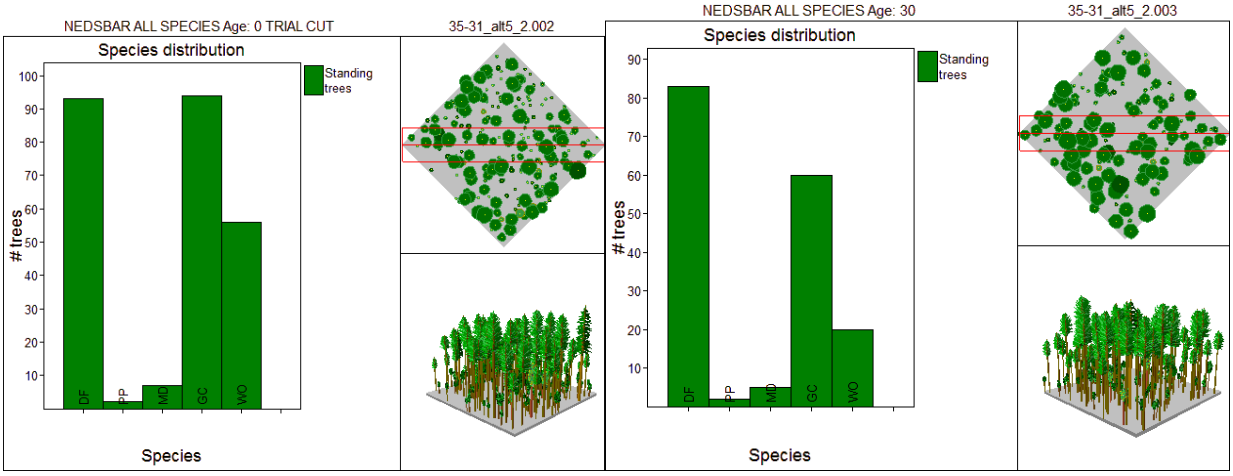




Alternative 5: Post Treatment vs 30-year Post Treatment Projection





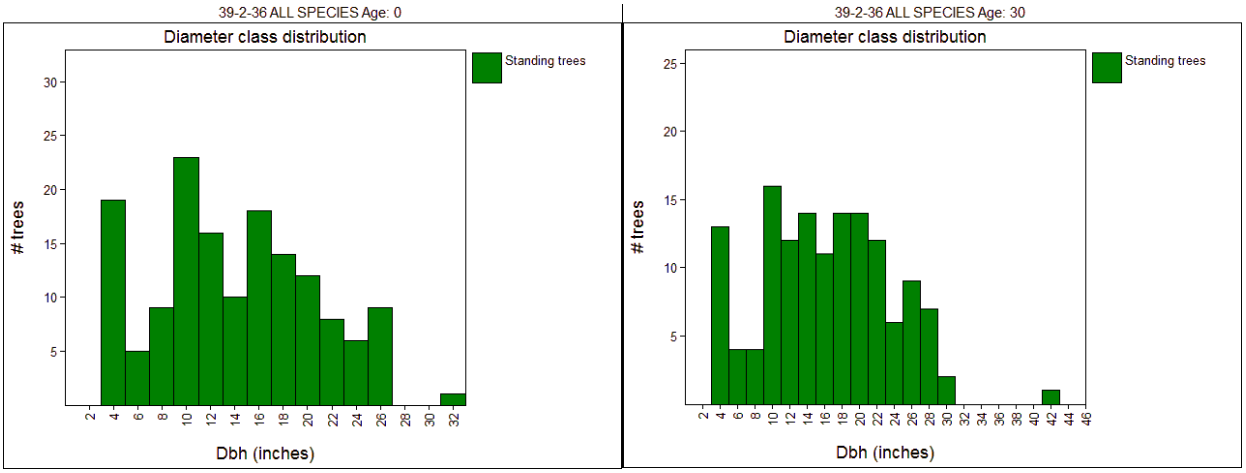


Unit # 36-24

Treatment Unit	QMD (inches)	Basal Area (ft^2)	Trees Per Acre	Live Crown Ratio (%)	Canopy Cover (%)	Relative Density	Species Proportion (%)	Scribner Volume (bd ft/ac)
Current Condition	16.2	227	158	30	68	0.65*	DF-95 PP-5	
30 years No Action	18.5	270	145	26	70	0.733*	DF-96 PP-4	
Alt 3-Dropped from Alternative 3: Refer to No Action								
Alt 4- Density Management: Post Treatment	19.1	200	100	31	60	0.54	DF-95 PP-5	3746
Alt 4 30 years Post Treatment	21.3	241	98	27	63	0.62	DF-96 PP-4	
Alt 5-Dropped from Alternative 5: Refer to No Action								

*Relative Density (Curtis 1982) indices above 0.55 = zone of occurrence of suppression mortality. Without stand treatments that reduce trees per acre, RDIs that remain above the 0.55 RDI threshold leaves stands more vulnerable to drought, insect, and disease mortality. Reducing stand density is critical in meeting the stated purpose and need of the Nedsbar Forest Management Project.

