United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Glendale Resource Area
2164 N.E. Spalding
Grants Pass, Oregon 97526

IN REPLY REFER TO:

1792 (ORM080)
DOI-BLM-OR-M080-2009-0005-EA

DEC 2 1 2009

Dear Interested Party:

Attached is a CD of the Environmental Assessment (EA) and Finding of No Significant Impact for the Reuben Hazardous Fuel Reduction Project (DOI-BLM-OR-M080-2009-0005-EA) prepared by the Glendale Resource Area, Medford District, Bureau of Land Management.

This EA discloses the predicted environmental effects of the Proposed Action and No Action Alternative. The Proposed Action includes thinning 1,737 acres of hazardous fuel reduction treatments, of which 768 acres are proposed for biomass removal on Matrix and within portions of Riparian Reserve land use allocations. To facilitate the transport of logs, there would be maintenance work on existing roads. Trees between 1 and 8 inches to be removed for biomass would be whole-tree yarded or yarded with tops attached. Slash remaining in units after yarding would be treated by lop-and-scatter or handpile-and-burn. Subsequent underburning may take place to prevent future increases in fuel loading.

The Reuben Hazardous Fuel Reduction Project Area is located west of the town of Glendale, Oregon. The legal description of the PA is Township (T) 32S, Range (R) 7W, Sections 9, 15, 17, 19, 21, 25 and T 33S, R 7W, Sections 3, 9, & 11 in Douglas County, Willamette Meridian.

The EA and FONSI are available for review and comment December 23, 2009 in the Grants Pass Interagency Office, 2164 NE Spalding Avenue, 97526. The documents may also be accessed on the Medford District's internet site at http://www.blm.gov/or/districts/medford/plans/index.php. Office hours are Monday through Friday, 8:00 A.M. to 4:30 P.M., closed on holidays. Paper copies of these documents may also be obtained by contacting Michelle Calvert, (541) 471-6505.

Written comments concerning the significance, as defined in 40 CFR 1508.27, of the environmental effects predicted for this action are requested to be submitted in writing to Glendale Field Manager, and received on or before January 23, 2010 at the address previously stated. Comments received will be considered in making the final decision.

Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored by the extent allowed by law. All submissions from organizations or businesses, and from

individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection on their entirety.

Thank you for your interest in public land management in the Glendale Resource Area.

Sincerely,

Katrina L. Symons
Field Manager
Glendale Resource Area

Enclosure:

1- Environmental Assessment and Finding of No Significant Impact for the Reuben Hazardous Fuel Reduction Project and Map (CD)

REUBEN HAZARDOUS FUEL REDUCTION PROJECT ENVIRONMENTAL ASSESSMENT

DOI-BLM-OR-M080-2009-0005-EA

December 2009

United States Department of the Interior
Bureau of Land Management
Medford District
Glendale Resource Area

Lead Agency: Bureau of Land Management

Responsible Official: Katrina Symons
Glendale Field Manager
2164 NE Spalding Avenue
Grants Pass, OR 97526

Abstract:

The Glendale Resource Area of the Medford District BLM is proposing 1,737 acres of hazardous fuel reduction treatments of which 768 acres would have biomass removal in the Reuben Hazardous Fuel Reduction Project Area. Biomass removal would be done by tractor yarding (495 acres) and cable yarding (273 acres) logging systems. Whole tree yarding would reduce the amount of limbs, branches and residual slash left on site. Slash remaining in units after yarding would be treated by lop-and-scatter or handpile-and-burn. Subsequent underburning may take place to prevent future increases in fuel loading. Associated harvest activities include 56.5 miles of existing road maintenance. Proposed treatments are near the community of Glendale as well as non-wildland urban interface areas.

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FINDING OF NO SIGNIFICANT IMPACT

Based upon review of the EA (DOI-BLM-OR-M080-2009-0005-EA) and supporting project record, I have determined that Alternative 2 (Proposed Action) is not a major federal action and would not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27. Therefore, an environmental impact statement is not needed. This finding is based on the following discussion:

Context. Alternative 2 is a site-specific action directly involving 1,737 acres of BLM (Bureau of Land Management) administered land that by itself does not have international, national, region-wide, or state-wide importance. The Proposed Action is located in Matrix (including two Connectivity/Diversity Blocks) and Riparian Reserve (RR) land use allocations (under the 1995 Medford RMP) and within the boundaries of the 6th field Hydrologic Unit Condition (HUC 6) boundaries of the Cow Creek/McCullogh Creek, Cow Creek/Dads Creek, Cow Creek/Riffle Creek, and Grave Creek/Poorman Creek sub-watersheds. The Project Area is partially located in the 2008 and the previous 1992 designated Critical Habitat for the northern spotted owl. The Proposed Action (including Project Design Features), avoids disturbance and changes to the amount of spotted owl habitat or its primary constituent elements; therefore, there would be no significant impact to the spotted owl, its prey or its Critical Habitat.

The discussion of the significance criteria that follows applies to the intended actions and is within the context of local importance. Appendix 2 of the EA describes the effects of the Alternatives. None of the effects identified, including direct, indirect and cumulative effects, are considered to be significant and do not exceed those effects described in the *Medford District Resource Management Plan/Final Environmental Impact Statement* (June 1995).

Intensity. The following discussion is organized around the Ten Significance Criteria described in 40 CFR 1508.27.

1. Impacts may be both beneficial and adverse. The predicted environmental effects of the Proposed Action, most noteworthy, include:

a) Hazardous fuels reduction activities would occur on approximately 1,737 acres by cutting trees and brush between 1 and 8 inches dbh in the Project Area. In timbered stands, the Proposed Action would reduce stand density and litter accumulation (modification of the fuel model from a TU5 to a TL3). A TU5 is represented by a very high load, dry climate timber-shrub component. A fuel model TL3 is represented by a moderate load of conifer litter and light load of coarse fuels. Changing the fuel model from a TU5 to a TL3 would reduce flame length during normal fire season conditions; therefore reducing the fire hazard in the Project Area.

b) The Proposed Action would result in 76 acres of compacted/displaced soils over new and existing footprints. Under Best Management Practices in the 1995 RMP (p. 166) up to 12% skid trail compaction is allowed to remain in a unit until final entry. Total compaction/displacement associated with new and existing temporary routes, tractor skid trails, landings and cable yarding corridors would account for 3.9% per unit. Alternative 2 would result in a 4% soil productivity loss in the proposed harvest units. Therefore, each proposed Reuben Hazardous Reduction Fuel Project unit would be below the 12% compaction and 5% productivity loss analyzed in the 1994 Medford District FEIS RMP.

c) Sediment from the Reuben Hazardous Fuel Reduction Project would not result in more than a 10% increase in stream turbidity, and would not measurably increase these conditions for more than 25 feet from haul roads. Sediment from this action would not be distinguishable above baseline levels or have any effect on aquatic organisms. Actions in this watershed would be consistent with the Clean Water Act, State of Oregon water quality standards, and ACS objectives (Appendix 5).

d) There would not be any increased risk for individual noxious weed site occurrences and densities in the Project Area as a result of the Proposed Action with application of the Project Design Feature (PDF) to wash equipment prior to it moving on-site. The mixed ownership pattern of private adjacent to BLM, existing use of reciprocal ROWs, and the cumulative effects from factors affecting weed spread (private logging, motor vehicles, recreation, rural and urban development, and natural air/water/wildlife processes) effecting the Project Area, and the implementation of PDFs, the presence or absence, or weed density would not be altered to any detectable degree at the 6th field watershed level by the Proposed Action.

e) See effects to Endangered Species Act (ESA) threatened and endangered species in criteria # 9 below.

2. The degree to which the selected alternative will affect public health or safety.
Public health and safety would not be affected. Concern regarding the burning of plastic sheeting in prescribed handpile and burn piles was identified during scoping regarding carbon dioxide emissions. The BLM would schedule hand pile burning primarily from October to May during unstable atmospheric conditions (e.g., rain, snow, or storm events) when atmospheric mixing is occurring and pollutant concentrations would be reduced. Wet season conditions minimize the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content, which reduces the amount of material actually burned. Timing of all prescribed burning would be dependent on weather and wind conditions to help reduce the amount of residual smoke to the local communities. If residual smoke impacts exceed limits set by the Oregon Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program, additional burning would be suspended until given the notice to proceed by the Oregon Department of Forestry.

The Planning Area is not located within a Class I designated airshed or non-attainment area. The impact of smoke on air quality is expected to be localized and of short duration. Particulate matter would not be of a magnitude to harm human health, affect the environment, or result in property damage. The general policy for prescribed burning on the Medford District is to notify residents prior to seasonal burning through news releases.

Dust created from vehicle traffic on gravel or natural-surfaced roads and logging operations would be localized and of short duration. As such, the Proposed Action is consistent with the provisions of the Federal Clean Air Act.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wild and scenic rivers, or ecologically critical areas. There are no park lands, prime farm lands, wetlands, or ecologically critical areas in the Proposed Action. There are no developed recreation sites that would be affected by the Proposed Action (see Appendix 2). The area is open to dispersed recreation use, as is most of the Glendale Resource Area. The Proposed Action would have a neutral effect on dispersed recreation in the Resource Area.

Cultural surveys were completed for the Reuben Hazardous Fuel Reduction Project Area and all known sites would be protected and buffered. If cultural resources are located during the implementation of an action, the project would be redesigned to protect the values present.

There is an eligible Wild and Scenic River segment of Cow Creek present within a portion of proposed units 19-1 and 3-2 of the Project Area. The Outstanding Remarkable Value for the Cow Creek river segment is fish and recreation. The Proposed Action would not affect the Outstandingly Remarkable Values for fish because any sediment from this action would not be distinguishable above baseline levels and would not have any effect on aquatic organisms. Sediment would not result in more than a 10% increase in stream turbidity, and would not measurably increase these conditions for more than 25 feet from haul roads. Stream buffers would be placed on intermittent, perennial, and fish-bearing streams. There would be no increase to stream temperatures since canopy would not be removed. The Proposed Action would not affect the Outstandingly Remarkable Values for recreation because the visual characteristics of the landscape would not be changed in the dominant and co-dominant components of the stand. The Proposed Action would help protect Project Area stands from loss of a wildfire event; therefore protecting future use of the Skull Creek Camground and dispersed recreation in the area.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial. The effects of the Proposed Action on the quality of the human environment are adequately understood by the interdisciplinary team to provide analysis for the decision. There are no highly controversial effects from the Proposed Action. A complete disclosure of the predicted effects is contained in Chapter 3 and Appendix 2 of the EA.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks. The effect of the Proposed Action is not unique or unusual. The BLM has experience with hazardous fuel reduction projects and have found the effects to be reasonably predictable. The environmental effects to the human environment are fully analyzed in Chapter 3 of the EA. There are no predicted effect on the human environment which are considered to be highly uncertain or involve unique or unknown risks. Public scoping for the Reuben Hazardous Fuel Reduction Project did not identify any unique risks.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration. The Proposed Action does not set a precedent for future actions that might have significant effects nor does it represent a decision in principle about future consideration. The Proposed Action would meet the 1995 Medford District Resource Management Plan (RMP) to "Reduce both natural and activity based fuel hazards through methods such as prescribed burning, mechanical or manual manipulation of forest vegetation and debris, removal of forest vegetation and debris, and combinations of these methods" (p.91). Any future projects would be evaluated through the National Environmental Policy Act (NEPA) process and would stand on their own as to environmental effects.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. The interdisciplinary team evaluated the Proposed Action in context of past, present and reasonably foreseeable actions. Significant cumulative effects outside those already disclosed in the *Medford District Resource Management Plan/Final Environmental Impact Statement (1995)* are not predicted. A complete disclosure of the effects of the Proposed Action is contained in Chapter 3 of the EA.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources. Cultural surveys were completed within the proposed ground disturbing activity location for the Reuben Hazardous Fuel Reduction Project Area and all known sites would be protected and buffered. The Proposed Action would not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor would the Proposed Action cause loss or destruction of significant scientific, cultural, or historical resources.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973. The proposed hazardous fuels reduction and biomass removal would have no effect on the OC and SONC coho salmon or CCH because the Proposed Action because any sediment from this action would not be distinguishable above baseline levels and would not have any effect on aquatic organisms. Sediment would not result in more than a 10% increase in stream turbidity, and would not measurably increase these conditions for more than 25 feet from haul roads. Stream buffers would be

placed on intermittent, perennial, and fish-bearing streams. There would be no increase to stream temperatures since canopy would not be removed.

Oregon coast coho (*Oncorhynchus kisutch*) and southern Oregon northern California (SONC) coho salmon are present in the Project Area and adjacent to units in section 3 and 11. The closest fuels treatment units (sections 3 and 11) are located adjacent from coho critical habitat (CCH) in Cow Creek and Rattlesnake Creek, respectively.

Marbled murrelet – Threatened

The Project Area is over 15 miles from the known range of marbled murrelets as described in the currently accepted survey protocol (Pacific Seabird Group 2003), outside designated Critical Habitat for the species, and the area is also beyond (9 miles east of) the area in which marbled murrelet surveys are required to avoid disturbance to adjacent potential murrelet nesting habitat. Therefore, the proposed project would have no effects on marbled murrelets or their Critical Habitat.

Spotted owl – Threatened

The Proposed Action (including the Project Design Features) avoids disturbance to nesting spotted owls and impacts to the prey community. The project is partly in the Critical Habitat for the spotted owl designated in 2008 (USFWS 2008) and the previous designation in 1992 by the US Fish and Wildlife Service. The primary constituent elements are likely to remain at a level to allow the species and its prey to function in the 2008 and 1992 Critical Habitat, and to reduce the long-term risk of loss of habitat to stand-replacing fires, forest pests and disease.

Plants - There would be no anticipated effect from the Proposed Action on any federally listed plant.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.** The Proposed Action does not violate any known federal, state, or local law or requirement imposed for the protection of the environment. Furthermore, the Proposed Action is consistent with applicable land management plans, policies, and programs (EA, Chapter 1.5).

Chapter 1.0 Purpose and Need

1.1 Introduction

This Environmental Assessment (EA) will analyze the impacts of proposed forest management activities on the human environment in the Reuben Hazardous Fuel Reduction Project Area (PA). The EA will provide the decision maker, the Glendale 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 *Medford District Resource Management Plan/Final Environmental Impact Statement (1995)* and whether a supplement Environmental Impact Statement is needed or if a Finding of No Significant Impact is appropriate.

Chapter 1 discloses to the reader:

- what the BLM proposes to do (Proposed Action),
- the location and description of the Project Area,
- describes why the BLM is proposing these forest management activities (Purpose and Need),
- identifies what factors the decision maker will use for choosing the action or no action alternative (Chapter 2) that will best meet the purpose and need for this proposal
- how the public has been involved in this project
- the method for alternative development consideration
- what the decision maker will decide upon

The analysis utilizes field data, ground verification by resource specialists and Geographical Information System (GIS) technology to estimate acres, road miles and produce reference maps. Estimates are intended to aid the reader in understanding the proposed actions. The reader should be aware that electronic technology can produce information that appears precise but is still dependent on further field work. During implementation, unit boundaries are posted and surveyed and unforeseen features, such as water sources, are appropriately buffered. It has been the experience for past Glendale Resource Area environmental assessments that estimates of treatment acres in the EA have been generally more than the actual acres treated on the ground.

1.2 Proposed Action

The Reuben Hazardous Fuel Reduction Project includes 1,737 acres of hazardous fuel reduction and biomass removal of forest land, of which 768 acres are proposed for biomass removal by cable or tractor logging systems. Trees and brush between 1 and 8 inches would be cut to reduce the fuel loading in stands. Riparian fuels reduction would occur up to 25 feet of the stream bankful width. Biomass removal could occur, outside field verified Ecological Protection Zones or Riparian Reserves, to remove cut woody material via whole-tree yarding or yarding with attached tops to minimize the amount of

slash remaining in units. Biomass removal may occur within a 200 ft corridor of road systems and on slopes less than 35% in project units. Yarded material would be brought to landings where it would be piled and burned or utilized for biomass. Slash remaining in units after yarding would be treated by lop-and-scatter or handpile-and-burn. Once the activity slash is treated, subsequent underburning may take place in the thinning units to prevent future increases in fuel loading.

Hazardous fuel reduction and biomass removal are planned to start in 2010. BLM planning decisions and harvest activities would apply only to BLM-administered lands.

1.3 Project Location

The Project Area is located within Douglas county, Oregon on BLM managed land west of the town of Glendale, Oregon. Project activities are proposed on federal land managed by the Glendale Resource Area, Medford District BLM. The proposed treatments are within the Middle Cow Creek fifth-field watershed. The legal description of the Project Area is Township (T) 32S, Range (R) 7W, Section 9, 15, 17, 19, 21, 25 and T 33S, R 7W, Section 3, 9, & 11 (see attached Project Area Map). The Project Area includes the land allocations of Matrix (including two Connectivity Diversity/Blocks), and Riparian Reserves (RR) as described in the 1995 *Medford District Record of Decision and Resource Management Plan* (1995 ROD/RMP). The Connectivity Diversity/Blocks are located in T32S-R7W-Sections 15 and 21.

1.4 Purpose and Need for the Proposal

The purpose of the Proposed Action is to reduce the existing fire hazard in the wildland-urban interface (WUI) near the community of Glendale, as well as non-wildland urban interface areas. Homes in close proximity to the BLM landholdings may become threatened by wildfire due to heavy fuel loading that may lead to uncharacteristic fire behavior (high intensity and severity). The purpose of the Proposed Action is to also limit uncharacteristic fire behavior by reducing the existing fire hazard in Condition Classes 2 and 3 in Fire Regimes I, II, and III. The treatments would focus on thinning dense stands of trees and brush, biomass removal and/or hand piling and pile burning the cut material. Underburning would occur within 10 years of initial project implementation in areas that would benefit from maintenance treatments and where it is feasible.

Another purpose of the project is to moderate the potential of uncharacteristic fire behavior that would allow firefighters to utilize direct attack suppression strategies to limit wildfire size and impacts. The treatments would help create defensible fuel breaks along road system and ridges within the Project Area that could be utilized during fire suppression operations.

> ***Fire behavior fuel models*** are a tool used to predict fire behavior, including flame length, which is the unit of measure for the fire behavior threshold. The models classify vegetation into seven groups: nonburnable, grass, grass-shrub, shrub, timber-

understory, timber litter, and slash-blowdown. Several fuel characteristic factors are incorporated into the models in order to predict the type of fire behavior a stand has the potential to produce under certain environmental conditions.

Fuel structure and loading would be altered to moderate potential wildfire behavior and reduce fire severity. Standard fire behavior fuel model changes characterize this objective:

- In timbered stands, reduce stand density and litter accumulation (fuel model TU5 reduced to a fuel model TL3). With weather conditions given a moderate 5 mph summer wind, flame length would decrease from approximately 8 ft to less than 2 ft.

Project objectives include:

- Reduce both natural and activity based fuel hazards through methods such as prescribed burning, mechanical or manual manipulation of forest vegetation and debris, removal of forest vegetation and debris, and combinations of these methods (1995 RMP, p.91).

- Apply biomass removal, where economical, would be applied to reduce hazardous fuels, reduce smoke emissions, and utilize biomass to benefit the local economy.

1.5 Plan Conformance

This Proposed Action conforms to the:

- *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (Northwest Forest Plan FSEIS, 1994 and ROD, 1994);
- *Final Medford District Proposed Resource Management Plan/Environmental Impact Statement* and *Record of Decision* (EIS, 1994 and RMP/ROD, 1995);
- *Final Supplemental Environmental Impact Statement: Management of Port-Orford-Cedar in Southwest Oregon* (FSEIS, 2004 and ROD, 2004);
- *Record of Decision To Remove The Survey And Manage Mitigation Measure Standards And Guidelines* (ROD, 2007) and;
- *Final Medford District Integrated Weed Management Plan Environmental Assessment (1998*) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS, 1985).

The *Middle Cow Creek Watershed Analysis* is incorporated by reference. Watershed analysis is an analytical process and not a decision-making process as provided in the Record of Decision for the Northwest Forest Plan (p. B-20).

1.6 Public Scoping and Identification of Alternative Use of Resources

1.6.1 Public Scoping

Initial contact was made with individuals, groups or agencies that have expressed interest in forest management and other types of projects through a postcard mailing to individual landowners within ¼ mile of the Project Area boundary. A brief description of the Reuben Hazardous Fuel Reduction Project, a legal location, and purpose of the proposed action was included on the postcard. Two comments were received during the Reuben Hazardous Fuel Reduction Project scoping process. One commenter, Douglas Forest Protective Association, inquired about the details of the project. The other commenter, Klamath-Siskiyou Wildlands Center, requested consideration of using wax paper over slash burn piles instead of plastic sheeting to keep piles dry until wet weather conditions allow for burning. Use of wax paper was considered but eliminated from detailed study because in the experience of the Glendale Resource Area fuels management specialist the wax paper becomes saturated during heavy rains resulting in wet piles that cannot be successfully ignited or consumed adequately to meet the prescribed burn plan objectives.

1.6.2 Alternative Use of Resources

The Reuben Hazardous Fuel Reduction Project interdisciplinary team (IDT) considered conflicts of alternative uses of available resources through the IDT process. Project Design Features (PDFs) were developed by the interdisciplinary team in Chapter 2 to eliminate potential conflicts of alternative uses of available resources. Since there were no unresolved conflicts concerning alternative uses of available resources identified by the interdisciplinary team, there was no procedural requirement to develop additional action alternatives (**Appendix 2**).

1.7 Decisions to be Made

The Glendale Field Manager is the official responsible for deciding whether a supplemental Environmental Impact Statement (EIS) should be prepared based on whether the Proposed Action would result in significant impacts to the human environment not already analyzed in *Medford District Resource Management Plan/Final Environmental Impact Statement* (June 1995). If there are any such additional impacts that are significant, project proposals could be modified to mitigate the impacts so a Supplemental FEIS (SFEIS) would not be necessary. If it is determined that there is no need to prepare a SFEIS, a Finding of No Significant Impact (FONSI) would be prepared.

An additional decision to be made is whether to implement the Reuben Hazardous Fuel Reduction Project as designed or whether to select the No Action Alternative.

In selecting an alternative, the Glendale Field Manager would evaluate the No Action Alternative and Proposed Action's ability to meet the purpose and need identified in

Section 1.2 of this EA, along with the relative merits and environmental consequences of each alternative.

Chapter 2.0 Alternative Ways of Accomplishing the Objectives

2.1 Introduction

This chapter presents alternative proposals that meet the project objectives identified in Chapter 1 and describes and compares the no action alternative (Alternative 1) with the action alternative, Alternative 2 (Proposed Action) as specified in 40 CFR (Code of Federal Regulations) § 1502.14. Descriptions summarize potential environmental consequences and focus on potential actions and outputs. Project Design Features were identified and are included here to ensure project compliance with higher-level National Environmental Policy Act (NEPA) documents, laws and BLM guidelines.

Chapter 2 provides the reader:

- description of the No Action and Proposed Action alternatives
- a brief description of the types of forest management activities proposed
- specific measures incorporated in the design of Alternative 2 to eliminate or minimize adverse impacts on the human environment (Project Design Features)

2.2 Description of the Alternatives

2.2.1 Alternative 1 (No Action)

Under this alternative, the federal management actions described under the action alternative would not take place at this time. However, the opportunity to implement hazardous fuel reduction treatments would continue to be a viable option for the future but would be analyzed through a separate environmental analysis.

2.2.2 Alternative 2 (Proposed Action)

The Proposed Action is to manually treat forest fuels on approximately 1,737 acres of BLM land. Treatments would include a mix of thinning, slashing, handpiling, biomass removal, underburning and handpile burning, depending on site specific conditions. Biomass removal may occur within 200 feet of roads, on slopes less than 35%, and ridgeline treatments encompassing natural fuels in the WUI and non wildland urban interface areas. Trees may be pruned to reduce ladder fuels. Trees and other vegetation to be cut would be greater than 12 inches in height or length and between 1 and 8 inches diameter at breast height (dbh). Residual hardwood and conifers would be spaced

approximately 14 to 40 feet apart. Low intensity underburning might be prescribed after initial treatment within timber stands to ensure desired fuel loadings are maintained typically within 5 years of treatment. Firelines would be less than 18 inches wide and would be constructed using hand tools and chainsaws only.

Biomass may be removed during initial fuel hazard reduction. While approximately 768 acres of ground and cable yarding are proposed, it is likely fewer acres of extraction would occur due to economic, safety and access limitations. Slash created from the proposed fuel reduction treatments would be treated using one or more of the following actions: lop & scatter, pile & burn, or biomass removal. Biomass removal would occur via whole-tree yarding or yarding with attached tops to reduce ground disturbance and fuel loading. Yarded material would be brought to landings where it would be piled and burned or utilized for biomass. In areas where biomass removal is not feasible, hand piling and burning would occur.

The treatments would be site specific, meeting established land use objectives. Stand treatments would maintain conifer stocking levels within a range of 222 (14ft x 14ft) trees per acre to 109 (20ft x 20ft) trees per acre. Tree form hardwood residual stocking levels would be within a range of 48 (30ft x 30ft) trees per acre to 27 (40ft x 40ft) trees per acre. Form and vigor would take precedence over species preference in regard to retention of leave trees. Pacific yew (*Taxus brevifolia*) would be retained and not cut or damaged.

Shrub form competing vegetation would be removed, cutting 100% of all non-reserve species between 1 and 8 inches dbh within the treatment area. Between 0 and 1 inch in diameter, material under 1 ft in height would not be removed, which includes most sprouts of understory shrubs and ground cover. These would maintain at least some of the forage and cover components for the spotted owl prey base. Fuel hazard slash less than 6 inches in diameter and greater than 2 feet in length would be piled. Pile size would be no larger than 8 feet in diameter and 8 feet in height.

Hazardous Fuel Reduction in Riparian Reserves

A 25 ft No Treatment Zone (NTZ) would be applied from the stream bankfull width (by slope distance) along streams and perennial springs and seeps to protect stream channel structure and water quality. No biomass removal would occur within Riparian Reserves (RR) unless field stream surveys are conducted by qualified personnel to establish Ecological Protection Zones (EPZ). No biomass removal would occur within the EPZ (at least 75 ft from the stream bankfull width (by slope distance) along streams, perennial springs, seeps, and unstable areas within RRs to protect stream channel structure and water quality). Specific EPZ distances per stream would be developed using field verified, site specific information and stated protection criteria[1] for individual elements of

[1] Ecological Protection Width Needs chart (Northwest Forest Plan Record of Decision, p. B-15); **Forest Ecosystem Management Assessment Team** (FEMAT) 1993; and the Northwest Forest Plan Temperature Total Maximum Daily Load (TMDL) Implementation Strategies, U.S. Forest Service and BLM, 2005).

the RR including: streambank stability; shade and temperature; surface erosion of streamside slopes; fluvial erosion of the stream channel; soil productivity; the ability of streams to transmit damage downstream; the role of streams in the distribution of large wood to downstream fish bearing waters; and riparian microclimate. The Ecological Protection Width Needs chart is based on slope and rock type, and takes into account protection of streams from "surface erosion of streamside slopes, fluvial erosion of the stream channel, soil productivity, habitat for riparian-dependent species, the ability of streams to transmit damage downstream, and the role of streams in the distribution of large wood to downstream fish bearing waters".

Canopy closures and species diversity would be maintained. Treatment within this area would be designed to ensure that habitat conditions for the wildlife and plant species that use this zone are not degraded.

