Revised Environmental Assessment

Middle Cow LSR Landscape Planning Project

EA Number OR118-05-022
August 2006

United States Department of the Interior
Bureau of Land Management
Medford District
Glendale Resource Area
Douglas and Josephine Counties, Oregon

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Abstract:

The Glendale Resource Area, Medford District, Bureau of Land Management (BLM) proposes to conduct commercial density management (thinning), fuels reduction treatments, and transportation management (temporary road construction, maintenance, decommissioning, and road gating) in Late Successional Reserves (LSR) and Riparian Reserves (RR) land use allocations within the Middle Cow Creek fifth-field watershed. The Planning Area is located on federal land in portions of Township (T) 31S, Range (R) 4W, Sections 31 & 32; T32S, R4W, Sections 3, 5, 8-11, 15, 19-21, 28-32; T32S, R5W, Sections 1, 13, 23, 25, 27, 33, 35; T33S, R5W, Sections 2, 3, 10, & 11. The Planning Area also includes Northern Spotted Owl Critical Habitat Unit (CHU) OR#32.

This environmental assessment discloses the predicted environmental effects of two alternatives: Alternative 1 (No Action), Alternative 2 (Proposed Action). Alternative 2 includes commercial density management on approximately 1,236 acres. Harvesting methods include tractor, high lead cable, and helicopter. Fuels reduction treatments (slash/handpile/pile burn, underburn or lop-and-scatter) on created harvest residue (slash) would be conducted to mitigate the related fire hazard. Alternative 2 also includes 2,501 acres of hazardous fuels reduction treatments in forested stands that would not be commercially harvested at this time. Biomass utilization would remove slashed woody material within 300 feet of roads. Transportation management activities include 62 miles

of road maintenance and reconstruction; construction of 1.6 miles of temporary roads that would be decommissioned after use; gating 3.6 miles of road; and 0.84 miles of road decommissioning. Riparian restoration activities such as adding boulders and large wood and replacing culverts are also proposed to improve fish habitat and passage. Snag and coarse woody debris creation and recruitment are a part of the Proposed Action to create and enhance wildlife habitat structures. Density management and other forest management activities are planned to occur between 2006 and 2016.

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FINDING OF NO SIGNIFICANT IMPACT

Based upon review of the EA (Environmental Assessment #OR-118-05-022) 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 approximately 3,773 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 within the late successional reserve and riparian reserve land use allocations and within the boundaries of the 6th field Hydrologic Unit Condition (HUC 6) boundaries of the Whitehorse Creek and Quines Creek sub-watersheds. The Planning Area also includes Northern Spotted Owl Critical Habitat (CHU) OR#32.

The discussion of the significance criteria that follows applies to the intended actions and is within the context of local importance. Chapter 3 of the EA details 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. The impacts of Alternative 2 is compared with the no action alternative in Table 2-2 (Summary of Consequences) of the Middle Cow LSR EA.

1. Impacts may be both beneficial and adverse. The predicted environmental effects of Alternative 2, most noteworthy, include:

a) social and economic benefits by providing a by-product supply of timber and other forest commodities to provide jobs and contribute to community stability;

b) short term effect of commercial density management treatments is an increased fire hazard on 1,236 acres due to the presence of slash on site. There would be a short term cumulative effect increase in fire hazard due to implementing the commercial density management prescriptions on approximately 3,095 acres (including proposed thinning treatments in the Westside Project). This increase is considered short term until the slash is mitigated which generally occurs within six months to two years after the harvest activity takes place. Although hazardous fuel treatments also produce slash, this does not necessarily result in increased fire behavior, in terms of flame length, compared to the

current conditions of the stands proposed for these treatments. The action alternative proposes 2,501 acres of hazardous fuel treatments in the Middle Cow LSR Planning Area. The Westside project proposes similar treatments on approximately 988 acres and approximately 250 acres of fuel treatments have already been implemented within the fire analysis area since implementation of the National Fire Plan in 2000. The cumulative effect of these combined activities may be a long term decrease in fire hazard on approximately 3,740 acres under Alternative 2. The long term cumulative effect would be a decrease in fire hazard on approximately 3,489 acres of hazardous fuel treatment units under either action alternative (Westside Project). Conversely, the fire hazard is expected to increase in the long term due to the trends discussed in the current conditions section and the continued exclusion of fire on up to 8,099 acres under the No Action Alternatives of Westside and Middle Cow Creek LSR Project. Also, there are no expected direct, indirect, or cumulative effects on fire risk under any of the alternatives (see fire effects analysis in Chapter 3) since there is no permanent road construction proposed within this project;

c) Proposed Action would result in soil compaction and top soil erosion that would reduce localized areas of soil productivity. The incremental effects of disturbance from yarding corridors, roads, and landings would cause up to 46.6 acres (0.12%) of compaction, and productivity losses equaling the equivalent of up to 41 acres (0.09%) within the Planning Area. Baseline compaction within these watersheds, discussed in the affected environment, is 3.3% (727 acres) of Whitehorse Creek HUC 6 sub-watershed and 3% (545 acres) in Quines Creek HUC 6 sub-watershed. Under the Proposed Action this project would add less than 0.12% compaction in all watersheds, thus compaction would remain well below the maximum 12% compaction standard at the Planning Area level (RMP, p. 166). Because BMPs and project design features such as maximum skid trail widths, 150 foot separation requirement for skid trails, and seasonal restrictions would be implemented, compaction would also be below 12% at the harvest unit scale. Productivity loss from past harvest and road construction within these sub-watersheds is approximated to be 2.3% (511 acres) in Whitehorse Creek and 2.1% (381 acres) in Quines Creek. The Proposed Action productivity losses in Whitehorse Creek HUC 6 would be approximately 0.02% and 0.13% in Quines Creek HUC 6 sub-watershed for a total of 0.09% for the Planning Area. Therefore under this alternative, productivity losses would not exceed 5% (RMP/EIS p. 4-13) within the Planning Area and within each commercial density management unit.

d) timber harvest activities, road work (including 4 fish bearing culverts and approximately 10 non-fish bearing culverts), and the fish habitat enhancement project in Tennessee Gulch would cause sediment to enter Oregon Coast coho and Oregon Coast steelhead habitat as well as Essential Fish Habitat (EFH). Because of the Project Design Features (PDF) which includes the Best Management Practices (BMP) within the RMP, the amount of sediment reaching fish habitat from these activities would be minimal. The amount entering fish habitat, including, EFH, would not cause turbidity to the point of substantially disrupting fish behavior. The amount of sediment would not cause a reduction in macroinvertebrates. Sediment input would not cause a detectable change in fish habitat. Sediment input would not cause measurable change quality or quantity of

EFH. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering fish habitat would decrease to the point of being immeasurable. Because of the above explanation the proposed activities would not contribute to the need to list the Bureau sensitive Oregon Coast coho or Oregon Coast steelhead. The proposed actions would not cause a reduction in population within the Evolutionary Significant Unit (ESUs) or the smaller populations of Oregon Coast coho or Oregon Coast winter steelhead because sufficient quantity and quality of habitat would remain for coho and steelhead to utilize. Therefore the effects to coho and steelhead habitat would not be expected to contribute to the need to list these species under the Endangered Species Act because of the above explanation the proposed activities would have a minimal effects on the quality and quantity of EFH. The factors which led to these conclusions include 1) the short term nature of the effects, 2) the small scale and localized areas of habitat which would be affected, and 3) the minimal amount of sediment input. The effects would be immeasurable at the HUC 6 or HUC 5 scales;

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

None of the environmental effects disclosed above and discussed in detail in Chapter 3 of the EA are considered significant.

2. The degree to which the selected alternative will affect public health or safety. Public health and safety would not be affected. The Proposed Action is comparable to other timber harvest projects which have occurred within the Glendale Resource Area with no unusual health or safety concerns. Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 11 public responses from either letters or emails. Responses to public scoping comments are found in Appendix 3. No public health or safety risks were identified in those comments.

Activity and hazardous fuels would be burned 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 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, road construction, and logging operations would be localized and of short duration.

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, prime farm lands, wetlands, wild and scenic rivers or wildernesses located within the Planning Area. Cultural surveys were completed for the Middle Cow LSR Planning Area. All recorded sites located in units would be protected and buffered using Project Design Features except for one location which has State Historic Preservation Office concurrence to cross a mining ditch with a logging system. As such, cultural resource values would not be affected. If cultural resources are located during the implementation of an action, the project would be redesigned to protect the values present.

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. The 11 public comment letters or e-mails were analyzed by the Middle Cow LSR interdisciplinary team and the BLM responded fully to those comments under Appendix 3 of the EA. While comments, such as other scientific research, was mentioned by the public, the effects of the Proposed Action are within those identified for the RMP and the predicted effects are contained in Chapter 3 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 Proposed Action is not unique or unusual. The BLM has experience implementing similar actions in similar areas and have found 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 effects on the human environment which are considered to be highly uncertain or involve unique or unknown risks. The Middle Cow LSR Project conducted a public meeting for local residents and received 11 letters of comment. The Middle Cow LSR interdisciplinary team analyzed those comments and the responses are found in Appendix 3. No unique risks were identified in those comments.

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 occur within the late successional reserve and riparian reserve land use allocation and Chapter 1 of the Middle Cow LSR EA identifies the proposed actions and how they are consistent with the Purpose and Need and compliance with higher level EIS documents. Chapter 3 evaluates the effects of the alternatives and the findings are that all projects proposed would be compliant with the effects anticipated under the Medford RMP. Any future projects would be evaluated through the NEPA (National Environmental Policy Act) 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* 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. 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 Action would not negatively affect Endangered Species Act (ESA) listed Southern Oregon Northern California (SONC) coho salmon (Threatened). SONC coho salmon are not located within the Planning Area but road maintenance and haul would occur within the Rogue River Basin, in which SONC coho salmon are found. The 2.1 miles of road maintenance and haul proposed within the Rogue River Basin would have no effect on SONC coho salmon or coho critical habitat (CCH). CCH is more than 300 feet away from the closest aggregate road. The closest perennial stream crossing from coho is more than 2.0 miles away. Because of the PDFs, BMPs and the distance of road maintenance activities and hauling, there would be no mechanism for sediment delivery into SONC coho or CCH streams.

Harvesting would affect northern spotted owl suitable habitat and the effects are within these anticipated in the Medford Resource Management Plan/Environmental Impact Statement (RMP/EIS). The cumulative effect of harvesting from private lands and the Proposed Action are less than what was anticipated in the RMP/ROD. The cumulative downgrading of suitable habitat from the Proposed Action, combined with other foreseeable projects, for example Westside and Boney Skull, is less than 13% of the current suitable habitat in this Section 7 watershed. The Biological Assessment (RORSISBLM FY 06-08 BA, p.48) states that no more than 13 percent of the suitable habitat would be removed and downgraded from any Section 7 Watershed and that reduction was anticipated in the Northwest Forest Plan (NFP). Cumulative effects on the spotted owl sites in the Planning Area affected by the Proposed Action are not expected to change the population trend in the Klamath Province.

Harvesting would affect northern spotted owl critical habitat and the effects were analyzed in the Medford Resource Management Plan/Environmental Impact Statement (RMP/EIS). The Proposed Action would result in downgrade of 300 acres of current CHU suitable habitat. The BA (RORSISBLM FY 06-08, p. BA-49) states that it has anticipated the removal or downgrade of up to 4,442 acres of suitable habitat from all

CHUs over the next three years. The Middle Cow LSR Project is included in this prediction. USFWS issued a Biological Opinion in August 2006 (1-15-06-F-0162) and found that the proposed action would not jeopardize the continued existence of the spotted owl, nor result in the adverse modification of spotted owl critical habitat.

The Proposed Action is unlikely to impact fishers because they have not been found in the Glendale Resource Area for successive years by peer-reviewed survey methods. Due to the small size and isolation of late-successional forest units from previous harvesting on BLM and private lands within the Middle Cow Creek watershed, it is not known whether the watershed is capable of supporting fisher. The largest late-successional blocks are expected to continue to be restricted to LSRs. With the cumulative effects of private harvesting, checkerboard BLM ownership and few large patches of BLM late-successional habitat at low elevations, combined with the fisher's natural rareness, low fecundity and slow re-colonization rates of restored habitats, the species is not expected to be well distributed throughout its range (USDA/USDI 1994a, pp. 53, 470). In the long term (greater than 100 years) the larger diameter trees that would develop from these proposed commercial density managements would add to the recruitment of the larger (>31" dbh) snags that serve vital roles for reproducing fishers or as natal and maternity dens, and nesting sites for fisher females (Aubry and Lewis 2003). Overall, the Proposed Action would improve the ability of the Planning Area on a landscape level to support fisher. However, the Proposed Action would not change the assessment predicted in the NFP.

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 in section 1.5 of the EA.

Chapter 1.0 What is the Action Proposed and Why?

1.1 Introduction

This environmental assessment (EA) analyzes the impacts of proposed forest management activities on the human environment in the Middle Cow LSR Planning 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 Environmental Impact Statement for the Medford District's Resource Management Plan and whether a supplement to that Environmental Impact Statement is needed or if a Finding of No additional Significant Impact is appropriate.

Chapter 1 of the EA for the proposed Middle Cow LSR provides a context for what will be analyzed in the EA, describes the kinds of actions that will be considered, defines the PA, describes what the proposed actions need to accomplish, and identifies the criteria that we will used for choosing the alternative that will best meet the purpose and need for this proposal.

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

This project is within the South Umpqua/Galesville Late Successional Reserve (LSR) and Riparian Reserve Land Use Allocations. The Proposed Action includes commercial density management and riparian thinning on approximately 1,236 acres of LSR and Riparian Reserves, up to 60-125 ft of the stream bankful width (ecological protection zone). Harvesting methods include helicopter, tractor, and high lead cable yarding systems. Biomass utilization, piling and burning, underburning, or lop-and-scatter would be also be conducted on approximately 1,236 acres of created harvest residue (slash) to reduce fire hazard. Non-commercial density management may occur within the ecological protection zone, however no mechanical removal methods (tractor or cable yarding) would be permitted. To facilitate the transport of logs there would be approximately 62 miles of road maintenance and reconstruction; construction of 1.6 miles of temporary roads that would be decommissioned after use; gating 3.6 miles of road; and 0.84 miles of road decommissioning (as funding is available).

Approximately 2,501 acres of overstocked vegetation would receive hazardous fuel reduction treatments including a combination of slashing and prescribed burning. Riparian fuels reduction would occur up to 25 feet of the stream bankful width. Biomass utilization may remove slashed woody material within 300 feet of roads created in these units or harvest activity units. Riparian restoration activities such as adding boulders and large wood and replacing 4 fish bearing culverts are also proposed to improve fish habitat and fish passage. Ten additional non-fishbearing culverts would be replaced to upgrade the culverts and accommodate high water flow. Snag and coarse woody debris creation and recruitment are a part of the Proposed Action to create and enhance wildlife habitat structures.

Harvesting and other forest management activities are planned to occur between 2006 and 2016, with the majority of units being treated within five years. BLM planning decisions and harvest activities would apply only to BLM-administered lands.

1.3 Project Location

The PA is located northeast of the community of Glendale, south of Canyon Creek Pass, and immediately northeast and southeast of Interstate 5 (Map 1). For purposes of environmental analysis, the PA is contained within the boundaries of the 6th field Hydrologic Unit Condition (HUC 6) boundaries of the Whitehorse Creek and Quines Creek sub-watersheds. The Planning Area encompasses approximately 40,222 acres in a checkerboard pattern of public and private ownerships and is in the eastern half of the 113,000 acre Middle Cow Creek Watershed. These BLM lands are part of the Oregon and California O&C (Oregon and California) revested railroad lands and have land use allocations of Late Successional Reserve, and Riparian Reserves under the *Medford District Record of Decision and Resource Management Plan (*RMP, 1995). The Planning Area also contains 508 acres of Public Domain land and Northern Spotted Owl Critical Habitat (CHU) OR#32.

The legal description of the PA is Township (T) 31S, Range (R) 4W, Sections 31 & 32; T32S, R4W, Sections 3, 5, 8-11, 15, 19-21, 28-32; T32S, R5W, Sections 1, 13, 23, 25, 27, 33, 35; and T33S, R5W, Sections 2, 3, 10, & 11; Douglas County, Willamette Meridian.