Current Condition vs 30-year No Action Projection



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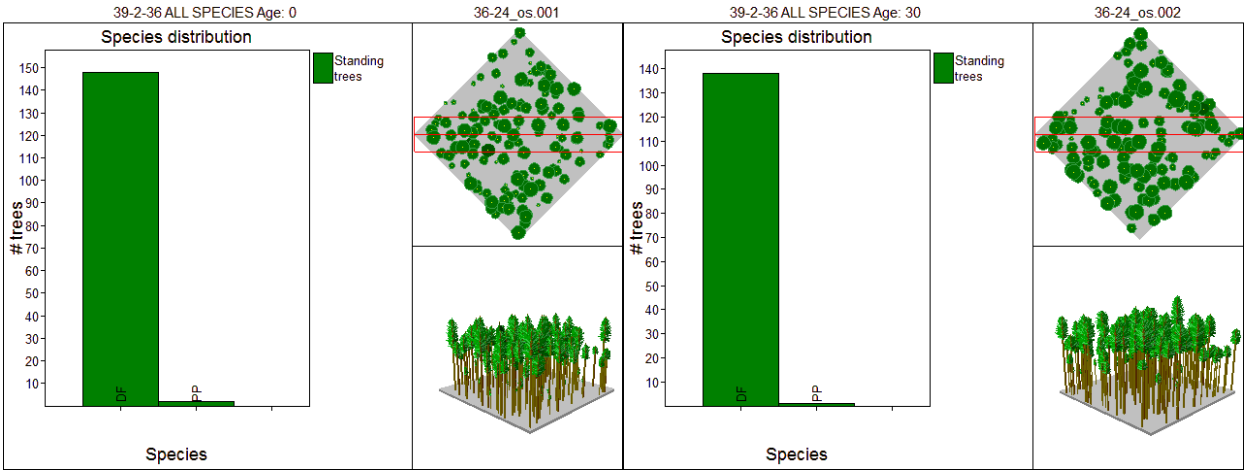
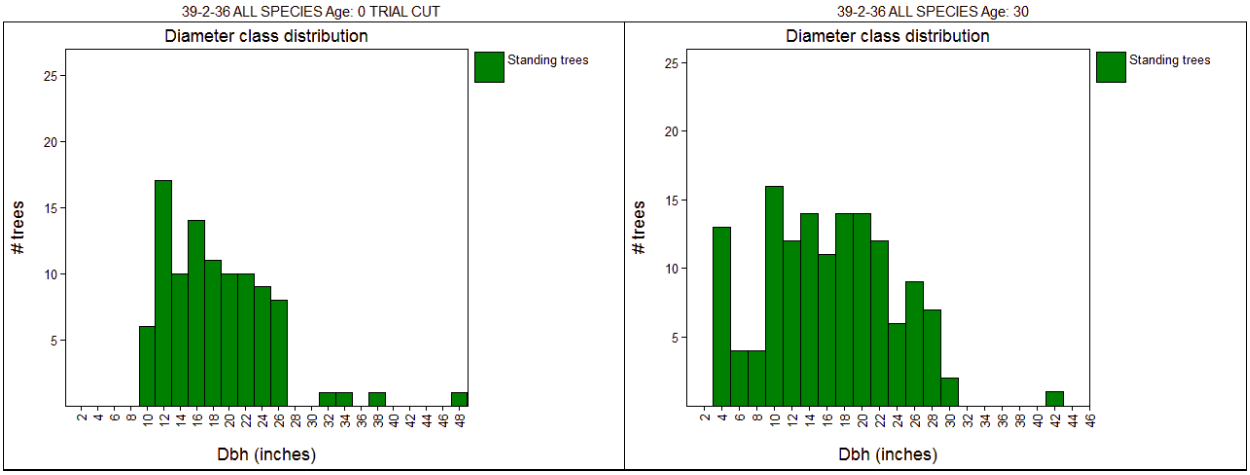
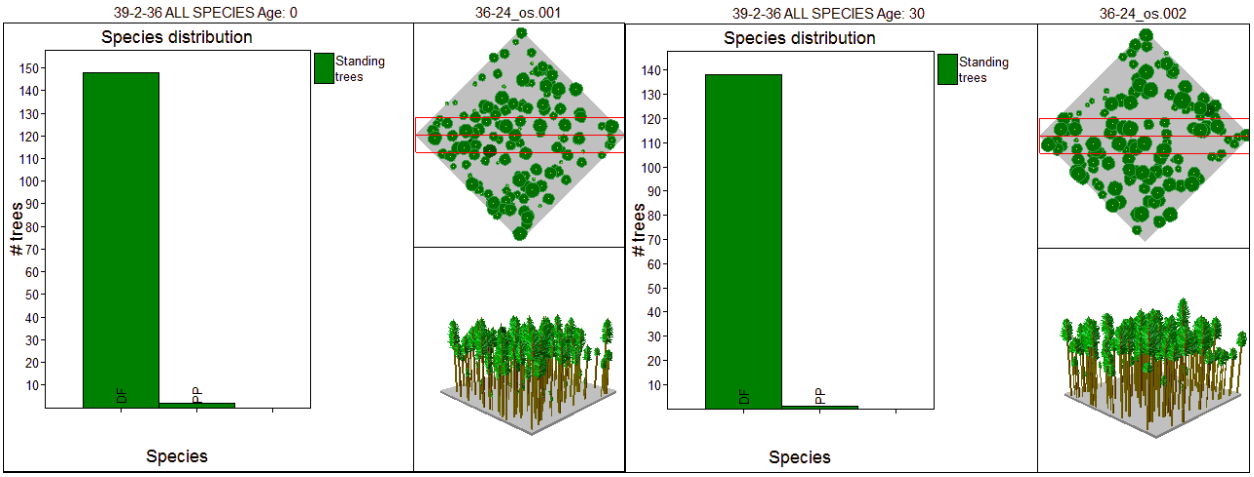