Proposed Activities Adjacent to Streams for the Reuben Hazardous Fuel Reduction Project, Illustrated

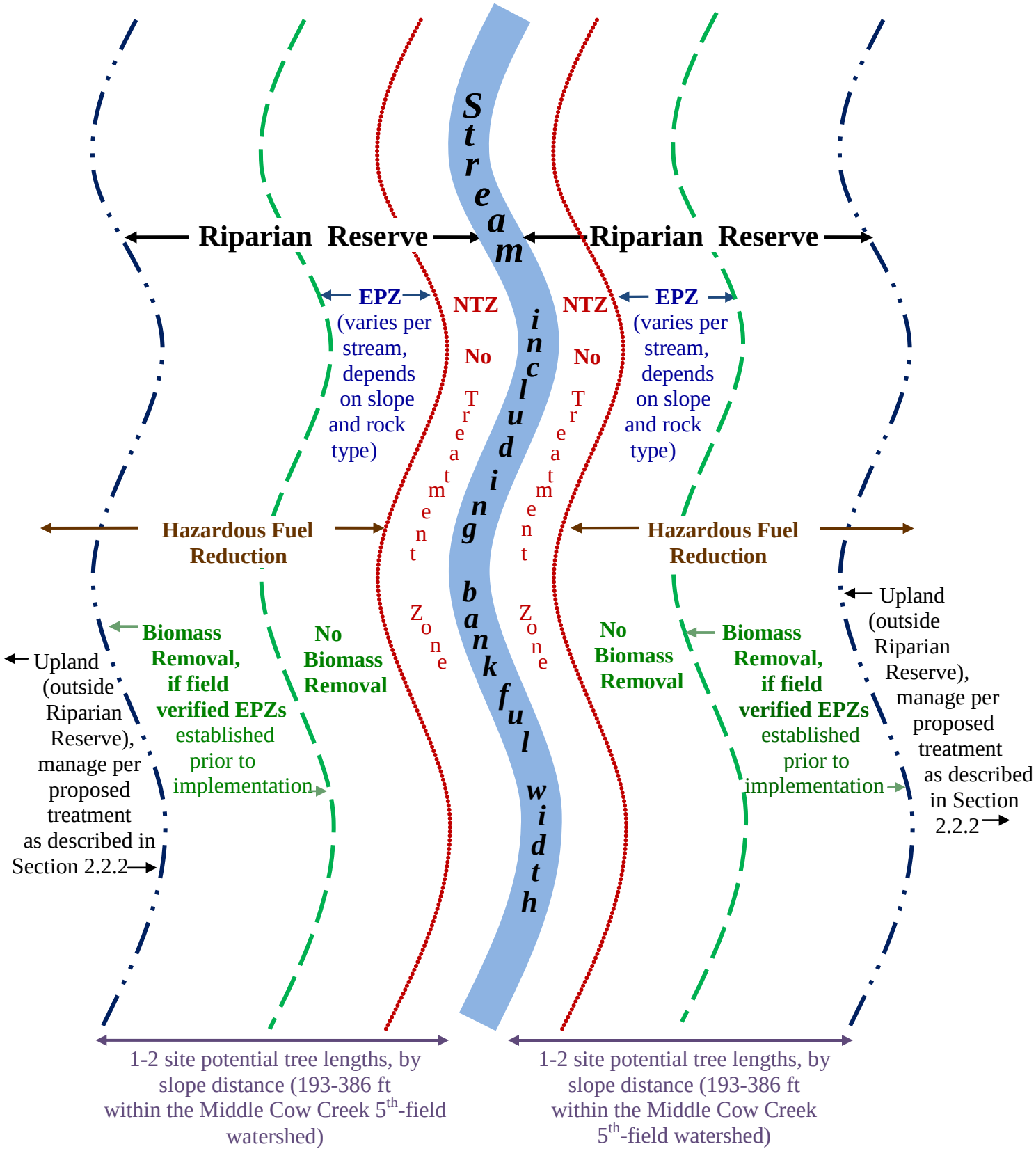

Table 2-1. Reuben Hazardous Fuel Reduction and Biomass Removal Location, Units, Acres, and Logging Systems

Township-Range-Section	Unit #	hazardous fuel reduction (acres)	biomass removal (acres)	
			tractor	cable
T32S-R7W-9	9-3	16	1	7
	9-4	16	1	8
	9-5	15	3	7
	9-6	18	2	14
	9-7	22	1	9
T32S-R7W-15	15-1	71	24	4
	15-2	80	33	1
T32S-R7W-17	17-1	182	55	36
T32S-R7W-19	19-1	190	82	12
T32S-R7W-20	20-1	171	26	50
T32S-R7W-21	21-1	87	36	5
	21-2	81	44	11
	21-4	26	14	3
T32S-R7W-25	25-1	51	11	5
	25-2	74	9	6
	25-3	30	13	2
	25-4	40	23	6
	25-6	36	28	3
	25-7	10	4	1
T33S-R7W-3	3-1	47	18	4
	3-2	201	33	25
T33S-R7W-9	9-1	138	14	19
	9-2	16	6	8
T33S-R7W-11	11-1	33	3	12
	11-2	86	13	18

Table 2-2. Project Treatment Summary

	Alt.2 Proposed Action
Number of units	25
Hazardous fuel reduction (acres)	1,737
Biomass removal (acres)	768
tractor (acres)	495
cable (acres)	273

Road Maintenance

Road maintenance would occur on existing roads to keep their original design standard. Typical maintenance within the Reuben Hazardous Fuel Reduction Project may include, but is not limited to: 1/ blading and shaping; 2/ cleaning of ditches, catch basins and culverts; 3/ brush cutting and vegetation removal from roadway; 4/ pot hole repair; 5/ surface replacement; 6/ slide removal. See Appendix 3 for the specific roads proposed for road maintenance and use for biomass removal.

2.3 Project Design Features

Project Design Features (PDFs) are specific measures included in the site specific design of the Proposed Action to eliminate or minimize adverse impacts on the human environment. These PDFs were developed by the Reuben Hazardous Fuel Reduction Project interdisciplinary team from management guidance of the 1995 Medford District ROD/RMP (Appendix D) and other regulatory laws for resource protection measures specific to the Planning Area.

2.3.1 Soil Productivity, Residual Trees, and Coarse Woody Debris

- Whole tree yarding would occur as long as it would not create unacceptable damage from bark slippage, girdling, broken tops, or damage to live crowns. If it is determined by the Authorized Officer that unacceptable amounts of damage would occur, trees would be required to be bucked and limbed as directed by the Authorized Officer.

- Slash piles would not be allowed on roadways, including the entire road prism from the edge of the road shoulder (including turnouts) to the top of the cut bank.

- On the ground conditions would be monitored for whole tree yarding or other operational changes (such as reducing the number or width of skid trails) so that productivity loss on a unit by unit basis would remain below 5%.

- Slumps, intermittent seeps, and other unstable areas would be buffered by leaving one row of overstory trees or a 25 foot distance (whichever is greatest) around these areas for soil stabilization.

- Native grass/forb seeding, mulching or hay bale placement would be used, where needed, to minimize surface erosion, and reduce stream sedimentation.

- Within RRs, retain snags and coarse woody debris during fuels treatments, except for safety or operational reasons.

- All non-hazardous snags would be retained in all biomass removal units. If it is necessary to fall snags for safety reasons, they would remain on site as down

wood. All existing naturally occurring dead and down woody debris, greater than or equal to 16 inches diameter, would remain on site.

- Lateral yarding would be required on all units to protect residual leave trees and existing conifer regeneration.

2.3.2 Sedimentation and Soil Compaction

- In previously unentered stands, following biomass removal the total area compacted as a result of this project would not exceed 12% of any unit. (RMP, p. 166).

- Productivity loss resulting from topsoil disturbance and soil compaction would not exceed a combined calculated total of 5% of the unit.

- Partial suspension would occur for all yarding operations where feasible.

- Yarding (tractor and cable) and skid trail use would be allowed during dry conditions when soil moistures at a depth of 4 inches below the surface are at, or below 20%.

- Tractors would be restricted to slopes <35% in order to prevent excessive soil disturbance (RMP, p. 166).

- Old skid trails would be used whenever practical. Priority for skid road selection would be those that have not recovered from previous use. Where use of old skid trails is not possible, new skid trails construction would be pre-designated by the Authorized Officer to ensure soil disturbance/compaction would not exceed 12% per unit and soil productivity would not exceed 5% per unit as analyzed in the 1994 Medford District RMP/EIS. Skid trail spacing may vary dependant on site conditions and size of equipment use. New skid trials would be located outside of Riparian Reserves whenever possible. No trees greater than 8 inches dbh would be cut to accommodate a skid trail.

- Riparian skid road construction would not occur in RRs, unless field verified EPZs are established. In such a case, skid road construction could occur outside the EPZ, within the remaining portion of a RR.

- To minimize soil disturbance the use of blades while tractor yarding would not be permitted to keep soil organics on site. Equipment would walk over as much ground litter as possible to reduce compaction.

- Prior to October 15 of the same operating season, winterize and rehabilitate landings, corridors, skid trails and other areas of exposed soils by properly using techniques such as installing and/or using water bars, berms, sediment basins, gravel pads, hay bales, small dense woody debris, seeding and/or mulching, to

reduce sediment runoff as directed by the Authorized Officer. Water bar spacing and drainage angles used to rehabilitate tractor skid trails would be based on the NWFP Standards and Guidelines erosion control measures for timber harvest which considers slope and soil series (RMP, p. 167)

- For all subsoiling, skid trails and natural surface landings constructed that are designated for decommissioning would be discontinuously subsoiled (preferably with a winged ripper) to a depth of at least 18 inches or bedrock with rips no more than 36 inches apart, water-barred, seeded and mulched with native grass seed and native or weed free straw, and blocked during dry soil conditions (less than 20% soil moisture at 4 inches depth) upon completion of biomass removal. Where it is determined by the Authorized Officer that subsoiling skid trails would cause damage to the root plate of residual trees, subsoiling may be intermittent, so that damage is reduced to less than 60% of the critical root area.

- Hauling on all road types would be suspended at any time-during and immediately following precipitation events if road surface conditions would result in continuous mud splash or tire slide; surface rutting; fines being pumped through road surface from the subgrade; road drainage causes a visible increase in stream turbidities or more than 10% cumulative increase in natural stream turbidities as measured relative to a control point above the road; or road surface conditions would result in water being redirected into tire tracks or away from designed drainage patterns.

- Cleaning culvert inlets in stream channels would occur during the low period of flow (generally July 15 to September 15) in accordance with Oregon Department of Fish and Wildlife (ODFW) in-stream work period guidelines (RMP, p. 161)

- In units where biomass removal would occur, no material would be allowed on the running surface of roadways, including turnouts, or between the ditch line and the shoulder. Landing piles would be burned, if necessary.

- Landings would be located in approved sites and designed with adequate drainage. Step landings would be re-contoured following use. Dust abatement on landings would include rocking and water. No trees greater than 8 inches dbh would be cut to accommodate a landing.

2.3.3 Air Quality / Smoke Management

- Prescribed burning would occur under atmospheric conditions that allow for the mixing of air to lessen the impact on air quality. Burning would be conducted in compliance with the Medford District RMP, the Oregon State Implementation Plan, and the Smoke Management Plan as administered by the Oregon Department of Forestry.

2.3.4 Cultural sites

- Surveys in Project Area were conducted. All known sites would be protected and buffered. The proposed cutting of vegetation and underburning could occur through identified mining ditches, as it would not impact its cultural resource value. However, biomass removal would not occur 20 ft of either side of the center line of mining ditches, unless full suspension could be achieved. Trees adjacent to the mining ditch would be directionally felled away from the buffer boundary so tree felling would not impact the historic mining ditches. Handpiles for burning would be placed 20 ft of either side of the center line of mining ditches.

- If any archaeological or historical artifacts are uncovered during project implementation, they would be left intact and undisturbed. All work in the immediate vicinity would stop immediately and the resource area archeologist would be notified. The project may be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the resource area archaeologist and concurrence by the Glendale Field Manager and State Historic Preservation Office.

2.3.5 Streams and Riparian Zones

- No hand pile ignition would occur in NTZs. Where biomass removal units are adjacent to RRs, no underburning ignition would occur in RRs unless field verified EPZs are established. Where EPZs are established underburning ignition could occur outside the EPZ, within the remaining portion of RR.

- Piles would not be placed within 25 feet of the unit boundary, within 25 feet of NTZs, placed on logs or stumps, or within channel bottoms or streams. Logs or stumps are identified as >10 inches dbh, at the small end of the log.

- Limit firelines inside RRs. Construct firelines by hand on all slopes greater than 35%. Use erosion control techniques such as tilling, waterbarring, and/or debris placement on firelines. Avoid placement of any fireline where water would be directed into waterbodies, floodplains, wetlands, headwalls, or areas of instability.

- Mechanized equipment would be limited to chainsaws in RRs unless field determined EPZs are established. In such a case, mechanized equipment beyond chainsaws could be used outside the EPZ, within the remaining portion of RR.

- Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition in order to minimize potential for leakage into streams. No re-fueling of heavy equipment would occur within 150 feet of streams or stream crossings.

- Foam would not be used within 150 feet of streams and wetlands to control the spread of prescribed fire.

- Refueling of chainsaws and pumps would be done no closer than 150 feet of any stream or wet area. Spilled fuel and oil would be cleaned-up and would be disposed of at an approved disposal site.

- Unless unsafe, trees within RR boundaries (one or two site potential trees) would be directionally felled away from the stream, and upslope trees would not be felled into RRs.

- There would be no new landing construction in RRs. Expansions of existing landings in the RR would not occur unless field determined EPZs are established. However, expansions of landings would not occur into the EPZ.

2.3.6 Special Status Plant Species

- Bureau Sensitive and Federally Threatened/Endangered plant sites in hazardous fuels reduction treatments would receive a 25 foot diameter no treatment buffer.

2.3.7 Northern Spotted Owl (Threatened)

- No activities would occur in spotted owl nest patches (within 300 meters (or 70 acres) of an owl activity center).

- Habitat patches for the benefit of spotted owl prey, songbirds and other species would be retained in the Project Area. These patches would maintain habitat diversity, a variety of vegetative structure, and function in the Project Area. Approximately 15 to 20% of piles would remain untreated, scattered across riparian and upland areas. Units that are less than 10 acres in size may not have untreated reserves if the project as a whole reserves 15 to 20% of its total unit area in an untreated condition.

- Work activities (chain saw noise during slashing) that produce loud noises above ambient levels would not occur within specified distances (195 feet for chainsaws and 105 feet for heavy equipment) of any documented or unsurveyed nesting habitat between March 1 and June 30 (or until two weeks after the fledging period) – unless protocol surveys have determined the activity center to be not occupied, non-nesting, or failed in their nesting attempt. March 1 – June 30 is considered the critical early nesting period. The action agency biologist has the option to extend the restricted season, based on site-specific knowledge (such as a late or recycle nesting attempt). The boundary of the prescribed area may be modified by the action agency biologist using topographic features or other site-specific information. The restricted area is calculated as a radius from the assumed nest site (point).

- If an active spotted owl nest or activity center is located in or *adjacent* to a Project Area, the project activity would be delayed until September 30th or until an action agency biologist determines that young are not present. (If any project activity is so close to a known or suspected owl site that the disturbance would flush a nesting spotted owl, project activities would be discontinued until September 30 or until the biologist determines that young are not present.) The field biologist has the discretion to conduct surveys and determine fledging activity.

- Burning would not take place within 0.25 mile of spotted owl sites (documented or unsurveyed suitable habitat) between March 1 and June 30 (or until two weeks after the fledging period) unless substantial smoke would not drift into the nest stand.

2.3.8 Raptors

- Human disturbances that may disturb or interfere with nesting would not occur within 0.25 mile of active nesting areas between approximately March 1 and July 15 of the same calendar year.

- No bald eagle sites are known in the Project Area at this time. If a bald eagle nest is discovered, human disturbance (vehicular traffic on infrequently-used roads and all human foot traffic) would not occur within 0.5 miles of the nest site, from February 1 to August 15 (1995 RMP, p.55).

2.3.9 Noxious Weeds

- In order to prevent the potential spread of noxious weeds into the Medford District BLM, the operator would be required to clean all logging, construction, chipping, grinding, shredding, rock crushing, and transportation equipment prior to entry on BLM lands.

- Cleaning shall be defined as removal of dirt, grease, plant parts, and material that may carry noxious weed seeds into BLM lands. Cleaning prior to entry onto BLM lands may be accomplished by using a pressure hose.

- Only equipment inspected by the BLM would be allowed to operate within the Project Area. All subsequent move-ins of equipment as described above shall be treated the same as the initial move-in.

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

- Equipment would be visually inspected by the Authorized Officer to verify that the equipment has been reasonably cleaned.

Chapter 3.0 Affected Environment and Environmental Consequences

3.1 Introduction

In accordance with law, regulation, executive order and policy, the Reuben Hazardous Fuel Reduction Project interdisciplinary team reviewed the elements of the environment to determine if they would be affected by the Proposed Action (Alternative 2) as described in Chapter 2.0 of this EA. Those elements of the human environment determined to be affected define the scope of environmental concern (**see Environmental Elements in Appendix 2** for a discussion of the potentially affected resources and site-specific environmental impacts of the proposed action). The relevant resources that could be potentially impacted are: northern spotted owl, soils, water quality, and fire hazard.

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 that each alternative would have on the relevant resources. Impacts can be beneficial, neutral or detrimental. This analysis considers the direct impacts (effects caused by the action and occurring at the same place and time), indirect impacts (effects caused by the action but occurring later in time and farther removed in distance but are reasonably foreseeable) and cumulative impacts (effects caused by the action when added to other past, present and reasonably foreseeable future actions). The temporal and spatial scales used in this analysis may vary depending on the resource being affected.

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, 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 on past action may be useful in two ways according to the CEQ guidance. One is for consideration of the proposed action's cumulative effects, and secondly as a basis for identifying the proposed action's direct and indirect effects.

The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Our information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis, than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination.

The second area in which the CEQ guidance states that information on past actions may be useful is in "illuminating or predicting the direct and indirect effects of a proposed action." The usefulness of such information is limited by the fact that it is anecdotal only, and extrapolation of data from such singular experiences is not generally accepted as a reliable predictor of effects.

Scoping for this project did not identify any need to exhaustively list individual past actions or analyze, compare, or describe the environmental effects of individual past actions in order to complete an analysis which would be useful for illuminating or predicting the effects of the proposed action.

When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete and unavailable information was posed: Is this information "essential to a reasoned choice among the alternatives?" (40 CFR §1502.22[a]). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely reverse or nullify understood relationships. Although new information would be welcome, no missing information was determined as essential for the decision maker to make a reasoned choice among the alternatives.

3.2 Soil Compaction and Productivity

3.2.1 Affected Environment for Soil Compaction and Productivity

Physical, chemical, and biological properties of soils determine the level of productivity of a soil. These properties also determine how different soils respond to disturbance. For soils to be productive for timber management, soils must be able to acquire, maintain, and release water and nutrients needed by trees. Soils must also be able to support the microorganisms necessary to maintain nutrient cycling and plant nutrition. Forest management activities can affect these soil properties by compacting or displacing soils and by removing organic material in the topsoil.

Soil compaction can be defined as the packing together of soil particles by physical pressure that results in an increase in soil bulk density and a decrease in total pore space. A decrease in soil pore space results in restricted movement of water, nutrients, air, and plant roots, and as such generally decreases site productivity in most soil types.

Soil productivity is primarily the soil's capacity to support plant growth over time as reflected by some measure of biomass accumulation. Loss of a soil's plant growth capacity means the potential loss of a site's ability to sustain timber production as well as ecological values important in meeting land management objectives. Soil productivity is affected by soil bulk compaction, soil displacement, and by changes in the availability of soil nutrients. Litter, humus, soil wood, and certain key properties of the surface mineral layers of forest soils are most easily and commonly disturbed by yarding and other activities. Changes in soil productive can be gauged by the amount of compaction and/or disturbance occurring on a unit by unit basis. Desired levels of soil productivity can be maintained by managing the amounts of soil displacement, compaction, and topsoil loss. The most common types of disturbances effecting soils and associated long term productivity are displacement and compaction. Soil compaction and displacement, which effects growth, is a combined effect which cannot be separated (1994 Medford District EIS, Vol. 1, p. 4-13).

Soil productivity calculations are based on compaction/displacement representing a 40% growth/productivity loss per acre (*Productivity losses are generally calculated at 30% for disturbance acres and 40% for compacted acres. For this project's analysis, productivity losses were based upon a loss of 40% for acres compacted or disturbed. The majority of acres proposed for biomass removal would be tractor yarded.) The acres of compaction/ displacement will be multiplied by the inherent loss of 40% growth divided by the unit area to determine the reduction in productivity. This calculation takes into account all new and existing compaction/displacement associated with skid trails, cable yarding corridors, and landings.

Where whole tree yarding is used, productivity loss may occur from the removal of topsoil organics as trees would not be yarded over limbs and slash (as would happen with cut-to-length yarding). In these cases, the total percentage of soil productivity loss would be calculated using the following method: the total number of acres within the unit designated as skid trails multiplied by 0.4, *plus* the number of acres outside of designated skid trails with exposed mineral soil multiplied by 0.3. This total divided by the total number of acres in the unit would give a calculated loss in soil productivity.

3.2.3 Environmental Effects on Soil Compaction and Productivity

3.2.3.1 Alternative 1 (No Action) - Direct and Indirect Effects on Soil Compaction and Productivity

Alternative 1 would result in a negligible increase in soil productivity. Existing compacted and displaced soils from past disturbance, harvests or other activities in several of the proposed Reuben Hazardous Fuel Reduction Project units would continue to recover towards pre-disturbance conditions. Fine roots of current vegetation would

continue to loosen compacted soil. Leaf fall and other litter from the vegetation would continue to add organic material to the soil. Soil productivity in areas not affected by past disturbance would continue along existing trends.

3.2.3.2 Alternative 2 (Proposed Action) - Direct and Indirect Effects on Soil Compaction and Productivity

The Proposed Action would result in an estimated 76 acres of compacted/displaced soils over new and existing footprints that would reduce soil productivity by 4%, from 768 acres of proposed biomass removal units. Under Best Management Practices in the 1995 RMP (p. 166) up to 12% skid trail compaction is allowed to remain within a unit until final entry. Total compaction/displacement associated with tractor skid trails was calculated at 12% and cable yarding corridors were calculated at 4% per unit. For the purposes of this analysis all compaction/displacement associated with new and existing cable yarding corridors were included along with skid trail compaction. Therefore, each proposed unit would be below 12% compaction and 5% productivity loss as analyzed in the 1994 Medford District FEIS RMP.

Hazardous Fuels Reduction Treatments

Hazardous fuels reduction treatments proposed under Alternative 2 would result in negligible changes in soil productivity. Soil compaction and disturbance would be limited to that caused by walking through forest stands during operations. Some soil organics would be lost where piles were burned. However, as all cut material would not be piled, there would be an increase in soil organics elsewhere in units. Should underburning occur at a later date, some soil would be displaced during fireline construction. The productivity of the sites in terms of the amount of desired vegetation would increase. Competition for available nutrients and water would be decreased and reserved vegetation would be released.

Biomass Removal

Biomass removal proposed under Alternative 2 would result in some loss of soil productivity in treatment areas due to soil compaction and displacement. The specific actions of the Proposed Action (Section 2.2) that affect the physical, chemical, or biological properties of soils in proposed biomass removal units are described below.

Soil Compaction/displacement

Skid trails, Cable Yarding Corridors, and Landings

Soil compaction and displacement from skid trails, cable yarding corridors, and landings would occur on an estimated 71 acres as a result of biomass removal on 768 acres under this project. The 71 acres account for less than 10% of the total acres proposed for biomass removal. Compaction and soil displacement would likely be less than for yarding commercial material (greater than 8”dbh) due to the lesser weight of individual pieces being yarded in this project. Operators working in areas would be required to utilize existing skidtrails to the greatest extent

possible before consideration of new construction. New skid trials, would be pre-designated and approved by the BLM Authorized Officer.

All skid trails, cable yarding corridors, and landings would be winterized and rehabilitated by installing and/or using water bars, berms, sediment basins, gravel pads, hay bales, small dense woody debris, seeding and/or mulching, to reduce sediment runoff as described in Section 2.3.2, p.19.

Productivity

Alternative 2 would also benefit stand productivity by increasing water and nutrient availability. The mixed-aged dense stands in this Project Area are a product of past timber management activities and aggressive fire suppression activities. Many of these stands are currently showing reduced growth rates as a result of competition for soil nutrients and water caused by overstocked conditions. These treatments would reduce competition on the retained trees for light, nutrients, water and growing space.

As described in the PDFs (Section 2.2), on the ground conditions would be monitored for whole tree yarding or other operational changes (such as reducing the number or width of skid trails) so that productivity loss on a unit by unit basis would remain below 5%.

3.2.3.5 Alternative 2 (Proposed Action) - Cumulative Effects on Soil Compaction and Productivity

There is one foreseeable project in the Reuben Hazardous Fuel Reduction Project Area units, the Wolf Pup Project. Two acres in proposed unit 11-1 of the Reuben Hazardous Fuel Reduction Project overlaps the Wolf Pup Project, which proposes thinning merchantable trees (trees greater than 8 inches dbh). The extraction method (tractor), landing and skid trail use, in this unit overlap, would be the same for both projects. No additional soil disturbance would be created so no additional foreseeable compaction and productivity analyses are needed.

3.3 Water Quality and Erosion

3.3.1 Affected Environment for Water Quality and Erosion

The Planning Area is primarily in the 113,050 acre Middle Cow Creek HUC 5 watershed[2]. It includes portions of twelve HUC 7 drainages within three HUC 6 sub-watersheds, McCullough Creek-Cow Cr, Dads Creek-Cow Creek, and Riffle Creek-Cow Creek. This Planning Area is a total of 25,986 acres, with units located in drainages that total approximately 85% (11,842 acre) of the 13,922 acre McCullough Creek-Cow Cr HUC 6 sub-watershed, 70% (10,961 acre) of the 15,748 acre Dads Creek-Cow Creek, and 23% (3,183 acre) of the 13,641 acre Riffle Creek-Cow Creek HUC 6 sub-watershed.

[2] Eight acres of the Reuben Hazardous Fuel Reduction Project overlays the Grave Creek HUC 5. Should the maximum allowable compaction (12%) occur within these 8 acres, there would be, at most, 0.4 acres of compaction that would affect the Grave Creek HUC 5. These acres are located along a ridge, and are not hydrologically connected to stream systems. Given the location and negligible amount of potential compaction, these 8 acres would not have any measureable affect at the HUC 7 drainage level or at a wider scale. As such, these acres will not be discussed as a part of the Planning Area for the Water Quality and Erosion sections.

Combined, these three HUC 6 sub-watersheds account for approximately 38% (43,322 acre) of the 113,050 acre Middle Cow Creek HUC 5 watershed.

Table 3-1. Sub-watersheds and Land Ownership within the Reuben Hazardous Fuel Reduction Project Planning Area

Sub-watershed	Private Land Acres (%)	BLM Acres (%)	State Acres (%)	Total Acres
McCullough Creek	8,220 (59)	3,961 (29)	1,742 (13)	13,923
Dads Creek	8,882 (56)	6,677 (42)	189 (1)	15,748
Riffle Creek	6,068 (45)	7,573 (56)	0	13,641
Totals	**23,170 (54)**	**18,211 (42)**	**1,931 (5)**	**43,312**

The entire Middle Cow Creek HUC 5 watershed has federal lands intermingled with non-federal land in a "checkerboard" pattern characteristic of much of the Oregon and California (O&C) railroad lands of Western Oregon. BLM administers about 45,642 acres (48%) of the Middle Cow Creek HUC 5 watershed. Designated beneficial uses for Middle Cow Creek watershed include private and public domestic water supply, industrial water supply, irrigation, livestock watering, anadromous fish passage, anadromous fish rearing, anadromous fish spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and hydropower.

Stream Condition

- Temperature
  Water quality within the Cow Creek-Fortune Branch HUC 6 sub-watershed is generally in fair to good condition. Within these sub-watersheds, the Oregon Department of Environmental Quality (ODEQ) has listed Cow Creek, Rattlesnake Creek, Panther Creek, Skull Creek, Bonnie Creek, and Riffle Creek[3] on the water quality limited list from Section 303(d) of the Clean Water Act for a variety of reasons.

Table 3-2. Water Quality Assessment 2004/2006 (ODEQ)*

Creek Name	Temperature	Sediment	Flow Modification	Habitat Modification	Dissolved Oxygen	E.Coli	pH	Toxic Substances	Miles Affected
Cow Cr.	X	X	X	X	X	X	X	X	80
Rattlesnake Cr.	X								2.6
Dads Cr.	X	X		X					3.4

[3] Within the Riffle Creek sub-watershed Middle Creek is also listed. However, there are only approximately 100 meters of stream within the Reuben Hazardous Fuel Reduction Planning Area on private lands. This project would not have any effect on Middle Creek; therefore, this analysis will not include any further discussion of Middle Creek.

Creek Name	Temperature	Sediment	Flow Modification	Habitat Modification	Dissolved Oxygen	E.Coli	pH	Toxic Substances	Miles Affected
Panther Cr.	X								2
Skull Cr.	X								2
Riffle Cr.	X								5.7
Bonnie Cr.	X								3.8

*13.8 miles within this Planning Area

Streams listed for temperature do not meet the ODEQ designated criteria for anadromous fish rearing and/or anadromous fish spawning (water temperature exceeds 64°F for rearing and/or 46.4°F for spawning). Temperature and water quality have been monitored in several locations on the above listed streams to track BMP effectiveness of treatments on federal lands. Nearly all tributary streams on federal lands in this sub-watershed appear to be narrow enough for streamside vegetation to provide adequate shade (BLM, 1999).

The BLM, in cooperation with the U.S. Forest Service, ODEQ, 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/USDI 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 will also adhere to the State Anti-degradation Policy (OAR 2005; 340-041-0004) under any proposed actions.

- Sediment and Aquatic Habitat

  Though there is currently no standard for measuring sediment, the health of aquatic macroinvertebrate communities has been used as an indicator of sedimentation effects and overall water quality conditions in aquatic systems than visual surveys. The Glendale Resource Area has monitored aquatic macroinvertebrates within this sub-watershed beginning in 1991. Surveys generally indicate that fish streams in this sub-watershed are impaired primarily due to excessive sediment deposition within the interstitial space of the stream substrate (BLM 1999, p. 24, 28-30).