1.4 Purpose and Need for the Proposal

1.4.1 Need for Action

The Proposed Action meets the needs identified in the Medford District RMP to manage late-successional reserves “enhance and/or maintain late-successional forest conditions” (USDI 1995, p.21) and provide a commodity product as described in the 2003 O&C Settlement Agreement. “Agencies [Forest Service and BLM] will use their best efforts every year beginning in Fiscal Year 2005:...to offer thinning sales [where development of late successional or riparian habitat is the primary objective]…” (*American Forest*

Resource Council et al. v. Clarke, Civil No.94-1031 TPJ (D.D.C.), appeal pending No. 02-5024 (D.C. Cir).

Although much of the federally managed forests within the Planning Area can be categorized as late successional habitat, or progressing towards late successional conditions, overstocked stands are also present within this area. Stands containing single story structure would benefit from density management to maintain or enhance the following: adequate spacing for tree growth, forest/stand health, diverse stand structure (large limbs and full crowns), wildlife habitat, and stand characteristics for purposes other than growth and yield. Under the current conditions such stands are more prone to disease, catastrophic fire, and suppressed growth.

Multiple projects are proposed to implement RMP directives within late successional reserves including density management (commercial and non-commercial), thinning in riparian reserves, temporary road construction (to facilitate stand treatment), road decommissioning, and fuels reduction. Entry into the LSR would be to obtain long term desired characteristics for late-successional forest and habitat conditions such as: large diameter trees, trees with large branches and full crowns, plant species diversity representative of the plant association/series for the site, structural diversity, snags and large down logs, on average a closed canopy with a component of canopy gaps, multiple canopy layers, a constituent of decadence, and presence of hardwood species and shrub species.

Consideration for entry into Riparian Reserves would be to achieve similar objectives as those stated for the LSR with the addition of a sustainable recruitment of large woody debris (LWD) i.e. multiple size classes. Management activities would include thinning dense stands and thinning around conifers in dense hardwood patches.

Opportunities also exist to improve stream channel complexity within the Project Area. Falling large alders or conifers and placing boulders into streams to create pools would provide spawning habitat for anadromous fish species. Culvert replacement would improve fish passage, upgrade the culverts, and accommodate high water flows.

The primary purpose of risk reduction activities in this LSR is to reduce the probability that large-scale late-successional habitat loss would occur and to reduce the risk of remnant and large tree loss due to competing surrounding smaller trees. Fire suppression has allowed many areas to develop a higher stocking of small Douglas-fir, hardwoods or brush. The high density of small trees and brush could result in large, intense fires or widespread disease or insect damage. Hazardous fuel treatments are needed where existing vegetation and fuel loading pose a wildfire hazard.

Wildland-Urban Interface (WUI) areas occur where homes and other structures are adjacent to natural or undeveloped areas. The proximity of these structures to wildland fuels make them susceptible to wildfire. Portions of the Middle Cow LSR project area reside within the WUI area as defined by the U.S. Forest Service, the BLM, and the Oregon Department of Forestry. WUI areas are identified as high priority treatment areas

to mitigate the existing fire hazard and minimize the threat of wildfire to rural communities. Hazardous fuel treatments are designed to reduce the existing fire hazard and are included in this project due to the presence of the high priority WUI areas. The South Umpqua/Galesville Late Successional Reserve Assessment (1999, p.65) also recommended the high priority for fuels reduction treatments to be along major roads and adjacent to homes since these areas that have greater numbers of ignition sources (USDA/USDI 2004a, p.65). The desired future condition of existing fuels would be a reduction in surface and ladder fuels that pose a risk of active crown fire.

The RMP provides an objective of having ". . .a healthy forest ecosystem with habitat that will support populations of native species and includes protection for riparian areas and waters" (USDI 1995, pg. 4). The Middle Fork Cow Creek Watershed Analysis (pg. 70, 71 & Appendix F) identified opportunities such as replacement of failing stream crossings in the watershed that need immediate action to reduce road-related hydrologic and erosion impacts on the streams and protect the public investment in the road system.

1.4.2 Purpose (Objectives) for Action

Any action alternative to be given serious consideration as a reasonable alternative must meet the objectives provided in the RMP or Northwest Forest Plan for projects to be implemented in the Planning Area. The following objectives to be accomplished in managing the lands in the project area include:

1. Enhance and/or maintain late-successional forest conditions within the Late Successional Reserves by

    - "plan and implement silvicultural treatments inside late-successional reserves that are beneficial to the creation of late-successional habitat" (USDI 1995, p. 33).

    - "meeting or exceeding Desired Future Condition (DFC) levels" for snags and down logs, as described in the South Umpqua/Galesville Late Successional Reserve Assessment (2004).

2. To comply with the Oregon & California Settlement Agreement by

    - providing a commodity product as described in the 2003 O&C Settlement Agreement, "Agencies [Forest Service and BLM] will use their best efforts every year beginning in Fiscal Year 2005:...to offer thinning sales [where development of late successional or riparian habitat is the primary objective]…"

3. Manage riparian reserves to restore and maintain the ecological health of watersheds and aquatic ecosystems by

- controlling stocking, re-establish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy and riparian reserve objectives (USDI 1995, p. 27);

- closing and stabilizing roads based on the ongoing and potential effects to Aquatic Conservation Strategy and riparian reserve objectives and considering short-term and long-term transportation needs (USDI 1995, p. 28);

- "design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems…" (USDI 1995, p. 31);

- "design prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy and riparian reserve objectives" (USDI 1995, p. 30).

4. Manage fuels in accordance with guidelines for reducing the risk of large-scale disturbances. Use risk assessment as a tool to allow interdisciplinary decision making that seeks to prioritize fuel treatment need based on potential loss of critical habitat (USDI 1995, p.90).

    - developing silvicultural prescriptions to reduce the risk of stand-replacing fires in Late-Successional Reserves in the Eastern Cascades or Klamath Provinces. Treatments may include thinning and underburning." (Northwest Forest Plan, Record of Decision, p.B-7).

1.4.3 Decision Factors

In choosing the alternative that best meets the purpose and need, the Glendale Field Manager would evaluate alternatives on:

- facilitation of thinning stands toward the desired future condition of late-successional characteristics that are economically practical, and capable of maintaining the long-term health and productivity of the forest ecosystem.

- provide for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris;

- promote the development of healthy late-successional characteristics and establish a defensible area for use during extended fire suppression activities to limit the overall size of a wildfires

- provide timber resources and revenue to the government from the sale of those resources.

1.5 Plan Conformance

This Proposed Action conforms to the:

- 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);
- the *Final-Medford District Proposed Resource Management Plan/Environmental Impact Statement* and *Record of Decision* (EIS, 1994 and RMP/ROD, 1995); the *Final Supplemental Environmental Impact Statement: Management of Port-Orford-Cedar in Southwest Oregon* (FSEIS, 2004 and ROD, 2004);
- the *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and* Guidelines (FSEIS, 2000 and ROD, 2001) including any amendments or modifications in effect as of March 21, 2004;
- the *Final Supplemental Environmental Impact Statement Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan National Forests and Bureau of Land Management Districts Within the Range of the Northern Spotted Owl and Proposal to Amend Wording About the Aquatic Conservation Strategy* (FSEIS, 2003 and ROD, 2004); and
- *Medford District Integrated Weed Management Plan Environmental Assessment (1998*) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS, 1985)

The Glendale Resource Area is aware of the August 1, 2005, U.S. District Court order in Northwest Ecosystem Alliance et al. v. Rey et al. which found portions of the *Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (January, 2004) (EIS) inadequate. The Glendale Resource Area is also aware of the recent January 9, 2006, Court order which:

- set aside the 2004 Record of Decision *To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern spotted Owl* (March, 2004) (2004 ROD) and

- reinstate the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines* (January, 2001) (2001 ROD), including any amendments or modifications in effect as of March 21, 2004.

The order further directs "Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities....unless such activities are in compliance with the provisions of the 2001 ROD (as amended or modified as of March 21, 2004)".

The litigation over the amendment that eliminated the Survey & Manage mitigation measure from the Northwest Forest Plan does not affect the Middle Cow LSR Project. This is because all required biological surveys for Survey & Manage species were completed before the completion of the Middle Cow LSR Project EA and meets the 2001 protocol (2001 ROD as amended or modified as of March 21, 2004). Therefore, this project complies with the Northwest Forest Plan prior to that amendment.

The Glendale Resource Area is also aware of ongoing litigation Pacific Coast Federation of Fishermen's Associations et al. v. National Marine Fisheries Service et al. (W.D. Wash.) related to the 2004 supplemental environmental impact statement and record of decision for the Aquatic Conversation Strategy. The Magistrate Judge issued findings and recommendations to the Court on March 29, 2006. The District Court has not yet adopted them. The Court has not found this amendment to be "illegal," nor did the Magistrate recommend such a finding. The District Court has yet to adopt the findings and recommendations and rule.

Parts of the *Middle Cow Creek Watershed Analysis (1999) and South Umpqua/Galesville Late Successional Reserve (amended 2004)* are incorporated by reference; the watershed analysis and LSR assessment provide background for the project planning and but are neither NEPA nor decision documents.

1.6 Permits and Approvals Required

The following permits and approvals are required prior to project implementation:

- license agreements with adjacent landowners for landings and to have a third party haul timber;
- in compliance with the Oregon Smoke Management Plan, prescribed burning activities on the Medford District require pre-burn registration of all prescribed burn locations with the Oregon State Forester; and
- hazardous fuels treatments (outside of harvest units) to reduce short term risks and silvicultural prescriptions to reduce the risk of remnant and large tree loss (unit 30-4) are subject to LSR Working Group review (USDA/USDI 2004a p. S-3) for exemption and ensure such treatments comply with the objectives of the Northwest Forest Plan.

1.7 Public Scoping

1.7.1 Public Scoping

Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing

interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 11 public responses from either letters or emails and are fully responded to in Appendix 3 of this EA. Comments were considered in the development of the alternatives. The Glendale Resource Area also accepts public comment of proposed forest management activities through the quarterly BLM Medford Messenger publication. A brief description of proposed projects, such as Middle Cow LSR Project, a legal location and general vicinity map are provided along with a comment sheet for public responses. The Middle Cow LSR Project was included in these quarterly publications beginning in fall, 2004.

1.8 Decisions to be Made

The Glendale Field Manager is the official responsible for deciding whether or not to prepare an Environmental Impact Statement (EIS), and whether to approve the treatments as proposed, not at all, or to some other extent.

It is anticipated that one decision document would be prepared for timber harvesting on up to two timber sales; and one or more decision document would be prepared for hazardous fuels treatments; riparian restoration (including fishbearing culvert replacements); snag and coarse woody debris creation/recruitment; and stewardship projects.

Chapter 2.0 – Alternative Ways of Accomplishing the Objectives

2.1 Introduction

This chapter presents the alternative ways of meeting the project objectives identified in Chapter 1, by describing and comparing the alternatives, including Alternative 1 (No Action Alternative) and 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.

Through the scoping process, the public provided comments that were considered by the interdisciplinary team and BLM responses are found in Appendix 3 (Public Comment to Middle Cow LSR Landscape Planning Project Scoping Report and BLM Response). 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 1**). As such, the alternatives that will be analyzed in detail in this EA include the No Action Alternative and the Proposed Action Alternative.

2.2 Description of Forest Management Treatments

Commercial Density Management (CDM). The objective of commercial density management is to enhance late-successional forest conditions (RMP, p. 21) and provide a commodity by-product as described in the 2003 O&C Settlement Agreement.

Commercial density management treatments would remove merchantable size logs (up to 20 inches diameter at breast height in stands) from the site and would loosely resemble commercial thins. The objective of the treatment would be however, the development of stands with characteristics of older forests rather than yield. For this proposal, density management treatments would be designed to enhance and promote desired stand characteristics for wildlife. Treatments would reduce stand densities so that the competition for light, water, nutrients and growing space is decreased on desired leave trees. Long-term stand vigor and growth (forest health) would be promoted. While wood volume would result from the treatment, production of wood volume at the present time or for the future is not a primary objective. Wood volume produced would be a by-product of the treatment. Stand treatment would be limited to those less than 80 years of age with the exception of Unit 30-4. The purpose of treating Unit 30-4 would be risk-reduction, not stand development. Remnants and larger conifers within this unit are at risk from overstocked conditions. The desired future condition resulting from this action

would change unit conditions only slightly. Treatment would be to thin from below to maintain large remnant ponderosa pine and Douglas-fir.

Non-commercial Density Management (NDNM). The objective of non-commercial density management treatments would be the same as for commercial treatments, that is to reduce stand densities. Treatments would not remove commercial size trees from the site (although some merchantable size trees up to 10" dbh may be felled or girdled and left on the site for wildlife or other objectives).

Riparian Thinning. *The objective of riparian thinning treatments is to create a stand that is on a trajectory to reach a late-successional condition.*

Many of these units are dominated by smaller diameter stands of Douglas-fir and some hardwoods. Most stands are lacking large wood debris, downed logs, and large tree structure. The treatment would reduce competition on the retained trees for light, nutrients, water and growing space. These trees would develop larger canopies, display better vigor and put on diameter growth faster than if left untreated. Canopy gaps would also be created in these zones to promote multiple-layered stands and promote species diversity that is a key element in late-successional habitat. Production of wood volume is a by-product of this treatment, but is not a primary objective.

Riparian thinning would be done within riparian reserves adjacent to commercial density management units throughout this Planning Area to improve stand health and species diversity, and to reduce the existing fire hazard. Riparian areas proposed for treatment were selected based on the high density and young age (20-80 years) of the stand, or as a result of existing disease pockets or unnaturally low species diversity. Treatments would occur in accordance with the following prescriptions to ensure protection of streams while restoring stand health.

On all units, a minimum 25 ft no treatment buffer, from bankful width, would be used to protect streambank stability. Studies have shown that "vegetation immediately adjacent to the stream channel is most important in maintaining bank integrity" (FEMAT 1993). Twenty-five feet is roughly equal to the largest crown width that is generally present on trees occurring within riparian stands that have been chosen for treatment under this project. For Douglas-fir trees typical of these stands, crown width generally relates to the extent of the root network (Kocher) that is helping to stabilize the streambanks. In addition to the stabilizing effect of the root network, adjacent trees also dissipate stream energy during high or overbank flows, further reducing bank erosion (FEMAT 1993).

Where treatments occur between 25-60 ft of the stream, angular canopy density would remain within 5% of existing levels to protect stream shading. A 60 ft buffer was found to protect nearly all shade characteristics necessary to maintain or improve stream temperatures (NWFP Temperature TMDL Implementation Strategies, US Forest Service and BLM, 2005). Understory trees, which are not providing shade, would be treated within this buffer to reduce fire hazard and to improve the vigor of the remaining overstory trees by increasing available growing space, water, and nutrients.

Between 60 and 125 ft wide, measured from the stream channel, a variable width buffer would be used that is based on the Ecological Protection Width Needs chart (NFP ROD, B-15). This 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" (NFP, Standards and Guidelines, B-15). Within this buffer zone forest health treatments would occur. Canopy closure within this ecological protection zone (EPZ) would remain above 50%, species diversity would be maintained, and all naturally occurring or felled course and large woody debris would be left on site. These treatments would be used to reduce the number of diseased trees within stands, promote forest health and diversity, and to reduce fire hazard. No treatments within this zone would use ground disturbing yarding activities to remove excess biomass. Studies by Emmingham et al (2002) and others have shown a 50% canopy closure is sufficient to maintain microclimate conditions within this portion of the riparian reserve in the long term, without measurably increasing stream temperatures in the short or long term.

Treatments within the riparian reserve that are outside the variable width ecological protection zone would be done to promote forest health as discussed above. Canopy closures would remain above 40%, and species diversity would be maintained. Forty percent was selected because it was considered by the silviculturist to be the maximum canopy closure that should remain on some sites to promote late successional characteristics in the long term. Projects within this area would be designed to ensure that habitat conditions for the wildlife and plant species that use this zone are not degraded.