Alternative 4: Post Treatment vs 30-year Post Treatment Projection




39-2-36 ALL SPECIES Age: 0
36-24_os.001
Species distribution
Standing trees
trees
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
DF
PP
Species
39-2-36 ALL SPECIES Age: 30
36-24_os.002
Species distribution
Standing trees
trees
140
130
120
110
100
90
80
70
60
50
40
30
20
10
DF
PP
Species

Appendix H – CONSISTENCY WITH AQUATIC CONSERVATION STRATEGY

A. INTRODUCTION

The NWFP's 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 5th-field hydrologic scale, or watershed, at the 6th and/or 7th fields (subwatershed and/or drainage), and at the site level. In this case, the Analysis Area covers numerous small 7th field drainages, which drain into the Little Applegate and Upper Applegate 5th field Watersheds. How the four components of ACS relate to the Nedsbar Forest Management 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 NWFP's ACS and are listed in the PDFs for the Nedsbar Forest Management 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. Upper portions of the Little Applegate Watershed, including portions of four 7th field drainages within the Analysis Area, are designated as a Key Watershed. Key Watersheds include a special management mandate of no net increase in road densities. No new roads are proposed in any of the drainages within the Key Watershed area in the Nedsbar Forest Management Project.

3. Watershed Analysis: The Applegate Star/Boaz Watershed Analysis was completed by the BLM in 1998 and covers the portion of the Upper Applegate Watershed within the Analysis Area, and the Little Applegate Watershed Analysis, completed in 1995 by the USFS and BLM covers the portion of the Analysis Area within the Little Applegate Watershed.

4. Watershed Restoration: Restoration activities in the Upper Applegate Watershed have focused on those streams in the watershed which are fish bearing (Star Gulch, Beaver Creek, and Palmer Creek) and not within the Analysis Area drainages. Large wood additions, gravel augmentation, dam removals, and numerous road decommissioning and storm proofing projects have occurred within these fish bearing sub-watersheds. Future activities within the Analysis Area drainages which would benefit aquatic habitat include road decommissioning and storm proofing of problematic roads, which would be especially beneficial in Boaz Gulch. In the Little Applegate Watershed, restoration has included dam removal on private lands, ditch screening and lining, and instream work up on Forest Service lands. BLM recently obliterated over a mile and a half of stream adjacent road in the Lick Gulch drainage, and roughly 0.5 mile in the Second Water Gulch drainage, and upgraded a fish passage barrier pipe on Yale Creek. Other roads in the watershed have recently been storm proofed as well.

B. CONSISTENCY REVIEW

1. Evaluation of This Action's Consistency with Northwest Forest Plan Aquatic Conservation Strategy Objectives

ACSO 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.