  Overall, stream bed quality is in fair to poor condition. Data from surveys are available in the Glendale Resource Area files in the Fish/Hydrology work areas. The greatest factors resulting in sediment to streams are roads, tractor skid trails, naturally unstable areas, and current timber harvest near streams occurring on non-federal lands (ibid).

Aquatic habitat within this Planning Area is in fair to poor condition. This assessment is based on stream condition factors such as riparian seral stage, human disturbance within the riparian zone, streambank stability, the influence of roads, tractor logging, and natural processes on sediment delivery, the amount of large woody debris and pool frequency and complexity within the stream channel, and water diversions (BLM 1999, p. 24). Major factors affecting water quality and aquatic habitat in this sub-watershed are the high number of roads within the riparian, insufficient road maintenance due to a lack of funding, and alterations of the riparian zone by private landowners that result in an increase in solar heating, stream sedimentation, and insufficient in-stream large woody debris (LWD) (BLM 1999, p.20, 23, 24, 28-30, 61). Tributary streams in this Planning Area tend to be high gradient, confined, and have very low or intermittent summer flows. Channel roughness in the upper reaches of all streams within this HUC 6 sub-watershed is high. Low average flows relative to the stream roughness results in increased friction, further reductions in flow velocities, and less ability of stream flow to entrain and transport bedload and sediment through the system expect during flood events.

Soils and Soil Complexes

This watershed is located in the Klamath Mountain Province. The Klamath Mountains were formed from Mesozoic-Jurassic geologic formations which are folded and faulted, and intruded by the collision of the North American and Farallon Plates. Extensive natural erosion has a dissected landscape within the Klamath Mountain Province that has deep canyons and steep slopes. National Resource Conservation Service (NRCS) Douglas County Soils Survey Manual identifies the steepness of the slope as a "Major management limitation" for many soil types and complexes with slopes at or above 30%.

The Planning Area is primarily within the Dothan and Galice Formations. These formations are composed of metavolcanic and metasedimentary rock types, intruded by the White Rock Pluton. Soils derived from metasedimentary rock tend to be deeper and have more nutrients, whereas the metavolcanic soils tend to be shallower, with fewer nutrients and a lower water holding capacity. Soils of ultramafic metavolcanic origin are generally poorly developed and prone to erosion if disturbed. Metasedimentary and other metavolcanic soils in this Planning Area tend to be more developed, have a higher nutrient availability, and are generally relatively stable when dry. Productivity on most sites increases toward the lower 1/3 of the slope due to increased depth of the soils. Site productivity is regulated by nutrient inputs obtained from the organic layer on many of the soils within the Middle Cow Creek HUC 5 watershed, especially on sites with, schist, peridotite, and some sandstone soils.

The following describes some of the important characteristics and management limitations of the soils and soil complexes found in the Planning Area. The selection of proper Best Management Practices (BMPs) and PDFs that would be implemented during a project are based on these characteristics and management limitations.

Based on information obtained in the Soil Survey of Douglas County Area, Or (1994), soil types found in the proposed harvest units and unpaved haul routes include the

following:

Table 3-3. Soil Types in the Reuben Hazardous Fuel Reduction Project Area

Soil Name	Parent Material	Landscape location & Aspect	Surface Soil Texture	Soil Texture at Depth	Soil Depth (inches)	Soil drainage	soil permeability	Soil Water Holding Capacity (inches)	Identified Manage-ment Limitations **
Acker-Norling complex	colluvium and residuum from metasedimentary & metavolcanic rock	Sideslopes ranging between 30-60% N	brown to dark brown gravelly loam	Strong brown very gravelly loam	20-60	Well drained	moderately slow to moderate	5.0 - 9.0	1, 3, 5, 6, 8
Pollard gravelly loam	colluvium and residuum from sandstone, siltstone, and metasedimentary & metavolcanic rock	Foot slopes and ridges ranging between 3-30%	dark brown gravelly loam	yellowish red clay loam	60+	Well drained	slow	8.0	1, 2, 3, 4, 5, 7, 8
Dumont gravelly loam	colluvium and residuum from metasedimentary & metavolcanic rock	Side slopes and ridges 12- 30% N,S,E,W	dark brown gravelly loam	Red clay loam	60	well drained	moderately slow	8.0	1, 2, 3, 5, 8
Josephine-Speaker complex	colluvium and residuum from sandstone, siltstone, and metamorphic rock	Concave and convex side slopes 30- 60% S	dark brown gravelly loam	Soft bedrock	40-60	well drained	moderately slow	7.0	1, 2, 3, 5, 6, 8
Beekman-Vermisa complex	colluvium from metasedimentary & metavolcanic rock	Side slopes and headwalls 60- 90% S	brown gravelly loam	Hard bedrock	10-40	well drained to somewhat excessively drained	Moderate to moderately rapid	2.0 - 3.0	1, 3, 4, 6, 8, 9, 10, 11
Kanid-Atring complex	colluvium from metasedimentary & metavolcanic rock	Side slopes 60- 90% N	Very dark grayish brown very gravelly loam	Dark yellow brown & dark brown very gravelly clay loam	20-60	well drained	moderately rapid	3.0 – 5.0	1, 3, 4, 6, 8, 9, 10

****** These management limitations were identified by NRCS based on the physical, chemical, and biological properties of the soil

The below management limitations correspond to representative numbers in Table 3-3.
1- Rapid surface runoff/Hazard of accelerated erosion 2- Susceptibility to soil compaction 3- Plant competition
4- Seedling Mortality 5- Areas of moderately slow permeability 6- Shallow depth of soil in some areas 7- Low soil strength
8- Steepness of slope and slope stability 9- Low available water capacity 10-High amounts of rock fragments in soil
11- Hazard of windthrow

Soil Compaction

As defined in Section 3.2, soil compaction is defined as the packing together of soil particles by physical pressure at the soil surface that results in an increase in soil density and a decrease in pore space. Reduced pore space can result in increases in surface runoff that can result in accelerated erosion rates. In this Planning Area most soils are moderately susceptible to compaction, especially during wet periods.

Currently soil properties in this HUC 6 sub-watershed have been altered by past timber management and road construction activities. Based on historic aerial photos (circa1965) and current satellite imagery, the three HUC 6 sub-watersheds that encompass the Reuben Hazardous Fuel Reduction Project Planning Area currently have moderate levels of existing compaction from existing road footprints, landings, and skid trails.

- Roads
  Roads that are presently visible on the landscape occupy approximately 360 acres or 1.4% of the Planning Area. At the HUC 6 scale, compaction from road acres was calculated at 283 acres (2.0%) within the McCullough Cr sub-watershed, 240 acres (1.5%) in the Dads Cr sub-watershed, and 219 acres (1.6%) in the Riffle Cr sub-watershed for a total of 742 acres. Many of these roads are system roads that will continue to be used and maintained for future management on public and private lands. A small number of these roads are now in various stages of naturally decompacting and re-vegetating because they are not currently being used. However, since these roads have not been officially abandoned or decommissioned, for the purpose of this analysis, these roads have been considered along with active roads to be a permanent soil resource loss. Given the soil types, and climate of these watersheds, it would be expected that advanced their stages of recovery on these roads will take 50-70 years if no further use or decommissioning actions occur (Wert and Thomas, 1981).

- Landings and skid trails
  Existing landings and skid trails have been estimated to occupy approximately 3.7% of the landscape within this Planning Area. This estimate was calculated based on typical rates of compaction within past harvest units for tractor, cable, or helicopter yarding systems[4]. Estimated compaction from landings, cable yarding corridors, and skid tails is 956 acres within the Planning Area. At the HUC 6 scale, compaction from landings, cable yarding corridors, and skid trails was calculated at 650 acres (4.7%) within the McCullough Cr sub-watershed, 616 acres (3.9%) in the Dads Cr sub-watershed, and 532 acres (3.9%) in the Riffle Cr sub-watershed.

[4] Medford Change Detection (2002), 1965 aerial photography, and satellite imagery was used to estimate units that have been harvested in the past 43 years. Though this does not account for all potentially affected soils, it is the extent of the data that is presently available. This lack of data is not considered to be a measurable source of error since compaction recovers naturally over time, and it is expected that those soils that may have been unaccounted for during this analysis (as a result having been harvested prior to the first available year of data) would be in an advanced stage of recovery. This is based on average natural recovery for the soil types, climate, and elevation of this watershed, and on the skid trail conditions observed during field visits to units within these drainages that are known to have been harvested 40-50 years ago. Yarding systems were identified based on known data, visible landscape scar patterns, or slope steepness. Tractor yarding on slopes over 35% has not been permitted on federal lands since the implementation of the Northwest Forest Plan in 1994. Units identified as having been tractor yarded prior to NWFP BMPs are calculated at 25% compaction, and at 12% following the implementation of the NWFP. All cable yarded units are calculated at 4% compaction for thinning units, and helicopter units are calculated at 1% compaction. These compaction percentages are based on research by Swanston and Dryness, 1973, Adams and Froehlich, 1981, Dryness, 1967, and Clayton, 1981.

The combined existing conditions have resulted in 1,316 acres, or 5.1 % total compaction within the Reuben Hazardous Fuel Reduction Project Planning Area. The total existing compaction for the three HUC 6 sub-watersheds that are partially occupied by this Planning Area is calculated to be 933 acres or 6.7% within the McCullough Cr sub-watershed, 856 acres (5.4%) in the Dads Cr sub-watershed, and 751 acres (5.5%) in the Riffle Cr sub-watershed. Road acres are generally considered to have the greatest affect on the watershed hydrology by changing the timing of runoff, which can lead to peak flow increases. This is generally a result of reduced infiltration on compacted surfaces, more rapid routing of runoff in ditchlines, and the interception of surface and subsurface flows (Ziemer, 1981). Research indicates that changes in runoff timing may occur when roads acres occupy 3-4% of the watershed (WPN, 1999). These changes however were found to be "small, inconsistent, and statistically non-significant" when roads occupied less than 5% of the basin, and significant changes are not seen until at least 12% of a watershed is compacted (Harr, et al. 1975). Within this Planning Area, and its associated HUC 6 sub-watersheds, roads acres would be considered to be a permanent loss of soil resources, and localized alterations surface and subsurface water movement would be expected. However, due to the percentages of road acres and compacted acres that are currently present within these sub-watersheds, measurable changes in the watershed hydrology is not presently a concern. Road acres occupy 2% of the McCullough Cr HUC 6, 1.5% of the Dads Cr HUC 6, and 1.6% of the Riffle Cr HUC 6 sub-watershed. As such, it would be expected that localized changes in infiltration, surface flow, and subsurface flow, may currently be affecting runoff timing in limited areas adjacent to existing roads, but that this environmental alteration would currently be of a magnitude that would result in a low risk of peak flow changes that would not be measurable at either the Planning Area or HUC 6 sub-watershed scale.

Total road density within the three HUC 6 sub-watersheds 4.4 mi/mi^2. Road density within the McCullough Cr sub-watershed is currently 5.2 mi/mi^2, in the Dads Cr sub-watershed is 3.9 mi/mi^2, and in the Riffle Cr sub-watershed 4.1 mi/mi^2. Road densities within a watershed that are currently above what is considered to be Properly Functioning Condition (<2.0 mi/mi^2) by the National Marine Fisheries Service (NMFS), and the percentage of compacted acres within the Planning Area have altered subsurface flow patterns and increased surface erosion. This conclusion was substantiated during field observations where localized instances of moderate rilling across compacted soils, and instances of subsurface flow reaching the surface in the form of seeps or springs upslope of skid trails were found.

Soil Erosion and Stream Sedimentation

Soil displacement refers to the moving of the surface soils as a result of some applied force. When soil displacement occurs soil horizons may become mixed, essential soil nutrients, water, and soil organisms may be rearranged or removed, and topsoil may beome rutted. These alterations to the soil profile or soil characteristics may result in accelerated erosion. Soil displacement and erosion can occur during forest management activities when mechanized harvesting or yarding equipment drives over or yards timber across poorly vegetated, bare, or wet soils. Where logging and prescribed fire operations result in exposed soil, surface erosion can occur when rain splash or overland flow causes the detachment of soil particles during wet conditions, or when gravitational and wind

movement causes detachment of particles during dry weather conditions. Vegetative cover reduces the particle detachment rate, and through the binding capacity of root masses, the sediment transport rate (NOAA Fisheries, 2004). Therefore surface erosion, from disturbed soils that are not compacted, is normally greatly diminished in 3-5 years, following the re-growth of vegetation. Additionally, there are management techniques that would greatly reduce the amount of erosion from a timber management operation. For example, soils protected by litter are less prone to erosion (Rothacher and Lopushinsky 1974). Therefore, by limiting the amount of surface disturbance and the amount of exposed soil, erosion can be reduced.

Erosion can also occur as a result of the blading of road surfaces, the use of inadequately rocked and natural surface roads, ditchline maintenance, an insufficient number of road cross drains or culverts, undersized or poorly placed cross drains or culverts, and in areas of exposed soil. Roads can cause increased channelization of hillslopes and mass wasting (Wemple and Jones, 2003). Where hydrologically connected, un-vegetated ditchlines, road surfaces, and cross drains all mobilize eroded soils to streams.

Based on field surveys, historic aerial photos (circa 1965), and current satellite imagery, the ten HUC 7 drainages that form the Reuben Hazardous Fuel Reduction Project Planning Area currently have accelerated surface erosion as a result of timber management and the preserving of public access routes.

- Roads

  Currently water quality in this HUC 6 sub-watershed has been altered by past timber management and road construction activities. Roads in close proximity to streams, un-maintained or poorly maintained roads, native surface roads used for winter haul, and roads open year round for public motor vehicle use are the major ongoing sediment sources in this sub-watershed (BLM 1999). Roads constructed in riparian zones along streams contribute sediment to the adjacent stream, reduce riparian habitat quality, and remove potential sources of large woody debris from streams. Un-vegetated ditchlines, road surfaces, and cross drains can all transport sediment. Oregon Department of Forestry monitoring data shows approximately one-third of private and state roads deliver sediment to streams via ditchlines, especially when used during winter hauling operations. A number of issues were identified to be contributing to the problem of sediment delivery to streams from these roads including: a lack of filtering prior to road drainage entering streams; too wide of spacing between, or poor placement of, cross drainage structures; and a “lack of rules to address turbidity caused by wet-weather hauling” (ODF & DEQ, 2002). Approximately 53% of roads in this Planning Area are Bituminous Surface Treatment (BST) surfaced or rocked. When rocked roads are used for winter haul, they are generally upgraded to provide adequate surfacing to prevent excessive erosion and road damage. Natural surface roads on BLM lands are only used for log hauling during dry conditions.

  As stated above, road densities within the McCullough Cr HUC 6 sub-watershed are currently at approximately 5.2 mi/mi^2, the Dads Cr. HUC 6 sub-watershed at approximately 3.9 mi/mi^2, and Riffle Cr. HUC 6 sub-watershed at 4.1 mi/mi^2.

Within the Planning Area road densities are currently at approximately 3.6 mi/mi^2. Road densities above 5 mi/mi^2 are a cause for concern from a hydrologic perspective (USDI, 1999). Road densities as a result of past road construction are currently above National Marine Fisheries Service (NMFS) recommended levels for properly functioning sub-watershed condition. The NMFS target established for proper functioning condition is 2 mi/mi^2, and above 3 mi/mi^2 is considered not functioning properly (USDA et al. 2004). About 47% of the roads in this Planning Area are unsurfaced. Many of these roads are non-federal roads and are not maintained by the BLM. Unsurfaced roads are generally the largest sediment sources, especially if they are open to year round public motor vehicle use. Within the Middle Cow Creek watershed 53% of streams and 93% of all fish streams are within 180 feet of a road (BLM 1999). Within the Poorman Creek-Grave Creek, Wolf Creek, and Rat Creek-Grave Creek HUC 6 sub-watersheds approximately 46%, 46%, and 53% are unsurfaced, respectively.

There are approximately 278 miles rocked and natural surface system roads currently used and maintained as needed within these three HUC 6 sub-watersheds. Within the Planning Area there are approximately 137 miles of rocked and natural surface roads. These roads are open to the public and are periodically used and maintained as haul routes for private and government timber operations. These roads contribute to accelerated erosion in the watersheds at different levels depending on the type of use and moisture levels of the road surface during the period of use. "Dry conditions only" use of these roads is implemented by the federal government to reduce erosion and protect road surface integrity. A majority of roads within the Planning Area are hydrologically connected to streams through either tributary stream crossings or by proximity with valley roads paralleling the stream. Hauling during wet conditions on unsurfaced valley bottom roads running adjacent to streams is a chronic contributor to the reductions in streambed and aquatic health that are presently occurring within these sub-watersheds. All hydrologically connected roads contribute to accelerated erosion and stream sedimentation within the sub-watersheds at different levels depending on the maintenance frequency, the type or rate of use, and moisture levels of the road surface during the period of use.

In addition to the maintenance of ditchlines and running surfaces implemented on the 278 miles of rocked and natural surface roads, ditchline maintenance on BST (bituminous surface type) and paved roads currently occurs as needed on another approximately 19 miles of road within the three HUC 6 sub-watersheds. Ditchline maintenance includes the removal of debris and vegetation where it is impeding water flow, and the digging out or "pulling" of ditchlines where they are lacking the ability to carry the volume of water that is entering them without spilling out across the road surface. This maintenance results in an increase in erosion in ditchlines for the first season until protective vegetation re-grows and bare soils regain stability. Where these ditchlines are hydrologically connected to streams, ditchline maintenance can result in chronic sediment delivery to streams through the first winter, unless Best Management Practices require a sediment filter to be in place prior to stream culverts. Following this first season, ditchline

maintenance results in an overall reduction in chronic erosion of the road surface and where hydrologically connected, subsequent stream sedimentation. Proper cross drain spacing and vegetated ditchlines can greatly reduce the amount of sediment that enters streams as a result of roads. In these sub-watersheds, cross drain spacing is generally adequate except during high flow events. Ditchlines are only "pulled" as necessary to protect road integrity. As a result most ditchlines in these sub-watersheds have sufficient vegetation in the ditchlines to slow erosion and filter a portion of the sediment.

Cross drain culverts on road systems in the Planning Area are generally spaced further apart than recommended under the Oregon Administrative Rules for forest roads (OAR 629-625-0330). However, upgrading this spacing is only necessary to prevent exceeding water quality standards. Roads proposed for haul and maintenance would be inventoried prior to use to ensure that culvert and cross drains additions are not necessary to comply with the OAR. In most instances ditchlines along haul routes in this Planning Area appear to be functioning properly, having adequate movement of water and little scour. Downspouts of some cross drains could be upgraded by installing splash pads or downspouts to reduce erosion.

- Landings, Skid trails, and Yarding Corridors
  It was calculated that approximately 956 acres (3.7%) within this Planning Area have had soil displacement and subsequent erosion as a result of the construction and use of landings, skid trails, and yarding corridors during timber management operations in the past 40 years. Many of these disturbed acres are no longer visible on the ground and appear to have recovered as a result of the re-growth of vegetation. Of these acres 308 acres (32%) are on federally managed land. Where poorly rehabilitated skid trails, landings, and yarding corridors are hydrologically connected to the streams through road systems, or are adjacent to streams that have little or no riparian buffer, these areas have become chronic sources of stream sediment that are contributing to the aquatic conditions discussed above. Based on calculations of existing tractor compaction, and the soil displacement, disturbance, and compaction from the past 10 years within cable and helicopter units, and those acres that are still visibly altered on the ground, approximately 858 acres (3.3%) are still potentially exhibiting accelerated erosion within this Planning Area.

  At the HUC 6 scale, it is estimated that accelerated erosion is still evident on 581 acres (3.3%) within the McCullough Cr sub-watershed, 543 acres (3.4%) within the Dads Cr sub-watershed, and 474 acres (3.5%) within the Riffle Cr HUC 6 sub-watershed.

- Wildfire and Prescribed Fuels Reduction
  Severe fires can increase the risk of dry ravel and rill erosion on severely burnt, steep sites by reducing the adhesive properties of water found in the organic matter, microbes, fungal filaments, woody debris, and roots in the soil matrix (Barnett, 1989). There are approximately 991 acres of fuels treatments that have

occurred in the past five years in the Reuben Hazardous Fuel Reduction Project Planning Area. These treatments were designed to limit the extent and magnitude of onsite erosion, and to protect from offsite erosion. These treatments help to reduce the probability of an intense, large scale wildfire occurring by reducing fuel loading and horizontal continuity in the stand.

Heat resulting from large scale and intense fires can damage soil biology such as mycorrhizae, nitrifying bacteria, and other soil organisms in proportion to burn intensity, adversely affecting soil productivity for up to 10 years (Barnett, 1989). GIS data indicates that there have been 8 fires totaling 23 acres in these three HUC 6 sub-watersheds in the last 10 years. Seven of these were less than 10 acres in size, and seven were less than 0.25 acres. Within the Planning Area, there have been 4 fires in the last 10 years that burned less than 1 acre combined. In 1998 there was one larger fire that burned 22.5 acres within the Dads Creek area HUC 6 sub-watershed.

The extent of offsite erosion from these fires, though expected to be negligible, has not been measured. There are presently no indications of accelerated erosion in the acres that have previously burned in this sub-watershed, as burned areas appear to have recovered with the re-growth of vegetation and conservation of water retaining organic ground cover, such as logs, branches, and other forest debris.

3.3.2 Environmental Effects on Water Quality and Erosion

3.3.2.1 Alternative 1 (No Action) – Direct and Indirect Effects on Water Quality and Erosion

Under Alternative 1, soil resources on BLM lands would remain in their present condition. There would be no increase in the amount of compaction or the number of acres presently experiencing accelerated erosion as a result of this project, because there would be no activities occurring that would result in alterations to the physical, chemical, and biological properties of the soils. Existing compacted acres that are not associated with active road systems would continue to slowly improve over time as tree roots and other natural processes begin to break apart soil particles, eventually resulting in a reduction in compaction on these acres. Watershed processes, such as runoff timing and subsurface flow patterns, would slowly improve on BLM lands in the McCullough Creek, Dads Creek, and Riffle Creek HUC 6 sub-watersheds. There would also be no increase in the amount of sediment to stream channels resulting from upland yarding or hauling activities on BLM lands within these watersheds, because there would be no activities occurring that would result in compaction, bare soil, or accelerated erosion.

Within the McCullough Creek, Dads Creek and Riffle Creek HUC 6 sub-watersheds, there is one proposed project on BLM lands that would affect road erosion and water resources. The Wolf Pup Project has proposed timber hauling on two roads within the Riffle Creek HUC 6 sub-watershed that would result in small amounts of sediment entering streams at road crossings. This sediment would not result in visible increase in

turbidity during any hauling activities, and sediment deposition would not be measurable for more than 25 feet downstream of stream crossings. This project was analyzed under a separate environmental assessment and the decision to implementation this project would not be affected by the decision made for the Reuben Hazardous Fuels Reduction Project. Actions with the potential to result in offsite erosion or impacts to water quality, such as non-federal timber harvest and road building would be expected to continue to occur at approximately the same rate as has occurred in the past decade on non-federal lands. Any future actions on federally managed lands would be analyzed under separate environmental analysis, once proposed. Affects of all the above actions are discussed within Section 3.2.3.5, Cumulative Effects.

Current hazardous fuel reduction treatments and young stand management activities (pre-commercial thinning) in this Planning Area and the McCullough Cr, Dads Cr, and Riffle Cr HUC 6 sub-watersheds would continue to occur. These projects were previously completed under Categorical Exclusion and Environmental Assessment documents. Hazardous fuels reduction treatments and young stand management activities may result in minor increases in onsite soil erosion, but due to the implementation of riparian buffers, would not measurably affect water quality.

3.3.2.2 Alternative 2 (Proposed Action) - Direct and Indirect Effects on Water Quality and Erosion

Alternative 2 would result in soil displacement and erosion in the McCullough Creek, Dads Creek, and Riffle Creek HUC 6 sub-watersheds. BMPs and PDFs (Section 2.3) were identified for implementation to address any general management concerns for each soil type in this sub-watershed. Satellite images and soil surveys were used to identify and defer all areas that have the potential to result in chronic erosion or landsliding. Field inventories would be conducted prior to any timber extraction within Riparian Reserves to ensure that sufficient buffers are applied to ensure full protection of water quality. Following incorporation of these BMPs and PDFs, offsite erosion and stream sedimentation would only occur during hauling and maintenance activities on roads that are hydrologically connected to streams. These actions are discussed below. All other biomass removal, landing expansion, yarding operations, and hazardous fuel reduction treatments proposed under this project would be hydrologically disconnected using PDFs and BMPs, ensuring the protection of all water resources. Critical environmental elements related to erosion and water resources not effecting water quality or watershed hydrology are addressed in Appendix 2.

- Roads: Timber Haul and Maintenance
  A total of approximately 56.5 miles of roads would be used for biomass removal haul in this Planning Area. Proposed activities along these roads would contribute to accelerated erosion within these watersheds at different levels depending on the moisture levels of the road surface during haul, and the type of maintenance needed. All roads would be maintained as necessary to prevent road damage or excessive erosion.

Approximately 19.5 miles of haul roads within this Planning Area are hydrologically disconnected from stream channels. There are 23 roads totaling approximately 37.0 miles that are hydrologically connected to streams within this Planning Area. Of these, approximately 36.7 miles are rocked surface roads. Another 4.0 miles of hydrologically connected road is paved. Where these hydrologically connected roads cross intermittent or perennial stream channels within the Planning Area, maintenance and hauling activities would result in localized instances of offsite erosion. There are approximately 60 perennial and numerous intermittent stream crossings that occur over the 37 miles of hydrologically connected roads within this Planning Area. There are approximately 10 miles of these roads that are also within 50-200 feet of streams. Maintenance activities on these roads would include periodic instances of roadside brushing, spot rocking, culvert cleaning, surface blading and shaping, and ditchline maintenance. These actions would occur only during dry conditions. Log hauling on all rocked and natural surface roads would also be limited to dry conditions. Any road condition that would result in continuous mud splash or tire slide, fines being pumped through road surfacing from the subgrade, road drainage causing a visible increase in stream turbidities, surface rutting, muddy water running in ditchlines, or surface runoff being chronically routed into tire tracks or away from designed road drainage during precipitation events, would be considered wet conditions and would be prohibited for maintenance and hauling activities until road conditions change. This restriction would considerably reduce the amount of erosion that would occur during hauling and maintenance activities on hydrologically connected roads.

As a result of the dry condition hauling and maintenance constraints that would be applied to hydrologically connected roads, and the rocked or paved surfacing that is on 97% of the Planning Areas road systems, sediment entering stream channels at crossing locations and from haul roads parallel to streams would not be of a magnitude to result in a visible increase in stream turbidity during hauling activities, or a measurable increase in the overall stream sediment deposition for more than 25 feet downstream within any stream channels. There are no stream crossings that are close enough together on any hydrologically connected roads for these impacts to combine and increase the magnitude of this effect. Any sediment entering streams would be redistributed and immeasurable within the channel following the first bankfull event of the winter season. Hauling and road maintenance activities would therefore not exceed State of Oregon water quality standards and would not result in any measurable effects on macroinvertebrates communities or aquatic habitat. This action is also consistent with the standards and guidelines set forth under the 1994 Medford RMP EIS. Although the Proposed Action on BLM land would create a small localized effect to water quality at the site scale, it would not be detectable at the HUC 7 scale or larger.

- Landings, Skid trails, Whole Tree Yarding, and Cable Yarding Corridors
  Under Alternative 2, biomass removal would include the construction and use of landings, skid trails, and whole tree and cable yarding corridors that would result in up to 70 acres (see footnote 2, p.28) of compaction and accelerated on-site

erosion within this Planning Area. Approximately 14 acres from this project would occur within the McCullough Cr HUC 6 sub-watershed. Dads Cr HUC 6 would be subject to approximately 39 acres of disturbance, and disturbed ground within the Wolf Creek HUC 6 sub-watershed would increase by about 17 acres. Skid trial construction and yarding corridors would not occur within RRs, unless field verified EPZs are established. RRs and EPZs are both designed to filter out any accelerated erosion from upslope practices that are implemented using PDF and BMPs (see discussion of Riparian Thinning and EPZs in Section 2.2.2)[5]. If EPZs are established, there could be one landing expanded outside the EPZ, but within the Riparian Reserve of unit 15-1. This landing would expand an existing footprint by up to 0.25 acres.

BMPs and PDFs designed into this project would be used to keep erosion from yarding corridors, landings, and skid trails onsite and to a minimum. The amount of onsite erosion would be measurably reduced by the use of these PDFs and BMPs, which are designed to reduce the amount of ground disturbed, as well as the magnitude of the disturbance that occurs during timber management activities. One of the management practices that would be employed during implementation of this project is limiting the amount of compaction within a unit to less than 12%, and the amount of combined soil productivity loss from compaction and disturbance to less than 5%. This would reduce the total amount of ground that would experience topsoil loss or detrimental disturbance to less than 15% of the unit, thus minimizing the initial source of erosion from timber harvest activities. Timber yarding would use partial suspension where feasible, limiting the magnitude of the yarding impacts. Furthermore, skid trail construction, timber yarding, and landing construction would all be limited to dry conditions. This would increase the resistance of the soils to disturbance, compaction, and erosion. It would also limit the movement of detached soil particles, allowing them to become trapped within the existing ground cover within the thinning unit prior to entering streams, springs, and seeps.