The exception to the rule is for units 21-2 and 10-1. The adjacent roads and a portion of the units are located within the ecological protection zone (EPZ) of streams. Removing material out of these units, via cable or tractor yarding, requires access through the EPZ from the road.

Hazardous fuel treatments (HFT) are designed to reduce the existing fire hazard. This is accomplished by thinning the understory of a stand to reduce the amount of surface and ladder fuels present.

The desired future condition for fuels would be a reduction in ladder fuels that pose a risk of crown fire initiation, discontinuous fuel concentrations, and a minimized presence of fine fuels. Treatments include slashing, hand-piling, pile-burning, and/or underburning. Slashed material would be between 1 and 7 inches in diameter and conifer spacing would vary between 16 x 16 feet to 20 x 20 feet and hardwoods at 40 x 40 feet, or closer. Riparian fuels reduction would be permitted up to 25 feet of the stream bankful width. Maintenance underburning is generally performed within 7 years following initial treatments and would be driven by the condition of the stand and re-growth of slashed vegetation.

For activity slash created from timber harvesting, fuel reduction treatments include slashing, hand-piling, pile-burning, underburning, and/or lop-and-scatter. The lop-and-scatter method would be used on cut material up to 6 inches in diameter. This method is normally used when there is very little treatment needed within a unit. Areas that pose an increased fire hazard due to residual slash would be hand-piled and burned rather than receive a lop-and-scatter treatment. Appropriate treatments depend on the amount of slash created and would therefore be determined by an assessment of the post-activity condition of each unit.

Temporary Spur Road Construction would allow operator access to commercial density management units. After harvest is complete, the roads would be decommissioned after use.

Road decommissioning would include partial re-contouring (pulling of fills), channel stabilization, sub-soiling, planting, barricading, placement of woody material, seeding with native seed and mulching. Existing culverts and crossdrains would be removed. Roads would be closed with a device similar to an earthen barrier or equivalent. Roads would not be maintained in the future.

Gating would limit traffic on roads that are no longer regularly needed for administrative purposes or provide access to private lands. Restricting use of these roads would reduce disturbance to wildlife and sedimentation into streams, compaction, and future road maintenance needs.

Road reconstruction would restore a road to its original or modified condition. The road is pre-existing however, the road has been unused for an extended period of time and trees are developing in its path.

Road maintenance would keep a facility (road) in such a condition that it may be continuously utilized at its original or designed capacity and efficiency, and for its intended purposes. It is composed of surface blading; roadside brushing; spot rocking; surface replacement; slump and slide removal; drainage maintenance, installation, replacement, or repair (ditch-lines, water dips, cross drain and non-fish-bearing stream culverts, and water bars); dust abatement, and replacement of signs.

Biomass Utilization measures would be used in conjunction with mechanical and prescribed burning techniques to reduce fire hazard. Material to be utilized would only be removed from areas already identified as hazardous fuel treatment units, commercial and non-commercial activity units. Removal would be restricted to 300 feet along roads as this is the distance that removal of material could reasonably occur by hand. Material removal may occur during or after fuels reduction treatment implementation. Removal would occur during implementation if conducted under a service contract or after implementation by leaving some of the slashed material scattered on the ground to be gathered by members of the public authorized by special forest product permits. In either case, falling of any undesignated vegetation would be prohibited and removal of material would be by hand only.

Stream habitat improvement would place boulders and large diameter trees (less than 20 inches in diameter) in Tennessee Gulch (stream) to create pools and slow stream current for fish and other aquatic species as well as replace culverts on fish bearing streams hindering the passage of fish and other aquatic species.

Snag and Coarse Woody Debris Creation and Recruitment. Where snags and coarse woody debris are lacking (less than the recommended amount the LSR Assessment), snags and hollow trees would be created within the Planning Area after harvesting activities are completed. Snags would be created by treating up to 75 live trees greater than 24 inches dbh and require a diameter least 18 inches at the height of the potential cavity [Harris 1982 (Zeiner et al 1990)]. Snag creation would provide habitat for cavity nesters such as the pileated woodpecker, spotted and other owls, raptors, woodpeckers, flying squirrels, red tree voles, bats and other small mammals. Selected trees would be treated in 25 groups of three, with all three trees located within one micro-site (50 ft of each other) to facilitate comparison among the results. Within each cluster, one snag would be created using each of three methods: girdling just below all the live limbs to produce a snag, girdling just above the lowest live whorl of limbs to produce a large horizontal structure within the crown, and inoculating the tree with heart rot fungus, collected within the same subwatershed.

2.3 Description of the Alternatives.

2.3.1 Alternative 1 (No Action)

The No Action Alternative provides a baseline for the comparison of the Action Alternative and describes the existing condition and the continuing trends. Selection of this alternative would not meet the purpose and need of the project (described in Chapter 1) to enhance late-successional forest conditions and implementing the Medford RMP at this time. Consideration of this alternative provides the answer to the question of what it would mean for the objectives not to be achieved. Selection of this alternative would not constitute a decision to reallocate these lands to non-commodity uses. Future forest management treatments and transportation management in this area would not be precluded and could be analyzed under subsequent environmental analysis.

Hazardous fuel reduction treatments to mitigate existing wildfire hazard within this project area would be delayed indefinitely, as would the opportunity to develop biomass utilization avenues.

There would be no road gating to reduce road related impacts. Road maintenance would be dependant on available funding and reciprocal road use agreements. Decommissioning and repair of roads to reduce road related impacts would be deferred indefinitely. Road maintenance would be on a sporadic “as needed” basis for the primary purpose of keeping roads open to traffic.

2.3.2 Alternative 2 (Proposed Action)

This alternative includes treatments in Riparian Reserves and LSR land use allocations in the Middle Cow LSR Planning Area. The Proposed Action would meet the purpose and need objectives stated in section 1.3.2 (Objectives for the Action).

2.3.2.1 Forest Management

Under alternative 2, approximately 1,236 acres of commercial density management (CDM), non-commercial density management (NDNM) treatments and riparian thinning are proposed within the Late Successional Reserve and Riparian Reserve so that desired late successional stand characteristics can develop, desired stand components may be retained, and stand growth/vigor is promoted. CDM on 25 units would release the residual trees and maintain approximately 30% to 60% of the canopy (see Table 2-1 located at the end of section 2.3.2.4 for a list of specific harvest unit treatments and Appendix 4, the Silvicultural Prescription for specific harvest unit descriptions). Biomass Utilization may also occur within 300 feet along roads as this is the distance that removal of material could reasonably occur by hand.

2.3.2.2 Timber Yarding

Harvesting methods include 165 acres of tractor, 1,009 acres of high lead cable, and 62 acres of helicopter. Cable yarding and tractor yarding would be permitted outside of the Ecological Protection Zone (EPZ), but within the Riparian Reserve (one to two site potential tree lengths). See Table 2-1 for individual unit harvesting methods.

2.3.2.3 Activity Fuel Treatments

Approximately 1,236 acres of CDM units would be treated by slashing and hand piling or lop-and-scatter methods to reduce activity slash. This work is required by the timber sale purchaser as part of the timber sale contract. Prescribed burning of slash would include a combination of pile burning material between 1 and 7 inches in diameter and underburning. Appropriate treatments depend on the amount of slash created and would be determined by an assessment of the post-activity condition of each unit. Activity units or portions thereof deferred from CDM may receive hazardous fuel reduction treatments. Deferred activity unit boundaries may increase or decrease in order to meet hazardous fuel reduction objectives. Increased unit boundaries would not exceed surveyed areas. Biomass Utilization may also occur within 300 feet along roads as this is the distance that removal of material could reasonably occur by hand.

2.3.2.4 Hazardous Fuel Treatments

Hazardous fuel treatments would be implemented on approximately 2,501 additional acres and 15 units where existing vegetation and fuel loading pose a wildfire hazard. Private residences within 1.5 miles of federal land may be classified as being within the WUI area as described by the National Fire Plan. These lands serve to increase the risk

of a fire occurring from human causes if left untreated. Unit boundaries may be altered during the layout process to facilitate logistically practical implementation; however, boundary adjustments would not exceed surveyed areas. Hazardous fuel reduction treatment implementation is subject to prioritization at the Medford District and Glendale Resource Area levels and may be affected by funding availability. Biomass Utilization may also occur within 300 feet along roads as this is the distance that removal of material could reasonably occur by hand.

Table 2-1 provides a list of fuel reduction treatments for the proposed action.

Table 2-1. Forest Management Units in the Middle Cow LSR Project

Township-Range-Section	Unit	Acres	Alternative 2		
			Treatment & Canopy Cover Retention	Yarding	Fuels Treatment
31-4-31	E31-1	298	NDNM/Fuels	----	S,H,HPB,UB
31-4-32 & 32-4-5	E32-1	250	NDNM/Fuels	----	S,H,HPB,UB
32-5-1	E1-1	210	NDNM/Fuels	----	S,H,HPB,UB
32-4-3	3-1	83	CDM 30% retained CC	cable/tractor	L&S,S,H,HPB,UB
32-4-8	8-1	14	CDM 40% retained CC	cable	L&S,S,H,HPB,UB
32-4-9	9-1	79	CDM 40% retained CC	manual/cable	L&S,S,H,HPB,UB
32-4-10	10-1	247	CDM 50% retained CC	cable/tractor/ helicopter	L&S,S,H,HPB,UB
	10-2a	12	CDM 50% retained CC	helicopter	L&S,S,H,HPB,UB
	10-2b	19	CDM 50% retained CC	helicopter	L&S,S,H,HPB,UB
	10-2c	21	CDM 40% retained CC	cable	L&S,S,H,HPB,UB
	10-3	7	CDM 50% retained CC	helicopter	L&S,S,H,HPB,UB
32-5-13	E13-1	191	NDNM/Fuels	----	S,H,HPB,UB
	13-2	13	CDM 30% retained CC	tractor	L&S,S,H,HPB,UB
32-4-15	15-1	38	CDM 50% retained CC – northern portion 40% on most southerly south aspect	cable/ helicopter	L&S,S,H,HPB,UB
	15-2	29	CDM 40% retained CC	cable/ helicopter	L&S,S,H,HPB,UB
	15-5	51	CDM 50% retained CC	cable/ helicopter	L&S,S,H,HPB,UB

Township-Range-Section	Unit	Acres	Alternative 2		
			Treatment & Canopy Cover Retention	Yarding	Fuels Treatment
32-5-23	E23-2	15	NDNM/Fuels	----	S,H,HPB,UB
32-4-19	E19-1	71	NDNM/Fuels	----	S,H,HPB,UB
32-4-21	21-2	59	CDM 40% retained CC	tractor/cable	L&S,S,H,HPB,UB
32-5-27	E27-1	72	NDNM/Fuels	----	S,H,HPB,UB
32-5-25	E25-1	413	NDNM/Fuels	----	S,H,HPB,UB
32-4-30	30-2	10	CDM 40% retained CC	cable/tractor	L&S,S,H,HPB,UB
	E30-3	63	NDNM/Fuels	----	S,H,HPB,UB
	30-4	10	CDM 60% retained CC	cable	L&S,S,H,HPB,UB
32-4-29	29-1	223	CDM 40% retained CC	cable/tractor	L&S,S,H,HPB,UB
	29-3	10	CDM 50% retained CC	cable	L&S,S,H,HPB,UB
	29-4	46	CDM 40% retained CC	tractor	L&S,S,H,HPB,UB
32-4-28	28-1	107	CDM 40% retained CC	cable	L&S,S,H,HPB,UB
	28-4	13	CDM 40% retained CC	cable/tractor	L&S,S,H,HPB,UB
32-5-33	E33-1	179	NDNM/Fuels	----	S,H,HPB,UB
32-5-35	E35-1	261	NDNM/Fuels	----	S,H,HPB,UB
32-4-31	E31-3	106	NDNM/Fuels	----	S,H,HPB,UB
33-5-3	3-2	36	CDM 30% retained CC	cable/tractor	L&S,S,H,HPB,UB
33-5-3	E3-3	190	NDNM/Fuels	----	S,H,HPB,UB
	E3-5	11	NDNM/Fuels	----	S,H,HPB,UB
33-5-2	E2-1	171	NDNM/Fuels	----	S,H,HPB,UB
32-4-31	31-2	6	CDM 40% retained CC	tractor	L&S,S,H,HPB,UB
32-4-31	31-4	65	CDM 40% retained CC	cable	L&S,S,H,HPB,UB
32-4-31	31-5	4	CDM 40% retained CC	cable	L&S,S,H,HPB,UB
33-5-11	11-4	34	CDM 40% retained CC	cable	L&S,S,H,HPB,UB

* Units would be re-evaluated prior to fuels reduction treatment to determine if the prescribed treatment is still appropriate given the current, post-harvest unit conditions.

Legend for Table 2-1

CDM = Commercial Density Management NDNM = Non-commercial Density Management
manual = trees removed by hand
S = slash H= handpile HPB= handpile burn UB = underburn
L&S = lop & scatter

Table 2-2. Forest Treatment Summary

	Alt.2 Proposed Action
Number of units	40
Acres of NDNM/fuels	2,501
Acres of CDM	1,236
Total treatment acres	**3,737**
Acres of tractor	165
Acres of cable	1,009
Acres of helicopter	62
Roads (miles) • decommission • gate • maintenance • new temp	 0.84 3.60 62 1.55

2.3.2.5 Road Work

Proposed road work for commercial density management under Alternative 2 would include temporary road construction, maintaining and reconstructing roads that access proposed commercial density management units consistent with existing right-of-way agreements, gating of roads, and road decommissioning.

Approximately 1.6 miles of temporary roads would be constructed to access density management areas and would be decommissioned after use. Road construction would be kept to a minimum, designed to reduce impacts, examples include road placement on the ridgetop, on low slope conditions, and minimization through sensitive soils. Decommissioning is proposed on 0.84 miles of existing roads and 3.6 miles would be gated to reduce sedimentation into streams, compaction, and future road maintenance needs. Approximately 62 miles of roads would be used for the hauling of timber (See Appendix 5 for specific road hauling routes, reconstruction, and maintenance).

The following primitive roads are proposed to be decommissioned: spur roads off BLM roads 32-5-26 and 32-5-25.1 of T32S-R5W-Section 25; 32-4-30.2 of T32S-R4W-Section 30 and 32-4-31.3 of T32S-R4W-Section 31 in the Quines Creek sub-watershed; and BLM road 32-4-23.1 of T32S-R4W-Section 23 in the Whitehorse Creek sub-watershed. These primitive roads are classified as a poorly located, designed, constructed and/or are no longer needed for management purposes. Decommissioning would include partial re-contouring (pulling of fills), channel stabilization, sub-soiling, removing existing culverts and crossdrains, barricading, placement of woody material, seeding with native seed and mulching, and would be evaluated for tree planting. All requests to decommission spur roads with reciprocal right-of-ways were granted.

Table 2-3 Temporary Use Roads, New Construction, Road Blocking, and Decommissioning		
Temporary use of existing roads – a.k.a roads where barricades would have to be removed in order to acce units.		0.5 mi. Unit 3-1; Block, rip, seed, and mulch after use.
		Remove barricade along road #32-4-30.4 into Unit E25-1; then replace barricade.
		Remove barricade spur road into #32-5-13.1 rd into Unit 13-2; then replace barricade.
		Remove barricade spur road into #32-5-25.5 rd into Unit E30-3; then replace barricade.
New construction	Temporary	0.35 mi. Unit 8-1; Block, rip, mulch after use.
		0.10 mi. Unit 15-2; Block, rip, mulch after use.
		0.75 mi. Unit 28-1 and 29-1; Block, rip, mulch after use.
		0.35 mi. Unit 30-1; Block, rip, mulch after use.
Gate (dependent on available funding)	Road # 32-4-11.5	Within treatment Unit 15-1, 10-2, 11-2. Replace gate, *2.05 mi.
	Road # 31-4-34	Within treatment Unit 33-1. Put in new gate for seasonal restriction, 1.55 miles.
Decommissioning (dependent on available funding)	Spur off of road # 32-5-26 (Public Domain Land)	Decommission 0.15 mile; outside of treatment unit.
	Spur off of road # 32-4-30.2	Decommission 0.15 mile; barricade after use. Within Unit 30-1.
	Spur off of road # 32-4-23.1	Decommission 0.30 mile; barricade road, 0.30 mi; Outside of treatment unit.
	Spur off of road # 32-5-25.1	Decommission 0.16 mile; barricade road; Along boundaries of fuels reduction Unit 25-1 and commercial density management Unit 30-2.
	Spur off of road # 32-4-31.3	Decommission 0.30 mile; barricade road; Portion along boundary of commercial density management Unit 30-2.