Topography, slope, forest fire regime, climate, and the distribution of soil types and plant communities are some of the landscape-scale features affecting aquatic systems in the Watershed. One of the treatment objectives of the Nedsbar Forest Management Project is to compensate for an altered fire regime and increasing episodes of beetle kill, and to restore certain plant communities. The intent of this objective is to restore the function of landscape-scale processes like wildfire in order to protect the complexity and distribution of plant communities (including riparian areas) across the landscape. Over time this may be noticeable at the site level, but would have only a minor benefit at the watershed scale, as less than 1% of the watershed would be treated.

ACSO 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.

In the Upper Applegate Watershed, the presence of Applegate Dam is by far and away the biggest effect on this indicator. The dam does not allow for any upstream passage by aquatic organisms past the top of the watershed. Additionally there is a smaller diversion which is a barrier to certain life stages of aquatic organisms at certain flows. In the Little Applegate Watershed, there are numerous small diversion dams and a barrier falls near the mouth of the stream that prevent passage by certain species during at least certain portions of the year. The only project element proposed in the Nedsbar Forest Management Project that would affect this indicator is the installation of two small culverts associated with the new road construction proposed in Alternative 4 over intermittent streams in the Lick Gulch drainage. This would represent a site level impact of this indicator, however it would be of little consequence to aquatic organisms as the streams are dry most of the year and do not support fish or other large aquatic organisms.

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

The only element proposed in the Nedsbar Forest Management Project that would affect this indicator is the installation of the two crossings as discussed above. Again, this would represent a site level impact to this indicator as the physical integrity of the channel (banks and bottom configuration) would be degraded by installation of the culverts.

ACSO 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.

There would be no effect on water temperature, because primary shade would not be reduced adjacent to any perennial stream channels, and secondary shade reductions would be very slight, as over 50% canopy cover would be retained in the outer portion of the RR where riparian thinning prescriptions, which would retain the large trees, are proposed. Short-term there is a high probability that log haul and road construction would increase sediment and turbidity inputs to aquatic habitat throughout the Analysis Area, though the magnitude of inputs from haul is not anticipated to be measurable or discernible above background turbidity which would occur during high flow event. Road construction is expected to input up to 2 cubic yards of sediment at the site of two crossings. This sediment would likely remain in the channels immediately downstream of the crossings (site level impact). Smaller contributions may occur to the intermittent channels during storm events, but inputs would not likely be detectable beyond the site level. Log haul is likely to result in inputs as well, spread throughout the Analysis Area, and over the life of the timber sale contract (3 years) as described in the analysis of this work in the EA. Overall, Alternative 4 is estimated to contribute up to almost 4 cubic yards of sediment to analysis area streams. The other alternatives were determined to contribute less than 1 cubic yard, all of which would result from haul. Upland work would have no effect on fine sediment levels, due to the filtering action of RR buffers, extensive PDFs designed to prevent overland sediment movement, and normal BMPs.

ACSO 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.

The only elements of this project which could affect the sediment regime are log haul, and the new road construction proposed under Alternative 4. See previous objective and the analysis in the EA. The proposed road construction would be likely to contribute larger amounts of coarser sediment in the vicinity of the two crossings. Because the intermittent streams would be dry during construction activities, sediment would remain in the channels until storm flows elevated the water table to the point where the intermittent streams had surface flow, at which time any unconsolidated fine sediment could be entrained and carried through the system as a one-time turbidity pulse. Future smaller imputs could also occur (chronic source) as weathering of the new road surfaces occurs, resulting in additional small turbidity pulses. This turbidity would pass through habitat during a time of year (in response to storm events) when stream flows are elevated and prone to natural increases in turbidity. At such a time, it would be undetectable in downstream habitats impacted by turbidity from a myriad of other sources. In general, high road densities, episodic ditch failures, and natural disturbance process in those portions of the watersheds containing highly erodible soils will continue to be the major source of sediment input into aquatic habitats in the Analysis Area.

ACSO 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.

Peak flows and summer low flows would not be affected by the Nedsbar Forest Management Project. See Section E: Water Resources for details. Any effects on ground water availability from the project would be too insignificant to be noticeable at the site, much less at the drainage or watershed scale. Storage dams, water releases, transfers and withdrawals for agriculture and residential use, and the high amount of non-porous surfaces (roads, buildings, etc.) have the most significant impacts to instream flows in the watersheds.

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

Only harvest would have any mechanism to affect the timing, variability, and duration of floodplain inundation and water table elevation. However, harvest would not occur and would leave canopy cover within the range of natural variability within the Analysis Area. Because of this, any extra water input intercepted by the ground as a result of harvest would likely be utilized by remaining vegetation before it reached the floodplain. Therefore, this objective would not be measurably affected at any spatial scale.