BMPs would additionally be used during timber harvest activities to provide further protection of water resources including streams, springs, and seeps from upslope erosion. For instance, all yarding corridors that are constructed upslope of, or within Riparian Reserves, or upslope of hydrologically connected roads, would be waterbarred prior to any rain event as necessary to eliminate the hydrologic connection. These waterbars would filter surface water runoff from yarding corridors away from stream Riparian Reserves and hydrologically connected road ditchlines, and into vegetation that is adequate to slow surface water and allow for deposition of detached soil particles. Additionally hydrologically connected landings used during dry conditions within the wet season (October through May) that have the potential to transport erosion and

[5]When properly functioning stands exist, Riparian Reserves provide additional upslope habitat that functions as corridors for wildlife among other benefits (RMP, pg 26). Riparian Reserves stands within this Planning Area often are lacking in complexity and are suppressed due to overcrowding. Riparian thinning is used under certain situations to accelerate the development of more favorable riparian stand conditions.

result in stream sedimentation, would have silt fencing or other sediment control measures in place during periods of non-use. These PDFs and BMPs would reduce erosion and break the hydrologic connection, keeping erosion from upslope activities onsite, and preventing stream sedimentation during and following implementation of these activities. Additionally, rehabilitation of landings, yarding corridors, and skid trails would include installing and/ or using water bars, sediment basins, gravel pads, hay bales, small dense woody debris, seeding and/or mulching that would greatly reduce the amount of erosion occurring at these sites.

As a result of the BMPs and PDFs used during project implementation, accelerated onsite erosion from landings, skid trails, and whole tree yarding corridors would not be expected to be measurable beyond the third year following the implementation of this action due to the depth of the organic layer within the soil profiles where these actions would take place and the considerable amount of remaining ground cover vegetation that would still be present within each unit. Furthermore, yarding actions associated with these units would result in compaction and disturbance that would cause an increase in onsite erosion, but would not affect water resources.

Compaction from yarding, landings, and skid trails under Alternative 2 would lead to reductions in productivity (discussed in Section 3.2.3.2), and would increase the total compaction within this Planning Area by 70 acres (see footnote 2, p.28), taking total compaction from 956 acres (3.7%) to 1,026 acres (3.9%). Since changes in watershed hydrology have been shown to be small and inconsistent (WPM, 1999) when roaded compaction is less than 5% and watershed compaction is less than 12% (Harr et al. 1975), compaction from this action would not substantially alter watershed hydrology.

- Hazardous Fuel Reduction

  Handpile burning and underburning treatments are site specifically designed to limit the extent and magnitude of onsite erosion, and to protect from offsite erosion. These treatments help to reduce the probability of an intense, large scale wildfire occurring by reducing fuel loading and horizontal continuity within the stand.

  Under Alternative 2, forest fuels would be manually treated on approximately 1,737 acres of BLM land. Treatments would include a mix of thinning, slashing, hand-piling, handpile burning, lop-and-scatter, and underburning, depending on site specific conditions. Hazardous fuel reduction treatments would be allowed within Riparian Reserves outside the NTZ where beneficial to improve stand quality and reduce fire danger. Due to the implementation of PDFs and the lack of transport mechanisms with the application of the no treatment buffers on all streams within or adjacent to units, any erosion from activity fuels treatments would remain onsite and would have no effect on water quality.

Alternative 2 (Proposed Action) - Cumulative Effects on Water Quality and Erosion

In compliance with the 1995 Medford RMP, a cumulative effects analysis for this project was completed at the HUC 6 sub-watershed scale. The 1995 RMP guidance to "minimize detrimental impacts on water and soil resources resulting from the cumulative impact of land management activities within a watershed" is to delineate watersheds for cumulative effects analyses using natural drainage boundaries and third to fifth order drainages (approximately 500 to 10,000 acres)," (RMP, p.153). Cumulative effects should therefore be written using a watershed delineated boundary that, as defined by acreage and stream order in the 1995 RMP, at the HUC 7 or HUC 6 scale.

Aquatic Conservation Strategy (ACS) objectives, which are measured at the HUC 5 scale, are analyzed to ensure the Reuben Hazardous Fuel Reduction Project would not cumulatively elevate effects occurring in this HUC 5 watershed to a level that would result in the degradation of aquatic and riparian habitat or species. However, if there are no detectable effects found to be occurring at the HUC 7 scale, then there would also be no detectable effects from this project on aquatic species at the HUC 6, and similarly if effects are not detectable at the HUC 6 scale they would also not be detectable at a larger HUC 5 scale.

Compaction

Past harvesting operations used a combination of cable, tractor, and helicopter yarding in the McCullough Creek, Dads Creek, and Riffle Creek HUC 6 sub-watersheds. Roads were also constructed to access and remove timber products from these areas. As a result of these activities about 933 acres (6.7%) in McCullough Creek, 856 acres (5.4%) in Dads Creek, and 751 acres (5.5%) in Riffle Creek sub-watersheds, have been compacted in the last 40 years. Alternative 2 of the Reuben Hazardous Fuel Reduction Project could result in up to 71 acres of additional compacted ground as a result of skid trails, yarding corridors, and landings (Section 3.2.3.2, Soil Compaction and Productivity). Approximately 14 of the compacted acres from this project would occur in the McCullough Creek HUC 6 sub-watershed. Dads Creek HUC 6 would be subject to approximately 39 acres of new compaction, an increase of 17 acres in the Riffle Creek HUC 6 sub-watershed, and up to 1 acre from this project in the Grave Creek watershed. There are no other reasonably foreseeable commercial timber management projects proposed on federally managed lands in these HUC 6 watersheds that would affect watershed compaction.

The McCullough Creek, Dads Creek, and Riffle Creek HUC 6 sub-watersheds are approximately 28%, 42%, and 54% federally managed land, respectively. Objectives for soils under the 1995 RMP are to "improve and/or maintain soil productivity" and to keep compaction within units to less than 12% (RMP, p.41 & 166).

There are no known non-federal projects currently occurring in these HUC 6 sub-watersheds. Aerial photo and satellite imagery analyzed on ArcMap GIS indicates that, based on stand age, up to 6,550 acres of timber could be available for non-federal harvest in the 13,922 acre McCullough Creek HUC 6 sub-watershed; up to 6,425 acres in the 15,748 acre Dads Creek; and up to 3,813 acres in the 13,641 acre Riffle Creek sub-

watershed in the future. Based on past harvest trends, it would be expected that approximately 600 acres, 430 acres, and 400 acres would be harvested in the next 5 years in these HUC 6 sub-watersheds, respectively. These activities would result in an increase in the overall compaction in these sub-watersheds due to harvest related activities. Though the amount of compaction that may occur on non-federal lands in the near future is unknown, past trends indicate that up to 105 acres of compaction could occur in the McCullough Creek sub-watershed, up to 77 acres in the Dads Creek HUC 6, and up to 71 acres in the Riffle Creek HUC 6 sub-watershed as a result of future timber harvest activities on non-federal lands. Any additional road building needed to provide access to non-federal actions would further increase compaction. The number of potential future road miles needed to implement non-federal projects in these HUC 6 sub-watersheds is unknown, but current road patterns indicate that no more than 6 miles would be necessary to implement the expected levels of harvest activities in the next 5 years in any one sub-watershed. As a result of this potential road construction there would be up to 15 acres of compacted soil in each HUC 6 sub-watershed. As stated earlier, such right-of-way construction would undergo proper review/evaluation/analysis prior to implementation on federal lands.

The past, present, and future actions would be expected to result in approximately 1,053 acres (7.6%) of compacted soil in the McCullough Creek HUC 6 sub-watershed under Alternative 1, and up to 1,067 acres (7.7%) of compacted soil, under Alternatives 2. In the Dads Creek HUC 6, compaction would be expected to be 948 acres (6.0%) under Alternative 1, and approximately 987 acres (6.3%) of compacted soil, under Alternative 2. Compaction in the Riffle Creek HUC 6 sub-watershed as a result of past, present, and future actions on private, state, and federally managed lands would be expected to be approximately 837 acres (6.1%) under Alternative 1 and 854 acres (6.3%) under Alternative 2. Research indicates that changes in runoff timing may occur when roads acres occupy 3-4% of the watershed (WPN, 1999). These changes however were found to be “small, inconsistent, and statistically non-significant” when roads occupied less than 5% of the basin, and significant changes are not seen until at least 12% of a watershed is roaded (Harr, et al. 1975).

Water Quality and Erosion

Past and current timber yarding, road construction and renovation, road maintenance, and road use are all contributing to soil disturbance and erosion in these sub-watersheds. Harvest activities using BMPs or PDFs generally only result in onsite erosion. This is true with the exception of areas that were harvested prior to the implementation of the Northwest Forest Plan or in areas of non-federal harvest, where riparian buffers are absent or limited. In these instances, erosion from upslope activities may be hydrologically connected to streams and would contribute to offsite sedimentation of streams.

- Roads

  During past projects on federal and non-federal lands within the Planning Area, and these HUC 6 sub-watersheds, road construction, maintenance, and use have all resulted in accelerated erosion, and where hydrologically connected stream sedimentation. Chronic erosion is currently ongoing at the HUC 6 sub-watershed

scale due to road densities of 5.2 mi/mi^2, 3.9 mi/mi^2, and 4.1mi/mi^2 respectively, within the McCullough Creek, Dads Creek, and Riffle Creek sub-watersheds. The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) target of 2mi/mi^2 for streams to be considered in properly functioning condition (BLM 1999). Many of these roads are unpaved and a majority of them are hydrologically connected to tributary stream channels within this sub-watershed.

Since the Reuben Hazardous Fuel Reduction Project does not propose any permanent road or temporary route construction, it would not increase the number of roads or the road densities in these drainages.

Future road building proposed on non-federal lands would continue to increase road densities in these sub-watersheds. Past trends indicate that up to 6 miles of road may be needed on non-federal lands to facilitate future harvest in each of the HUC 6 sub-watersheds of this Planning Area. This would increase road densities in the McCullough Creek HUC 6 sub-watershed to up to 5.5 mi/mi^2. Road densities in Dads Creek HUC 6 could increase to 4.1 mi/mi^2 and up to 4.4 mi/mi^2 in the Riffle Creek HUC 6. These actions could contribute to increases in onsite and offsite erosion depending on the location of these roads and the BMPs implemented. In the federally managed portion of these 3 sub-watersheds, there are no proposed future actions that would result in road construction. All roads built on non-federal lands would be expected to be constructed and used in compliance with the State of Oregon water quality standards.

Hydrologically connected road use and hauling operations during current and past actions have also resulted in increased sedimentation to streams within both the Planning Area and within the HUC 6 sub-watersheds. Roads in close proximity to streams, un-maintained or poorly maintained roads, and native surface roads used for winter haul, are the major ongoing sediment sources in these watersheds (BLM, 1999). Roads within riparian zones along streams contribute sediment to the adjacent stream, reduce riparian habitat quality, and remove potential sources of large woody debris from streams. Un-vegetated ditchlines, road surfaces, and cross drains can all transport sediment. Oregon Department of Forestry monitoring data shows approximately one-third of private and state roads deliver sediment to streams via ditchlines, especially when used during winter hauling operations.

A number of issues where identified to be contributing to the problem of sediment delivery to streams from roads including; a lack of filtering prior to road drainage entering streams; too wide of spacing between, or poor placement of, cross drainage structures; and a “lack of rules that specifically address minimizing turbidity caused by wet-weather hauling” (ODF/DEQ, 2002). Many roads in these sub-watersheds do not have adequate filtering of ditchline sediment. Most BLM roads in these sub-watersheds are rocked, and when used for wet condition haul, are upgraded to provide adequate surfacing to prevent excessive erosion and road damage. To reduce sedimentation, hydrologically connected natural surface and inadequately rocked roads on BLM lands are only used for log hauling under dry conditions.

Hauling and maintenance would occur on 56.5 miles of unpaved roads in these sub-watersheds as part of the Reuben Hazardous Fuel Reduction Project. Of these roads, approximately 37.0 miles are hydrologically connected. Approximately 97% of all haul roads, and 99% of the hydrologically connected haul roads, in this Planning Area are rocked or paved surface roads. The Wolf Pup Project would haul on 5.1 miles of rocked roads in this Planning Area.

There would be a very slight increase in surface erosion and the amount of sediment in the ditchlines of haul roads where these roads receive maintenance activities that disturb the soil. Most of this erosion would filter out within the hillslope vegetation at cross drain outlets. Where these roads cross perennial and intermittent stream channels in this Planning Area, maintenance and hauling activities would result in localized offsite erosion. Since these roads would only be used and maintained during dry conditions, sediment entering stream channels from haul roads would not be of a magnitude to result in a visible increase in stream turbidity, or a measurable increase in the overall stream sediment deposition for more than 25 feet downstream of any stream channels. Hauling and road maintenance activities would therefore not exceed State of Oregon water quality standards and would not result in any measurable effects on macroinvertebrates or aquatic habitat.

There is no other road maintenance or hauling planned in these HUC 6 sub-watersheds. Separate from this project, ditchline maintenance in these HUC 6 sub-watersheds would only occur on federally maintained roads as scheduled under routine maintenance, or as necessary to ensure proper drainage. Where ditchlines are hydrologically connected to streams, ditchline maintenance can result in sediment delivery to streams through the first winter. Best Management Practices would require a sediment filter to be in place prior to stream culverts if ditchline maintenance would result in exceeding water quality standards, or an affect to fish habitat. Following the first season, ditchline maintenance results in an overall reduction in chronic erosion of the road surface and where hydrologically connected, subsequent stream sedimentation.

Hauling and road use would be expected to continue to occur in the future on most roads in these sub-watersheds. This would result in continued stream sedimentation where these roads are hydrologically connected. Ongoing maintenance efforts will continue to occur as funding allows in an effort to reduce the impact of roads on streams and aquatic habitat. Roads used during the dry season would be expected to have impacts consistent with those described above for the Reuben Hazardous Fuel Reduction Project. However, roads used during wet road and weather conditions, would need to be closely monitored to ensure compliance with State water quality standards, and would be expected to further reduce streambed condition and aquatic habitat.

- Skid Trails, Landings, and Yarding Corridors
  It is estimated, based on satellite imagery and harvest data approximately 956 acres within this Planning Area have had soil displacement and subsequent erosion as a result of the construction and use of landings, skid trails, and yarding corridors during

timber management operations within the past 40 years. At the HUC 6 scale, it is estimated that accelerated erosion is still evident on 581 acres within the McCullough Cr sub-watershed, 543 acres within the Dads Cr sub-watershed, and 474 acres within the Riffle Creek HUC 6 sub-watershed. Where poorly rehabilitated skid trails, landings, and yarding corridors are hydrologically connected to the streams through road systems, or are adjacent to streams that have little or no riparian buffer, these areas have become chronic sources of stream sediment that are contributing to the aquatic conditions discussed within the Section 3.4.1.

During the implementation of Alternative 2 of the Rueben Hazardous Fuel Reduction Project, up to an additional 70 acres (see footnote 2, p.28) could be disturbed as a result of skid trails, yarding corridors, landings, and road construction (Section 3.2.3.2 Soil Compaction). Approximately 14 acres from this project would occur within McCullough Creek sub-watershed. The Dads Creek sub-watershed would be subject to approximately 39 acres of disturbance, and disturbed ground within the Riffle Creek HUC 6 sub-watershed would increase by about 17 acres. This project would be implemented using full Riparian Reserves (Unless EPZs are identified by qualified personnel prior to biomass extraction) and other Project Design Features that would reduce erosion and filter out sediment prior to streams. As a result, harvesting of the Reuben Hazardous Fuel Reduction Project would not contribute to the currently degraded streambed conditions, or the impaired aquatic habitat that has resulted within these sub-watersheds from past harvesting actions. There are no other reasonably foreseeable commercial timber management projects proposed on federally managed lands within these HUC 6 watersheds that would affect watershed compaction.

Future actions would be expected to continue at current rates on non-federal lands. As stated in the under soil compaction above, the construction and use of landings, skid trails, and yarding corridors could result in up to an additional 105, 77, and 71 acres of disturbance and compaction respectively within the McCullough Creek, Dads Creek, and Riffle Creek HUC 6 sub-watersheds. Since actions on non-federal lands use less extensive riparian buffers than federal actions, it would be expected that this would further reduce water quality and streambed conditions within the Cow Creek-Fortune Branch HUC 6 sub-watershed, respectively. However, since Oregon Forest Practices are intended to comply with the State of Oregon water quality standards, it would be expected that increases in fine sediment from these actions would not exceed 10% above baseline conditions, and would comply with the Clean Water Act.

- Wildfire and Prescribed Fuels Reduction
  Erosion has also been affected by 8 uncontrolled fires totaling up to 23 acres, which have occurred in three HUC 6 sub-watersheds in the last 10 years. Most of these were relatively small, with 7 fires being under 0.25 acres and 7 fires being less than 10 acres in size. Erosion from wildfires generally is greatly reduced in 3-5 years as vegetation re-grows. The extent of the loss to soil productivity, though expected to be a relatively small percentage of the acres that have burned, has not been measured. Short term soil erosion has also been affected by approximately 1,151 acres of handpile and burn fuels treatments that have occurred in the past five years within the

three HUC 6 sub-watersheds. Erosion from these small-type of wildfires and from prescribed fuels treatments generally is greatly reduced in 3-5 years as vegetation re-grows.

Because BMPs would be followed, short term impacts would be within the scope of the 1994 Medford District EIS, and erosion would not be expected to move off-site because large organic ground cover would remain on site and soils would not be excessively heated, thus maintaining much of their adhesive properties.

Within the Middle Cow Creek HUC 5 watershed, water quality is generally in fair to good condition and aquatic habitat is predominately in fair to poor condition. Sediment from this project would only enter streams as a result of hauling and maintenance activities. Sediment from all hauling and maintenance activities associated with the Reuben Hazardous Fuel Reduction Project would not result in more than a 10% increase in stream turbidity, and would not measurably increase these conditions for more than 25 feet from haul roads. Logically it can be concluded that negligible increases in sediment from these activities would contribute to the overall amount of sediment entering streams from past, present, and future impacts in these sub-watersheds, but sediment from this action would not be distinguishable above baseline levels or have any effect on beneficial uses. Actions in this watershed would be consistent with the Clean Water Act, State of Oregon water quality standards, and ACS objectives.

3.4 Northern Spotted Owl (Threatened) and its Critical Habitat

3.4.1 Affected Environment for Northern Spotted Owl and its Critical Habitat

The Planning Area is located within the Middle Cow Watershed, which contains a mixture of seral stages, including approximately 22,000 acres of mature and old-growth forest habitat (about 50% of the 45,510 acres in federal ownership, USDI, 1999, p.34) used by northern spotted owls. The Medford BLM baseline suitable habitat within the Klamath Province is 306,406 acres and 99,186 acres for the baseline dispersal habitat (BLM 2009a, p.15).

Extensive harvesting on BLM occurred in the Planning Area prior to the 1990 listing of the spotted owl as a threatened species, and the implementation of the NWFP in 1994. The Middle Cow Creek Watershed Analysis (BLM 1999, p.36) notes that the late-successional stands in this watershed are highly fragmented and frequently isolated from other late successional stands because of the checkerboard pattern of federal land ownership and past logging practices. Harvesting on private lands continues to be extensive. Most private land has been intensively harvested, much of it in the last few decades (satellite change detection data 1974-2002). Other past events, such as quarry development, road building, rock slides, and fire have also contributed to presently unsuitable spotted owl habitat.

One of the functions of matrix lands is to serve as connectivity between LSRs (USDA/USDI. 1994b, p. B-43). Two sections (T32S-R7W-Section 15 and 21) are designated as a Connectivity/Diversity Block within the Matrix land use allocation. LSRs were established "to protect and enhance conditions of late-successional and old-growth forest ecosystems, and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest related species including the northern spotted owl" (Northwest Forest Plan, p. A-5).

Northern spotted owl suitable habitat includes stands suitable for nesting, roosting, and foraging. There are two categories of suitable habitat. "Habitat 1" conifer stands satisfy the daily and annual needs of the owl for nesting, roosting and foraging. These stands generally have a multilayered canopy with large trees in the overstory and an understory of shade tolerant conifers and hardwoods. Canopy closure generally exceeds 70%, and average DBH is generally 21 inches or greater. "Habitat 2" suitable habitat includes conifer stands with understory vegetation or coarse woody debris which provide roosting and foraging opportunities but lack the necessary structure for consistent nesting. These stands have less diversity in the vertical structure and canopy closure generally exceeds 70% and average DBH is 11- 21 inches. Units were either field-reviewed or analyzed using aerial photographs to determine if they met the definition of suitable habitat. Dispersal (non-suitable) habitat generally includes conifer stands with trees greater than or equal to 11" dbh and canopy closure of 40-60%. Table 3-4 summarizes the amount of each habitat type in the Project Area.

The U.S. Fish and Wildlife Service revised designation of Critical Habitat for the northern spotted owl was published in the *Federal Register* and signed on August 12, 2008. Prior to 2008, Critical Habitat was designed in 1992.

Table 3-4. Spotted Owl Habitat Types in the Reuben Hazardous Fuel Reduction Project.

Habitat type	Area (acres)
Suitable owl habitat	1,056
Dispersal habitat	372
1992 Designated Critical Habitat	1,496
2008 Designated Critical Habitat	1,216

Critical habitat was, and, as defined in section 3 of the Endangered Species Act, as "the specific areas within the geographic area occupied by a species…on which are found those physical or biological features essential to the conservation of the species," (USFWS 1992). These features are referred to as the primary constituent elements which support the life requisites of nesting, roosting, foraging, and dispersal. As the U.S. Fish and Wildlife Service noted in its biological opinion on the NWFP, for a wide-ranging species such as the spotted owl, each CHU has both a local role and a rangewide role (USFWS 1994, p.20). Impacts from proposed harvest therefore are evaluated based upon removal, downgrading, and degradation of suitable (nesting, roosting, foraging) habitat and dispersal habitat, and are evaluated at both the local level and the provincial level.

Units 9-1, 9-2, 9-3, 9-4, 9-5, 9-7, 15-1, 15-2, 17-1, 19-1, 20-1, 21-1, 21-2, 21-4, 25-1, 25-2, 25-3, 25-4, 25-6 and 25-7 of the Proposed Action would occur in the 2008 Critical Habitat designation.

Units 3-1, 3-2, 9-1, 9-2, 11-1, and 11-2 would occur within the 1992 Critical Habitat designation, CHU #OR-64 and units 9-3, 9-5, 9-4, 9-6, 9-7, 15-1, 15-2, 17-1, 19-1, 20-1, 21-1, 21-2, and 21-4 would occur in CHU#OR-62.

3.4.2 Environmental Effects on Northern Spotted Owl and its Critical Habitat

3.4.2.1 Alternative 1 (No Action) - Direct and Indirect Effects on Spotted Owl and its Critical Habitat

Under the No Action Alternative, no hazardous fuel reduction or biomass removal would occur at this time. However, stands would likely be reviewed under future actions. With no hazardous fuel reduction or biomass removal and without wild fires, severe-wind induced blowdown or other catastrophic events; the existing stands would likely continue to slowly develop into late-successional stands. In addition, competition for resources among trees would continue to produce snags and down wood of all size classes. The entire Project Area, however, would be at greater risk of stand-replacing fires; which can leave the affected stands with no spotted owl habitat for decades to come. The length of time needed for a stand to recover would depend on the severity of the fire in the stand, the extent of the fire and many other factors. In a worst case scenario, a wild fire with widespread, high-severity burns could delay the development of suitable spotted owl habitat for over a hundred years.

Temporary and permanent right-of-way construction would continue on private lands and potentially on BLM (after proper review/evaluation) to allow private harvesting, resulting in removal of suitable and dispersal habitat.

Even though some risk factors have declined (such as habitat loss due to harvesting) other factors continue such as habitat loss due to wildfire, potential competition with the barred owl, West Nile virus, and sudden oak death (USFWS 2004, Lint 2005). The barred owl is present throughout the range of the spotted owl, so the likelihood of competitive interactions between the species raises concerns as to the future of the spotted owl (Lint 2005). Lint (2005) also found that between 1994-2003, federal lands in the Klamath Province lost 6.6% of spotted owl nesting habitat to stand-replacement fire, mainly to the Biscuit Fire (almost 500,000 acres). However, the findings by Anthony et al. (2004) are now five years old, and there is a lag time between when a population change occurs and when it statistically is verified. For this reason, the analysis regarding significant population decline, addresses all of western Oregon (BLM 2008b, p.3-298). The role of critical habitat to provide nesting, roosting, foraging, and dispersal would remain unchanged; however, the effectiveness of critical habitat and the rate of population decline beyond the most recent meta-data analysis (Anthony et al. 2004) would be uncertain.

3.4.2.2 Alternative 2 (Proposed Action) - Direct and Indirect Effects on Spotted Owl and its Critical Habitat

The Proposed Action would maintain 1,056 acres of nesting, roosting, and foraging habitat in units 3-1, 3-2, 9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7, 11-1, 11-2, 15-1, 15-2, 17-1, 19-1, 20-1, 21-1, 21-2, 21-4, 25-1, 25-3, and 25-4; and 372 acres would maintain dispersal habitat in units 17-1, 19-1, 25-1, 25-2, 25-4, and 25-6. Portions of units are not currently in suitable or dispersal habitat, totaling 309 acres in units 3-2, 9-1, 9-2, 9-3, 9-4, 9-6, 9-7, 11-1, 15-2, 17-1, 20-1, 21-1, 21-2, 21-4, 25-1, and 25-6. Units 15-1, 15-2, 21-1, 21-2, and 21-4 would treat and maintain habitat conditions in approximately 345 acres in two Connectivity/Diversity Blocks in T32S-R7W-Section 15 and 21. No late-successional habitat would be removed or downgraded from this section. These units have variable habitat conditions that support both dispersal and suitable habitat. The proposed thinning would maintain the habitat structure and diversity within these units.

Following the guidance from the USFWS (USDI Fish and Wildlife Service et al. 2008) areas within 300 meters (or 70 acres) of spotted owl nest patches would be reserved from treatment. BLM would maintain the characteristics that classify a stand as NRF or dispersal habitat throughout the treatments for no loss of NRF or dispersal habitat. The primary constituent elements would be maintained in all units, and at the forest stand and critical habitat level. Treatments would retain the canopy cover of the dominant and intermediate canopies. Large trees, snags, large down wood, and some structural diversity important to northern spotted owls would be retained. Components important to spotted owls such as nest trees, multi-layered canopies, and dead and down wood and some of the shrub layer that support prey species habitat would remain to some degree within a given project area, retaining the ability to provide for the nesting, roosting, foraging and dispersal of spotted owls. No nest trees or co-dominants would be removed. Project Design Features would avoid adverse disturbance. Fifteen to 20% of the areas would go untreated, to provide for owl prey habitat.

Anticipated beneficial effects which may result from the implementation of hazardous fuel reduction include:

- Improve ecological health of the stand.
- Slightly accelerated development of the residual stand to the late-successional condition.
- Renewal of forage plants important to spotted owl prey.
- Reduced chance of tree loss due to suppression mortality (in cases where the stand has more trees than the site can support over the long-term).
- Reduced intensity and hazard fuels that contribute to increased wildfire severity.
- Long-term increase in the sizes of snags and down wood, which would provide habitat for a greater diversity and abundance of small mammals. Larger pieces of dead and down wood also decay more slowly, so the dead and down wood would exist and confer its benefits to the system for a longer period of time, than the same mass in smaller diameter material would.

Prey Species

Forest health treatment treatments may improve foraging habitat conditions for prey. Lehmkuhl et al (2006a&b) confirmed the importance of maintaining snags, down wood, and mistletoe. Gomez et al (2005) also noted the importance of fungal sporocarps, which were positively associated with large down wood. Several studies have established the link between the amounts of down wood and understory richness, and the abundance and diversity of the small mammal community (West 1991, Sakai and Noon 1993, Carey and Johnson 1995, Manning and Edge 2004, and Lehmkuhl et al 2006).

Residual trees, snags and down wood that are retained in the treated stands and the understory that would remain in the RRs would provide some cover for prey species over time, and would help minimize impacts to some prey species. However, edges can be areas of good prey availability and potentially increased vulnerability (i.e., better hunting for owls) (Zabel 1995). In addition, there are substantial areas that would not be treated within the core areas of spotted owl nest sites, due to operational difficulties. Approximately 15 to 20% of the piles would remain untreated.

Between zero and one inch in diameter, material under 1 ft in height would not be removed, including most sprouts of understory shrubs and all relatively prostrate vegetation such as salal (*Gaultheria shallon*), evergreen huckleberry (*Vaccinium ovatum*), holly-leaf ceanothus (*Ceanothus prostratus*), Oregon grape (*Berberis nervosa*), native blackberry (*Rubus ursinus*), honeysuckle (*Lonicera involucrata*), creeping snowberry (*Symphoricarpos mollis*) and whipple vine (*Whipplea modesta*). This retention would maintain at least some of the forage and cover components for the spotted owl prey base.