2.3.2.5 Watershed Restoration (Alternative 2)

Riparian restoration projects are proposed within the Planning Area, such as adding boulders and large alders or conifers to create pools and slow stream current for fish and other aquatic species as well as replacing four culverts on fish bearing streams that are currently hindering the passage of fish and other aquatic species. Riparian restoration would occur in a tributary of Quines Creek (Tennessee Gulch), T33S, R4W, Section 2. The four culverts to be replaced for fish passage are located in T32-R4W-Section 6, 22 and 23 along roads 32-4-6, 32-4-22, and 32-4-22.1, respectively.

2.3.2.6 Snag/Coarse Woody Debris Creation and Recruitment

Snag and coarse woody debris (CWD) creation and recruitment are proposed in the Middle Cow LSR Project. CWD is important to soils, plants and wildlife as habitat structure and source of nutrients during decomposition. The below table describes the desired future condition levels for snags and down wood as recommended by the South Umpqua/Galesville Late Successional Reserve Assessment (2004).

Table 2-4 Desired Future Conditions for Snags and Down Wood in the South Umpqua River/Galesville Late Successional Reserve.		
	Western Hemlock Cool Douglas-fir/Hemlock Cold Douglas-fir	**Douglas-fir/Chinquapin Tanoak**
Snags	At least 4 per acre > 20" dbh and 15' tall	At least 13 conifer or hardwoods ≥ 4"dbh At least 2 conifers ≥ 16" dbh and ≥ 13' tall.
Down logs	≥ 8% cover including 4 pieces ≥ 24" diameter at the large end and > 50' long	≥ 8% cover including 2 pieces ≥ 17" diameter at the large end and > 50' long

Table 2-5. Summary of Consequences. This table provides a summary comparison of the proposed action and the no action alternative on existing resource components within the Middle Cow LSR Planning Area. The information in this table serves as a general baseline for determining the effects of the alternatives under the Environmental Consequences (Chapter 3) section of this document.

Affected Elements	**Alt. 1 No Action**	**Alt. 2 Proposed Action**
Supply of byproduct timber to economy (acres) as described in the 2003 O&C Settlement Agreement	0	1,236
Long-term enhance and development of late successional habitat	0	1,236
Fire Hazard (acres) • short-term increase from commercial density management • long-term decrease from hazardous fuels treatments • net decrease in fire hazard	 0 0 0	 1,236 2,501 1,265
Increase in Soil Productivity Loss (acres and % of Planning Area)	0 0	37.5 0.09%
Increase in Soil Compaction (acres and % of Planning Area)	0 0	46.6 0.12%
Erosion Potential acres and % disturbance	0 0	68.7 0.17%
Water Quality (exceed Oregon water quality standards)	No	No
Effects to Essential Fish Habitat and Bureau Sensitive fishery species (Oregon coho salmon and Oregon coast steelhead)	No Effect	Minimal Effects (negative and beneficial)

Affected Elements	Alt. 1 No Action	Alt. 2 Proposed Action
Spotted owl suitable NRF[1] habitat (acres) in Critical Habitat (see Section 3.3.1.2)		
• Downgraded	0	300
• Degraded	0	2,451
Spotted owl dispersal habitat (acres) in Critical Habitat (see Section 3.3.1.2)		
• Removed	0	36
• Degraded	0	780
Spotted owl dispersal degraded (acres) outside of Critical Habitat	0	867
Fisher – late successional habitat downgraded (acres)	0	300
Goshawk and Western Pond Turtle (contribute to the need to federal listing)	No	No

[1] NFR = nesting, roosting, and foraging

2.4 Project Design Features

Project Design Features (PDFs) are specific measures included in the site specific design of the action alternative to eliminate or minimize adverse impacts on the human environment. These PDFs were developed by the Middle Cow LSR interdisciplinary team from guidance of Best Management Practices (BMPs) identified in the Medford District ROD/RMP, Appendix D, and resource protection measures specific to the Planning Area.

2.4.1 Soil, Residual Stand, and Coarse Woody Debris

- Trees 20 inches dbh and larger would be designated as reserve trees (including in Riparian Reserves) and would not be cut except in the following reasons: yarding corridors, guy line or tailhold trees, logging tower locations, temporary road construction and/or safety reasons. Trees of this diameter and larger felled or accidentally knocked over would be left on site (within the unit) to augment coarse woody debris levels.

- Lateral yarding would be required on all units to protect residual leave trees and existing conifer regeneration. Yarding carriages would be required to maintain a fixed position during lateral yarding to reduce damage to the residual stand. Minimize yarding corridor widths where crowns of trees greater than 20 inches diameter at breast height (dbh) could be damaged during yarding operations.

- Tractor and cable yarding on commercial density management units would not be allowed between March 1 and June 1 to prevent damage of bark slippage on residual trees.

- All trees to be yarded in cable units would be limbed and cut into lengths not to exceed 41 feet prior to yarding to minimize damage to residual trees.

- Directional falling toward the lead would be required on cable yarded units to minimize damage to residual (reserve) trees.

- During the harvest operations, some residual trees may become broken topped, girdled, or cut as tailhold trees. Those trees would be left to become snags and add to structural diversity.

- The levels of large, down wood and snags would be created or retained as characterized by the Desired Future Condition (see Table 2-4, Section 2.3.2.6) for this Late Successional Reserve (LSR).

- Prescribed fire plans are prepared for all burning activities. The plans are designed to ensure that resource and fire management objectives are met by setting parameters under which the burning may take pace. Prescribed burning would be conducted in a manner that would minimize damage to reserve trees, duff, and soil organic material, and to avoid loss of large, coarse woody debris.

- Piles would be burned in the fall to winter season after one or more inches of precipitation have occurred. Patrol and mop-up of burning piles would occur when needed to prevent treated areas from reburning or becoming an escaped fire. The timing of prescribed burns depends on these parameters and the availability of adequate fire suppression resources as described in a contingency plan in the event of escaped fire.

- Firelines would be constructed by hand on slopes greater than 35%. On slopes less than 35%, one-pass with a brush blade could be used to construct fireline using machinery.

- Landing piles would be burned, if necessary, on all harvest units. In units where biomass (firewood or posts/poles) utilization would occur, no material would be allowed on the running surface of roadways, including turnouts, or between the ditch line and the shoulder.

2.4.2 Air Quality/Smoke Management

- All prescribed burning would be managed in a manner consistent with the requirements of the Oregon Smoke Management Plan administered by the Oregon Department of Forestry and the regulations established by the Air Quality Division of the Oregon Department of Environmental Quality.

- Residents would be notified of prescribed burning through News Releases.

2.4.3 Cultural sites

- Surveys in the Planning Area revealed some cultural sites and all known sites would be protected and buffered except for one location (unit 29-1). The State Historic Preservation Office concurred with a logging system crossing a mining ditch at one location. The width of the crossing would be approximately 20 feet and the length would be that required to span the ditch.

- If cultural resources are found during project implementation; 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.

- The cutting of trees for commercial density management would not be permitted within 25 ft of either side of the center line of mining ditches or other known historic sites. Trees adjacent to the 25 ft no commercial density management buffer would be directionally felled away from the buffer boundary so tree felling would not impact the historic mining ditches. Cutting of material for non-commercial purposes such as fuels reduction, slash piling, and pile burning would also receive a 25 ft no activity buffer around known historic structures; however such non-commercial treatments would be permitted through identified historic mining ditches, as it would not impact its cultural resource value.

2.4.4 Rural Residential Areas

- Dust abatement measures (such as watering roads) would be used, where needed, on rural residential non-paved roads within ¼ mile of residents and along haul routes near Starveout Creek and Fizzleout Creek. These areas include BLM roads 32-4-20A, 32-4-20B, and 32-4-20.1A. Should dust abatement be needed, treatment would occur approximately $^{1}/_{8}$ – ¼ of a mile beginning at the junction of County Road 95, near these mentioned areas.

- Maintain a “no-fly zone” over rural residential lands when helicopter-harvesting methods are in use. Notify rural residents located within ¼ mile of helicopter harvest units (in designated Rural Interface Areas), of potential flight activities, prior to harvest activities.

2.4.5 Noxious Weeds

- Heavy equipment would be washed before initial move-in and prior to all subsequent move-ins into the Project Area to remove soil and plant parts to prevent the spread of invasive and noxious weeds.

- Only logging and construction equipment inspected by the BLM would be allowed to operate within the Project Area, or in the immediate vicinity of the

Project Area. All subsequent move-ins of logging and construction equipment would be treated the same as the initial move-in.

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

- Logging and construction equipment would be visually inspected by a qualified BLM specialist to verify that the equipment has been cleaned. The timber sale contract would ensure compliance.

2.4.6 Streams and Riparian Reserves

- In accordance with the Medford District RMP and the Northwest Forest Plan (NFP), riparian reserve widths would be 165 feet (one site potential tree) on each side of non-fish-bearing intermittent and perennial streams. On fish-bearing streams, the width would be a minimum of 330 feet (two site potential trees), (USDI 1999).

- Outside of the ecological protection zone, canopy closures within the remaining riparian reserve would be above 40%, and species diversity would be maintained. A minimum of partial suspension would be used, and all corridors would be rehabilitated using waterbars, seed, mulch, or small dense woody debris, as necessary to minimize erosion. All skid roads within the riparian reserve would be ripped and rehabilitated using waterbars, seed, mulch, or small dense woody debris, as necessary to minimize erosion after use.

- Springs and perennial wet areas would be buffered in accordance with the buffer widths that have been designated for the streams within that unit. Slumps, intermittent seeps, and other unstable areas would be buffered by leaving one row of overstory trees or a 25 foot diameter (whichever is greatest) buffer around these areas for soil stabilization.

- Slashing, piling, and burning of vegetation to meet fuels reduction objectives would be done within the riparian reserve portions of units. There would be a 25 foot slope distance no treatment buffer retained along fish-bearing streams, permanently flowing non-fish-bearing, seasonally flowing (intermittent) streams as well as lakes, ponds, springs, and other wet areas to protect streambank stability. The no treatment buffer would extend from the edge of the annual high water mark or the break in slope (whichever is greatest).

- Fuels treatments (i.e., treatments with chainsaws, similar power equipment, or non-motorized equipment) within Riparian Reserves would be the same as for the uplands, except where noted in the silviculture prescription (e.g. with regard to the treatment of certain species, such as, Big Leaf maple, Pine, or Western Hemlock).

- Underburning would be allowed within the Riparian Reserves. Fire lines, created by hand or machine, would be allowed within Riparian Reserves but would not be created within the EPZ. Along fish-bearing perennial streams fire lines would be no closer than 50 feet from streambanks.

- Foam would not be used within 150 ft of stream channels to control spread of prescribed fire.

- Within 60 feet of all streams angular canopy density would remain within 5% of existing levels. Only fuels treatments, and young stand management activities that do not use ground disturbing yarding systems would be allowed.

- Unless unsafe, trees within riparian reserves would be directionally felled away from the stream, and upslope trees would not be felled into riparian reserves.

- To reduce sediment downstream from culvert replacement sites, geotextile fabric or coconut fiber logs/bales (or equivalent) would be placed immediately downstream of the work area and removed prior to Oct 15th of the same calendar year.

- Flowing water would be diverted around each culvert replacement site whenever there is sufficient water volume, and would be returned to the channel immediately downstream of the work site.

- Trees within the EPZ that are accidentally knocked over during falling and yarding would be retained on site for fish /wildlife habitat or would be treated with activity fuels.

- Refueling of chainsaws and other equipment would be done no closer than 150 feet of any stream or wet area. Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition in order to minimize potential for leakage into streams. Helicopter refueling sites would not be located within riparian reserves.

- Before work begins a spill containment and control plan would be agreed upon between the contractor and the BLM contract officer or contract officer representative. The plan would contain notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that would be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.

- No new landings would be constructed within riparian reserves. Any expansions needed within the remaining portion of the riparian reserve (outside the EPZ) to facilitate logging systems would be pre-designated and approved by the Authorized Officer. Landings with exposed soils would be winterized prior to

Oct 15. However, if existing road prisms or landings are utilized, only new ground disturbance created by expansion of these areas would be ripped and mulched. Helicopter landings would only be rocked if necessary to prevent erosion and sedimentation into the stream.

- Culvert replacement work and other in-stream projects would be allowed between July 1 and through September 15 in accordance with Oregon Department of Fish and Wildlife (ODFW) instream work period guidelines (ODFW 2000).

- Any instream large wood or riparian vegetation within one site potential tree height that is removed during culvert replacement and other in- stream work would be replaced.

- Ensure that all large wood is retained in the stream channel during culvert cleaning activities by moving logs which had accumulated on the upstream side of a culvert to the downstream side of the culvert.

2.4.7 Sedimentation and Soil Compaction

2.4.7.1 Sedimentation and Soil Compaction from Logging

- Tractor yarding and ripping would be allowed between May 15 and October 15 (during the dry season, typically) of the same year to minimize the amount of soil disturbance and compaction. If soils are sufficiently dry outside this season, tractor yarding may be allowed if approved by the Authorized Officer.

- Old skid trails would be used whenever practical, and new skid trails would be placed at least 150 feet apart, where topography allows, to reduce the amount of compaction within tractor yarded units. New skid roads would be pre-designated and approved by the Authorized Officer. Total compaction would not exceed 12 percent of the harvested area within any unit (RMP, P.166).

- Yarding tractors would not exceed nine feet in width and would be equipped with an integral arch to minimize soils disturbance and compaction. Skid trails would not exceed a width of 12 feet on average per unit (skid trails also include turning points).

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

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

- Partial suspension (at a minimum) would be required on all units to minimize soil disturbance. Full suspension would be required if yarding is needed to cross the EPZs or unstable areas.

- To reduce gullying and surface erosion following harvest that could lead to offsite transport of sediment, all yarding corridors with more than 50% exposed mineral soils would be rehabilitated. This would include the installation of waterbars, constructed in accordance with RMP BMPs (USDI 1995, p. 167), re-contouring of displaced soils adjacent to corridors, and applying mulch or fine slash to cover exposed soil.

- Cable yarding lines would be respooled when changing yarding corridors.

- The number of yarding corridors would be minimized to reduce soil compaction and displacement from cable yarding. Corridors would be located approximately 150 feet apart at the tail end.

- Specific to the treatment of unit 21-2: The non-tractor portion of this unit would limit the total sum width of all corridors to 24 feet and would not occur side-by-side. Corridors would be constructed and used in a manner that minimizes ground disturbance. No new landings would be constructed for the support of cable yarding. The existing road prism below the corridors would be used as the landing site for those corridors.

- Specific to the treatment of unit 10-1: There would be no landings constructed within the EPZ. The portion of the road below the EPZ (that falls within the unit) would not be used as a landing site. Should the stand need to be accessed through a portion of the EPZ that falls within the unit, there would be a maximum of one access point (i.e. skid road). The skid road would be constructed, used, and rehabilitated in the same year the stand is treated. No other ground based equipment, with the exception of the skid road, would be allowed within the EPZ.

- Tractor yarding would be restricted to slopes less than 35% in order to prevent excessive soil disturbance.

- No downhill cable yarding would be permitted within this particular project to minimize soil disturbance and sedimentation within the late successional reserve.

- Where width of the trail would allow and damage to residual trees would not result, skid trails within tractor units would be discontinuously subsoiled to a depth of at least 18 inches preferably with winged ripper teeth, seeded, water-barred, mulched, and blocked during dry soil conditions, upon completion of current harvest. Where it is determined by the Authorized Officer that subsoiling skid trails would cause unacceptable damage to the root systems of residual trees along a majority of the skid trail, such as where new skid trails are constructed within the dripline of leave trees, subsoiling may be intermittent, or scarification

may be used instead. These trails would be seeded, water-barred, mulched, and blocked by Oct 15 of the year of harvest. Water bars would be installed at the same time as sub-soiling/ripping, unless skid road would be needed to complete harvest the following season. In this case, water-bars would be constructed and mulch would be applied to exposed soil prior to fall rains to reduce sedimentation during winter months. Water bar spacing on tractor skid trails would be based on the RMP BMPs erosion control measures for timber harvest which considers slope and soil series (USDI 1995, p. 167).