ACSO 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 only activities proposed in RR under the Nedsbar Forest Management Project are log haul, road construction proposed under Alternative 4, and riparian thinning proposed under Alternatives 3 and 4. Haul would not negatively disturb riparian vegetation. Proposed new road construction would permanently remove an estimated 2.1 acres of riparian vegetation at the site level of the outer portions of two perennial streams, and inner portions of two small intermittent streams. Thinning prescriptions proposed in the outer portions of 16.5 acres of RR would reduce stocking densities slightly, but would retain the large trees. Site level effects to future coarse woody inputs would be reduced slightly, though because only small trees are proposed for removal, the large trees would still remain to eventually contribute ample amounts of coarse wood. This indicator would remain unaffected at larger spatial scales.

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

See previous objectives. No detectable effects beyond site level sediment and turbidity inputs to aquatic and riparian habitat are anticipated to occur as a result of this project. These inputs would not meaningfully affect populations of native flora and fauna at any spatial scale.

APPENDIX I –BUREAU SENSITIVE SPECIES, WILDLIFE SPECIES OF CONCERN, AND SURVEY AND MANAGE COMPLIANCE

Specialist Report Memo

Special Status Species

Special Status Species are those species that are Federally listed as Threatened or Endangered; proposed or candidates for Federal listing as Threatened or Endangered; or are BLM-designated Sensitive species. Table I-1 lists the Special Status species that are known, suspected or have habitat in the project area. Species determined to have a very low likelihood of occurring in the project area, or whose presence would be considered accidental, were not included in this analysis. All Sensitive species were considered and evaluated for this project, and only those that could be impacted by the action alternatives are discussed in more detail in the EA.

The table below lists the Bureau Sensitive species that are documented or Suspected on lands within the Ashland Resource Area.

Table I-1. Special Status Species - Nedsbar Project

SPECIES	12/12/15 STATUS	Project within RANGE (Y/N)	Project Status 1/ Not Present 2/ Not Affected 3/ Affected	Comments Regarding Status
Birds: Bureau Sensitive				
American peregrine falcon	BSEN	Y	Not Present	No nesting habitat in the Project Area, but they could forage in the Project Area. Project activities would not affect this species at the landscape scale.
Bald eagle	BSEN	Y	Not Affected	There are no known bald eagle nest trees located in the Planning Area. If a nest is located prior to implementing the project, it would be protected under through Project Design Features (see Chapter 2), the 1995 RMP guidelines, and the Bald and Golden Eagle Protection Act.
Birds: Bureau Sensitive				
Lewis' woodpecker	BSEN	Y	Not Present	N/A
Purple martin	BSEN	N	Not Present	N/A
Tri-colored Blackbird	BSEN	N	Not Present	N/A

Table I-1. Special Status Species - Nedsbar Project

SPECIES	12/12/15 STATUS	Project within RANGE (Y/N)	Project Status 1/ Not Present 2/ Not Affected 3/ Affected	Comments Regarding Status
White-headed woodpecker	BSEN	N	Not Present	N/A
White-tailed kite	BSEN	N	Not Present	N/A
Amphibians: Bureau Sensitive				
Black Salamander	BSEN	Y	Not Affected	Conservation Assessment states riparian reserves and Siskiyou Mountains Salamander Management Sites offer adequate protection in Oregon for this species.
Siskiyou Mountains salamander	BSEN	Y	Affected	Conservation Agreement provides a network of protected sites. This species is addressed in Chapter 3.
Yellow Legged Frog	BSEN	Y	Not Affected	There is occupied habitat in the Applegate River. They are not expected to occur in or adjacent to project units. No anticipated effects.
Reptiles: Bureau Sensitive				
Northwestern pond turtle	BSEN	Y	Not Affected	Located in the watershed at large water sources, but not expected to occur in or adjacent to project units. No anticipated effects.
Mammals: Bureau Sensitive				
Fisher	BSEN	Y	Affected	Addressed in Chapter 3.