Habitat patches (as described in Section 2.3.7) would minimize the impact of fuels reduction activities within the Project Area. The locations of these patches would be dispersed throughout the Cow Creek/McCullough Creek, Cow Creek/Dads Creek, Cow Creek/Riffle Creek, and Grave Creek/Poorman Creek 6th field watersheds.

Noise Disturbance

Some treatments may occur in non-owl habitat, but could result in some discountable noise that could carry into adjacent stands. The Reuben Hazardous Fuel Reduction Project Design Features would protect known owl sites from noise disturbance. Activities along the edge of habitat would be of short duration and low intensity. Some owls may notice noise or activity, but due to the PDFs, these noises and activities would not cause "*significant impairment to feeding, breeding and sheltering such that harm would occur." (USFWS ESA Handbook, version 3).*

3.4.2.3 Alternative 2 (Proposed Action) - Cumulative Effects on Spotted Owl and its Habitat

The scale of cumulative effects analysis for this project was chosen where owl home ranges (1.3 miles of an owl site) would overlap the Reuben Hazardous Fuel Reduction

units and other current and foreseeable activities, as this is the area of potential effects to spotted owl pairs.

The Proposed Action would not change the amount of nesting, roosting, foraging or dispersal habitat for spotted owls. The quality of the foraging habitat within the Project Area could conceivably be affected and if a spotted owl changed its foraging activities in response, owls in neighboring territories might be indirectly affected.

Current and foreseeable projects within this analysis area are the Boney Skull Hazardous Fuel Reduction and Wolf Pup Projects. These projects are designed to maintain spotted owl habitat and would not modify designated Critical Habitat (BLM 2009a, BLM 2009b). The Boney Skull Hazardous Fuel Reduction Project is located within the 2008 CHU-14 and 1992 CHU OR-62. The Wolf Pup Project is not located in the 2008 CHU designation but is located in 1992 CHU OR-64.

The Wolf Pup Project would maintain habitat conditions on approximately 213 acres of owl NFR and dispersal habitat in T33S-R7W-Sections 9-11, 13, 15, and 24 within the Reuben Hazardous Fuel Reduction spotted owl analysis area. The Wolf Pup Project would moderate/light thin stands to 40%-60% canopy closure and would retain the primary constituent elements present within stands.

The Boney Skull Hazardous Fuel Reduction Project would cut small trees and brush would be thinned. The project was designed to retain canopy cover of dominant and intermediate canopies, large trees and snags, large down wood, and some structural diversity important to spotted owls and prey species. Trees and other vegetation to be cut would be over one foot tall and between one and seven inches diameter at breast height (dbh). Residual hardwood and conifers would be spaced approximately 14-40 ft apart. Low intensity underburning may be prescribed after initial treatment to ensure desired fuel loadings are maintained. These actions would not cause disturbance to owls.

The U.S. Fish and Wildlife Service has concurred with the BLM that these actions would not change the classification of the habitat types within each stand, and they would function as previously for spotted owls.

The beneficial effects of these projects to the spotted owls are the improved health of the stands, slightly accelerated development of the stand to the late-successional stage, the renewal of forage for prey, the reduced chance of tree loss to suppression mortality, the reduced risk of stand loss to wild fire and the increased future recruitment of larger snags and down wood pieces.

On private and county lands, habitat modification and removal with fewer protection measures would continue, which negatively affect suitable and dispersal CHU habitat for northern spotted owls. Due to 50-80 year rotations on private lands, expected to continue in the Planning Area, private lands would not provide suitable spotted owl habitat, but are expected to provide some dispersal habitat.

There are no foreseeable projects that would downgrade or remove owl habitat within CHU-14, CHU OR-62, and CHU OR-64 within the Glendale Resource Area. Since the Reuben Hazardous Fuel Reduction Project would not result in modification of critical habitat leading to an adverse affect, there would also be no modification at the CHU scale from the Reuben Hazardous Fuel Reduction Project or other current or foreseeable projects.

Treatments within designated CHU would retain important habitat components such as a multistoried, multi-species canopy with remnant trees, large overstory trees, trees with various deformities, large snags, down wood, and existing canopy closures. Habitat at the forest stand level and critical habitat unit level would continue to provide abundant habitat elements supporting spotted owls and continue to function as critical habitat.

3.5 Fire Hazard

3.5.1 Background Information on Fire Hazard

Fire is the primary natural disturbance agent in the Klamath Siskiyou province forests, influencing vegetation structure, species composition, soil properties, nutrient cycling, hydrology and other ecosystem processes (Agee 1993). Forests with high stem density and fuel loading combined with extreme fire weather conditions has led to severe and large wildfires that have put a number of important values at risk. Homes in the path of a wildfire are perhaps the most immediately recognized value; however these wildfires also put numerous other human and ecological values at risk such as power grids, drinking water supplies, firefighter safety, critical habitat, soil productivity, and air quality (Graham et al. 2004, p.43).

3.5.2 Affected Environment for Fire Hazard

Fire Regimes

Fire regimes refer to the combination of fire frequency, predictability, intensity, seasonality, and extent of characteristic of fire in an ecosystem. A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). As scale of application becomes finer these five classes may be defined with more detail, or any one class may be split into finer classes, but the hierarchy to the coarse scale definitions should be retained. The Reuben Hazardous Fuel Reduction Project includes **Fire Regimes 1 (92%), 2 (2%), and 3 (6%)**.

Table 3-7. Fire Regime, Fire Return Interval, Fire Severity within the Reuben Hazardous Fuel Reduction Project

Fire Regime	Fire Return Interval	Fire Severity	Vegetative Examples
I	0-35 years	Low	Ponderosa pine, other long needle pine species, and dry site Douglas-fir
II	0-35 years	Stand Replacement	Drier grassland types, tall grass prairie, and some Pacific chaparral & southern rough ecosystems
III	35-100 years	Mixed	Interior dry site shrub communities such as sagebrush and chaparral ecosystems
IV	35-100 years	Stand Replacement	Lodge pole pine and jack pine
V	Over 200 years	Stand Replacement	Temperate rain forest, boreal forest, and high elevation conifer species

http://www.nwcg.gov/teams/wfewt/message/FrccDefinitions.pdf

Fire Regime Condition Class

Fire Regime Condition Class (FRCC) has become a measure of ecological departure used by the BLM, as well as other federal agencies, to describe resource conditions. This measure involves two pieces of information: (1) historic fire regime, and (2) the condition class. Condition classes classify the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001) (FRCC). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime.

Condition Class 1 – (21% of the Reuben Hazardous Fuel Reduction Project Area): Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.

Condition Class 2 – (55% of the Reuben Hazardous Fuel Reduction Project Area): Moderate departure from the natural (historical) regime of vegetation characteristics: fuel composition; fire frequency, severity and pattern; and other associated disturbances.

Condition Class 3 – (25% of the Reuben Hazardous Fuel Reduction Project Area): High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.

Fire Hazard

Fire hazard is the ability of a fire to spread once ignition has occurred. Fire behavior dictates which fire suppression strategy may be effectively employed, and therefore the extent to which a fire may grow and the subsequent damage it may cause. Because fire behavior is critical in fire suppression strategy selection, it serves as the threshold used for this analysis.

Fire hazard is a fuel complex, defined by volume, type, condition, arrangement, and location, that determines the degree of ignition and of resistance to control. For example, the moisture content of the fuel will influence the ability of the fuel to catch and sustain fire (degree of ignition) and how difficult it will be to control or extinguish the fire (degree of control).

Fire hazard ratings were developed for the Reuben Hazardous Fuel Reduction Project Area. Crown fire activity, flame length, and rate of spread were utilized to develop the fire hazard ratings. An estimated 57% of the project unit acres rate as high hazard, 22% rate as a moderate hazard, and 21% low hazard. The high and moderate hazard acres account for 79% of the project acres.

Fuel Models

Fire behavior fuel models are grouped by fire-carrying fuel type. The majority of the Project Area can be identified within the timber understory (TU) and the timber litter (TL) fuel models. The Planning Area can be categorized into four fuel models: Fuel Model TU5 (Very High Load, Dry Climate Timber-Shrub) – 66%, Fuel Model TL9 (Very High Load Broadleaf Litter) – 21%, Fuel Model TL8 (Long-Needle Litter) – 7%, Fuel Model TL7 (Large Downed Logs) - 3%. Less than 2% of the Project Area is identified as Fuel Model GS2 and TL5. This analysis was derived utilizing LANDFIRE data. LANDFIRE is also known as Landscape Fire and Resource Management Planning Tools Project which is a multi-agency and partner project producing consistent and comprehensive maps and data describing vegetation, wildland fuel, and fire regimes across the United States (USDA et al. 2009).

Table 3-8. Fuel Models within the Reuben Hazardous Fuel Reduction Project

Fuel Model	Acres
TU5	1153
TL9	367
TL8	124
TL7	46
GS2, TL5	45

3.5.3 Environmental Effects on Fire Hazard

3.5.3.1 Alternative 1 (No Action) - Direct and Indirect Effects on Fire Hazard

In the long-term, the No Action Alternative would continue conditions that have a high potential for large, high intensity fires. The fuel hazard would increase as vegetation continues to develop. Surface fuels would increase due to tree mortality in dense stands as higher levels of insect and disease mortality are expected. The Project Area would remain in moderate to high fire hazard, resulting in a higher potential of increased fire behavior if a wildfire occurs. The potential for increased fire behavior would create a

greater risk for private land, homes, and resources in the Reuben Hazardous Fuel Reduction Project Area.

In the short-term (1-2 years), there would be no increase in fire hazard as no landing piles would be constructed, because no vegetation would be cut under this alternative.

3.5.3.2 Alternative 2 (Proposed Action) - Direct and Indirect Effects on Fire Hazard

The majority of cut vegetation would be treated by biomass removal or handpile and burning. A portion of the cut vegetation may be lop & scattered in units to prevent concentrations of slash and to arrange the material in a discontinuous pattern. In cases where field review indicates lop & scatter would result in a shift of the fuel model and an increase in flame length, then the cut vegetation would be hand piled and burned to decrease the fire hazard.

In timbered stands the proposed activities would modify the fuel model from a TU5 to a TL3. During fire season weather conditions given a moderate 5 mph summer wind, flame length would decrease from approximately 8 ft in the TU5 (Very High Load, Dry Climate Timber-Shrub) to less than 2 ft in the TL3 (Moderate Load Conifer Litter). Empirical evidence from other wildfires also supports the concept that forests treated with fire-hazard reduction objectives burn with less severity than adjacent untreated areas (Omi, and Martinson, 2002; Pollet and Omi, 2002).

Cut vegetation extracted from each unit would be piled at landing sites. If biomass is not extracted from these piles, they would be burned under conditions that maximize consumption while minimizing potential escaped prescribed fire. The piles would need to cure (dry out) to burn thoroughly enough to achieve these conditions. This curing process generally takes over a year, during which time there would likely be a short term increase in fire hazard because the piles have the potential to produce flame lengths that exceed the fire behavior threshold to the extent of increased spotting distance. There are no long term effects to fire hazard due to the fact that the short term increase would be negated once the landing piles are burned and/or removed.

Once the cut vegetation is removed and/or treated, subsequent underburning may take place within units to prevent future increases in fuel loading. The majority of the Reuben Hazardous Fuel Reduction units are identified in the Southwest Oregon Fire Management Plan as Fire Regime 1, with low to mixed severity fires historically occurring roughly every 0-35 years. This fire regime has been interrupted due to past fire and forest management practices, resulting in a current condition of Condition Class 2 and 3 with moderate to high departure in natural vegetation characteristics and fuel loading. The purpose of reintroducing fire into the area by prescribed burning is to shift these stands into Condition Class 1 to maintain the fuel loading and vegetation characteristics within the historic range of variability.

3.5.3.3 Alternative 2 (Proposed Action) - Cumulative Effects on Fire Hazard

The Reuben Hazardous Fuel Reduction Project Area is located within three sixth-field watersheds defined by ridgelines which serve as strategic locations to construct firelines. In the event of a wildfire, these strategic locations may be utilized to contain a fire within the Project Area, or conversely, to prevent a fire from entering it. As such, the Riffle Creek, Dads Creek, and McCullough Creek sixth-field watersheds are a logical scale to conduct fire hazard cumulative effects for the Reuben Hazardous Fuel Reduction Project.

The Boney Skull Hazardous Fuel Reduction Project is the one federal project currently being implemented within the Reuben Hazardous Fuel Reduction Project cumulative effects analysis area. This project consists of cutting vegetation between one and seven inches dbh and limbing trees to reduce ladder fuels. Slash is being hand piled, covered and burned, or removed by hand from the site. The Boney Skull Hazardous Fuel Reduction Project will reduce the fire hazard within its Project Area.

There is one foreseeable project federal within the Reuben Hazardous Fuel Reduction Project Area, the Wolf Pup Project. Eight acres of the Rueben Hazardous Fuel Reduction Project (unit 11-1) overlaps the Wolf Pup Project, in the Grave Creek watershed. This Wolf Pup Project unit proposes to lightly thin a stand to 60% canopy cover. Merchantable trees (> 8 inches dbh) would be removed by whole-tree yarded or yarded with attached tops to minimize the amount of slash remaining within the harvest units. Slash would be treated using one or more of the following actions: lop-and-scatter, handpile and burn, or biomass removal. Once the activity slash is treated, subsequent underburning may take place in the thinning units to prevent future increases in fuel loading. There would be a short term increase in fire hazard from slash piled at landing sites along the ridgeline between these two Project Areas (Wolf Pup units 10-1, 15-2, 11-1, and 13-1) until the slash is removed for biomass or burned within 2 years of yarding after curing. Until burning or removal, the piles have the potential to produce flame lengths that exceed the fire behavior threshold to the extent of increased spotting distance. There are no long term cumulative effects to fire hazard from the Wolf Pup Project since the short term increase would be negated once the landing piles are burned and/or removed.

Both the Boney Skull and Reuben Hazardous Fuel Reduction Projects would reduce fire behavior including flame length, rate of spread, and the probability of crown fire activity and would create more defensible space along road systems within this anlaysis area. The reduced fire behavior would allow for firefighters to utilized direct attack, which can reduce the acres burned during a wildfire event.

Chapter 4.0 List of Preparers

The following individuals participated on the interdisciplinary team or were consulted in the preparation of this EA:

Name	Title	Primary Responsibility
Yanu Gallimore	Fire and Fuels Specialist	Team Lead, Fire and Fuels
Donni Vogel	Fire and Fuels Specialist	Fire and Fuels Fire Hazard and Fire Risk
Michelle Calvert	Planning and Environmental Coordinator	NEPA
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Mike Crawford	Fish Biologist	Fisheries
Jim Brimble	Forester	Silviculture, Compaction, & Productivity
Brian Bickford	Forester	Logging Systems
Del Longbrake	Civil Engineer Tech.	Transportation
Marlin Pose	Wildlife Biologist	Wildlife
Marylou Schnoes	Wildlife Biologist	Wildlife
Rachel Showalter	Botanist	Botany & Noxious weeds
Lisa Brennan	Archaeologist	Cultural Resources

Chapter 5.0 Public Involvement and Consultation

5.1 Public Notification

5.1.1 Public Scoping

Initial contact was made with individuals, groups or agencies that have expressed interest in forest management and other types of projects through a postcard mailing to individual landowners within ¼ mile of the project area boundary. A brief description of the Reuben Project, a legal location, and purpose of the proposed action was included on the postcard. There are two commentors on the Reuben Hazardous Fuel Reduction Project during scoping. One from Douglas Forest Protective Association inquiring about the details of the project. The other commenter, Klamath Siskiyou Wildlands Center, requested consideration of using wax paper over slash burn piles instead of plastic sheeting to keep piles dry until wet weather conditions allow for burning.

5.1.2 30-day Public Comment Period

The Environmental Assessment will be made available for a 30-day public review period. Notification of the comment period will include: the publication of a legal notice in the Daily Courier, newspaper of Grants Pass, Oregon and on the Medford District Bureau of Land Management website at http://www.blm.gov/or/districts/medford/index.php.; and a letter to be mailed to those individuals, organizations, and agencies that have requested to

be involved in the environmental planning and decision making processes for forest management activities. Comments received in the Glendale Resource Area Office, 2164 NE Spalding Avenue, Grants Pass, Oregon 97526 on or before the end of the 30-day comment period will be considered in making the final decision for this project.

5.2 Consultation

5.2.1 United States Fish and Wildlife Service (USFWS)

Compliance with Section 7 of the Endangered Species Act for the northern spotted owl was completed for the Reuben Hazardous Fuel Reduction Project and for the Healthy Forest Initiative's counterpart regulations process. The "counterpart regulations" are described in Instruction Memorandum No. OR-2004-085 for National Fire Plan projects undertaken for the Bureau of Land Management in Oregon and Washington for actions that would "not likely to adversely affect" the spotted owl or its designated critical habitat.

5.2.2 National Marine Fisheries Service (NMFS)

The fuels treatments, road maintenance and hauling activities which would occur within the Umpqua Basin and the range of the federally threatened Oregon Coast coho salmon were determined to have no effect on coho or critical habitat.

Consultation for the Endangered Species Act with NMFS is not needed as the Proposed Action would not affect listed species or their habitat. No consultation is required under the Magnuson-Stevens Fishery Conservation and Management Act as there would be no adverse affect to Essential Fish Habitat of coho and chinook salmon within the Umpqua Basin.

5.2.3 State Historical Preservation Office

Required cultural surveys were completed for the Reuben Hazardous Fuel Reduction Project. All known sites would be protected and buffered. The State Historical Preservation Office approved the clearance/tracking form for this project. The form is contained within the environmental assessment case file.

ACRONYMS AND GLOSSARY

Abbreviations:

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
BMP	Best Management Practices
BSO	Bureau Sensitive
CCH	coho critical habitat
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHU	Critical Habitat Unit
dbh	diameter at breast height
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
HUC	Hydrologic Unit Condition
NEPA	National Environmental Policy Act
NWFP	Northwest Forest Plan
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
O&C	Oregon & California
ODEQ	Oregon Department Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODF	Oregon Department of Forestry
PDFs	Project Design Features
RMP	Resource Management Plan
ROD	Record of Decision
SFEIS	Supplemental Final Environmental Impact Statement
SHPO	State Historic Preservation Office
SONC	Southern Oregon/Northern California
SSS	Special Status Species
T/E	Threatened/Endangered
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management

Air Quality. Refers to standards for various classes of land as designated by the Clean Air Act, P.L. 88-206, Jan. 1978.

Authorized Officer. BLM employee delegated the authority to oversee contract administration.

Best Management Practices (BMPs). Required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) to reduce nonpoint source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon water quality standards. Methods, measures, or practices selected on the basis of site-specific conditions to ensure water quality will be maintained at its highest practicable level. Not limited to structural and nonstructural controls, operations, and maintenance procedures. Usually, Best Management Practices are applied as a system of practices rather than a single practice. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation).

Canopy. The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand.

Coarse Woody Debris. Portion of trees that have fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

Cover. Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

Critical Habitat. Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species. For further information see (Federal Register (57):1796-1838) for the 1992 CHU designation and Federal Register (73): 47326-47522 for the 2008 CHU designation.

Cultural resources. The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) having scientific, prehistoric or social values.

Cumulative effect. 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 regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can also result from individually minor, but collectively significant actions taking place over a period of time.

Diameter at Breast Height (dbh). The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Dispersal habitat (northern spotted owl). Dispersal habitat for the northern spotted owl consists of forest lands generally greater than 40 years of age with canopy closures of 40% or greater and an average diameter at breast height of 11 inches or greater. Spotted owls use dispersal habitat to move between blocks of suitable habitat; juveniles use it to disperse from natal territories. Dispersal habitat may have roosting and foraging components, enabling spotted owls to survive, but lack structure suitable for nesting.

Effects (or Impacts). Environmental consequences as a result of a Proposed Action. Effects provide the scientific and analytical basis for comparison of alternatives. Effects might be either

direct (caused by the action and occur at the same time and place) or indirect (occurring later in time or at a different location, but are reasonably foreseeable or cumulative results of the action).

Effects and impacts as used in this EA are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or healthy effects, whether direct, indirect, or cumulative. Effects might also include those resulting from actions that might have both beneficial and detrimental effects, even if on the balance it appears that the effects would be beneficial.

Environmental Assessment (EA). A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of NEPA and is released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the project proposal.

Environmental Impact Statement (EIS). A detailed document under the National Environmental Policy Act (NEPA) of 1969, 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 irreversibly or irretrievable commitment of resource.

Erosion. Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is more rapid than normal, natural, or geologic erosion, primarily resulting from the activities of people, animals, or natural catastrophes.

Fire Hazard. The ability of a fire to spread once ignition has occurred (NIFC-B 2006). It is contingent upon the fire behavior that a stand has the potential to produce. Fire behavior is determined by three factors: weather conditions like temperature, wind speed, and relative humidity; topographical characteristics such as slope, aspect, and elevation; and the type and arrangement of fuels available such as surface, ladder, or aerial.

Fire Risk. The probability of a fire starting, as determined by the presence of ignition sources (NIFC-B 2006). Ignition sources include natural causes such as lightning, and human causes such as improperly discarded cigarettes and unattended camp fires. Fire risk generally increases as human presence increases because these types of activities become more frequent. Recreational areas and areas along travel routes like trails and roads are usually at a higher risk of a fire ignition than areas that experience less frequent human activity.

Floodplain. The lowland and relatively flat area adjoining inland and coastal waters, including, at a minimum, areas that are subject to a 1% or greater chance of flooding in any given year.

Forage. Food available to animals for feeding. Habitat containing forage for predators is a source and hiding cover and/or shelter for prey species.

Fuels. Combustible wildland vegetative materials present in the forest which potentially influence fire behavior.

Impacts. A spatial or temporal change in the environment caused by human activity**.** See effects.

Indirect effects. Secondary effects which occur in locations other than the initial action or significantly later in time.

Intermittent stream. Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Matrix. Designated under the *Final-Medford District Proposed Resource Management Plan/Environmental Impact Statement* and *Record of Decision* (EIS, 1994 and RMP/ROD, 1995), these federal lands are outside of reserves and special management areas that are available for timber harvest at varying levels.

Mitigation. Mitigation includes (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (5) compensating for the impact by replacing or providing substitute resources or environments.

National Environmental Policy Act of 1969 (NEPA). This law requires the preparation of environmental impact statements for every major Federal Action which causes a significant effect on the quality of the human environment.

No-Action alternative. The No-Action Alternative is required by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The No-Action Alternative provides a baseline for estimating the effects of other alternatives. When a proposed activity is being evaluated, the No-Action Alternative discusses conditions under which current management direction would continue unchanged.

Non-attainment. Failure of a geographical area to attain or maintain compliance with ambient air quality standards.

Noxious weeds. Rapidly spreading plants that can cause a variety of major ecological or economic impacts to both agriculture and wildland.

Overstory. That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

Perennial streams. Streams that flow continuously throughout the year.

Project Design Features (PDFs). Practices determined by the resource professional to be the most effective and practicable means of preventing or reducing the amount of water pollution generated by non-point sources; used to meet water quality goals (See Appendix D in RMP (USDI BLM 1995)).

Riparian Reserves. Designated under the *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (Northwest Forest Plan FSEIS, 1994 and ROD, 1994), these riparian areas are outside Late-Successional Reserves.

Stand. A community of trees or other vegetation uniform in composition, physiognomy, spatial arrangement, or condition to be distinguishable from adjacent communities.

Sub-watershed. In this document the term refers to the entire area that contributes water to a drainage system or stream at the sixth-field watershed scale (HUC 6). The sixth field watersheds within the Reuben Project area are the Cow Creek/McCullogh Creek, Cow Creek/Dads Creek, Cow Creek/Riffle, and Grave Creek/Poorman Creek sub-watersheds.

Threatened Species. Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and which has been designated in the Federal Register as such. In addition, some states have declared certain species in their jurisdiction as threatened or endangered.

Understory. Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

Water Quality. The chemical, physical and biological characteristics of water.

Watershed. Entire area that contributes water to a drainage system or stream. The fifth- field watershed within the Reuben Project Area is Middle Cow Creek.

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APPENDIX 1 - ALTERNATIVE DEVELOPMENT SUMMARY

DOI-BLM-OR-M080-2009-0005-EA

Pursuant to Section 102 (2) (E) of NEPA (National Environmental Policy Act of 1969, as amended), Federal agencies shall "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The CEQ (Council on Environmental Quality) regulations for implementing the procedural provisions of NEPA states, alternatives should be "reasonable" and "provide a clear basis for choice" (40 CFR 1502.14).

In light of the direction contained in both NEPA and the CEQ Regulations, the following questions were used to 1/ identify the alternatives to be analyzed in detail in this environmental assessment that are in addition to the "Proposed Action" and "No Action" alternatives, and 2/ document the rationale for eliminating alternatives from detailed study.

1. **Are there any unresolved conflicts concerning alternative uses of available resources? If yes, document and go to Question #2.** *If no, document rationale and stop evaluation.*

   Yes. One commenter requested consideration of using wax (or kraft) paper over slash burn piles instead of plastic sheeting to keep piles dry until wet weather conditions allow for burning. The organization's interest was to "limit the carbon footprint".

2. **What alternatives should be considered that would lessen or eliminate the "unresolved conflicts concerning alternative uses of available resources"?** *List alternatives and go to Question #3. If no alternative is identified other than the "no action" alternative, document and stop evaluation.*

   Yes. See response to Question #1.

3. **Of those alternatives identified in Question #2, are there reasonable alternatives for wholly or partially satisfying the need for the Proposed Action? If so, briefly describe alternatives and go to question #4.** *If no, document rational and stop evaluation.*

   No. The Glendale Resource Area fuels management specialists (Gallimore) stated in his operational experience, use of wax (or kraft) paper becomes saturated during heavy rains resulting in wet piles that cannot be successfully ignited or consumed adequately to meet the prescribed burn plan objectives. See Appendix 8 of the EA for more detailed analysis (Air Quality Specialist Report). No additional action alternatives were developed or identified during external or internal scoping.

4. **Of those alternatives identified in Question #3, will such alternatives have meaningful differences in environmental effects?** *If so, seek line officer approval to carry alternatives forward for detailed analysis in the environmental assessment. If no, document rationale and stop evaluation.*

   No. The minimal amount of plastic sheeting would not measurably contribute carbon emissions into the atmosphere. Combustion studies involving lignocellulosic materials suggest that uncoated kraft paper may produce some of the same substances as polyethylene (Garcia et al. 2003). See Appendix 8 of the EA for more detailed analysis (Air Quality Specialist Report).

APPENDIX 2 - ENVIRONMENTAL ELEMENTS

DOI-BLM-OR-M080-2009-0005-EA

In accordance with law, regulation, executive order and policy, the Reuben Hazardous Fuel Reduction Project interdisciplinary team reviewed the elements of the environment to determine if they would be affected by the Proposed Action (Alternative 2) as described in the EA. The following **two tables** summarize the results of that review.

Table 1. Supplemental Authorities to be Considered (BLM Handbook 1790-1 Appendix 1). This table lists some of the other authorities that may apply if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.

Supplemental Authorities	Status 1/ Not Present 2/ Not Affected 3/ Affected	Interdisciplinary Team Remarks 1/ If not affected, why? 2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.
Air Quality (Clean Air Act as amended [42 USC 7401 et seq.])	Not Affected	Prescribed burning would be administered in accordance with the Oregon Smoke Management Plan administered by the Oregon Department of Forestry and the regulations established by the Oregon Department of Environmental Quality. The Planning Area is not located within a Class I designated airshed or non-attainment area. The impact of smoke on air quality is expected to be localized and of short duration. Particulate matter would not be of a magnitude to harm human health, affect the environment, or result in property damage. The temporal and spatial small scale of the project would not involve enough traffic or ground disturbance to generate road dust. A concern was raised during external scoping regarding the effects to air quality from burning plastic sheeting in slash burn piles. The minimal amount of plastic sheeting would not measurably contribute carbon emissions into the atmosphere. As such, the Proposed Action is consistent with the provisions of the Federal Clean Air Act. *See the Air Quality Specialist Report in Appendix 8 for further discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
Areas of Critical Environmental Concern	Not Present	There are no Areas of Critical Environmental Concern located within the Project Area.
Cultural Resources (National Historic Preservation Act)	Not Present	A cultural resource surveys were completed in 2009. All recorded sites located in units would be protected using Project Design Features such as a no cut buffer. As such, cultural resources would not be affected. If cultural resources are found during the implementation of the Proposed Action, the project may be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the Resource Area Archaeologist and concurrence from the Field Manager and SHPO.