- If skid roads would be needed to complete harvest the following season, water-bars would be constructed and mulch would be applied to exposed soil prior to fall rains to reduce sedimentation during winter months.

2.4.7.2 Sedimentation and Soil Compaction from Roads and Landings

- Effective erosion control measures would be in-place at all times during the contract. Culvert replacement within the project vicinity would not begin until all necessary temporary erosion controls (*e.g.*, sediment barriers) are in place.

- During culvert replacement, all erosion controls would be inspected daily during periods of precipitation and weekly during the dry season to ensure they are working adequately, such as no turbidity plumes are evident during any part of the year in live streams. Any turbidity caused by the project would not exceed DEQ water quality standards, as described in Oregon Administrative Rules (OARs) Division 41.

- If inspection of culvert work shows that the erosion controls are ineffective, work crews would make repairs in a timely manner, install replacements, or install additional controls as necessary.

- For culvert replacement, sediment would be removed from erosion controls once it has reached 1/3 of the exposed height of the control. Sediment removed would be placed where it can not enter streams.

- Temporary roads would be winterized with water bars, berms, dikes, dams, sediment basins, gravel, or mulched as needed. "Winterize" is the process that minimizes the amount of erosion which would take place before disturbed soil and new surfaces stabilize.

- Temporary spur roads and landings constructed (helicopter and cable) would be decommissioned after use. This would involve discontinuous sub-soiling (Davis 1990, pp. 138 & 139) with winged rippers, mulching, pulling culverts, water-barring and barricading, and planting with conifer seedlings, and/or native grass/forbs mixtures.

- To reduce erosion and stream sedimentation, temporary road construction, reconstruction, road maintenance, road decommissioning and log hauling on natural and rocked roads would be restricted to the dry season (typically between May 15 and October 15 of the same calendar year). Road conditions would be monitored during the allowable period, and activity may be suspended on roads with either erosive surfaces, or any condition that would result in water being perpetually re-routed into tire tracks or away from designed drainage patterns. If soils are sufficiently dry outside this season, the Authorized Officer may approve a provisional off-season agreement.

- Blading ditchlines and the road prism, would be done only where necessary to maintain proper drainage and minimize potential sediment to streams.

- Energy dissipaters and down spouts would be installed as the need is determined by a BLM engineer (e.g. rock material) at new or existing cross drain and stream culverts, where necessary, to protect road fill slopes that are not adequately protected by natural materials.

- Material removed during excavation would only be placed in locations where it cannot enter streams or other water bodies.

- If slide and waste material is removed from roads it would be disposed of in stable, non-floodplain sites approved by an engineer. Use stable sites which would not lead to sediment entering stream channels. Disposal of slide and waste material within existing road prism or adjacent hillslopes is acceptable to restore natural or near-natural contours, as approved by an engineer or other qualified personnel.

- All exposed or disturbed areas would be stabilized to prevent erosion. Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas would be stabilized by native seed, as quickly as reasonable after exposure.

- Road cuts, fill slopes, borrow material and other bare ground disturbed by road construction activities would be planted with a native grass and forb seed mix (if available) or other approved grass mix prior to autumn rains (generally October 15).

- Culvert replacement work that removes native channel material and topsoil would be stockpiled for redistribution on the Project Area and re-vegetated with native vegetation.

- All damaged areas would be rehabilitated similar to or better than pre-work conditions including restoration or original streambank lines, and contours.

- Landings would be located in approved sites and designed with adequate drainage. Helicopter landings would be constructed and used in the same season, however, if they are to be left over winter, the landings would be mulched to prevent erosion. Step landings would be re-contoured following use. New landings would be sub-soiled following logging and planted with conifers. Exceptions would be where landings utilize existing road prisms, in which case the original roads would not be sub-soiled or planted. Dust abatement on landings would include rocking and/or watering. Adequate drainage would be provided to minimize erosion. Helicopter landings would only be rocked if it is necessary to prevent erosion and stream sedimentation.

2.4.8 Special Status Wildlife Species and their Habitats

Northern Spotted Owl

- Any of the following PDFs may be waived in a particular year if nesting or reproductive success surveys conducted according to the (USFWS) endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year. Previously known well established sites/activity centers are assumed occupied unless protocol surveys indicate otherwise.

- Work activities (such as tree felling, yarding, road construction, hauling on roads not generally used by the public, and prescribed fire) would not be permitted within specified distances (see Table 2-6), of any nest site or activity center of known pairs and resident singles between March 1 and 30 June (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 restricted season may be extended to as late as September 30 during the year of harvest, based on site-specific knowledge (such as a late or recycle nesting attempt). The restricted area is calculated as a radius from the assumed nest site (point).

Table 2-6. Seasonal Restrictions for Spotted Owls[2]

Type of Activity – for Spotted Owl	Zone of Restricted Operation
Impact pile driver, jackhammer, or rock drill	180 feet
a helicopter or a single-engine airplane	360 feet for small helicopters; 0.25 miles for Type 1 or 2 helicopters
Chainsaws (hazard trees, tree harvest, etc.)	195 feet
Heavy equipment	105 feet

[2] FY 2006-2008 Programmatic Biological Assessment (RORSISBLM FY 06-08 BA)

- Prescribed underburning activities occurring within 0.5 miles of active spotted owl nests in units greater than 300 feet wide would be implemented under the Low or Desired ranges of acceptable fire behavior as described in each Prescribed Fire Plan. These parameters allow for lower temperatures and higher relative humidities under which the burning may take place, thereby minimizing effects to understory habitat conditions while achieving fuel reduction objectives.

- For hazardous fuels unit E35-1, the portion that lies north of road 32-5-35.3 would be staggered a year apart from the treatment of the portion south of the road due to the presence of a northern spotted owl nest site. Staggering the treatments would distribute the effects to northern spotted owl prey species habitat temporally.

Northern Goshawk (BLM Sensitive)

- Limited surveys thus far have not found northern goshawks in the Planning Area. If a northern goshawk (*Accipiter gentilis*) nest is located, it would be protected with a 30-acre nest core area (IMOR-94-112) and no activity would be permitted within ¼ mile of the nest between March 1-July 15, or until a biologist has determined that nesting is not occurring or that the juveniles have sufficiently dispersed.

Raptors

- All special status raptor nests would be protected from project activities that are within ¼ mile that might disturb or interfere with nesting between March 1 and July 15.

2.4.9 Special Status Plant Species and Habitat

- Within timber harvest units, Survey and Manage, Bureau Sensitive, and Bureau Assessment species would be protected by buffers, which would vary in diameter. Sensitive and Assessment sites residing in units retaining more than 40% canopy closure would receive a 100 ft buffer, while sites within units retaining less than 40% canopy closure would receive a 200 ft buffer.

- Survey and Manage, Bureau Sensitive, and Bureau Assessment plant sites within hazardous fuels reduction treatments would either receive no buffer or a 5 to 30 ft in diameter buffer depending on 1) the prescribed fuels treatment, 2) the time of year treatment would occur, and 3) whether or not that species has demonstrated a tolerance to fire-related disturbance.

Chapter 3.0 Affected Environment and Environmental Consequences

3.1 Introduction

In accordance with law, regulation, executive order, policy and direction, an interdisciplinary team reviewed the elements of the human environment to determine if they would be affected by the alternatives described in Chapter 2.0. Those elements of the human environment that were determined to be affected define the scope of environmental concern (**see Environmental Elements in Appendix 2 for full list of elements considered**). The Affected Environment portion of this chapter describes the current conditions and how they came to be. The relevant resources that could be potentially impacted are: fire hazard, northern spotted owl and fisher species and northern spotted owl critical habitat, western pond turtle, soils, water quality, fisheries, and essential fish habitat as the result of proposed management activity.

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 Fire Hazard

3.2.1 Background Information

Fire is a chemical reaction that results in the release of energy in the form of heat and light when oxygen combines with a combustible material (fuel) at a suitably high temperature (heat). This combination of fuel, heat, and oxygen is often referred to as "the fire triangle" and if any one of the three components is not present, fire cannot burn (NIFC-A, 2006).

Fuels, in regard to land management, are defined as combustible vegetative material. Fuels are categorized in several ways, depending on their arrangement:

> *Surface Fuels*: Loose litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, stumps, downed branches, and downed logs (NIFC-B, 2006).
>
> *Ladder Fuels*: Material that provides vertical continuity between surface fuels and aerial fuels. Ladder fuels may include tall grasses and low lying limbs of trees, along with bushes, shrubs, and small trees that make up the understory of a forested stand (NIFC-B, 2006).
>
> *Aerial Fuels*: Vegetation in the forest canopy, including tree branches, twigs and cones, snags, moss, and high brush (NIFC-B, 2006).

Fire behavior, in the context of wildland fire, is dictated by fuel, weather, and topography. There are several types of fire behavior, categorized by the fuels that sustain the flame:

> *Surface fires* burn on the surface of the ground and consume surface fuels. The fire stays on the ground.
>
> *Passive crown fires*, also referred to as "torching," occur when the fire burns up through the ladder fuels and into the crown of an individual tree or small groups of trees. The fire is sustained by the surface fuels but a solid flame is not consistently maintained in the canopy of the stand of trees.
>
> *Active crown fires* burn from the surface fuels, up through the ladder fuels, and into the aerial fuels enabling a solid flame to be consistently maintained in the canopy of the stand of trees.

Fire suppression strategies are the methods that firefighting personnel use in order to contain wildland fires. The strategy employed depends on the fire behavior. There are essentially two basic fire suppression strategies, direct attack and indirect attack.

> *Direct Attack* can be used when a fire is exhibiting surface or passive crown fire behavior because the fire intensity is low enough to allow for safe operations by firefighters at the fire's edge (NWCG, 1994).
>
> *Indirect Attack* is used when fire intensity is extreme enough to make working at the fire's edge impractical. This method is usually required when dealing with active crown fires (NWCG, 1994).

There are many advantages of using the direct attack method compared to indirect attack. The most important of which is that direct attack is safer for fire suppression personnel than indirect attack because firefighters can escape into the already burned area if necessary. Also, direct attack minimizes the amount of area burned because massive backfiring operations are not required, meaning fires can be contained at smaller sizes (NWCG, 2004). The goal of fire suppression on BLM lands within the Medford District is to contain 94% of fires at 10 acres or less (BLM, 2003).

Fire Behavior Threshold

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 analysis in the Environmental Effects section. The unit of measure of the threshold is considered in terms of flame length. Flame lengths under 4 feet can generally be effectively managed by fire suppression personnel, such as hand crews, using the direct attack method. Flame lengths greater than 4 feet generally require specialized equipment and indirect attack methods which are inherently more expensive and dangerous due to their complexity (Rothermel, 1982).

Table 3-1. Fire Behavior and Suppression Activities

Flame Length (in feet)	**Fire Suppression Strategy**	**Fire Suppression Tactics**
0-4	Direct Attack	Hand crews
4-8	Direct Attack	Dozers, engines, aircraft
8-11	Indirect Attack	Backfiring operations
11+	Indirect Attack	Backfiring 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 four groups: grass, shrub, timber, and slash. 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.

Table 3-2. Fire Behavior Fuel Models with Flame Lengths

Fire Behavior Fuel Model	**Fuel Model Group**	**Flame Length** (in feet)
1	Grass	4
2	Grass	6
3	Grass	12
4	Shrub	19
5	Shrub	4
6	Shrub	6
7	Shrub	5
8	Timber	1
9	Timber	2
10	Timber	4
11	Slash	3
12	Slash	8
13	Slash	10

These fuel models are the standard set used by the wildland fire community and they are commonly referenced from Anderson's 1982 publication "Aids to Determining Fuel Models for Estimating Fire Behavior." This set is used throughout this fire analysis.

Fire hazard is 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. Fuels are often manipulated during management activities, which result in effects on fire hazard. The management activities proposed in the Middle Cow LSR project that have the potential to affect fire hazard are described in the Affected Environment section and their effects are analyzed in the Environmental Effects section.

Fire risk is 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. Management activities, such as new permanent road construction, have the potential to increase fire risk by allowing for an increased human presence. Because the Middle Cow LSR project proposes no new permanent road construction, this project does not increase fire risk and this issue will therefore not be addressed in the Affected Environment or Environmental Effects section, but it is discussed in the Fire and Fuels Specialist Report (Appendix 10).

3.2.2 Affected Environment

Reference Conditions

The Middle Cow LSR Planning Area is within the Klamath Mountain Province of southwestern Oregon where fire is recognized as a key natural disturbance process (Atzet and Wheeler, 1982). Prior to Euro-American settlement, low and mixed severity fires burned regularly in most dry forest ecosystems, such as those conditions found in this Planning Area. These types of fires controlled the regeneration of fire intolerant species (plants unable to physiologically withstand heat produced by fires), promoted fire tolerant species (for example ponderosa pine and Douglas-fir), and maintained an open forest structure by reducing forest biomass (Graham 2004). Native Americans influenced vegetation patterns for over a thousand years in this area by igniting fires for agricultural practices and to control their environment for hunting and food gathering (Agee 1993). Large, low and mixed severity fires were a common occurrence in the area, evidenced by fire scars and vegetative patterns.

Ecosystems with substantial presence of fire contain species that are adapted to it in order to survive (Agee, 1993). The plant communities found in this Planning Area include the Douglas-fir/tanoak-madrone group, the Mixed conifer/madrone-deciduous brush/salal group, and the White oak-ponderosa pine/manzanita-wedgeleaf/grass groups (USDA/USDI. 1994a). These plant communities are related to natural fire regimes I, II, and III (FMP, 2006).

Fire regimes refer to a general classification of the role fire would play across a landscape naturally, meaning in the absence of modern human intervention such as aggressive fire suppression efforts. The fire regimes are classified based on fire return interval and fire severity (FMP, 2006).

Table 3-3. Natural Fire Regimes

Fire Regime	Fire Return Interval (in years)	Fire Severity	Percent of Planning Area
I	<35	Low	50
II	<35	High	30
III	<50	Mixed	20
IV	35-100+	High	0
V	200+	High	0

Fire Regime I. 0-35 years, High Frequency/Low Severity
Plant communities include pine-oak woodlands and dry Douglas-fir sites found on south and west aspects. Surface fires are the norm with large, high severity fires rarely occurring (i.e. every 200 years). Approximately 50% of BLM land in the project area is within this fire regime.

Fire Regime II. 0-35 years, High Frequency/High Severity
Plant communities include ceanothus and Oregon chaparral. Typical fire return intervals are 10-25 years. High fire severity occurs due to the presence of brushy vegetation. Approximately 30% of BLM land in the project area is within this fire regime.

Fire Regime III. < 50 years, Moderate Frequency/Mixed Severity
Plant communities include mixed conifer and Douglas-fir sites found on north and east aspects. Fire severity is mixed with large, high severity fires occurring rarely (i.e. every 200 years). This fire regime exhibits fire behavior that results in mosaic patterns on the landscape with burned and unburned patches. Approximately 20% of BLM land in the project area is within this fire regime.

Current Conditions

The natural fire regimes in the Planning Area indicate that the landscape experienced fires frequently, less than every 35 years in 80% of the area and less than every 50 years in 100% of the area (FMP, 2006). Aggressive fire suppression efforts since the 1940s have interrupted this natural fire regime, shifting the Planning Area into condition classes 2 and 3.

Condition class is a relative description of the degree of departure from natural fire regimes and generally describes how ecosystems have reacted with fire intervals outside their historic range of variability (FMP, 2006).