Table I-1. Special Status Species - Nedsbar Project

SPECIES	12/12/15 STATUS	Project within RANGE (Y/N)	Project Status 1/ Not Present 2/ Not Affected 3/ Affected	Comments Regarding Status
Fringed myotis Pacific pallid bat	BSEN	Y	Not Affected	The fringed myotis and pallid bat, are associated with late-successional habitat, and suspected to occur in the Planning Area. Some loss of potential roosting sites, such as snags and large mature trees, important to other bat species is expected from salvage activities. However, adequate amounts of roosting habitat would be retained through green tree and snag retention as listed in the PDFs (Chapter 2), which would help minimize potential effects.
Townsend's big-eared bat	BSEN	Y	Not Affected	Townsend's big-eared bats hibernate in caves and mines during winter (Sherwin 1998).There are no mine adits in the Planning Area with historic Townsend's big-eared bat observations. Therefore, no effects are anticipated.
Invertebrates: Bureau Sensitive				
Siskiyou Short-Horned Grasshopper	BSEN	Y	Not Affected	This grasshopper may be present in the Project Area. Adequate amounts of habitat would be retained in the Planning Area. No effects are anticipated.
Western Bumblebee	BSEN	Y	Not Affected	The western bumblebee may be present in meadows in the Project Area, however, removal of dead or down salvage trees would not affect any meadow systems in the Planning Area.
Invertebrates: Bureau Sensitive				
Johnson's Hairstreak	BSEN	Y	Affected	This butterfly is associated with mistletoe clumps. Mistletoe clumps would be retained in the portions of units 28-10 and 28-11 as listed in PDFS (Chapter 2.) Therefore, effects would be minimized in areas with mistletoe clumps.
Mardon skipper butterfly	BSEN	N	Not Affected	This butterfly is associated with meadows. Project activities would not affect this species.
Oregon Shoulderband snail	BSEN	Y	Not Present	N/A
Travelling sideband	BSEN	Y	Not Present	N/A

Table I-1. Special Status Species - Nedsbar Project

SPECIES	12/12/15 STATUS	Project within RANGE (Y/N)	Project Status 1/ Not Present 2/ Not Affected 3/ Affected	Comments Regarding Status
snail				
Evening Fieldslug	BSEN	Y	Not Present	N/A
Chase sideband snail	BSEN	Y	Present	Buffers to protect known locations have been established. Surveys were conducted in 2014 and 2015.
Siskiyou hesperian	BSEN	Y	Present	Buffers to protect known locations have been established. Surveys were conducted in 2014 and 2015.
Crater Lake tightcoil	BSEN	N	Not Affected	N/A

Status:
BSEN - Bureau Sensitive (BLM) - Generally these species are restricted in range and have natural or human caused threats to their survival.

WILDLIFE SURVEY & MANAGE COMPLIANCE

Survey & Manage Tracking Form: Wildlife Species Survey and Site Management Summary
Medford District BLM –Ashland Resource Area

Project Name: Nedsbar Project **Prepared By:** Ginelle O'Connor

Project Type: Forest Management Project **Date:** June 16, 2016

Location: T.39S., R.03W
T.39S., R.02W
T.39S., R.01W

S&M List Date: 2001 with 2003 Annual Species Review

Survey & Manage Wildlife Species

The Medford District BLM compiled the species list below (Table I-2) from 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* with 2003 Annual Species Review and includes those wildlife species whose known or suspected range includes the BLM Medford District 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 v 3.0* (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)

Species listed are Category A and C species, for which pre-disturbance surveys are required.

This list also includes any Category D, E, or F species with known sites located within the Nedsbar Project Area.

Table I-2. Survey and Manage Wildlife Species Known or Suspected in the Planning Area

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]	Yes	Yes	Yes	No	N/A	Yes	Buffers
Great Gray Owl (*Strix nebulosa*)	A	Yes	Yes	Yes	Yes	2012/2013	TBD	TBD
Red Tree Vole (*Arborimus longicaudus*)	C	No	N/A	N/A	No	N/A	N/A	N/A
Mollusks								
Chase Sideband (*Monadenia chaceana*)	B[2]	Yes	Yes	Yes	Yes	2011	Yes	Buffers
Oregon Shoulderband (*Helminthoglypta hertleini)*	B[2]	Yes	Yes	Yes	Yes	2011	No	Buffers
Evening Fieldslug (Deroceras hesperium)	B[2]	Yes	Yes	No	No[3]	N/A	No	N/A
Crater Lake Tightcoil (*Pristiloma arcticum crateris*)	A	No	No	No	No[4]	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.
[2] Equivalent-effort pre-disturbance surveys are required for this species.
[3] Suitable habitat for the evening Fieldslug is "associated with wet meadows in forested habitats in a variety of low vegetation, litter and debris; rocks may also be used. Little is known about this species or its habitat. Surveys may be limited to moist surface vegetation and cover objects within 30 m. (98ft.) of perennial wetlands, springs, seeps and riparian areas…" (pg. 41, *Survey Protocol for S&M Terrestrial Mollusk Species v3.0*, 2003). Within the project, suitable habitat is confined to the stream-side areas that are contained within Riparian Reserves in the harvest units. Significant negative affects to the micro-climate of this habitat within the Riparian Reserve will not occur so there is no trigger for surveys. Although, pre-disturbance surveys were conducted in areas outside of the riparian buffers and if this species presence is confirmed, it will receive the appropriate management protection.
[4]Suitable habitat for the Crater Lake tightcoil is "perennially wet situations in mature conifer forests, among rushes, mosses and other surface vegetation or under rocks and woody debris within 10 meters of open water in wetlands, springs, seeps and riparian areas…" (pg. 43, *Survey Protocol for S&M Terrestrial Mollusk Species v3.0*, 2003). Within the project, suitable habitat is confined to the stream-side areas that are contained within Riparian Reserves in the regeneration harvest units. Significant negative affects to the micro-climate of this habitat within the Riparian Reserve will not occur so there is no trigger for surveys.