Table 1. Supplemental Authorities to be Considered (BLM Handbook 1790-1 Appendix 1). This table lists some of the other authorities that may apply if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.		
Supplemental Authorities	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Environmental Justice (Executive Order 12898)	Not Affected	The Proposed Action is not anticipated to have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
Prime or Unique Farm Lands	Not Present	There are no Prime or Unique farmlands in or adjacent to the project area.
Flood Plains (Executive Order 11988)	Not Affected	The Proposed Action is mainly located along roadways, and does not involve occupancy and modification of floodplains, and would not increase the risk of flood loss. As such, the Proposed Action is consistent with Executive Order 11988.
Hazardous or Solid Wastes (Resource Conservation and Recovery Act of 1976)	Not Present	There are no known hazardous or solid wastes within or adjacent to the Project Area.
Invasive, Nonnative Species (Executive Order 13112)	Not Affected	Units with the Planning Area were surveyed for noxious weeds in the spring of 2007 through 2009. The Planning Area is known to have noxious weeds along many roadsides. Three populations of *Rubus armeniacus* (Himalayan blackberry), 1 population of *Cytisus scoparius* (Scotchbroom), and 13 populations of knapweed (*Centaurea maculosa* (spotted) *and C. pratensis* (aka *C. debeauxii*) (meadow)) were documented within proposed units. The Medford District RMP states that the objectives for noxious weeds are to "contain and/or reduce noxious weed infestations on BLM-administered land.(p. 92)," and "survey BLM-administered land for noxious weed infestations…(p. 93)." These RMP directions for weed management are intended to be met at a landscape level. In an effort to continue to contain and/or reduce noxious weeds on federal land, the BLM has treated many of these known weed populations within the Reuben Planning Area. Subsequent follow-up treatments are scheduled to occur in the spring of 2010. There are three main reasons why potential weed establishment is not expected to result in a detectable effect to overall ecosystem health. First, surveys indicate that a very small percentage - less than 1% of acreage within the Planning Area units - are affected by noxious weeds. Second, these sites located in units proposed for treatment have been reported during predisturbance surveys, and have received weed treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14* Third, Project Design Features (PDFs) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources.

Table 1. Supplemental Authorities to be Considered (BLM Handbook 1790-1 Appendix 1). This table lists some of the other authorities that may apply if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.		
Supplemental Authorities	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Invasive, Nonnative Species (Executive Order 13112) (continued)	Not Affected	Seeds are spread by the wind, by animal/avian vectors, natural events, and by human activities - in particular through soil attachment to vehicles. BLM's influence over these causes of the spread of noxious weeds is limited to those caused by human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weed establishment, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds, it may only reduce the risk or rate of spread. See noxious weed specialist report in Appendix 6.
Native American Religious Concerns (American Indian Religious Freedom Act)	Not Present	No pre-European settlement cultural sites were found within the Project Area. If such sites are found during the implementation of the Proposed Action, the project may be redesigned to protect the site values present, or evaluation and mitigation procedures would be implemented.
Threatened or Endangered Fish Species or Habitat (Endangered Species Act)	Not Affected	The Proposed Action would not affect Endangered Species Act (ESA) listed Oregon Coast (OC) coho salmon (Threatened) or Southern Oregon Northern California (SONC) coho salmon. The closest coho presence and CCH in Cow Creek and Rattlesnake Creek is approximately 0.02 miles (85 feet) and 0.04 miles (200 feet) from the proposed project. The proposed fuels reduction, biomass removal, road maintenance, and haul would have no effect on the OC and SONC coho salmon or CCH because any sediment from this action would not be distinguishable above baseline levels and would not have any effect on aquatic organisms. Sediment would not result in more than a 10% increase in stream turbidity, and would not measurably increase these conditions for more than 25 feet from haul roads. Stream buffers would be placed on intermittent, perennial, and fish-bearing streams. There would be no increase to stream temperatures since canopy would not be removed.
Threatened or Endangered Plant Species or Habitat (Endangered Species Act)	Not Present	Of the four federally listed plants on the Medford District (*Fritillaria gentneri, Limnanthes flocossa* ssp. *grandiflora, Arabis macdonaldiana,* and *Lomatium cookii)* only *Fritillaria gentneri* has a range and habitat which extends into the Glendale Resource Area. The Reuben Planning Area resides outside the range of *F. gentneri,* as determined by the US Fish and Wildlife Service. Vascular plant surveys were conducted in the spring of 2007, 2008, and 2009, and no *Fritillaria gentneri* populations were found. There would be no anticipated effect from the proposed action on any federally listed plant.

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Supplemental Authorities	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Threatened or Endangered Wildlife Species, Habitat and/or Designated Critical Habitat (Endangered Species Act)	Not Present Marbled murrelet & critical habitat Affected Spotted owl Affected Spotted Owl critical habitat	The project area is over 15 miles from the accepted known range of marbled murrelets as described in the currently accepted survey protocol (Pacific Seabird Group 2003), outside designated Critical Habitat for the species, and the area is also beyond (east of) the area in which marbled murrelet surveys are required to avoid disturbance to adjacent potential murrelet nesting habitat. Therefore, the proposed project would have no effects on marbled murrelets or their Critical Habitat. Affected: The Proposed Action would maintain suitable habitat and dispersal habitat for the northern spotted owl (Threatened). The Proposed Action maintain NSO critical habitat within the Planning Area, including the primary constituent elements that support nesting, roosting, foraging, and dispersal. The unit of measure is the acres of suitable and dispersal habitat maintained. *Refer to Section 3.4 of the EA for a discussion of the affected environment and environmental effects of the Proposed Action related to this element of the environment.*
Water Quality Drinking-Ground	Not Affected (Temperature, Large Woody Debris)	Temperature: A total of 33.3 miles of stream within the three HUC 6 sub-watersheds encompassing the planning area do not meet ODEQ water quality standards for temperature. Lands in non-federal ownership along this, and other streams in the Planning Area, provides a lower level of protection to riparian areas that often does not allow for optimal shade conditions to be achieved. BLM lands would continue to be managed to attain compliance with state water quality standards and ACS objectives. Streams in this Planning Area are generally well shaded on public lands by both the mid and upper canopies of streamside vegetation. Within this Planning Area, the Ecological Protection Zone (EPZ described in Chapter 2) would maintain stream temperatures by reserving all trees within the primary shade zone, and a majority of the trees within the secondary shade zone (USFS and BLM, 2005) from biomass removal.

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Supplemental Authorities	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Water Quality Drinking-Ground (continued)	Not Affected (Chemical/Nutrient Contamination) Affected Sedimentation/ Turbidity (hauling and road maintenance) Not Affected: Sediment/Turbidity (biomass removal, yarding, landing expansion, haul, and hazardous fuel reduction)	Chemical/Nutrient Contamination: No herbicides or pesticides would be used in conjunction with this project. Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition in order to minimize potential for leakage into streams. Due to Project Design Features such as no re-fueling of any equipment within 150ft of streams or waterbodies, or use of foam within 150 feet of streams or waterbodies, it would not be expected for the proposed activities to have any effect on chemical contamination of streams or waterbodies. Adjacent to fuel treatment areas, nitrogen levels could increase in stream and riparian zones in the short term. These would be highly localized, low level increases and would not be of a magnitude that would have any adverse affect on macroinvertebrate populations which are the most sensitive indicators of water quality conditions. Sediment: A small amount of sediment may enter streams during hauling and road maintenance where roads are hydrologically connected. These actions would result in measurable increases in sediment for no more than 25 feet downstream of the impact point. All sediment producing actions would be within the State of Oregon water quality standard of no more than a 10% increase in turbidity and would not result in measurable effects on macroinvertebrates or other aquatic organisms. All other harvest, yarding, landing expansions and use, and activity fuels treatments, would not result in measurable inputs of sediment to streams. S*ee Section 3.3: Water Quality for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
Wetlands (Executive Order 11990)	Not Present	The Proposed Action would not result in the destruction, loss or degradation of any wetland. As such, the Proposed Action is consistent with Executive Order 11990.

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Supplemental Authorities	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Wild and Scenic Rivers (Wild and Scenic Rivers Act)	Not Affected	There is an eligible Wild and Scenic River segment of Cow Creek present within a portion of proposed units 19-1 and 3-2 of the Project Area. The Outstanding Remarkable Value for the Cow Creek river segment is fish and recreation. The Proposed Action would not affect the Outstandingly Remarkable Values for fish because any sediment this action would create would not be distinguishable above baseline levels and would not have any effect on aquatic organisms. Sediment would not result in more than a 10% increase in stream turbidity, and would not measurably increase these conditions for more than 25 feet from haul roads. Stream buffers would be placed on intermittent, perennial, and fish-bearing streams. There would be no increase to stream temperatures since canopy would not be removed. The Proposed Action would not affect the Outstandingly Remarkable Values for recreation because the visual characteristics of the landscape would not be changed in the dominant and co-dominant components of the stand. The Proposed Action would help protect Project Area stands from loss of a wildfire event; therefore protecting future use of the Skull Creek Camground and dispersed recreation in the area.
Wilderness (Federal Land Policy Management Act 1976)	Not Present	

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.

Other Elements of the Environment	Status 1/ Not Present 2/ Not Affected 3/ Affected	Interdisciplinary Team Remarks 1/ If not affected, why? 2/ If affected, develop cause/effect statement, unit of measure, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.
Essential Fish Habitat (EFH) (Magnuson-Stevens Fisheries Conservation and Management Act)	Not Affected	Some streams within this Planning Area are designated as EFH (Essential Fish Habitat) under the Magnuson-Stevens Fishery Conservation and Management Act. The treatment activity, road maintenance, and hauling activity would not adversely affect Coho and Chinook Salmon Essential Fish Habitat. The closest EFH in Cow Creek and Rattlesnake Creek is approximately 0.02 miles (85 feet) and 0.04 miles (200 feet) respectively from the proposed project. Sediment resulting from treatment activity, road maintenance, and hauling activity would not be of a magnitude that would result in a measurable increase in the overall stream sediment deposition for more than 25 feet downstream within any of the stream channels.
Fire Hazard	Affected	Hazardous fuel treatments would reduce fire hazard in the project area. Fuel Model is the unit of measure for fire hazard. *Refer to Section 3.5 of the EA for a discussion of the affected environment and environmental effects of the Proposed Action related to this element of the environment.*
Fire Risk	Not Affected	Fire risk generally increases as human presence increases, from activities such as improperly discarding cigarettes and unattended camp fires. This project is not expected to increase human presence; therefore, it is not expected to affect fire risk.
Recreation	Not Affected	There is one developed recreation site, Skull Creek Campground, within the Planning Area, but would not be negatively affected by hazardous fuel reduction treatments. The Proposed Action would have a neutral effect on dispersed recreation within the Resource Area.
Research Natural Areas (not including ACEC, FEIS 1995, p. 58-61)	Not Present	There are no designated special area land allocations within the Project Area.

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.

Other Elements of the Environment	Status 1/ Not Present 2/ Not Affected 3/ Affected	Interdisciplinary Team Remarks 1/ If not affected, why? 2/ If affected, develop cause/effect statement, unit of measure, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.
Special Status Species (not including T/E): Fish Species/Habitat	Not Affected (Oregon Coast steelhead ESU) Not Present Umpqua chub	On July 26, 2007 a new Special Status Species list went into affect (IM No. OR-2007-072). This new list has two categories, Sensitive and Strategic. The former categories of Bureau Assessment and Bureau Tracking no longer exist. Fish species are listed as special status species by ESUs. See the "T/E (Threatened or Endangered) Fish Species or Habitat" section above for the definition of ESUs. Not Affected (Oregon Coast Steelhead): the treatment activities, road maintenance, and hauling activity would have any adverse effect on OC Steelhead (ESA-species of Concern). The closest steelhead presence in Cow Creek and Rattlesnake Creek is approximately 0.02 miles (85 feet) and 0.04 miles (200 feet) respectively from the proposed project. Sediment resulting from treatment activity, road maintenance, and hauling activity would not be of a magnitude that would result in a measurable increase in the overall stream sediment deposition for more than 25 feet downstream within any of the stream channels. Umpqua chub are a sensitive species found in Cow Creek. No changes to Umpqua chub would occur because no measurable effects (sediment) would reach Cow Creek at such a distance from the Planning Area.
Special Status Species (not including T/E): Plant Species/Habitat	Not Present Not Affected	**Bureau Special Status plants** On July 26, 2007 a new Special Status Species list went into affect (IM No. OR-2007-072). This new list has two categories, Sensitive and Strategic. The former categories of Bureau Assessment and Bureau Tracking no longer exist. Sensitive species require a pre-project clearance and management to prevent them from trending toward federal listing. There is no pre-project clearance or management required for the Strategic Species at the BLM District level, thus Strategic Species will not be analyzed in this document. The new list is effective immediately; however, if pre-project clearances have already been conducted for a project, there are no requirements to conduct pre-project clearances for newly added Bureau Sensitive Species or to address the newly added Bureau Sensitive species in the NEPA document (IM No. OR-2007-072). **Bureau Special Status Vascular plants** Vascular plant surveys were conducted in the spring of 2007, 2008, and 2009, and revealed one site (Clustered lady's slipper (*Cypripedium fasiculatum*)) consisting of 1 Bureau Sensitive species. However, this species would not be affected by the Proposed Action as any sites would receive a treatment buffer (Section 2.3.6).

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.

Other Elements of the Environment	Status 1/ Not Present 2/ Not Affected 3/ Affected	Interdisciplinary Team Remarks 1/ If not affected, why? 2/ If affected, develop cause/effect statement, unit of measure, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.
Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Present Not Affected	**Bureau Special Status Non-Vascular plants** Nonvascular surveys, completed in spring 2007, 2008, and 2009, resulted in no bureau special status nonvascular plant sites. **Bureau Special Status Fungi** The Planning Area was not surveyed for fungi, as pre-disturbance surveys for Special Status fungi are not practical, nor required per BLM Information Bulletin No. OR 2004-121, which states "If project surveys for a species were not practical under the Survey and Manage standards and guidelines (most Category B and D species), or a species' status is undetermined (Category E and F species), then surveys will not be practical or expected to occur under the Special Status/Sensitive Species policies either (USDA/USDI 2004a, p.3)." Current special status fungi were previously in the aforementioned S&M categories which did not consider surveys practical, and are therefore exempt from survey requirements. With the recent Interagency Special Status/Sensitive Species policy (ISSSP), 20 species of fungi were designated as Sensitive (SEN), 9 of which have been documented on Medford District (IMOR-2007-072, USDA/USDI July 25, 2007). As mentioned above, none of these species require surveys. Oregon State office Information Bulletin No OR-2004-145 states that Bureau policy (Manual Section 6840) would be met by known site protection and large-scale inventory work via strategic surveys. District wide, the Medford BLM has 20 Sensitive (SEN) fungi species; 11 are suspected to occur here, while the remaining 9 have been documented. Of the 9 documented species, only one, *Phaeocollybia olivacea*, has been found in the Glendale Resource Area, approximately 1 air mile away from the closest unit in the Planning Area. Although this site and the closest unit in the watershed reside in the same HUC 5 watershed, dispersal via spore transport and/or mycelial network is improbable, as the two areas are separated by a ravine, several small ridges, and are opposite aspects (the site is west-facing, the closest Reuben unit is east-facing). While it is possible that this project is occurring within potential habitat for some species, there is very little information available describing the *exact* habitat requirements or population biology of these species (USDA,USDI 2004 (2004 Final SEIS vol.1) p. 148). The 2004 FEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines addresses this type of incomplete and/or unavailable information (p. 108-109). However, the *2004 Record of Decision* (ROD) *to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines*, offers a broad

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.		
Other Elements of the Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Affected (continued)	scale prospective of this current situation in stating, "Any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitat has been surveyed. Reserves have not been surveyed to the same degree as Matrix and Adaptive Management Area land allocations. The Reserves were not surveyed because there has been little management-induced disturbance there. The vast majority of pre-disturbance surveys have been located in the Matrix and Adaptive Management Area land allocation (19% of the northwest Forest Plan area), so that is where many of the known sites have been found. This does not mean that a disproportionate amount of their habitat is located in Matrix. If these species are truly closely associated with late-successional or old-growth forests, we can reasonably expect that the large amount of federally managed lands in Late-Successional and Riparian Reserves which provide the most amount of this type of habitat (86% of currently existing late-successional forests is in reserves) would also provide, at a minimum, its proportionate share of the habitat to support populations of these species (2004 ROD to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines, p.11)." Based on the above information, the likelihood of a Sensitive fungi species in this Project Area is very low; the likelihood of a sensitive fungi occurring within a single unit(s) encompassed in the Project list is not probable.
Special Status Species (not including T/E): Wildlife Species/Habitat	Not Affected Not Affected	**Bureau Sensitive** - American peregrine falcon, Townsend's big-eared bat, fringed Myotis (bat) and pallid bat. These species may fly through the project area in search of prey and the Proposed Action would not decrease their ability to do so. **Bureau Sensitive** - Fisher. The Proposed Action would not affect the quality or any fisher habitat components such as large wood and snags. An incidental observation of a fisher was made in T32-7-Section 19 of the Cow Creek watershed in 1996. Camera surveys in 1996 and 2002 did not detect any fishers. No resident fishers are known or expected. Although it is possible that fisher may disperse through the Project Area, the absence of detections from surveys indicates use is minimal at best.

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Other Elements of the Environment	Status 1/ Not Present 2/ Not Affected 3/ Affected	Interdisciplinary Team Remarks 1/ If not affected, why? 2/ If affected, develop cause/effect statement, unit of measure, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.
Migratory Birds (EO 131186)	Not Affected	Olive-sided flycatcher, rufous hummingbird, USFWS identified species of conservation concern (Federal Register July 10, 2003 Vol. 68, No. 25, 6179). Some migratory bird individuals other than USFWS species of concern may be temporarily displaced during project activities because of the limited duration of noise or the presence of humans, but there would be no perceptible shift in species composition because of the immeasurably small scale of habitat modifications. *See the Migratory Bird Specialist Report in Appendix 9 for further discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
Soil (erodibility)	Affected (Erosion)	Tractor and cable yarding corridors, landing expansion, use, and rehabilitation, hazardous fuels treatments, hauling, and road maintenance are proposed as part of this action. These activities would result in soil compaction and disturbance that would increase erosion. Compaction would not exceed 12% within any one unit, keeping impacts from compaction within those levels assessed under the RMP. There would be no new permanent or temporary roads built as a result of this project. Erosion from upland activities including tractor and cable yarding, landing expansion, use, and rehabilitation, upland road use, and fuels treatments would remain onsite. *Offsite erosion from hauling and road maintenance on hydrologically connected roads is discussed in the Water Quality section of Appendix 2 and Section 3.3 of this EA.*
Mass Wasting	Not Affected	Mass wasting alters site productivity, increases erosion and potential stream sedimentation, and damages road systems. The risk of large scale mass wasting within this Planning Area is low, as soils in this region are generally not prone to debris flows or other large scale events. The Rueben Hazardous Fuels Project was mapped with GIS layers that show where the geologic contact zones and fault lines occur. DOGAMI mapping was additionally used for this project to provide past locations of landslides on a watershed scale. Though the location of fault lines, and geologic contact zones is beneficial to know for the purpose of providing insight into areas on the landscape that may still recovering from a historic large scale event, or areas that may have geologic intrusions with sensitive soils, these mapped features provide little in the way of determining the surface stability of an area for surface land management purposes. Instead, indicators are identified on the ground prior to harvest, such as large scale or unexplainable areas of pistol butting or jack-strawed trees, slumps or hummocky ground, and areas with excessive seeps and springs (that beyond the expected conditions for the slope and aspect). When these types of conditions are found, appropriate buffers, dependent on the magnitude of proposed action, are placed accordingly to protect these areas from excessive erosion.

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the Proposed Action (Alternative 2) described in the Environmental Assessment was implemented.		
Other Elements of the Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure, and if applicable, Project Design Features not already identified in the 1995 Medford District Resource Management Plan (RMP) to reduce or avoid environmental harm.**
Mass Wasting (continued)	Not Affected	For the Rueben Hazardous Fuels Project there would be no road construction and all biomass units would be walked prior to biomass extraction to identify areas where indicators may be present, and buffers would be placed as needed to prevent an increase in the risk of mass wasting or excessive erosion from occurring during biomass removal. As a result of on the ground examination and the implementation of protective buffers, the risk of mass wasting or excessive erosion would not be elevated within any project units during or following implementation of this action.
Visual Resources	Not Affected	The proposed Project Area is located within the Class 4 VRM (Visual Resource Management) category which allows for major modification of the existing character of the landscape. The Proposed Action is consistent with these visual resource management objectives.
Water Resources	Not Affected	Water quantity can be affected during timber harvest by soil compaction and increased open space. Since this project would consist of thinning trees and brush between 1 and 8 inches dbh and there would be no new permanent roads or temporary routes built, this project would not result in the creation of forest canopy openings that would contribute to open space within any HUC 6 sub-watershed. As such, the Proposed Action would not have measurable effects on watershed hydrology, including peak flows, base flows, runoff timing, subsurface flow, or water storage, and would not affect municipal and domestic water use.
Port-Orford cedar	Not Present	Project is within natural range of Port-Orford-cedar (POC). A POC Risk Key Analysis was completed. No management specific to POC and POC root disease (*Phytophthora lateralis*) is required. The Proposed Action is consistent with management direction in the Port-Orford-cedar EIS (See POC Risk Key in Appendix 4).

APPENDIX 3 – REUBEN HAZARDOUS FUEL REDUCTION HAUL ROUTES AND ROAD MAINTENANCE

Road Number	Miles	Control	Surfacing	Haul Period
32-7-8	1.89	BLM	rock	dry condition haul*
32-7-15.1	0.80	BLM	rock	
32-7-17	0.67	BLM	rock	
32-7-17.1	0.71	BLM	rock	
32-7-17.2	0.33	PVT	native	
32-7-18A1	1.18	BLM	rock	
32-7-18A2	0.98	BLM	rock	
32-7-18B	0.79	PVT	rock	
32-7-18.1	0.24	PVT	native	
32-7-19.4	0.42	BLM	rock	
32-7-19.5	0.21	BLM	rock	
32-7-19.6A	0.17	BLM	native	
32-7-19.6B	0.24	BLM	native	
32-7-20.1A	4.80	BLM	rock	
32-7-21B	0.60	BLM	rock	
32-7-21C	0.92	PVT	rock	
32-7-21D	0.38	BLM	rock	
32-7-21E	0.30	BLM	rock	
32-7-21.1	1.65	BLM	rock	
32-7-21.2A	2.01	BLM	rock	
32-7-21.2B	1.84	BLM	rock	
32-7-21.3	0.57	BLM	rock	
32-7-21.4A	0.80	BLM	rock	
32-7-21.4B	1.85	BLM	rock	
32-7-22.2	1.51	BLM	rock	
32-7-25A	0.48	BLM	rock	
32-7-25B	0.24	BLM	rock	
32-7-25.1	1.65	BLM	rock	
32-7-25.3	0.21	BLM	rock	
32-7-25.4	1.25	BLM	rock	
32-7-36	2.38	PVT	rock	
32-6-31A	0.65	PVT	rock	
32-6-31B	0.51	BLM	rock	
32-6-33	0.9	PVT	rock	
33-7-2	4.00	BLM	paved	all season haul

Road Number	Miles	Control	Surfacing	Haul Period
33-7-2.1 A	0.78	BLM	rock	dry condition haul*
33-7-2.1 B	0.64	BLM	rock	
33-7-2.1 C	0.72	BLM	rock	
33-7-2.1 D	0.4	BLM	rock	
33-7-2.3A	1.50	BLM	rock	
33-7-3A	2.44	BLM	rock	
33-7-3B	1.57	BLM	rock	
33-7-3C	0.18	PVT	rock	
33-7-3D	0.57	BLM	rock	
33-7-3E	1.08	BLM	rock	
33-7-3.1	0.42	BLM	rock	
nonsystem road T33S-R7W-Section 3	0.16	BLM	rock	
33-7-9	0.4	BLM	rock	
nonsystem road T33S-R7W-Section 11	0.31	BLM	native	
33-7-11A	1.80	BLM	rock	
33-7-11B	1.19	BLM	rock	
33-7-11.4	0.20	BLM	rock	
33-7-13	0.9	BLM	rock	
33-7-13.5A	0.62	BLM	rock	
33-7-13.5B	1.12	BLM	rock	
33-7-21A	0.44	BLM	rock	
33-7-26	0.23	BLM	native	
33-7-32D	0.69	BLM	rock	
Total haul miles:	**56.49**			

*** Dry conditional haul =** Hauling would not occur when saturated road surfaces would result in continuous mud splash or tire slide; surface rutting; fines being pumped through road surface from the subgrade; road drainage causes a visible increase in stream turbidities or more than 10% cumulative increase in natural stream turbidities as measured relative to a control point above the road; or road surface conditions would result in water being redirected into tire tracks or away from designed drainage patterns.

APPENDIX 4 – PORT ORFORD CEDAR RISK KEY ANALYSIS FOR REUBEN

Risk Key is from Alternative 2 of the FSEIS for Management of Port Orford Cedar in Southwest Oregon 1/2004

QUESTION			UNIT															
			25-1 32-7-25	25-2 32-7-25	25-3 32-7-25	25-4 32-7-25	25-6 32-7-25	25-7 32-7-25	1-1 33-7-1	3-1 33-7-3	3-2 33-7-3	9-1 33-7-9	9-1 33-7-9	11-1 33-7-11	11-2 33-7-11	15-1 32-7-15	15-2 32-7-15	21-1 32-7-21	25-1 32-7-25
1a.	Are there uninfected POC within, near[1], or downstream of the activity area whose ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives?		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1b.	Are there uninfected POC within, near[1], or downstream of the activity area that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or product use or function measurable contributes to meeting land and resource management plan objectives?		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1c.	Is the activity area within an uninfested 7th field watershed[2] as defined in Alternative 6		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
			If the answer to all three questions, 1a, 1b, and 1c, is no, then risk is low and no POC management practices would be required.																
	If the answer to any of the three questions is yes, continue.																		
2.	Will the proposed project introduce appreciable additional risk[3] of infection to these uninfected POC?		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			If no, then risk is low and no POC management practices are required.																
	If yes, apply management practices from the list below [within FSEIS] to reduce the risk to the point it is no longer appreciable, or meet the disease control objectives by other means, such as redesigning the project so that uninfected POC are no longer near or downstream of the activity area. If the risk cannot be reduced to the point it is no longer appreciable through practicable and cost-effective treatments or design changes, the project may proceed if the analysis supports a finding that the		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

	value or need for the proposed activity outweighs the additional risk to POC created by the project.																			

1 - In questions 1a and 1b, "near" generally means within 25 to 50 feet downslope or 25 feet upslope from management activity areas, access roads, or haul routes; farther for drainage features; 100 to 200 feet in streams.

2 - Uninfested 7th field watersheds are listed on Table A12-2 [*of FSEIS*] as those with at least 100 acres of POC stands, are at least 50% federal ownership, and are free of PL except within the lowermost 2 acres of the drainage.

3 - Appreciable additional risk does not mean "any risk." It means that a reasonable person would recognize risk, additional to existing uncontrollable risk, to believe mitigation is warranted and would make a cost-effective or important difference (see Risk Key Definitions and Examples for further discussion.)

Risk Key is from Alternative 2 of the FSEIS for Management of Port Orford Cedar in Southwest Oregon
1/2004

QUESTION		Roads / Road Systems (operations and use including roadside brushing, renovation, drainage improvement, log hauling, and decommissioning.)																				
			Douglas County	32-6-33	32-6-31	32-7-25	32-7-25.1	32-7-25.2	32-7-25.3	32-7-25.4	32-7-36	32-7-26	Douglas County Road	33-7-2.1	33-7-2.2	33-6-7	33-7-13	33-7-11	33-7-11.4	33-7-13.4	33-7-13.5	33-7-3	33-7-3.1
1a.	Are there uninfected POC within, near[1], or downstream of the activity area whose ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives?		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1b.	Are there uninfected POC within, near[1], or downstream of the activity area that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or product use or function measurable contributes to meeting land and resource management plan objectives?		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1c.	Is the activity area within an uninfested 7th field watershed[2] as defined in Alternative 6		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
			If the answer to all three questions, 1a, 1b, and 1c, is no, then risk is low and no POC management practices would be required.																				
	If the answer to any of the three questions is yes, continue.																						
2.	Will the proposed project introduce appreciable additional risk[3] of infection to these uninfected POC?		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			If no, then risk is low and no POC management practices are required.																				
	If yes, apply management practices from the list below [within FSEIS] to reduce the risk to the point it is no longer appreciable, or meet the disease control objectives by other means, such as redesigning the project so that uninfected POC are no longer near or downstream of the activity area. If the risk cannot be reduced to the point it is no longer appreciable through practicable and cost-effective treatments or design changes, the project may proceed if the analysis supports a		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

	finding that the value or need for the proposed activity outweighs the additional risk to POC created by the project.																						

1 - In questions 1a and 1b, "near" generally means within 25 to 50 feet downslope or 25 feet upslope from management activity areas, access roads, or haul routes; farther for drainage features; 100 to 200 feet in streams.