> *Condition Class 1* = Fire frequencies are within or near the historical range, and have departed from natural frequencies by no more than one return interval

Condition Class 2 = Fire frequencies and vegetation attributes have been moderately altered from the historical range, and fire frequencies have departed from natural frequencies by more than one return interval

Condition Class 3 = Fire frequencies and vegetation attributes have been considerably altered from the historical range, and fire frequencies have departed from natural frequencies by multiple return intervals

Fire History

The limited size of fires due to aggressive fire suppression efforts illustrates the interruption of the natural fire regime. Fires ranged from less than an acre to over 20,000 acres prior to Euro-American settlement in areas with similar fire regimes (USDI 2005). Since 1962, however, 95% of the fires were held to 10 acres or less and 100% were limited to less than 1,000 acres. Information from the Oregon Department of Forestry database shows that a total of 284 fires occurred in the Middle Cow watershed between 1962 and 2004. Table 3-4 displays fire occurrences across all ownerships in the watershed.

Table 3-4. Wildfires in the Middle Cow watershed between 1962 and 2004

Total Number of Fires	Size Class	Acres
176	A	< .25
94	B	.26 – 10
12	C	10.1 – 99
0	D	100 – 299
2	E	300 – 999
0	F	1000 - 4999
0	G	> 5000

Frequent fires that historically served as thinning mechanisms by naturally regulating stand densities were effectively being excluded from ecosystems by the 1940s (Graham, 2004). As a result of the exclusion of fire, natural levels of vegetation are shifting to overstocked stands, with an increase in the number of suppressed trees and shrub species. This dense vegetation serves as surface and ladder fuels that cause undesired changes to potential fire behavior. For example, some stands that naturally resembled Timber Group fuel models 8, 9, and 10 have shifted into Shrub Group fuel models 4 and 6, which have the potential to produce flame lengths above the 4 foot fire behavior threshold (Table 3-2).

Fire Hazard

The management activities proposed in the action alternative that effect fire behavior include hazardous fuel treatments (HFT) and commercial density management prescriptions (CDM). The current conditions of the HFT stands are generally Shrub Group fuel models with associated flame lengths exceeding the 4 foot fire behavior threshold. The current conditions of the CDM stands are generally Timber Group fuel models with associated flame lengths less than 4 feet, which is within the fire behavior threshold. The effects on fire behavior resulting from each of these management activities are analyzed in the Environmental Effects section.

Wildland-Urban Interface (WUI) areas occur where homes and other structures are adjacent to natural or undeveloped areas. Homes and communities in these areas are therefore in close proximity to wildland fuels. The presence of the homes increases the risk of wildfire ignition and their location adjacent to wildland fuels makes them vulnerable to wildfire. The northwestern half of the Middle Cow LSR Planning Area resides within the WUI area as defined by the U.S. Forest Service, the BLM, and the Oregon Department of Forestry. WUI areas often extend to sub-watershed boundaries and incorporate all ownerships while Communities at Risk (CAR) areas are generally limited to residential private lands. There are CAR areas within this Planning Area, including the area between the town of Azalea and the Galesville reservoir. Hazardous fuel treatments are designed to reduce the existing fire hazard and are included in this project due to the presence of the high priority WUI and CAR areas.

3.2.3 Environment Effects

3.2.3.1 Direct Effects and Indirect Effects

Hazardous fuel treatments (HFT) are designed to reduce the existing fire hazard posed by dense younger stands and older stands with dense understories. This is accomplished by increasing the spacing between trees in the younger stands through thinning and by thinning the understories of the older stands. These treatments reduce the amount of surface and ladder fuels present, thereby reducing the existing fire hazard.

There are short term and long term effects of implementing hazardous fuel treatments. In the short term, the slash created from commercial density management could potentially transition the stands from their current Shrub Group fuel models 4 and 6 to Slash Group fuel model 11, with 12-15 tons of slash produced per acre. This transition does not necessarily translate into an increase in fire hazard however, as fuel models 4 and 6 both produce flame lengths above the 4 foot threshold and fuel model 11 does not (Table 3-2). Short term refers to the six month to two year period from when the slash is produced to the time it is mitigated by being disposed of through removal and/or prescribed fire.

In the long term, after the slash is mitigated, the fire hazard in these stands is decreased because implementation of these treatments results in a Timber Group fuel model 8 or 9. The stands prior to treatment have the potential to far exceed the fire behavior threshold of a 4 foot flame length, while the stands after treatment fall within the threshold with flame lengths of only 1 to 2 feet (Table 3-2). Some of the stands proposed for treatment currently resemble fuel models 9 or 10, with flame lengths already below the 4 foot threshold. These stands are proposed to receive treatment in order to maintain them as Timber Group fuel models and prevent them from becoming Shrub Group fuel models. Hazardous fuel treatments are considered to have long term effects because once the initial treatment is completed (i.e. the slash is burned or otherwise removed from the site) the stands are expected to be maintained through subsequent treatments such as underburning.

No Action – Alternative 1

Direct and Indirect Effects

No hazardous fuel treatments would take place under this alternative. There would be no long term decrease in the existing fire hazard from thinning dense stands and it is expected that the fire hazard would increase under this alternative on the 2,501 acres proposed for hazardous fuel treatments due to the trends discussed in the current conditions section and the continued exclusion of fire.

Proposed Action – Alternative 2

Under this alternative 2,501 acres are proposed to receive hazardous fuel treatments. The short term effects of slash present on site on these acres does not necessarily translate into an increased fire hazard, in terms of flame length, compared to the stand conditions prior to treatment. In the long term, implementing the proposed hazardous fuel treatments would decrease the existing fire hazard on the 2,501 acres proposed to receive these treatments.

Commercial Density Management (CDM)

Although the proposed CDM prescriptions are not specifically designed to affect fire behavior, they do have short term and long term effects. The short term effects may result in an increased fire hazard because the slash created from commercial density management treatments in stands could potentially transition the stands from their current Timber Group fuel models to Slash Group fuel models 11 and 12, with 12-35 tons of slash produced per acre. This may translate into increased fire behavior as Timber Group fuel models produce flame lengths in the realm of the 4 foot threshold while fuel model 12 can produce 8 foot flame lengths (Table 3-2). Short term refers to the six month to two year period from when the slash is produced to the time it is disposed of by removal and/or prescribed fire.

In the long term, after the slash is mitigated, the potential flame lengths in these stands may generally decrease compared to their current condition. Stands prior to density management generally resemble Timber Group fuel models 9 and 10 (2 to 4 foot flame lengths), whereas stands after density management generally resemble a fuel model 8 (1 foot flame lengths). This does not necessarily translate into a decrease in overall fire hazard though, because flame lengths are generally below the 4 foot threshold in the stands prior to density management.

No Action – Alternative 1

No commercial density management would occur under this alternative therefore the short term increase in fire hazard due to created slash would not occur. It is expected that the fire hazard would advance under this alternative on the 1,236 acres proposed for CDM due to the trends discussed in the current conditions section and the continued exclusion of fire as the understories of these stands become increasingly dense and experience fuel accumulations.

Proposed Action – Alternative 2

Commercial density management prescriptions open forest canopies. Concerns have been raised regarding the opening of forest canopies and related increases in fire hazard. Opening canopies can increase wind speeds and lower fuel moistures in the stand, which tends to exacerbate fire behavior. Also, opening canopies allows brush to grow in the understory, which may increase surface and ladder fuels, depending on stand condition prior to commercial density management. The probability of these concerns occurring is heavily dependant on site-specific variables such as slope, aspect, elevation, position on slope, adjacent stand conditions, and many others.

Regardless of these variables, fuels are the critical factor in influencing fire behavior. Surface fuels may be increased in the short term due to the creation of slash, as discussed above, but once the slash is mitigated the stand experiences an overall reduction in surface fuels. Ladder fuels are reduced when the limbs and branches are removed from the site as trees are removed during the commercial density management process. Aerial fuels are removed as a function of opening the canopy during commercial density management. If no subsequent treatment occurs in the stand after commercial density management, such as fuel treatments to mitigate the slash or future density management or brushing treatments to maintain the open stand conditions, the concerns listed above could lead to increased fire behavior. However, the stands proposed for commercial density management treatments in this Planning Area are managed stands within the LSR land allocation and many are within the WUI, meaning it is expected that these stands will receive fuel treatments to mitigate the slash as well as future treatments, either silvicultural or hazardous fuel related, that will maintain the stand to prevent overstocking and future accumulation of fuels (BLM, 1995). Also, studies show that thinning followed by sufficient treatment of surface fuels reduce the overall expected fire behavior, outweighing the changes in fire weather factors such as wind speed and fuel moisture (Weatherspoon, 1996).

In summary, the short term effect of CDM treatments may be an increased fire hazard on 1,236 acres due to the presence of slash on site. This increase is considered short term until the slash is mitigated which generally occurs within six months to two years after the harvest activity takes place.

There are no expected affects on fire hazard due to activities related to the creation of snags and coarse woody debris because a minimal number of trees would be involved (up to 75 trees) and they would be scattered throughout the Project Area (3,737 acres).

3.2.3.2 Cumulative effects

Methodology

The fire analysis area under consideration in this Cumulative Effects section includes the WUI area within the Middle Cow watershed and the area within the Middle Cow LSR Planning Area boundary. This area incorporates the Whitehorse Creek, Quines Creek, Fortune Branch Creek, Windy Creek, and McCullough Creek sub-watersheds, along with the southeast portion of the Langdon sub-watershed.

The proposed treatments in the Westside project are considered in this Cumulative Effects section because these two projects are being planned concurrently and both are within the fire analysis area. The Westside project proposes approximately 988 acres of hazardous fuel treatments (HFT) and commercial thinning prescriptions (CT, SC) on approximately 1,859 acres under Alternative 2 and 1,671 acres under Alternative 3. The Westside project also proposes regeneration harvest activities (RH, OR, SW, GS) under both action alternatives, the effects of which are further addressed in the Fire and Fuels Specialist Report (Appendix 10).

This Cumulative Effects section addresses the spatial and temporal effects of the alternatives on fire hazard by analyzing the short term and long term effects of all of the treatment types combined (CDM, HFT, CT, SC, RH, OR, SW, GS) that are proposed both in the Middle Cow LSR project and the Westside project.

Fire Hazard

Activity slash may occur on approximately 8,099 acres under the action alternative combined with Alternative 2 of the Westside project and approximately 7,734 acres under Alternative 3 of the Westside project. These acres include all of the HFT acres and commercial harvest prescription acres proposed in both the Middle Cow LSR project and the Westside project. It is not expected that all of these acres would have activity slash present concurrently because the commercial harvest activities are proposed to take place through several timber sales over a two to three year period and implementation of the hazardous fuel treatments are contingent upon funding, meaning they may not occur all in the same fiscal year.

Also, the presence of slash does not translate directly into an increased fire hazard on all of these acres because the HFT units and regeneration harvest units have the potential to produce flame lengths in their current condition comparable to those produced when slash is on site (1 to 8 feet). This is generally not the case in the commercial thinning (CDM, CT, SC) units though, which may have an increased fire hazard due to slash on site (flame lengths over 4 feet) that is not comparable to their current condition (flame lengths under 4 feet). The cumulative effect may be a short term increase in fire hazard due to the presence of slash in the commercial thinning units on approximately 3,095 acres under the action alternative combined with Alternative 2 of the Westside project and approximately 2,907 acres under the action alternative combined with Alternative 3 of the Westside project.

Hazardous fuel treatments decrease the fire hazard in the long term, once the slash is mitigated, by reducing the surface and ladder fuels. These stands prior to treatment have the potential to produce flame lengths above the 4 foot flame length threshold and after treatment generally resemble fuel models with flame lengths below the threshold. The Middle Cow LSR action alternative proposes 2,501 acres of HFT and the Westside project proposes 988 acres of HFT under either action alternative. Also, approximately 250 acres of fuel treatments have already been implemented within the fire analysis area under other fire management projects since implementation of the National Fire Plan began in 2000. The cumulative effect of these combined activities may be a long term decrease in fire hazard on approximately 3,740 acres.

In summary, the cumulative effect of implementing the action alternative may be a short term increase in fire hazard due to the presence of slash on up to 3,095 acres while the long term cumulative effect may be a decrease in fire hazard on approximately 3,740 acres. Conversely, the fire hazard is expected to increase in the long term due to the trends discussed in the current conditions section and the continued exclusion of fire on up to 8,099 acres under the no action alternatives of both projects.

3.3 Special Status Wildlife Species (Threatened, Endangered, Sensitive) and Critical Habitat

3.3.1 Northern Spotted Owl (Threatened) and Critical Habitat

3.3.1.2 Methodology

Under current consultation with the U.S. Fish and Wildlife Service (FY06-08 Biological Assessment) impacts for proposed harvesting in the Middle Cow LSR project was evaluated at both the local (Middle Cow LSR Project Planning Area) and provincial level (Klamath Province), based upon removal, downgrading, and degradation of suitable (nesting, roosting, foraging) habitat and dispersal habitat. *Degraded suitable habitat* still retains the minimum requirements to be considered suitable, but it has a decreased quality of suitable habitat and the species is expected to have reduced reproductive rates in that habitat. A *downgraded* suitable habitat, decreases the quality of suitable habitat to the point it is no longer used for nesting/roosting/foraging, but may be used for dispersal. Dispersal habitat that is modified to a lower quality habitat in which spotted owls can still disperse through it, although with some increased level of mortality is *degraded dispersal* habitat. For example, because of decreased cover and increased metabolic demands or fewer prey items, spotted owls may have a lower survival rate when migrating through the area and its quality is degraded. Since dispersal habitat is generally considered the lowest quality of habitat still useable by the species, dispersal habitat that is downgraded is no longer considered habitat. Thus, downgrading dispersal habitat is generally considered equivalent to *removing the dispersal habitat.*

3.3.1.3 Affected Environment

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 USFWS Section 7 Cow-Upper watershed baseline suitable (late-successional) habitat is 43,242 acres (USDA/USDI 2006, p. BA-47) and encompasses the West Fork Cow, Middle Cow and Upper Cow 5th field watersheds.

The project area is entirely located in the South Umpqua/Galesville Late-Successional Reserve (LSR), where the objectives are to "[p]rotect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest-related species including the northern spotted owl…" (RMP, p. 32). A shift to increasing numbers of owl sites in maturing large reserves [such as the South Umpqua Galesville LSR] is expected to contribute to the recovery goals and conservation needs of spotted owls by providing multiple clusters of breeding spotted

owls (USDA/USDI 2003a BO, p.103). Demographic data from northern spotted owls in the Klamath Demographic Study Area collected from 1985 – 2003 indicate that populations appeared to be stable in the Klamath study area as a result of high survival and number of young produced by territorial females, which were stable over the period of the study.

The Bureau of Land Management (BLM), Forest Service (FS), and US Fish and Wildlife Service (USFWS) have conducted a coordinated review of four recently completed reports containing information on the NSO. The reviewed reports include the following:

- *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney et al. 2004);
- *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony et al. 2004);
- *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and
- *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005).

Although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with barred owls, and habitat loss due to wildfire were identified as current threats; West Nile virus and Sudden Oak Death were identified as potential new threats. Complex interactions are likely among the various factors. The status of the NSO population, and increased risk to NSO populations due to uncertainties surrounding barred owls and other factors, were reported as not sufficient to reclassify the species to endangered at this time

The effects on NSO populations identified in the four reports were within those anticipated in the RMP EIS, and that the RMP goals and objectives are still achievable in light of the information from the reports.

The riparian reserves in the Project Area are “generally more complex than adjoining plant communities” (USDA/USDI 2004a, p. 16), however some were clearcut before the implementation of the Northwest Forest Plan. Thus, a spectrum of conditions exists from early plantation conditions to the older seral stages that contain multi-storied canopies, snags, down wood and large trees commonly observed in old growth stands.

There are a variety of stand compositions present with the Middle Cow LSR Project Area, including young stands that have been previously harvested, mixed stands containing portions of previously managed and unmanaged stands where one or more components of late successional habitat are missing, and one unentered single storied stand that has virtually no understory proposed to reduce the risk of structure loss.

Within the Planning Area there are stands that are considered sub-optimal habitat for spotted owls because no multi-storied canopy exists or growth of trees is suppressed due to vegetation competition. Multi-storied canopies are important because they create a more complex and varied types of habitat. Benefits of a greater array of habitats include greater numbers of prey species and higher population levels of prey, a greater variety of feeding and nesting opportunities for both the prey and the owl, and cover for both from the extremes of weather. Long-term stand vigor and growth (forest health) within these stands are a concern due to stand densities.