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* with 2003 ASR species list to the Nedsbar Forest Management Project, completing the pre-disturbance surveys, and management of known sites required by Survey Protocols and Management Recommendations to comply with the 2001 Record of Decision.

Summary of Survey Results

Great Gray Owls

BLM conducted surveys for great gray owls (GGO) in the planning area and located three nesting pairs. Known great gray owl reproductive sites will be protected with a 100 acre management area and a 0.25 mile protection zone (USDA and USDI 2001). Nest core areas were delineated around these three nest sites: Lick Gulch, Rush Creek and Grouse Creek.

s:\Ginelle O'Connor_____ June 16, 2016
Ginelle O'Connor, Wildlife Biologist Date
Medford BLM District, Ashland Resource Area

APPENDIX J – ACRONYMS AND GLOSSARY

ACEC – area of environmental concern
ACS – Aquatic Conservation Strategy
AMA – Adaptive Management Area
ARPA – Archaeological Resources Protection Act
ASQ – Allowable Sale Quantity
AUM – Animal Unit Month
BA – Biological Assessment
BCC – Bird Species of Conservation Concern
BCR – Bird Conservation Region
BLM – Bureau of Land Management
BMP – best management practice
BOR – Bureau of Reclamation
CAA – Clean Air Act
CAWG – Community Alternative Working Group
CC – canopy cover
CCH – Coho Critical Habitat
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
CHU – critical habitat unit
CWA – Clean Water Act
CWD – coarse woody debris
CWM – coarse woody material
DBH – diameter at breast height
DEQ – Department of Environmental Quality
DF – Douglas-fir
DM – density management
EA – Environmental Assessment
EFH – essential fish habitat
EIS – environmental impact statement
ENSO – El Nino Southern Oscillation
EP Act – Energy Policy Act
ERMA – Extensive Recreation Management Area
ESA – Endangered Species Act
ESU – evolutionarily significant unit
EO – Executive Order
FAA – Federal Aviation Administration
FAR – Functioning-at-Risk
FARD - Functioning-at-Risk-Downward-trend
FBFM – Fire Behavior Fuels Models
FCC – Federal Communications Commission
FEIS – Final Environmental Impact Statement
FG – fragile for slope gradient
FLPMA – Federal Land Policy Management Act
FMP – Fire Management Plan
FOI – Forest Operations Inventory
FONSI – Finding of No Significant Impact
FM - fragile soils for surface erosion potential
FP – fragile for mass movement
FRCC – fire regime condition class
FS – Forest Service
FW – fragile for ground water
FWS – Fish and Wildlife Service
GBBDC – Game Birds Below Desired Condition
GIS – Geographic Information System
GGO – great gray owl
GPS – Global Positioning System
GS – Grass-Shrub
GTRN – Ground Transportation Network
HPB – hand piled and burned
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
LWC – Lands with Wilderness Characteristics
mbf – thousand board feet
MOA – memorandum of agreement
MOU – memorandum of understanding
NAAQS – National Ambient Air Quality Standards
NAT - natural
NEPA – National Environmental Policy Act
NH – nesting habitat
NHPA – National Historic Preservation Act
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
OAR – Oregon Administrative Regulations
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
OM – organic matter
ORS – Oregon Revised Statutes
ORWD – Oregon Water Resources Department
OSHA – Occupational Safety and Health Administration
OSMP – Oregon Smoke Management Plan

OWAM – Oregon Watershed Assessment Manual
PDF – Project Design Features
PDO – Pacific Decadal Oscillation
PE – polyethylene
PLSS – Public Lands Survey System
PLST – Siskiyou Mountains salamander
PNW – Pacific Northwest
PP – Ponderosa Pine
PRMP – Proposed Resource Management Plan
QMD – quadratic mean diameter
RA 6 – Recovery Action 6
RA 10 – Recovery Action 10
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
SNEP – Sierra Nevada Ecosystem Project
SONCC – Southern Oregon/Northern California Coasts
PCT – pre-commercial thinning
SRMA – Special Recreation Management Area
SSP – Special Status Plants
SSS – Special Status Species
ST – Selective Thinning
SVS – Stand Visualization System
T&E – Threatened and Endangered
TMDL – total maximum daily load
TMIA - Transportation Management and Inventory Assessment
TP – tree planting
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.