2 - Uninfested 7th field watersheds are listed on Table A12-2 [*of FSEIS*] as those with at least 100 acres of POC stands, are at least 50% federal ownership, and are free of PL except within the lowermost 2 acres of the drainage.

3 - Appreciable additional risk does not mean "any risk." It means that a reasonable person would recognize risk, additional to existing uncontrollable risk, to believe mitigation is warranted and would make a cost-effective or important difference (see Risk Key Definitions and Examples for further discussion.)

Risk Key is from Alternative 2 of the FSEIS for Management of Port Orford Cedar in Southwest Oregon
1/2004

QUESTION		Roads / Road Systems (operations and use including roadside brushing, renovation, drainage improvement, log hauling, and decommissioning.)																
		33-7-9	33-7-8	33-7-32	Lower Grave Creek Road	33-7-13.7	33-7-35	33-7-36	Lower Wolf Creek Road (1100)	Leland Road	33-7-2	32-7-21	32-7-22.2	32-7-15	32-7-15.1	32-7-15.2	32-7-21.1	32-7-21.4
1a.	Are there uninfected POC within, near[1], or downstream of the activity area whose ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives?	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1b.	Are there uninfected POC within, near[1], or downstream of the activity area that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or product use or function measurable contributes to meeting land and resource management plan objectives?	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1c.	Is the activity area within an uninfested 7th field watershed[2] as defined in Alternative 6	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
		If the answer to all three questions, 1a, 1b, and 1c, is no, then risk is low and no POC management practices would be required.																
	If the answer to any of the three questions is yes, continue.																	
2.	Will the proposed project introduce appreciable additional risk[3] of infection to these uninfected POC?	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		If no, then risk is low and no POC management practices are required.																

	If yes, apply management practices from the list below [within FSEIS] to reduce the risk to the point it is no longer appreciable, or meet the disease control objectives by other means, such as redesigning the project so that uninfected POC are no longer near or downstream of the activity area. If the risk cannot be reduced to the point it is no longer appreciable through practicable and cost-effective treatments or design changes, the project may proceed if the analysis supports a finding that the value or need for the proposed activity outweighs the additional risk to POC created by the project.		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

1 - In questions 1a and 1b, "near" generally means within 25 to 50 feet downslope or 25 feet upslope from management activity areas, access roads, or haul routes; farther for drainage features; 100 to 200 feet in streams.

2 - Uninfested 7th field watersheds are listed on Table A12-2 [*of FSEIS*] as those with at least 100 acres of POC stands, are at least 50% federal ownership, and are free of PL except within the lowermost 2 acres of the drainage.

3 - Appreciable additional risk does not mean "any risk." It means that a reasonable person would recognize risk, additional to existing uncontrollable risk, to believe mitigation is warranted and would make a cost-effective or important difference (see Risk Key Definitions and Examples for further discussion.)

APPENDIX 5 – AQUATIC CONSERVATION STRATEGY ANALYSIS

"The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of the Pacific Ocean anadromy" (Medford District RMP pg. 22).

The four components of the ACS are riparian reserves, key watersheds, watershed analysis, and watershed restoration. The ACS was designed to meet the nine objectives discussed below.

This ACS consistency analysis evaluates Reuben Hazardous Fuel Reduction Project EA on BLM land.

Analysis of the Four Components of the ACS:

1. Riparian Reserves (RRs): The proposed project is consistent with the actions and directions within Riparian Reserves as described in the Medford District RMP. The Proposed Action would not occur in RRs unless field verified Ecological Protection Zones (EPZs) are established. Fuel treatments would be designed to reduce fuel hazard and the risk of large-scale, high intensity wildfires. The Proposed Action would also reduce the competition on retained trees for light, nutrients, water and growing space, allowing trees to develop larger canopies, display better vigor and put on diameter growth faster than if left untreated.

The project is also consistent with the Best Management Practices (BMP) within Appendix D of the 1995 Medford RMP.

2. Key Watershed: The Planning Area is not located in a Key watershed.

3. Watershed Analysis: The Glendale Resource Area completed the Middle Cow Creek Watershed Analysis in 1999. The proposed activity is consistent with the Watershed Analysis.

The Watershed Analysis found that management directions in the Northwest Forest Plan and the 1995 RMP including the Aquatic Conservation Strategy, Best Management Practices, and RR management would be adequate at protecting, maintaining and improving aquatic and riparian ecosystems.

The Reuben Hazardous Fuel Reduction Project does not propose any temporary route or permanent road construction consistent with the recommendations in the Middle Cow Creek Watershed Analysis.

The watershed analysis also recommends, "Forest fuels should be reduced and managed in the rural interface and near other residential areas," p.74.

4. Watershed Restoration: Though the Reuben Hazardous Fuel Reduction Project is not a watershed restoration project, it would aid in the improvement of watershed health through the following proposed activities: road maintenance and hazardous fuels reduction in Riparian Reserves.

Analysis of the Reuben Hazardous Fuel Reduction Project EA Proposed Action consistency with the Aquatic Conservation Strategy objectives:

The ACS gives direction to maintain and restore ecosystem health at watershed and landscape scales. For the purposes of this analysis the watershed scale will be discussed in terms of site or project scale and will be at the HUC 6 and 7 watersheds. The landscape scale will be at the HUC 5 watershed level.

Appropriate consideration of potential cumulative effects is a critical element in determining a project's consistency with the ACS. The minimal effects at the HUC 7 scale would not reach a magnitude detectable at the HUC 6 or HUC 5 scales. Because there would be no detectable cumulative effects caused by the proposed action, cumulative effects will not be discussed in the individual ACS objectives.

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.

The watershed and landscape-scale features which protect species, populations, and communities dependent on aquatic systems would be maintained and in some cases enhanced in the short term and long term. The distribution, diversity, and complexity of watershed and landscape-scale features needed for the protection of aquatic systems would be maintained. Proposed activities such as road maintenance and hazardous fuel reduction, and biomass removal would restore watershed features in the short and long term.

Riparian Reserves

One key component of watershed and landscape scale features needed for the protection of aquatic systems is RRs. RRs would be maintained at the site and watershed levels in the short and long term. Riparian vegetation treatments (slashing, handpiling, biomass removal, underburning and handpile burning) would enhance riparian characteristics. Hazardous fuel reduction would result in a reduction in stand densities in young dense stands and would reduce competition on retained trees for light, nutrients, water, and growing space, allowing trees to develop larger canopies, display better vigor, and gain diameter growth faster than if left untreated. Hazardous fuel reduction would reduce the risk of a high intensity or severity fire within RRs. Such a fire could result in tree mortality and a reduction in shade, which could negatively affect fish habitat by causing an increase in water temperature, a reduction in future recruitment of LWD, an increase in soil erosion and sediment entering streams.

Roads

The project would result in road maintenance (56.5 miles) or activities on an existing road to keep a road at its original design standard. Typical maintenance within the Reuben Hazardous Fuel Reduction Project may include, but is not limited to: 1) blading and shaping; 2) cleaning of ditches, catch basins and culverts; 3) brush cutting and vegetation removal from roadway; 4) pot hole repair; 5) surface replacement; 6) slide removal. See Appendix 3 of the Reuben Hazardous Fuel Reduction Project EA for the specific roads proposed for road maintenance and use for biomass removal.

Sedimentation would result from the blading of roads and pulling of ditchlines during maintenance of haul routes. There would also be a small amount of stream sedimentation from the use of this road at stream crossing locations. A small amount of sediment may also enter streams during log haul and existing road maintenance where roads are hydrologically connected. All sediment producing actions would result in measurable increases in sediment for no more than 25 feet downstream of the impact point, and would all be within the State of Oregon water quality standard of no more than a 10% increase in turbidity above and below the action.

Road maintenance would reduce sediment entering stream channels in the short and long term. Road maintenance would generally reduce chronic erosion problems and reduce sediment input to streams.

This project would not increase the number of permanent roads within this sub-watershed, since permanent road building is not part of the proposed project. No future permanent road construction is planned on federally managed lands within this sub-watershed.

Peak Flows

The proposed action would not affect the timing, magnitude, duration, and spatial distribution of peak, high and low flows. No regeneration harvest or overstory removal is proposed for this project.

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.

The spatial and temporal connectivity within and between watersheds would be maintained in the short and long term at the site and landscape scales. Chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species would be maintained.

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

The physical integrity of aquatic systems, including shorelines, banks, and bottom configurations would not be affected at the site or landscape scale in the short or long term. The proposed activities would not manipulate or affect shore lines, banks or bottom configurations.

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

Water quality necessary to support healthy riparian, aquatic and wetland ecosystems would be maintained. Water quality would remain within the range that maintains biological, physical, and chemical integrity streams.

Slight increases in turbidity would occur in the short term in localized areas as a result of road activities. Best Management Practices (BMPs) were designed to minimize the amount and duration of sediment entering stream channels. Such increases in turbidity would not measurably alter the biological, physical, or chemical integrity of streams. Aquatic and riparian dependent species' survival, growth, reproduction, and migration would be maintained.

The road maintenance, hauling on BLM land (56.5 miles), biomass removal, and hazardous fuel reduction treatments would have no effect on Oregon coast (OC) coho salmon (ESA-Threatened) or coho critical habitat (CCH). The closest coho presence and CCH in Cow Creek and Rattlesnake Creek is approximately 0.02 miles (85 feet) and 0.04 miles (200 feet) from the proposed project. Sediment would not be transported to CCH because of the dry condition haul, RRs or EPZs, the proximity of the road to fish habitat and the design features to reduce the transmission of fine sediment. Sediment resulting from the road use, and maintenance would not be of a magnitude that would result in a visible increase in stream turbidity, or a measurable increase in the overall stream sediment deposition for more than 25 feet downstream within any of the stream channels.

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 sediment regime under which aquatic ecosystems evolved would be maintained at the site and landscape scales in the short and long terms. Some of the proposed activities such as road maintenance would reduce sediment input in the short and long term. Streams within the Planning Area evolved with sediment input. Sediment input can result from natural disturbances such as landslides, slumps, wildfires, bank erosion, and channel scour.

Road Related Activities

The following road related activities proposed could deliver sediment to streams: maintenance and haul. Because of PDFs the amount of sediment entering streams from road related activities would be minimal. Changes in embeddedness, interstitial spaces, and pool depth would not be measurable.

Roads proposed for dry condition haul would result in negligible amounts of sediment entering streams because the roads are either bituminous surface treatment (BST) or crushed aggregate (rocked) or are hydrologically disconnected due to ridgetop location of treatment units. The roads proposed for dry condition haul could result in sediment entering stream channels, however; negligible changes to stream channels from sediment input would be expected. Changes in embeddedness, interstitial spaces, and pool depth would not be measurable.

Road maintenance would result in a minimal amount of sediment reaching stream channels. Increased sediment levels from road maintenance would not be detectable above background levels following the first few substantial rain events, therefore sediment input would be short term. Negligible changes to stream channels from sediment input would be expected. Changes in embeddedness, interstitial spaces, and pool depth would not be measurable.

Road maintenance would generally reduce chronic erosion problems and reduce sediment input to streams. Removing access and stabilizing the drainage on the roads would reduce the potential of the roads failing and sediment entering stream channels.

Biomass Removal

All other soil disturbing activities are located outside Riparian Reserves, unless field verified EPZs are established, and would be implemented using BMPs that minimize the quantity and transport of soil erosion. Since the EPZ is designed to filter out sediment produced during upslope activities that are implemented using BMPs, these activities would not result any sediment entering streams.

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

The Reuben Hazardous Fuel Reduction Project would not affect the timing, magnitude, duration, and spatial distribution of peak, high and low flows. No regeneration harvest or overstory removal is proposed in this project.

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

The timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands would not be affected by any of the proposed activities. There

are no wetlands, as defined on page 117 of the 1995 RMP, within the Project Area.

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 species composition and structural diversity of plant communities in riparian areas would be maintained at the site and landscape scales in the short and long term. There are no wetlands, as defined on page 117 of the 1995 RMP, within the Project Area. Vegetation treatments proposed in the Proposed Action were designed to enhance riparian conditions in the short and long term. Plant communities in riparian areas would be maintained and enhanced through silvicultural prescriptions and no treatment buffers in order to provide for 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.

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

Habitat for riparian-dependent plant, invertebrate and vertebrate species would be maintained at the site and landscape scales. Vegetation treatments proposed were designed to enhance riparian conditions in the short and long term. There would not be a reduction of habitat needed to support riparian dependant species in the short term or long term.

CONCLUSION:

Based on this analysis at both the site and landscape scale of the proposed activities in Reuben Hazardous Fuel Reduction Project, it was determined that the actions are consistent with the nine objectives and the four components of the ACS. This determination was based on the small spatial and temporal disturbances associated with the Proposed Action.

APPENDIX 6 - NOXIOUS WEEDS

Specialist Report Memo

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Rachel Showalter, Botanist, Glendale Resource Area
Re: Noxious Weed Rationale Report for the Reuben Hazardous Fuel Reduction Project Planning Area
Date: Sept. 2, 2009

<u>Noxious Weeds</u> – PRESENT, NOT AFFECTED

Units with the Reuben Hazardous Fuel Reduction Project Planning Area were surveyed for noxious weeds in the spring of 2007, 2008 and 2009. The Planning Area is known to have noxious weeds along many roadsides. Three populations of *Rubus armeniacus* (Himalayan blackberry), 1 population of *Cytisus scoparius* (Scotchbroom), and 13 populations of knapweed (*Centaurea maculosa* (spotted) *and C. pratensis* (aka *C. debeauxii*) (meadow)) were documented within proposed units. (Table A6-1).

Based on these population sizes, per noxious weed reports provided by professional botany contractors, the Glendale botanist estimated that less than 1% of the harvest unit / road construction / road decommission acreage harbor noxious weeds. The maximum square footage occupied by all noxious weed species is approximately 216,204 sq. ft (4.96 acres).

Table A6-1. Plant Surveys (2007-2009) Revealing Noxious Weed Species in the Reuben Hazardous Fuel Reduction Project Area Units

Location in Township (T), Range (R), Section (S)	Species	Coverage in Sq. Feet	Oregon Department of Agriculture Designation	Plant Description / Habitat Requirements
T32S-R7W-3 T32S-R7W-25	Himalayan Blackberry	300 350 (total)	B*	Himalayan blackberry is a robust, clambering or sprawling, evergreen shrub which grows up to 9.8 feet (3 m) in height (Munz, 1974). Himalayan blackberry typically grows in open weedy sites, such as along field margins, railroad right-of-ways, roadsides, and riparian areas (Crane, 1940; Hitchcock et. al, 1973; Laymon, 1984; Roberts, 1980).

Location in Township (T), Range (R), Section (S)	Species	Coverage in Sq. Feet	Oregon Department of Agriculture Designation	Plant Description / Habitat Requirements
T32S-R7W-15 T32S-R7W-21 T33S-R7W-25 T33S-R7W-3 T33S-R7W-12	Knapweed	400 (total) 500 (total) 213444 (ttl) 525 (total) 435 (total)	B*	Knapweed, a hardy biennial/perennial, favors moist roadsides, sand or gravel bars, river banks, irrigated pastures, moist meadows, and forest openings (ODA, 2005). Prefers full sun and well-drained soils. Many infestations start on rights-of-way or from infested gravel or fill. Seeds are often transported by automobiles, contaminated fill and gravel, and by wildlife (DNR, 2004).
T33S-R7W-3	Scotch broom	250		Scotch broom is a long-lived, brushy, early seral colonizer which does not grow well in forested areas, but invades rapidly following logging, land clearing, and burning (Mobley, 1954). Scotch broom is generally intolerant of shade and will not grow in heavily shaded places (DiTomaso, 1998; Peterson and Prasad, 1998), and is typically shaded out once native species are established (Bossard, 2000; Williams, 1983) or forest canopy closes (Sawyer et. al, 2000).
Total Sq. feet		216204 sq ft = 4.96 ac		

* "B" designation; a weed of economic importance which is regionally abundant but which may have limited distribution in some counties. Where implementation of a fully integrated statewide management plan is not feasible, biological control shall be the main control approach (ODA, 2005).

Over the last 150 years activities such as motor vehicle traffic, recreational use, rural and urban development, timber harvest, road construction, and natural process have introduced and transported noxious weeds into the Rogue Valley. Noxious weeds are spread by the wind and by seed via attachment to vehicles and vectors such as humans, animals, and birds, and are able to grow on suitable habitat (generally considered as any newly disturbed ground and/or an influx of light due to canopy removal). Since the 1970s, a recognition that weeds were causing environmental damage resulted in the passage of State noxious weed laws, the Carson-Foley Act of 1968 – Plant Protection Act of 2000, and Presidential executive orders like Invasive Species E.O. 13112, which directs federal agencies to combat the noxious weeds on federal lands. Additional direction is provided by the Medford District RMP, which states the district is to "contain and/or reduce noxious weed infestations on BLM-administered land...(p. 92)," and "...survey BLM-administered land for noxious weed infestations…(p. 93)." These RMP directions for weed management are intended to be met at a landscape level; whether the direction is achieved is not intended to be measured at the site specific level nor with the implementation of each project. Thousands of acres of weed treatments have occurred on federal (and non-federal) lands over the last decade across the Medford District with the RMP-driven objective of containing or reducing – not eradicating - noxious weed

populations (Budesa, 2006). In an effort to continue to contain and/or reduce noxious weeds on federal land, the BLM proposed to treat known weed populations within the Glendale Resource Area. In 2009, over 1,000 acres of BLM land in the Glendale RA was treated, including roadsides adjacent to Reuben Hazardous Fuel Reduction Project units. Roads within the Reuben planning area are scheduled for subsequent treatment in 2010.

Environmental Consequences of the Reuben Hazardous Fuel Reduction Project Implementation

Alternative 1 (No Action) – Direct and Indirect Effects

Under the No Action Alternative, noxious weeds within the Planning Area would continue to spread into suitable habitat at an unknown rate. The rate at which noxious weeds spread is impossible to quantify, as it depends on a myriad of factors including, but not limited to, logging on private lands, motor vehicle traffic, recreational use, rural and urban development, and natural processes (BLM 1985, p. 59). The following table (1-2) illustrates how each of these activities affects noxious weed dispersal.

Table A6-2. Factors Affecting the Determination of the Rate of Noxious Weed Spread

Activity	Role in Potential Noxious Weed Seed Dispersal
Private Land	Private lands host a perpetual source for noxious weed seed, which can be dispersed when seeds attach to tires, feet, fur, feathers or feces, or when natural processes such as wind and/or flooding events transport the seed from its source to another geographical vicinity.
Logging on Private Lands	Logging activity presents a key dispersal opportunity for noxious weed seeds per 1) attachment to tires/tracks of mechanized logging equipment, tires of log trucks, and various other logging-related substrates which subsequently transport the seed from its source to another geographic vicinity, 2) creation of openings for potential noxious weeds colonization and 3) a lack of PDFs – such as equipment/vehicle washing, etc. - which attempt to reduce the activity's spread of noxious weed seeds.
Motor Vehicle Traffic (including Log Trucks)	Roads on public land include public use, which results in a plethora of seed-dispersing activities occurring on a daily basis. Private landowners use public roads to haul logs, undertake recreational pursuits, and/or access their properties. This transportation often occurs along BLM-administered roads, which are situated within a checkerboarded ownership arrangement. How or when seed detachment occurs is a random event could take place within feet or miles from the work site/seed source, presenting a high likelihood of detachment on public lands.
Recreational Use	The public often recreates on BLM-managed public lands, and can spread seed from their residences to public land in a variety of ways such as attachment to vehicle tires, hikers' sox, shoes, or other clothing, the fur of domesticated animals, etc.
Rural and Urban Development	Rural development occurring within the checkerboard land arrangement often requires public landowners to acquire a Right-of-Way (ROW) from the BLM to legally access their parcel(s). These ROWs, or use of BLM-administered roads is often granted (Groves, 2006). Please refer to 'Motor Vehicle Traffic' and 'Private Land', for clarification of how this affects the spread of noxious weeds from private to public lands.

Activity	Role in Potential Noxious Weed Seed Dispersal
Natural Processes	Wind, seasonal flooding, and migration patterns of birds/animals are a few natural processes that potentially spread noxious weeds, especially from private land to public land. Wind carries seeds, and deposits them at random intervals. High water caused by flooding reaches vegetation (often harboring a noxious weed component) growing on the banks of rivers/creeks/streams, and deposits seeds downstream.

The abovementioned activities would contribute to noxious weed spread, which could degrade some elements of the environment. To predict the rate of this degradation would be highly speculative, as the extent of weed expansion is dependent on so many factors that it is considered impossible to quantify. The degree of degradation would depend on the noxious weed species, as some, such as scotch broom and meadow knapweed, are more intrusive than others. The more aggressive species mentioned in Table A6-2 - specifically scotch broom and meadow knapweed - are slated for treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14* under a separate project. However, the success of implementing the weed management plan would be temporary, as logging on non-federal lands, recreational use, rural and urban development, natural processes and vehicle traffic will continue to spread noxious weed populations into the Planning Area.

Indirect effects of noxious weed spread include the potential degradation of wildlife habitat (Rice et. al. 1997, Harris and Cranston 1979), a decline in natural diversity (Forcella and Harvey 1983; Tyser and Key 1988; Williams 1997), and decline in water quality (Lacey et al. 1989); however, a very small amount of Reuben unit acreage (less than 1% of unit acreage under Alt. 2) is covered by noxious weeds, making it difficult to quantify any potential decline in ecosystem health related to existing noxious weed populations, or to quantify the potential decline in ecosystem health related to any additional noxious weed populations potentially established by the activities described in Table A6-2.

Alternative 2 (Proposed Action) – Direct and Indirect Effects

In the short term (approximately 1-5 years), proposed activities within the Planning Area would result in the reasonable probability of spreading noxious weeds. However, the rate at which this potential spread would occur is unknown due to the indistinguishable causal effect of other activities and factors listed in table A6-2 on the spread of noxious weeds. Thinning the understory (1737 acres) might increase light levels enough to provide suitable habitat for some noxious weeds to colonize. In addition, during project implementation, increased vehicle traffic could increase, or at least perpetuate, weed infestations along road systems because of seed dispersal.

Openings and disturbance provide the greatest opportunity for the establishment of noxious weeds. In an effort to address the potential for project activities to increase the rate of spread of noxious weeds, Project Design Features (PDFs) have been included in the project to decrease the potential spread of weeds associated with the Proposed Action. Project Design Features include washing equipment prior to moving it on-site, operating vehicles/equipment in the dry season, and seeding and/or planting newly created

openings with native vegetation to reduce the potential establishment of noxious weeds. These PDFs are widely accepted and utlilized as Best Management Practices (BMPs) in noxious weed control strategies across the nation (Thompson, 2006). Table A6-3 delineates the project design features and their expected implementation results.

Table A6-3: Project Design Features and Expected Implementation Results

Project Design Feature (PDF)	Result of Implementing PDF
Washing vehicles / equipment	Removes dirt that may contain viable noxious weed seeds, thereby reducing the potential for noxious weed spread
Operating vehicles/equipment during the dry season	Reduces the potential for viable noxious weed seed to be transported and dispersed via mud caked on the undercarriages/tires/tracks of logging equipment.
Seeding and/or planting newly created openings with native seed vegetation.	Introduces native vegetation to the site prior to noxious weed seed recruitment, allowing native plants an advantageous jump-start in reestablishment, which reduces the potential for noxious weed infestation.

Implementing the PDFs that reduce the potential spread of noxious weeds associated with the Proposed Action, and using native species for seeding/planting newly disturbed openings is expected to result in a similar potential of noxious weed expansion as associated with the No Action Alternative.

In the long term (5-100 years), the understory could eventually expand and reduce light levels, which in turn would prevent weeds from growing and expanding within treated areas, as populations decline as the amount of light reaching the plants diminishes. Consequently, in the long term, remaining weed populations would be confined to the road prism and adjoining (private) disturbed land as canopy is re-established in treated areas over time.

The effect of implementing Alternative 2 could possibly result in the establishment of new noxious weed populations. Although the *immediate* potential for weed spread would be less with the No-Action Alternative than for the Proposed Action, the potential for the spread of existing noxious weeds and the introduction of new species is considered similar for both alternatives, because of the inclusion of PDFs in Alternative 2, and the fact that under the "No Action" Alternative, populations would continue to establish and spread due to seed transport by vehicular traffic, wildlife, and other natural dispersal methods listed in Table A6-2. Indirect effects associated with noxious weed population enlargement are similar to those mentioned in the No Action Alternative, and are known to include, generally, declines in the palatability or abundance of wildlife and livestock forage (Rice et al., 1997), declines in native plant diversity (Forcella and Harvey, 1983; Tyser and Key, 1988; Williams, 1997), reductions in the aesthetic value of the landscape, encroachment upon rare plant populations and their habitats, potential reductions in soil stability and subsequent increases in erosion (Lacey et. al, 1989), and an overall decline of ecosystem health. However, considering implementation of Alternative 2, there are three main reasons why potential weed establishment that might be caused by the

Proposed Action is not expected to result in a detectable effect to overall ecosystem health. First, surveys indicate that a very small percentage - less than 1% of acreage within the Project Area units - are affected by noxious weeds. Second, many of these sites located in units proposed for treatment have been reported during pre-disturbance surveys, and have already received treatment in 2009 under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14*, which means that the acreage in the Planning Area affected by noxious weeds is now even closer to 0% until ongoing activities listed in Table A6-2 would potentially re-introduce weeds into the Planning Area. Third, as aforementioned, Project Design Features (PDFs) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources.

Alternative 2 (Proposed Action)

In order to address the cumulative effects of the Proposed Action on the spread of noxious weed encroachment, the condition of non-federal lands must be considered. However, there is no available or existing data regarding noxious weed occurrence on local non-federal lands. Therefore, for purposes of this analysis, BLM assumes that 1) there is a perpetual source of noxious/invasive weeds on non-federal lands that can spread to federal lands, especially when the land ownership is checkerboard, as within the Planning Area, and 2) conversely that noxious weeds are not established on these lands, and therefore there is a need to reduce the risk of spread of noxious weeds from the federal lands to the adjoining non-federal lands. Seeds are spread by the wind, by animal/avian vectors, natural events, and by human activities - in particular through soil attachment to vehicles. BLM's influence over these causes of the spread of noxious weeds is limited to those caused by human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weed establishment, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds, it may only reduce the risk or rate of spread.

Given the unpredictable vectors for weed spread, such as the vehicle usage by private parties, wildlife behavior, and wind currents, it is not possible to quantify with any degree of confidence the rate of weed spread in the future, or even the degree by which that potential would be increased by the Proposed Action.

Foreseeable activities within the Planning Area are expected to be similar to past and current activities: motor vehicle traffic, recreational use, rural and urban development, timber harvest, road construction, and firewood collection. These types of activities could result in new disturbed sites available for colonization by existing noxious weed populations, and they do offer the possibility of introduction of new noxious weed species to the Planning Area under any alternative, including the No-Action Alternative. As stated above, there is no available or existing data concerning the rate of weed spread occurring on either federal or non-federal lands as a consequence of these types of activities. Also, as discussed above, there is no information on what, if any, increase in the rate of weed spread the Proposed Action would cause, and hence, it is not possible to quantify with any degree of confidence what the incremental effect of the Proposed

Action on the spread of noxious weeds would be when added to the existing rate of weed spread caused by past, present, and future actions.

PDFs exist to reduce the potential that the Proposed Action would contribute to the spread of weed seed and establishment of new populations. PDFs are not intended or expected to completely eliminate any possibility that the Proposed Action would contribute to the spread of weed seed and establishment of new populations; however, PDFs ensure that any incremental contribution of the Proposed Action to the spread of weeds, when added to the rate of weed spread caused by past, present, and future actions, would be so small as to be incapable of quantification or distinction from background levels.

As described above, PDFs for this project include washing vehicles/equipment, operating in the dry season, and seeding/planting newly created openings with native vegetation. BLM, and other federal and nonfederal organizations involved in combating noxious weed spread, routinely utilize these PDFs in noxious weed control strategies. These PDFs are widely accepted as Best Management Practices (BMPs), as they are inexpensive to implement, easily attainable, and accomplish the objective of reducing the potential of spreading noxious weeds as a result of project-oriented activities.

Data collection would not reduce the inherent speculation in predicting incremental effects of the proposed action on the spread of weeds because of (1) the unpredictable natural factors that largely determine whether weeds would spread after project activities, (2) the unlikelihood that future data collection would be able to detect or measure any difference between background rates of weed spread and the rate of weed spread as affected by the Proposed Action and correspondingly reduced by PDFs, and (3) the included PDFs that would reduce, if not eliminate, any project effects on the rate of weed spread that would make the already undetectable effects of the Proposed Action even more undetectable. Finally, further data collection on the rate of spread would not alter the PDF techniques already being applied to reduce that rate of spread. It cannot be over emphasized that under the “No Action” Alternative, noxious weeds are likely to spread over time regardless of whether or not the Reuben Hazardous Fuel Reduction Project occurs, and that rate would not be altered to any detectable degree by the Proposed Action.