For spotted owls this LSR also provides an essential link in connecting the Western Cascades Province with southern portion of the Coast Ranges and the northern end of the Klamath Mountains Province (USDA/USDI 2006 BA, App. B-18). This connection lies "between two large valley systems. To the south is the Rogue River Valley and to the north is the Umpqua Valley. North and south of this LSR there are no contiguous large LSRs. LSR 33 (greater than 2,000 acres) and several 100 acre owl core areas are dispersed within matrix. The LSR at the south end of the Umpqua valley is dominated by intermingled BLM and private lands. To the east and southeast of the LSR there is a large block of U.S. Forest Service land. The lack of federal ownership across the I-5 corridor in most of western Oregon points to this area as a vital link between major physiographic provinces" (USDA/USDI 2004a, p.S-2). 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 NFP in 1994. The Middle Cow Creek Watershed Analysis 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. In recent decades, much of the private land within the Project Area has been intensively managed for timber on a 40-60 year rotation, resulting in fragmentation and habitat loss for the spotted owl. Approximately 45% of the Planning Area is composed of private land. Harvesting on private lands continues throughout the Middle Cow Creek watershed. Other past events, such as quarry development, road building, rock slides, and fire have also contributed to a total of at least 25% (satellite imagery change detection data) of the Whitehorse and Quines 6th field sub-watersheds being converted to presently unsuitable spotted owl habitat. Since the 1930s, wildfire suppression efforts have increased the risk of stand replacement fire in recent years; thus an increased risk of late-successional habitat loss in the LSR (USDA/USDI 2004a, p. 8).

Characteristics of spotted owl suitable habitat are sometimes referred to as "primary constituent elements", which support the life requisites of nesting, roosting, foraging, and dispersal. These elements are uneven-aged, multilayered canopy; high canopy closure (65 – 80%); a component of old growth trees; and some large trees with deformities such as broken tops, deformed limbs and heart rot (Forsman et al. 1984), which are also sometimes referred to as "snags". A "large" tree is defined as a tree > 21" dbh for habitat which can consistently support nesting, down to 11" dbh trees for stands that can provide for roosting and foraging.

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 60% and dominant trees greater or equal to 11 inches dbh. However, suitable spotted owl habitat in the Klamath Province (compared to the rest of the range of the Northern spotted owl), has small inclusions of low-canopy (40 to 60%) closure, due to high fire frequency, wide variety of soil types and low rainfall. The mean canopy closure is 65 to 80%. Many of the units were field-reviewed and considered that they met the nesting definition if units had trees of appropriate size (21"dbh or greater), canopy closure of greater than 60%, and multi-storied characteristics. Dispersal (non-suitable) habitat includes conifer stands with trees greater than or equal to 11" dbh and canopy closure of approximately 40%. "The amount of suitable habitat…can be used as a guide to …viability and productivity. As a general rule, the guidelines are 50 percent of the area within 0.7 miles of the nest…in suitable habitat, or approximately 500 acres, and 40 percent of the area within 1.3 miles or approximately 1,338 acres," (USDA/USDI 2004a, p.25). As of 1999, this LSR supports 46 spotted owl nest sites, of which 17 are within the typical home range distance or 1.3 miles of units in the proposed action.

Protocol surveys for spotted owls have been conducted since at least 2001 for all sites and longer for some sites throughout the Project Area. This area is part of the Oregon Klamath demography study area (110,000 acres), of which the subpopulation of owls was found to be stable in 2003 (the most recent metadata analysis).

Barred owls sightings are shown in Table 3-5 and the species is now known to be nesting in the Planning Area (Fukuda 2006, pers. comm.)

Table 3-5. Summary of Barred Owl Sightings within the Project Area

Year	Number of Individuals Observed
1998	1
1999	1
2000*	6
2001	1
2002*	5
2003	1
2004*	5
2005	2
*A season in which a pair of barred owls successfully nested (produced young) in the Project Area.	

Critical Habitat for the northern spotted owl is identified in the USFWS FY06-08 Biological Assessment (p.BA-67) and was designated in *Federal Register 57* (USDC 2002) and includes the primary constituent elements that support nesting, roosting, foraging, and dispersal. Designated Critical Habitat also includes forest land that is currently unsuitable, but has the capability of becoming suitable habitat in the future (FR57 (10):1796-1837).

Primary constituent elements of spotted owl critical habitat *are those physical and biological attributes that are essential to species conservation. In addition, the Act stipulates that the areas containing these elements may require special management consideration or protection. Such physical and biological features, as stated in 50 CFR 4.2.4.1.2 includes, but are not limited to the following:*

-Space for individual and population growth, and for normal behavior;
-Food, water, or other nutritional or physiological requirements;
-Cover or shelter;
-Sites for breeding, reproduction, rearing of offspring; and
-Habitats that are protected from disturbance or are representatives of the historic geographical and ecological distribution of the species.

Critical Habitat Unit OR-32 coincides with the Rogue-Umpqua Area of Concern, which provides an essential link in connecting the Western Cascades Province with the northern end of the Klamath Mountains Province as well as the southern portion of the Coast Range Province (USDA/USDI 2006, BA, App. B-18). Approximately 37% of this CHU is in Late-Successional Reserve (USDA/USDI 2006 BA, Appendix B-18). The land ownership patterns elevate the importance of maintaining owl nesting habitat to link the Western Cascades, Coast Ranges and the Klamath Provinces (USDA/USDI 2006 BA, App. B-18). Harvesting on private land has converted stands into early and mid-seral stages, which may not serve as suitable habitat. While no target amounts of nesting, roosting and foraging habitat were identified for critical habitat, the current baseline for all CHUs in SW Oregon Administrative Units is 442,177 acres (USDA/USDI 2006 BA, Table 6, p.50). The 2006 baseline nesting, roosting, foraging (NRF) acres within CHU OR-32 are reported as 35,165 acres (USDA/USDI 2006, p.50).

The effect of harvesting on the viability of spotted owls is determined by disturbance to nesting owls and modification of habitat at the USFWS Section 7 Watershed scale through consultation with the USFWS. The amount of anticipated adverse impacts to spotted owls was accounted for through consultation and incidental take with the U. S. Fish and Wildlife Service (USDA/USDI 2006). The Fish and Wildlife Service analyzed incidental take of northern spotted owls by considering the removal, downgrading, or degradation of all suitable and dispersal habitat acres.

3.3.1.4 Environmental Effects

Alternative 1 (No Action)

Direct and Indirect Effects

The No Action Alternative would have little immediate impact on spotted owls or their critical habitat barring the occurrence of a wildland fire. The no-action alternative would not downgrade or degrade suitable spotted owl habitat in the LSR or CHU.

However, in the event of a wildland fire, the lack of fuels treatments would increase the risk of stand replacement fire within the Planning Area. Catastrophic loss of vegetation would threaten late-successionally affiliated species which depend on these forest habitats for survival, reproduction, and dispersal.

It is estimated by the silvicultural specialist, that stands would eventually develop into late successional habitat however, it would take twenty to eighty additional years or longer depending on current stand conditions such as percent canopy closure and stand density compared to the Proposed Action. More uniform stands would take approximately eight decades and stands in which large tree dominance is already present would take approximately two decades to reach a late successional condition. Some stands would continue to shade/crowd out some or most of the hardwood species, leaving the stands with reduced biodiversity of vegetation and, in turn, of owl prey (Lehmkuhl et. al. 2006).

Stands would likely be reviewed under future actions for commercial density management and/or hazardous fuels reduction. Temporary and permanent right of way construction would continue on BLM and private lands to allow private harvesting, resulting in removal of suitable and dispersal habitat.

Treatment of the riparian reserves for accelerating the development of late-successional habitat and benefiting riparian, spotted owls and their prey species would not occur. Habitat development in the riparian reserves would be reduced as young tree competition increases for nutrients and space.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

All proposed commercial density management units except one (Unit 3-1) contain suitable or dispersal habitat. Under the proposed action units 13-2, 15-1, 15-5, 21-2, 30-2, 29-3, 29-4, 28-1, & 28-4 would downgrade (suitable owl habitat) approximately 300 acres; units E31-1, E32-1, E1-1, 10-1, 10-2a, 10-2b, 10-2c, 10-3, E13-1, E23-2, E19-1, E27-1, E25-1, E30-3, 30-4, E33-1, E35-1, E31-3, E2-1, 31-2, 31-4, & 31-5 would degrade approximately 2,451 acres of suitable habitat; unit 3-2 would remove 36 acres of dispersal habitat; and units E31-1, 8-1, 9-1, 15-1, 15-2, 21-2, E27-1, 29-1, 11-4, & E3-3 would degrade 867 acres of dispersal habitat due to commercial density management treatments.

The Proposed Action would retain trees greater than 20 inches dbh, snag and down wood structures that serve, in part, as the primary constituent elements of spotted owl habitat. In addition, commercial density management would accelerate the growth of large trees and allow large branches and complex crowns to develop to a greater extent and more quickly than would otherwise be the case. Also, understory development and the rapid growth (within 20 years) of understory hardwoods producing a more complex, multi-storied canopy (a key constituent element of spotted owl habitat) would be facilitated. Reducing canopy closures to 30-50% in the proposed commercial density management units would result in a temporary downgrade of suitable spotted owl habitat, except in unit 3-1 which does not contain suitable owl habitat. The proposed action would downgrade 300 acres and degrade 2,451 acres of suitable nesting, roosting, and foraging habitat for 10-20 years by reducing the canopy closure, which is a key constituent element of suitable habitat. The silvicultural specialist assigned to the project estimated based on past experience with density management within the Planning Area stands would regain canopy closures to pre-treatment levels within 10-20 years after treatment.

As discussed in the spotted owl affected environment description (section 3.3.1.1), suitable spotted owl habitat in the Klamath Province has lower-canopy (40 to 60%) closure inclusions, compared to the rest of the range of the spotted owl, due to fire frequency intervals, soil types and low rainfall. Some proposed units comprise relatively small portions of the owl stand, and proposed treatments may mimic such relatively open, natural inclusions in areas of suitable habitat. The stand as a whole is expected to continue as nesting, roosting, and foraging habitat even though small portions would temporarily have lower canopy closure. As tree crowns expand and gradually become more closed, the canopy would progress from 40% closure, after treatment, to 80% canopy closure within 10 to 20 years. Silvicultural prescriptions in the proposed action were modified to maintain the suitability of the stand for spotted owls.

Commercial density management would reduce future numbers of snags and down wood resulting from snags by removing suppressed or defective trees, and would decrease snag recruitment thus reducing the capacity to provide optimal nesting structure and optimal prey abundance. However, the Middle Cow LSR Project proposes snag and down wood creation to mitigate for this reduction (see Section 2.2.2.6). The abundance of nesting structures for prey species in down wood, defective trees and snags, would not be reduced, because of the creation of snags and large wood would exceed current amounts.

While the local population of spotted owls has seemed resilient to the various indirect threats mentioned above (as given in the Affected Environment, section 3.3.1.3), reproduction in the sites affected by this action would likely decline for up to two decades following the proposed action. While the designers of the Northwest Forest Plan did not anticipate all the environmental factors currently known, they did expect that habitat manipulations in the LSRs would cause a decline in some late-successional associated species (FSEIS 1994). As identified by the LSR REO exemption (July 9, 1996), thinning prescriptions within the LSR with short term effects are permissible under the following conditions: “negative short-term effects to late successional forest-related species are outweighed by the long term benefits to species and will not lessen short-term functionality of the LSR as a whole”.

In summary, the spotted owl would be affected by the proposed action in the short-term (up to two decades) by downgrading and degrading suitable habitat for the owl and its prey, increased competition with goshawks, and by potentially greater predation pressure by goshawks on juvenile spotted owls. In the long term (beyond two decades), development of optimum late successional habitat would be accelerated and stands within the LSR and Critical Habitat Unit would have a greater likelihood of withstanding a wild fire event.

Also, because of the closed canopy nature of the stands at this time, the understory in some stands is growing very slowly, stagnate or dying out to leave a forest floor relatively devoid of the nut- and seed-producing species that contribute to the diversity and abundance of the spotted owl prey base. Reducing the canopy closure would open up the understory and would stimulate greater primary productivity, which would benefit the lower canopy layers and the animal community dependent on them. The resulting plant community would likely also have greater species diversity and thus the community as a whole would likely have greater resiliency to all disturbances: insects, diseases, fire,

invasive species, etc. Increasing the structural diversity of the canopy would also increase the diversity and abundance of spotted owl prey and other wildlife species.

In addition to this degradation, the 45% of the Planning Area that is held in private ownership is likely not to produce suitable habitat for the species because of the appreciable decrease in habitat quality. The overall effect of the proposed actions would reduce the reproduction of the spotted owl in the Project Area for one to two decades until the stands regain canopy closure to pre-treatment levels, as estimated by the silvicultural specialist.

This data is not outside those analyzed in the Medford District FEIS which anticipated future spotted owl populations would "vary in positive and negative ways throughout the range" due to the "full range of environmental heterogeneity represented within the reserves". The effects of loss, degradation and disturbance of habitat due to harvesting, fire, and temporary road construction, manifested in the spotted owl population decline rate, are not greater than was analyzed in the RMP (USDA/USDI 1994, p. 4-78) and NFP (USDA/USDI.1994a, pp. 3&4 -211-234). The Fish and Wildlife Service analyzed incidental take of northern spotted owls by considering the removal, downgrading, or degradation of all suitable and dispersal habitat acres at the Cow Upper Section 7 Watershed level.

The proposed action would result in downgrade of 303 acres, approximately 0.9% of the currently available suitable habitat with this CHU. At the local scale, since this amount is relatively small in proportion to the overall CHU, it is expected this action would not appreciably alter the function of this unit. At the provincial scale, the proposed actions are not expected to have a substantial effect on the ability of the CHUs to function as intended since it only impacts 0.07% of the CHU.

The downgrading and degrading of suitable habitat, and removal and degrading of dispersal habitat would likely have a temporary (10-20 years) negative effect. The proposed activities are expected to continue to function as intended, providing an important link between the Coast Range and Cascade/Klamath Provinces, and allowing genetic interchange.

Hazardous fuels reduction would affect 1,323 acres of spotted owl habitat, degrading suitable (1,122 acres) and dispersal (201 acres) habitat for 3-5 years through the removal of some of the 1"-7" diameter fine fuels. Of these, 1,236 acres are within CHU. Units E23-2 and E27-1 are not in Critical Habitat for the spotted owl. Reducing the density of the lowest canopy layers may reduce woodrat and flying squirrel (both owl prey species) densities by reducing canopy and simplifying forest habitat structure, which serves as thermal and visual cover, and understory plants that serve as a food source for these prey species (Lehmkulh et al 2005 and 2006, and Carey et al 1999). This may reduce or alter the distribution of terrestrial prey abundance for spotted owls. A shift in occurrence wildlife species may occur, favoring species that prefer more open understories such as the goshawk. The removal of brush and small trees as would occur in the proposed fuels reduction project would likely reduce visual cover for juvenile spotted owls as well. However, fuels treatments would reduce the risk of catastrophic fire thus reducing the risk of suitable habitat loss, in the event of a wildland fire.

Critical Habitat affected by construction of four spur roads totaling 1.6 miles of temporary roads, approximately 3.9 acres, which would be decommissioned after use, can be expected to return to a functional dispersal condition of 40 percent canopy closure and trees averaging 11"dbh or greater in approximately 50-60 years. Some trees larger than 20" diameter at breast height may be removed for spur construction, or placement of yarding towers, and would be retained within forested habitat as large down woody debris in order to meet desired future condition LWD levels. A length of 3.6 miles of road would be blocked by gating, and 0.84 miles of road would be decommissioned. All of these modifications to the road system would have little effect on the spotted owl, its prey or Critical Habitat since the area of disturbance would be no more than 4 acres for temporary road construction for the Middle Cow LSR Project. Owls would still be able to disperse through this area and it would not impede prey movement.