Adaptive Management Area: Ten landscape units identified in the Northwest Forest Plan designated to encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives and to help agencies learn how to manage on an ecosystem basis in terms of both technical and social challenges. Areas range from 92,000 to 500,000 acres in size.

Affected Environment: The area impacted by the Proposed Action.

Alternative: Management options by which the BLM can meet its purpose and need.

Analysis Area: Varies by resource and includes those areas that could potentially be affected by an alternative. In some cases the Analysis Area is confined to the Project Area and in others the Analysis Area extends beyond the Project Area.

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

Diameter at Breast Height (DBH): The diameter of a tree measured at 4.5 feet above the ground.

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.

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.

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 Hazard: Assesses vegetation by type, arrangement, volume, condition, and location.

Fire Regime: The characteristic frequency, extent, intensity, severity, and seasonality of fires within an ecosystem.

Fire Resiliency: Ability of a forest to readily recover from a fire event.

Fire Risk: The probability of when a fire will occur within a given area.

Flora: The plants of a specified region or time.

Fuel load: the oven-dry weight of fuel per unit area.

Fully Decommission: The road surface would be decompacted so that the former compacted surface would be rendered loose and friable to a depth of 12 to18 inches or to a point where 10-inch diameter stones are the dominant substrate (whichever is shallower). 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. Seeding with approved native seed species and mulching with weed-free straw or approved native materials would occur within Riparian Reserves and within 100 feet of the roads entrance. All drainage structures would be removed.

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.

Ground-Based Yarding: A moving vehicle (skidder) travels to the logs and pulls (i.e., skids) them to the landing; skidders can be wheeled or tracked. Trees and logs are removed from the woods and yarded to the landing by lifting the front end of the logs off the ground.

GTRN (Ground Transportation Road Network): 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.

Helicopter Yarding: Lifts trees with a helicopter bunched together by a cable, moving the trees from the treatment unit to a landing area near a road; allows for full suspension of trees from the treatment unit to the landing and skid trails or corridors are not needed.

HUC 5: Fifth-field (5th-field) hydrologic unit code, or watershed.

HUC 6: Sixth-field (6th-field) hydrologic unit code, or subwatershed.

HUC 7: Seventh-field (7th-field) hydrologic unit code or tributary to a subwatershed.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

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.

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.

Long-duration Intermittent Stream: A stream that flows seasonally, usually dry up during the summer.

Long-Term Closure: The road would be effectively blocked and winterized prior to the wet season. Blockage at the entrance would consist of placing logs, slash, boulders, earthen berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle use is precluded. Prior to closure the road will be left in an erosion-resistant condition.

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.

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 Weeds: 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.

Point Source Pollution: Pollution that arises from a well-defined origin, such as discharge from an industrial plant or runoff from a feedlot.

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.

Project Area: Interchangeable with treatment area, used to describe where action is proposed, such as units where forest thinning is proposed and where construction or road improvements are proposed.

Public Lands: Any lands administered by a public entity, including (but not limited to) the Bureau of Land Management and the US Forest Service.

Q

Quadratic Mean Diameter: A measure of the average mean diameter of all trees in a measurement unit, which is calculated using the central tendency of the averages.

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.

Relative Density Index: The ratio of actual stand density to the maximum stand density attainable or expected for that stand, which is dependent upon the species composition.

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.

Short-duration Intermittent Stream: A stream that flows only during storm or heavy precipitation events. These streams can also be described as ephemeral streams.

Silviculture: The science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet diverse needs.

Silvicultural Prescriptions: A planned sequence of treatments or prescriptions over the entire life of a forest stand needed to meet management objectives.

Site Potential Tree Height: the expected height of coniferous trees upon maturity.

Skid: To drag a log from within a harvest unit to a collection point (landing).

Skyline (Cable) Yarding: Cable system that pulls the logs to the landing using steel cables; a stationary machine (yarder) would be located on the road and would pull logs up to the landing with one end of the log suspended.

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.

Tractor Swing: One or more skidders accumulate loads to a designated location and the accumulated loads are then skidded along a single pre-designated skid trail for the run to the landing; also known as shuttle skidding.

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.

Y

Yarding: The act or process of conveying logs or whole trees to a landing, particularly by cable, tractor, or helicopter.