APPENDIX 7 - SPECIAL STATUS SPECIES

Specialist Report Memo

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Rachel Showalter, Botanist, Glendale Resource Area
Re: Special Status Plants Rationale Report for the Reuben Hazardous Fuel Reduction Project Planning Area
Date: Sept 2, 2009

Threatened & Endangered Plants – NOT PRESENT, NOT AFFECTED

Of the four federally listed plants on the Medford District (*Fritillaria gentneri, Limnanthes flocossa* ssp. *grandiflora, Arabis macdonaldiana,* and *Lomatium cookii),* only *Fritillaria gentneri* has a range which extends into the Glendale Resource Area. Final units within the Reuben Hazardous Fuel Reduction Project Area are not within the range of *F. gentneri,* as determined by the 2004 US Fish and Wildlife Service Biological Opinion. Vascular plant surveys were conducted in the spring of 2007, 2008, and 2009, and no *Fritillaria gentneri* populations were found. There would be no anticipated effect from the Proposed Action on any federally listed plant.

Bureau Special Status Plants – NOT PRESENT, NOT AFFECTED

On July 26, 2007 a new Special Status Species list went into affect (BLM 2007), coupled with a new Interagency Special Status Species Policy (ISSSP). This new list has two categories, (ISSSP) Sensitive and Strategic. The former categories of Bureau Assessment and Bureau Tracking no longer exist. Sensitive species require a pre-project clearance and management to prevent them from trending toward federal listing.
There is no pre-project clearance or management required for the Strategic Species at the BLM District level, thus Strategic Species will not be analyzed in this document. The new list is effective immediately, however, if pre-project clearances have already been conducted for a project, there are no requirements to conduct pre-project clearances for newly added Bureau Sensitive Species or to address the newly added Bureau Sensitive species in the NEPA document (BLM 2007). In addition to the new Special Status Species policy, the Record of Decision to remove the Survey and Manage Standards and Guidelines was also signed by the State Director and is effective immediately.

Bureau Sensitive Vascular Plants

Vascular plant surveys were conducted in the spring of 2007, 2008, and 2009. Professional botanists surveyed the Planning Area units using intuitive controlled methodology, wherein areas supporting high potential habitat were surveyed more intensively. Surveys revealed one new Bureau Sensitive (Clustered lady's slipper, *Cypripedium fasciculatum*) site.

Bureau Sensitive Nonvascular Plants

Nonvascular surveys, completed in 2007, 2008, and 2009, resulted in no new Sensitive or Strategic nonvascular plant sites.

Bureau Special Status Fungi – NOT AFFECTED

The Project Area was not surveyed for fungi, as pre-disturbance surveys for Special Status fungi are not practical, nor required per BLM – Information Bulletin No. OR 2004-121, which states "If project surveys for a species were not practical under the Survey and Manage standards and guidelines (most Category B and D species), or a species' status is undetermined (Category E and F species), then surveys will not be practical or expected to occur under the Special Status/Sensitive Species policies either (BLM 2004, p.3)." Current special status fungi were previously in the aforementioned S&M categories which did not consider surveys practical, and are therefore exempt from survey requirements. With the recent instatement the new Interagency Special Status Species policy (ISSSP), 20 species of fungi were designated as Sensitive, 9 of which have been documented on Medford District. As mentioned above, none of these species require surveys.

District wide, the Medford BLM has 20 Sensitive (SEN) fungi species; 11 are suspected to occur here, while the remaining 9 have been documented. Of the 9 documented species, only one, *Phaeocollybia olivacea*, has been found in the Glendale Resource Area, approximately 1 air mile away from the closest unit in the Project Area. Although this site and the closest unit in the watershed reside in the same HUC 5 watershed, dispersal via spore transport and/or mycelial network is improbable, as the two areas are separated by a ravine, several small ridges, and are opposite aspects (the site is west-facing, the closest Reuben unit is east-facing).

While it is possible that this project is occurring within potential habitat for some species, there is very little information available describing the *exact* habitat requirements or population biology of these species (USDA/USDI 2004b, p.148). The 2004 FEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines addresses this type of incomplete and/or unavailable information (p. 108-109). However, the *2004 Record of Decision* (ROD) *to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines*, offers a broad scale prospective of this current situation in stating, "Any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitat has been surveyed. Reserves have not been surveyed to the same degree as Matrix and Adaptive Management Area land allocations. The Reserves were not surveyed because there has been little management-induced disturbance there. The vast majority of pre-disturbance surveys have been located in the Matrix and Adaptive Management Area land allocation (19% of the northwest Forest Plan area), so that is where many of the known sites have been found. This does not mean that a disproportionate amount of their habitat is located in Matrix. If these species are truly closely associated with late-successional or old-growth forests, we can reasonably expect that the large amount of federally managed lands in Late-Successional and Riparian Reserves which provide the

most amount of this type of habitat (86% of currently existing late-successional forests is in reserves) would also provide, at a minimum, its proportionate share of the habitat to support populations of these species (USDA/USDI 2004a, p.11)."

Based on the above information, the likelihood of a Sensitive fungi species in this Project Area is very low; the likelihood of a sensitive fungi occurring within a single unit(s) encompassed in the Project Area is even lower. The likelihood of contributing toward the need to list is not probable.

Alternative 1 – No Action

Direct and Indirect Effects

Sensitive Vascular Plants
There would be no direct effects to ISSSP vascular plants under Alternative 1 because no physical disturbance – precipitated by natural resource management activities - would occur that could impact them.

Sensitive Nonvascular Plants
No direct or indirect effects would occur to Special Status nonvascular plants because A) there were no ISSSP or T&E species located, and B) no activities – precipitated by natural resource management activities - would occur that could impact them.

Sensitive Fungi
There would be no direct or indirect effects to Special Status fungi under Alternative 1 because no physical disturbance – precipitated by natural resource management activities - would occur that could impact them if they were present. There would be no loss of late-successional forest which provides suitable habitat for the 11 suspected and 9 documented Medford District BLM Sensitive fungi.

Cumulative Effects
Information is not available about rare plant populations in the Reuben Hazardous Fuel Reduction Project Planning Area prior to BLM botanical surveys, which began during the last 25 years. However, past activities, described in the affected environment, likely affected Special Status plants and populations by damaging or destroying individuals or reducing or degrading suitable habitat.

Although specific logging plans for private industrial forest lands are not available, it is assumed that commercial harvest will occur in the future on relatively short rotations, and that privately-owned forests will remain in early to mid-seral stages. Sensitive species do not receive protection on privately-owned lands, but will continue to be protected and conserved on federal lands, according to BLM policy (BLM 1990).

Alternative 1 would not contribute additional cumulative effects to ISSSP vascular / nonvascular plants, or fungi. The amount of late-successional forest on BLM-managed lands would remain unchanged.

Alternative 2

Direct and Indirect Effects

Sensitive Vascular Plants
In Alternative 2, hazardous fuel reduction treatment, including the use of equipment, would not affect ISSSP vascular species, since management activities would be prohibited between 20-40 feet from the plant site.

Sensitive Nonvascular Plants
No Sensitive nonvascular plants were found inside final Reuben Hazardous Fuel Reduction units.

Sensitive Fungi
No fungi surveys have been conducted in the Reuben Hazardous Fuel Reduction Project Area, therefore, it is unknown if Sensitive fungi are present in the treatment units. Potential habitat for many of the 20 Sensitive species exists in the Project Area because a predominant Douglas-fir component is present (generally considered an indicator species, but recorded sites commonly have white fir as well), but predicting their presence is difficult because the habitat requirements are poorly understood. Because of their rarity across the Northwest Forest Plan area, it is unlikely that populations are present in the treatment units. However, if present, they could be directly or indirectly adversely impacted by the proposed actions in Alternative 2.

Fuel treatments can have varying degrees of adverse impacts on fungi, depending on the level of vegetative removal and ground disturbance. Removing, disturbing, or compacting the top layer of organic material and mineral soil could negatively impact fungi. The main and most extensive part of the fungus consists of a below-ground mycelia network that resides in the top few inches of mineral soil. Mycelia networks are often connected to multiple trees through their root systems. In one study, fungal mycelia networks ranged in size from 1.5 - 27 square meters (Dahlberg and Stenlid 1995). Disruption of mycelia networks could occur during removal of host trees that sustain the ectomycorrhizae, or burning post-harvest slash piles. The effect of these activities on fungi is a loss of species diversity and abundance (Amaranthus et al. 1996). Alternative 2 presents a potential risk of impacting Sensitive fungi, if present, because it proposes fuel reduction treatments. Fungi could be directly impacted from radiant heat during pile burning. Effects of pile burning include damage or death of mineral soil fungi including the mycelia and spores; loss of litter, organic matter and large wood, resulting in reduced moisture retention capability, loss of nutrient sources, and changes in fungal species diversity and abundance. Implementation of Alternative 2 creates the greatest threat of damage to fungi from burn piles; however, the area impacted by burn piles would be a small percentage of acreage compared to the total amount of acres in the planning area.

Cumulative Effects

Information is not available for rare plant populations in the Reuben Planning Area prior to BLM botanical surveys, which began during the last 30 years. However, it is assumed that past activities, described in the affected environment, likely affected Sensitive plants and populations by damaging or destroying individuals or reducing or degrading suitable habitat.

Although information is not available for logging plans on private industrial forest lands, it is assumed commercial harvest will occur in the future and privately-owned forests will be in early to mid-seral stages. Sensitive species do not receive protection on privately-owned lands, but will continue to be protected and conserved on federal lands, according to BLM policies and federal regulations.

Sensitive plants would not be directly impacted by the activities proposed in Alternative 2 because the one site located during surveys would be protected by a no-treatment buffer. Project design features would reduce the risk of introducing or spreading noxious weeds during project implementation, which could potentially impact Sensitive vascular plant habitat. No Sensitive Status vascular or nonvascular plants would trend toward listing as a result of implementing the activities proposed in Alternative 2.

The potential cumulative effect of the proposed project on Sensitive fungi would be the risk of impacting rare populations on 1,737 acres during fuels management treatments. However, the proposed treatements would occur on matrix lands, which are designated for timber production and harvest. Across the Northwest Forest Plan area, approximately 14% of the 8 million acres of late-successional forest are in Matrix and are available for harvest, while 86% are designated as late-successional reserves, congressionally reserved and administratively withdrawn areas, and Riparian Reserves. It is estimated that over the next 50 years, late-successional forest would develop at 2.5 times the rate of loss through stand-replacement fires and harvest (USDA/ USDI 2004b, 107-111). This reserve system spread across the landscape is intended to provide protection and development of late seral habitat for the protection and expansion of late-successional associated rare plants. Under the Northwest Forest Plan, at least 15% late seral (80-plus years old) conifer forest must be maintained in each 5th field watershed (BLM 1994, p. C-44).

Because of their rarity across the Pacific Northwest Forest Plan Area, it is unlikely Sensitive fungi are present in the Reuben Hazardous Fuel Reduction units. The risk is low that they would be impacted. The assumption is made that protecting known sites (current and future found) of these Sensitive fungi, in addition to conducting large-scale inventories throughout the Pacific Northwest, will be adequate in ensuring that this project and future projects would not contribute to the need to list them (USDA/USDI 2004a, p.15).

APPENDIX 8 - AIR QUALITY

Specialist Report

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Yanu Gallimore, Fire and Fuels Specialist, Glendale Resource Area
Re: 'Not Affected' rationale regarding the burning of Polyethylene Plastic Sheeting used to Cover Slash Piles
Date: November 17, 2009

Analysis of Proposed Action Effects of Burning Polyethylene Plastic Sheeting used to Cover Slash Piles for the Reuben Hazardous Fuel Reduction Project Environmental Analysis

Compliance with the Clean Air Act and the Oregon Department of Forestry Smoke Management Plan

The Oregon Department of Forestry Smoke Management Plan addresses the issue of using plastic to cover piles. OAR 629-048-0210(2), Best Burn Practices; Emission Reduction Techniques, states, ". . .best burn practices involve methods that ensure the most rapid and complete combustion of forest fuels .. . ." Covering of hand piles is a "Best Burn Practice." OAR 629-048-0210(4) 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), except that polyethylene sheeting that complies with the following may be used: a) Only polyethylene may be used. All other plastics are prohibited." Air quality concerns have led to prohibitions on the open burning of household plastics in many areas of the country. "Inasmuch as regions in Oregon where silvicultural burning occurs are exposed to significant amounts of precipitation, there is an overall emissions reduction benefit from covering silvicultural piles. Polyethylene does not include chlorinated compounds or significant amounts of other chemicals likely to form uniquely toxic emissions, nor have these been demonstrated in the literature" (Wrobel and Reinhart, 2003).

An addendum to the original Wrobel and Reinhart literature review (2003) on the use of polyethylene sheeting to enhance combustion efficiency, discusses the rules affecting polyethylene (PE) burning. Oregon has addressed the issue based on the findings reported by Wrobel and Reinhart (2003). "The available literature does not support a contention that burning polyethylene (PE) sheeting would produce unique chemicals or classes of chemicals that are not also found in emissions from burning wood debris" (Wrobel and Reinhart 2003).

Oregon Department of Environmental Quality and the Oregon Department of Forestry Memorandum of Understanding for Use of Polyethylene Plastic

The Oregon Department of Environmental Quality and the Oregon Department of Forestry developed an MOU for PE, adopted in 2005. The MOU suggests the plastic material should be removed prior to burning when practicable. Adequate debris or slash is placed over the plastic sheeting to ensure the plastic remains covering the piles until

the piles are burned. Due to the difficulty of removing the plastic cover from below the debris, especially after long-term exposure to the elements, it would be operationally impractical to remove the plastic prior to burning for this proposed action. Therefore, the plastic would be left in place and burned in the pile.

Evaluation of Alternative Materials to Cover Slash Piles

Alternative coverings, such as kraft paper, are used in other parts of the country to cover burn piles in place of PE. Combustion studies involving lignocellulosic materials suggest that uncoated kraft paper may produce some of the same substances as polyethylene (Garcia et al. 2003). The study 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. Kraft paper averages 55 pounds per square bundle compared to 12 pounds per roll for polyethylene use. It takes 3 bundles of kraft paper (165 pounds) to cover the same amount of piles that one roll of PE (12 pounds) will cover. Kraft paper bundles are 4-foot by 4-foot square and are awkward to pack into a unit compared to a roll of polyethylene 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. Kraft paper has been utilized to cover slash piles on various projects in southern Oregon. My operational experience utilizing the kraft paper during wet conditions resulted in the kraft paper and the piles to be saturated, and the pile burn had to be halted since the majority of the piles would not burn or consumption of the piled material was inadequate to meet the prescribed burn plan objectives.

Weather Conditions during Hand Pile Burning

Pollutant concentrations are reduced by atmospheric mixing, which depends on weather conditions such as temperature, wind speed, amount of sunlight, and the movement of high and low pressure systems and their interaction with the local topography, for example, mountains and valleys. Normally, temperature decreases with altitude. But when a colder layer of air settles under a warm layer, producing a temperature inversion, atmospheric mixing is impeded and pollutants may accumulate near the ground. Inversions can become sustained under a stationary weather system coupled with low wind speeds. The BLM would schedule hand pile burning primarily from October to May during unstable atmospheric conditions (e.g., rain, snow, or storm events) when atmospheric mixing is occurring. Wet season conditions minimize the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content, which reduces the amount of material actually burned. All piles would be covered with 4 mil polyethylene plastic sheeting to facilitate rapid ignition and consumption of fuels to minimize residual smoke.

Underburning would be scheduled from October to the end of May. Burning in the spring or after rain events reduces impacts to the soil, consumption of large woody materials and duff layer, and allows for rapid mop-up following ignition. Localized concentrations of smoke may occur in adjacent drainages and low lying areas during prescribed burning operations. Timing of all prescribed burning would be dependent on weather and wind conditions to help reduce the amount of residual smoke to the local communities. If residual smoke impacts exceed limits set by the Oregon Smoke Management Plan, additional burning would be suspended until given the notice to proceed by the ODF Forester.

Conclusion

The use of polyethylene plastic sheeting would follow guidance from DEQ and Oregon Department of Forestry Smoke Management Plan. 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% 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 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 of course overwhelm the contribution from the PE. 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 (Worbel & Reinhardt, 2003).

APPENDIX 9 - MIGRATORY BIRDS

Specialist Report

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Marlin Pose, Wildlife Biologist, Glendale Resource Area
Re: 'Not Affected' rationale regarding migratory birds
Date: December 14, 2009

Analysis of Proposed Action Effects on Birds of Conservation Concern for the Reuben Hazardous Fuel Reduction Project Environmental Analysis

Compliance with the Executive Order To Protect Migratory Birds
Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds," (Federal Register 2001) highlights the need for federal agencies including the USDI Bureau of Land Management (BLM) to conserve migratory birds (those species listed in 50 C.F.R. 17.11) (U.S. Fish and Wildlife Service 2002) protected by the migratory bird conventions (the Migratory Bird Treaty Act [16 U.S.C. 703 – 711], the Bald and Golden Eagle Protection Acts [16 U.S.C. 668 – 668d], the Fish and Wildlife Coordination Act [16 U.S.C. 661 – 666c], and the Endangered Species Act of 1973 [16 U.S.C. 1531 – 1544. This responsibility includes the need to ensure that environmental analysis of federal actions evaluate the effects of those actions on migratory birds, "with emphasis on species of concern" (Federal Register 2001, p.3855).

"To the extent permitted by law and …in harmony with agency missions" (p.3854, Ibid.) such as the O&C Act of 1937, the Medford District Resource Management Plan (USDI 1995) and the Northwest Forest Plan (USDA/USDI 1994a); the proposed actions are consistent with "avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources," (p. 3854, Federal Register 2001) as directed in the Executive Order mentioned above.

Birds of Conservation Concern.
Table 1 below summarizes the potential effects of the proposed actions described in the Mini Mule Planning Environmental Analysis on the Birds of Conservation Concern known to occur on Medford District BLM managed lands.

Table 1: Birds of Conservation Concern for Medford District BLM		
species	**habitat**	**presence in the Reuben Hazardous Fuel Reduction Project Area and effects**
peregrine falcon	cliffs	Habitat not present in the Project Area
olive-sided flycatcher	Green coniferous forests with snags. Habitat is relatively broken-canopied coniferous forest from sea level to Cascades up to 9,000 ft elev., containing large trees and snags (Zeiner et al 1990). Geographic distribution over W side of CA,OR,WA, intermountain West and most of Canada (Natl. Geographic 1989). Mature and old-growth coniferous stands or fragments of these with uneven, mixed-age canopies that contain occasional snags, from which it forages (Csuti et al 2001, Kemper 2002, Altman 1999)	Present in Project Area, but very limited in proposed units which are dominated by younger trees and few large snags or large trees which are retained. Suitable medium and large conifer habitat would persist in Congressionally (Wilderness and National Parks) and Administratively (lands unsuitable for timber harvest) Withdrawn Lands, which total over 2.25 million acres (FEMAT 1993, Table IV-3) plus 100-acre owl cores (over 100,000 ac.[USDA/USDI 1994]); marbled murrelet LSRs; Riparian Reserves (630,000 ac [Ibid.]); and some forested lands in the following land allocations W of the Cascade crest: Mapped LSRs, many state parks; military installations, and national and state wildlife refuges. Individual home range is approximately 20 ac. (Johnston 1971 *In* Zanier 1980). Therefore, the proposed actions would have no measurable effect on population trends at a state or regional scale.
rufous hummingbird	Nests in shrubs and trees near foraging habitat including young second growth, mature and old growth conifer forests. Forages on nectar-producing flowers, which occur in early successional areas. (Healy et. al. 2006, Kemper 2002)	Present in the Project Area. Foraging habitat present over less than 10% of areas within proposed treatment units, as units are forested and not in early successional stages. Some small openings occur. Residential areas, or recent harvested area on private or BLM, natural or man-made openings may provide flowering plants. Nesting habitat is present in some edges of units. Some nesting habitat near edges within units would be removed. But since nesting habitat suitability depends on the proximity of trees and shrubs to foraging habitat, it is likely that the proposed action would not result creation or removal of woody vegetation for foraging or nesting habitat. However, since habitat for this species is very widespread (in suburban and forested areas of NW CA, the NW 2/3 of OR and ID, all of WA and over half of BC), population trends at state or regional levels would not be affected by proposed actions.
Allens's hummingbird	breeds only along a narrow strip of coastal California and southern Oregon, in moist coastal areas, scrub, chaparral, and forests (Mitchell 2000, Kemper 2002)	Not expected to occur inland in the Project Area.
Oregon Vesper Sparrow (*affinis* ssp.)	Open habitats, favoring areas with a high percentage of bare ground and short, sparse herbs or grasses. Similar habitat to the horned lark. It selects open habitats with scattered trees or shrubs for singing perches and escape cover . (Beauchesne 2002)	Habitat not affected by proposed action units, not expected to occur in Project Area.

species	habitat	presence in Reuben Hazardous Fuel Reduction Project Area and effects
bald eagle	Mature and old-growth forested areas adjacent to large bodies of water with some habitat edge, relatively close (usually <2 km)	Nearby Cow Creek may provide some foraging opportunity, however, repeated visits to Project Area over time have not detected eagles and potential habitat not expected to be affected by proposed action.
Horned Lark (*strigata* ssp.) ESA candidate	Occurs in short-grass habitats and areas with bare ground. (Kemper 2002, USFWS 2008)	No known sitings near the Project Area, and not expected to occur.
willow flycatcher (non-listed subspecies or population)	Shrubby, often wet habitats, river corridors; Occurs in moderate density in early-growth clearcuts in western Oregon. In California, high foliage-volume willow cover ares, moist brushy thickets, open second-growth, and riparian woodland, especially with willow. (Kemper 2002, Sedgwick 2000, Craig and Williams 1998)	May occur within Project Area. Proposed action not expected to reduce potential riparian or early successional conifer habitat.
purple finch	Breeds primarily in moist or cool coniferous forests. Also frequently found breeding in mixed coniferous-deciduous forest, edges of bogs, and riparian corridors. Also breeds in deciduous forests, orchards, ornamental plantations, pastures and lawns with scattered conifers and shrubs, hedgerows, and developed areas. Purple finch prefers open wooded habitats. (Wootton 1996)	May occur in Project Area and in or near proposed units. Typically nests on conifer branches. Some nests may be lost if proposed action occurs during nesting season. Suitable conifer habitat would persist in Congressionally (Wilderness and National Parks) and Administratively (lands unsuitable for timber harvest) Withdrawn Lands, which total over 2.25 million acres (FEMAT 1993, Table IV-3) plus 100-acre owl cores (over 100,000 ac.[USDA/USDI 1994]); marbled murrelet LSRs; Riparian Reserves (630,000 ac [Ibid.]); and some forested lands in the following land allocations west of the Cascade crest: Mapped LSRs, many state parks; military installations, and national and state wildlife refuges. Therefore, the proposed actions would have no measurable effect on population trends at a state or regional scale.

Regional Strategies

Both the USDI Fish and Wildlife Service (2008) and Partners in Flight (Altman 1999) consider the state and regional approach a key to the conservation of migratory songbirds. In 1999, strategies for the conservation of the olive-sided flycatcher and the rufous hummingbird and other species were proposed in the form of a regional conservation plan for coniferous forests in Oregon and Washington. This strategy, which "represents the collective efforts of multiple agencies and organizations within …Partners in Flight," recognized the Northwest Forest Plan as an effort in the same type of conservation planning process, which approaches management at a regional level. The proposed actions are consistent with the Northwest Forest Plan, which is also designed to provide for the conservation of other forest-related species in the range of the Northern Spotted Owl, such as these songbirds.

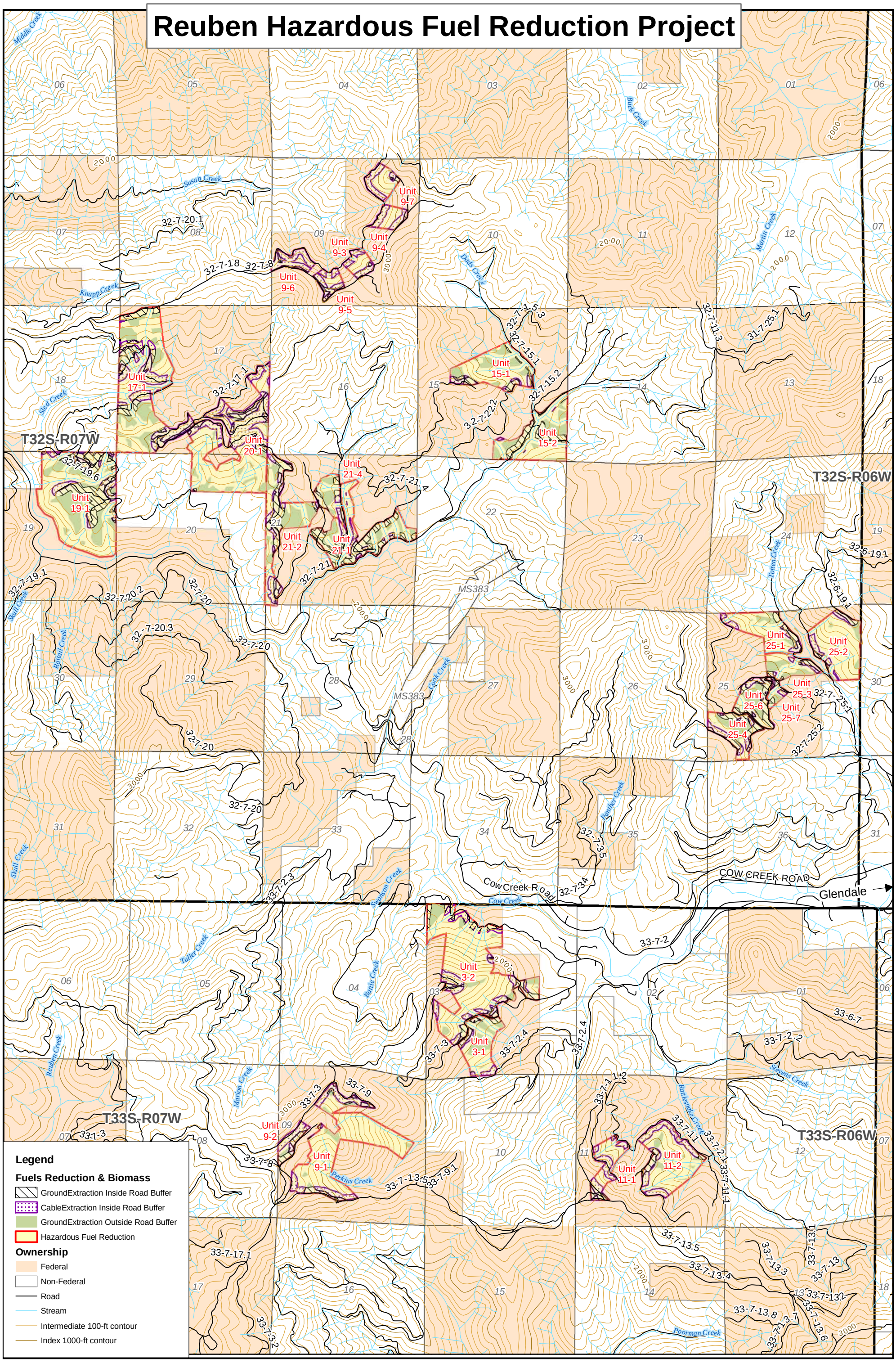
Within the Northwest Forest Plan (24,455,300 federal acres), reserved/ withdrawn lands total approximately 78% of the federal land base (USDA/USDI 1994, p. 2-62:65). Not all of the reserves are in or will obtain late-successional forest conditions, but the majority is expected to contribute as suitable habitat towards migratory birds utilizing late successional habitat. In addition, Matrix lands (3,975,300 acres) representing about 16% of the federal land base, contain selected portions of the land managed to retain 15-30% in late-successional forest, which provides additional suitable habitat.

Allocation	Acres	Percent
Congressionally Withdrawn	7,321,000	30
Late Successional Reserves	7,431,000	30
Riparian Reserves	2,628,000	11
Administratively Withdrawn	1,477,000	6
TOTAL	**18,857,000**	**77**
Matrix land	3,975,300	16

Compliance with the Migratory Bird Treaty Act.
This act implements various treaties and conventions between the U.S. and other countries that share migratory flyways. With this proposed action, and as prohibited in the Act, there would be no deliberate take (IM OR-2009-018), possession, import, export, transport, sale, purchase, barter or offering of these activities, or possessing migratory birds, including nests and eggs.

Summary
The implementation of the proposed actions is not expected to affect the trend in populations of migratory birds, as established at a state or regional scale. Also, the proposed actions are consistent with planning documents designed to conserve songbirds at those scales.

Reuben Hazardous Fuel Reduction Project



Legend

Fuels Reduction & Biomass

- GroundExtraction Inside Road Buffer
- CableExtraction Inside Road Buffer
- GroundExtraction Outside Road Buffer
- Hazardous Fuel Reduction

Ownership

- Federal
- Non-Federal
- Road
- Stream
- Intermediate 100-ft contour
- Index 1000-ft contour

0 0.5 1 2 Miles

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