Cumulative Effects (Alternative 2)

Northern Spotted Owl (Threatened)

Cumulative effects in the Planning Area result from the incremental impact of the Proposed Action, added to other past, present, and reasonably foreseeable actions regardless of land ownership. The majority of remaining older forest (49%) in this watershed is on public lands managed by BLM. Past activities have resulted in habitat loss and have changed the distribution and abundance of many wildlife species in the Planning Area. Habitat modification and removal with fewer protection measures would continue on private or county lands, which negatively affect late-successional dependent wildlife species on these lands.

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 NFP in 1994. The Middle Cow Creek Watershed Analysis (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 a total of at least 25% (satellite imagery change detection data) of the Whitehorse and Quines 6th field sub-watersheds being converted to presently unsuitable spotted owl habitat.

The RMP/EIS assumed that in the future nonfederal lands would have no suitable habitat due to 50-80 year rotation (RMP/EIS, 4-73), averaging 60 years (4-73) on private lands, but are expected to provide some dispersal habitat. The cumulative effect of harvesting from private lands and BLM federal lands are less than what was anticipated in the RMP/ROD for matrix land. The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres (USDA/USDI 2006, App. A). BLM administered lands assumed average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade on matrix lands (ROD/RMP. p, 9-11). The downgrading of 300 acres of suitable habitat in the Middle Cow LSR Project would be combined with other foreseeable removal and downgrading projects in this watershed, totaling 5,684 or 13% of the current suitable habitat in this Section 7 watershed. Remaining nesting habitat on

private land is not expected in the future to be suitable habitat, given a stand age rotation of 60 years (RMP/EIS, pp.4-5).

The combined effects of foreseeable projects in the Section 7 watershed would also result in 7,960 acres of degrading suitable and dispersal habitat through a variety of treatments including hazardous fuels reductions that are expected to affect such habitats in the short-term (3-5 years) through removing some of 1"-7" fine fuels which are used as denning, and nesting by primary prey species such as the bushy-tailed woodrat, red tree vole, flying squirrel, and other small mammals. The period of this effect would vary with the habitat use: for visual cover for ground dwelling species, the area would recover in 3 to 5 years. As food, some of the species would require approximately 10 to 15 years before they again produce fruits and nuts. It is expected there would be a potential beneficial effect to northern spotted owls due to the risk reduction of stand-replacement wildfire as a result of these fuels treatments.

The total cumulative actions from the project proposal when added other actions within the section 7 watertshed, would reduce suitable habitat available for owls within the project area, and contribute to the reduced viability of adjacent matrix land owl sites utilizing the project area, through reduction of available habitat utilized for breeding, nesting, feeding, sheltering, or dispersing, for approximately 10-20 years. The ultimate fate of individual owls in the Planning Area and owls in adjacent 5th field watersheds utilizing habitat in the Planning Area, as a result of the cumulative effects is unknown due to the variability in individual owl response to habitat modification, the unknown actual home range and habitat use of individual owl sites, stochastic effects and complications that other influences (e.g. disease and barred owls) might have. Nonetheless, the combined consequences of the present and reasonably foreseeable projects degrading, downgrading, and removal of late-successional stands, including the reduced viability of owl sites on matrix lands, was anticipated in the NFP (USDA/USDI. 1994a 3&4-241). Under the NFP, only matrix based spotted owl sites identified as of January 1994 received 100 acre residual habitat areas, which were not considered adequate to maintain reproductive owl pairs (USDA/USDI 1994 p.3&4-241) and provide for the long-term needs of owl pairs. The function of matrix lands is to serve as connectivity between late-successional reserves (USDA/USDI. 1994b vol 2, p. B-43). Remaining nesting habitat on private land is not expected in the future to be suitable habitat, given a stand age rotation of 60 years (RMP/EIS, pp.4-5).

The FY06-08 USFWS Biological Assessment (p.30) notes the following cumulative affects to LSR within the Medford District and Rogue-Siskiyou National Forest, "[h]abitat removal through timber sales in LSRs is inconsequential….There has been some minor tree harvest (light thinning) within LSRs since 1994, designed to improve late successional habitat by expediting large tree establishment and structure over the long term."

The BA (RORSISBLM FY 06-08 BA p. 42) states that no more than 13 percent of the suitable habitat would be removed from any Section 7 Watershed and that reduction was anticipated in the NFP. Cumulative effects on the spotted owl sites in the Planning Area affected by the Proposed Action and other foreseeable actions are not expected to change the population trend in the Klamath Province as noted in 3.3.1.3 above.

Critical Habitat

Cumulative effects in CHU#OR-32 result from the incremental impact of Alternative 2, added to other past, present, and reasonably foreseeable actions. The majority of remaining older forest in this CHU is on public lands managed by BLM. Past activities have resulted in habitat loss and have changed the distribution and abundance of many wildlife species in the CHU. Species associated with younger forested conditions have benefited from these changes. Habitat modification and removal with fewer protection measures would continue on private or county lands, which negatively affect suitable and dispersal CHU habitat for northern spotted owls. Due to 40-60 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.

The 2006 baseline nesting, roosting, foraging (NRF) acres within CHU OR-32 are reported as 35,165 acres (USDA/USDI 2006 BA, Table 2, p.50). The proposed action would result in 300 acres of downgrade suitable habitat approximately 0.9% of the currently available suitable habitat with this CHU. The FY06-08 USFWS Biological Assessment, noted the cumulative present and foreseeable projects in this CHU (such as the concurrent Westside Project and future Boney Skull Project), would remove and downgrade 1,690 acres of suitable habitat or approximately 4.8% of current CHU suitable habitat. The BA (RORSISBLM FY 06-08) states that it has anticipated the removal and downgrade of up to 4,442 acres of suitable habitat from all CHUs over the next three years. The Middle Cow LSR Project is included in this prediction. According to the 2006 environmental baseline, the total acreage of all CHUs in the Klamath Province is 913,954, of which 442,177, or approximately 48% are considered currently suitable habitat (USDA/USDI 2003a, p.62). The cumulative effect of present and foreseeable projects in suitable habitat of the Klamath Province is 1%. Because CHU function is assessed both at the local CHU scale and also at the provincial level, this amount of impact is not expected to alter its function as intended.

3.3.2 Fisher (Bureau Sensitive, Federal Candidate)

3.3.2.1 Affected Environment

Fishers are secretive mammals associated with closed canopy conditions in late-successional forests throughout their range in the western United States, often associated with riparian areas (Aubry and Houston 1992, Dark 1997). Jones and Garton (1994) noted that fisher do not use non-forested lands (<40% canopy cover). The fisher was analyzed in the NFP and failed to pass the species viability screens due to its dependence on interior forest habitat and large, down woody debris (USDA/USDI 1994a).

The USFWS listed the West Coast distinct population segment of the fisher under the ESA in 2004, as warranted but precluded due to other USFWS priorities (Federal Register April 8, 2004). The document further discloses that extant fisher populations in Oregon are restricted to two disjunct and genetically isolated populations in the southwestern portion of the State: one in the Siskiyou Mountains of the southwestern region and a reintroduced population in the southern Cascade Range. The fishers in the Siskiyou Mountains near the California border are probably an extension of the northern

California population, and are believed to represent the northern extent of indigenous fisher populations in the Pacific states. Causes of historical population declines in the Pacific states include loss of habitat from logging, overtrapping, predator control, and urban and agricultural development. High intensity fires could also have contributed to the loss of habitat. Habitat loss may have extirpated breeding fishers from the Planning Area. Dispersal of fishers may also be restricted by large rivers and wide highways. There are no known sightings in the Glendale Resource Area.

Approximately seventy remote camera surveys were conducted to protocol (Zielinski and Kucera 1995) in 2002-2005 in the Glendale Resource Area, with no fisher detections. Field surveys and incidental road observations from BLM personnel have also failed to detect this species in the Middle Cow Creek watershed or in any of the other 5th field watersheds within the Glendale Resource Area. However, the nearest known sightings, from four incidental visual observations (USDI 2004), are approximately 15 miles southwest. Powell and Zielinski (1994) generalized an average home range for fishers as 40 and 15 km^2 for males and females respectively. This indicates that suitable habitat in this LSR, which contains solid block ownership and extensive stands of older interior forest, could be used by fisher, and they could occupy or be dispersing through the resource area, including the Middle Cow Creek watershed.

Approximately 22,000 acres of the 45,642 acres of BLM administered lands, within the 110,000 acre Middle Cow Creek watershed are considered to be late-successional forest (USDI 1999).

3.3.2.2 Environmental Effects

Alternative 1 (No Action)

Direct and Indirect Effects

The Middle Cow Creek watershed would continue to provide habitat poorly suited for fishers due to landscape fragmentation as a result of checkerboard ownership, continued harvesting and stand age rotation of 60 years on private lands (RMP/EIS, p.4-5), past federal harvest, low quantity of large blocks of late-successional forest on BLM, low densities of large snags and down wood on BLM land harvested prior to the NFP, and high road densities.

These stands would eventually develop into late successional habitat; however, this would take twenty to eighty additional years compared to the proposed action. More uniform stands would take approximately eight decades and stands in which large tree dominance is already present would take approximately two decades to reach a late successional condition.

Stands would likely be reviewed under future actions for commercial density management and/or hazardous fuels reduction as selection of this alternative would not constitute a decision to reallocate these lands to non-commodity uses.

However, in the event of a wildland fire, the lack of fuels treatments would increase the risk of stand replacement fire within the Planning Area. Catastrophic loss of vegetation

would threaten late-successionally affiliated species which depend on these forest habitats for survival, reproduction, and dispersal.

Alternative 2

Direct and Indirect Effects

The Proposed Action would downgrade approximately 300 acres of late-successional forest from CDM units for one to two decades. Approximately 2,451 acres of suitable habitat and 867 acres of dispersal habitat in CDM units would be degraded and retain approximately 40% canopy, providing reduced protection and foraging until the understory responds to increased light levels. Large snags and down wood retained in proposed units would be less suitable for denning until covered with regrowth (30-40 years).

Large snags and down wood retained would be less suitable for denning until covered with regrowth (10-20 years). Commercial density management would reduce future numbers of snags, and down wood resulting from snags by removing suppressed or defective trees, and would decrease the snag recruitment thus reducing the capacity to provide fisher denning structures, and optimal prey abundance. However, the BLM would create many snags within the project area to partially mitigate for this reduction.

While some portions of treated stands that are below 60% canopy closure would be avoided for approximately 10 to 20 years by the fisher (Heinemeyer and Jones 1994), the species would benefit in the long term. This is because such treatments would eventually result in increased canopy complexity; therefore, more robust populations of prey (Carey et al 1999). Also, because fishers are highly dependent on an abundance of snags (for denning) and down logs for travel, prey and subnivean habitat (habitat available below snow) and appear to tolerate small clearings (Heinemeyer and Jones 1994), it is likely that fisher would benefit as soon as large wood and snags are created. Since some of these structures would be created in the first ten years following the commercial density management operation, improvements in fisher habitat would be realized more quickly than that for spotted owl habitat.

Since proposed temporary roads construction is so narrow and would likely be seldom used by vehicles, such limited road construction would have no effect on the viability of the area for fisher. The fuels reductions would benefit all non-early successional species, including the fisher, by reducing the probability of stand-replacing wild fire. There would be a short-term reduction in the abundance of prey species that depend on dense understories. The inoculation of live trees allows easier cavity excavation that could ultimately serve as denning sites for the fisher after approximately 2 decades, when the heart rot and woodpeckers have formed large cavities. Accelerating the development of larger diameter trees would also benefit the species, as it would allow more recruitment in the future of larger diameter snags and down wood.

Overall, the proposed action would improve the ability of the Planning Area on a landscape level to support fisher. However, this project would not change the assessment predicted in the NFP (p.J2-54), which stated the fisher failed to pass the species viability screens due to its dependence on interior forest habitat and large, down woody debris.

Cumulative effects

Due to the small size and isolation of late-successional forest units from previous harvesting on BLM and private lands within the Middle Cow Creek watershed, it is not known whether the watershed is suitable for resident fishers. The largest late-successional blocks are expected to continue be restricted to LSRs. With the cumulative effects of private harvesting, checkerboard BLM ownership and few large patches of BLM late-successional habitat at low elevations, combined with the fisher's natural rareness, low fecundity and slow re-colonization rates of restored habitats, the species is not expected to be well distributed throughout its range (USDA/USDI 1994a, pp. 53, 470). This project would not change the assessment predicted in the NFP.

Impacts to potential fisher habitat through loss of late-successional forest and modification to mid/late seral habitat are minor, due to project design and mitigations (USDA/USDI 1994a, p. 470). Some large snags and down wood den habitat may be lost, or the suitability of potential den sites may be reduced due to harvesting or fuels treatments. Retaining 50-60% canopy closure in harvesting units would minimize the impact to this species (USDA/USDI 1994a, p. 470).

The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres. While this figure represents suitable owl nesting, roosting, or foraging habitat, its late-successional, closed-canopy conditions also act as an indicator of the relative amount of mature forest habitat available for fisher use. The cumulative removal and downgrading of 5,287 acres of suitable habitat combined with other foreseeable projects in this watershed is approximately 13% of the baseline. Private land is not expected to support fisher, given a stand age rotation of 40-60 years.

The construction of 1.6 miles of temporary road which would be decommissioned after use can be expected to return to a functional dispersal condition of 40 percent canopy closure and trees averaging 11"dbh or greater in approximately 50-60 years.

To summarize, cumulative effects under Alternative 2 are not expected to contribute to the need to federally list the fisher as threatened or endangered. The Proposed Action is unlikely to impact fishers because they have not been found in the Glendale Resource Area for successive years by peer-reviewed survey methods. While some habitat would be downgraded or degraded, suitable fisher denning, foraging, and dispersal habitat would remain in the Planning Area. Since fishers are wide-ranging, they can move to minimize disturbance and utilize optimal habitat. Seasonal restrictions for wildlife, soil, and other resources would also benefit fishers by restricting project activities until young are approximately six weeks old. Habitat features, such as large snags and coarse wood would be maintained throughout the Planning Area, which would provide future habitat for denning and nesting. In addition, in the long term (greater than 100 years) the larger diameter trees that would develop from these commercial density managements would add to the recruitment of the larger (>31" dbh) snags that serve vital roles for reproducing fishers or as natal and maternity dens, and nesting sites for fisher females (Aubry and Lewis 2003).

Additionally, late-successional habitat would be maintained throughout the watershed in riparian reserves, 100-acre Known Spotted Owl Activity Centers, connectivity blocks, and 15% late-successional forest retention (RMP, pp.38-40). These reserve areas would continue to provide suitable habitat for fisher and would help maintain future dispersal opportunities throughout the Planning Area and the watershed.

3.3.3 Western Pond Turtle (Bureau Sensitive)

3.3.3.1 Affected Environment

The western pond turtle is an omnivorous reptile that historically occurred from northern Baja California, Mexico to Puget Sound. They occupy slow-moving streams and ponds during the warm seasons. The species is considered "cold blooded" and uses emergent boulders and CWD for basking on sunny days. Females lay their eggs up to 0.5 miles from their aquatic habitat on land in nests they excavate and subsequently cover with soil and debris. From approximately October through April the species hibernates under debris up, to 0.5 miles from its aquatic habitat. During such time the turtles are inactive and vulnerable to mortality. In some locations individuals may take 10 to 12 years to reach the age of reproduction and adults are believed to live over 30 years in the wild. The species is widely believed to be in decline from predation of young by bullfrogs and non-native fishes, habitat alteration, drought, local disease outbreaks and fragmentation of remaining populations (Storm and Leonard 1995). Even at great distances (over 150 feet), the presence of humans will often cause turtles to dive and hide, and thus the species is frequently overlooked in the wild (Storm and Leonard 1995). There are no widely accepted techniques for detection surveys and the federal land management agencies have not issued guidelines for management, other than the general direction to not contribute to the need to list the species under the authority of the Endangered Species Act.

Limited observations have revealed the presence of western pond turtles along Cow Creek and its tributaries. Specifically, the species has been observed this year within the Project Area in the Quines Creek tributary of Tennessee Gulch. The lower gradient reaches, eddies and back waters of the Quines Creek system likely forms the area the subpopulation disperses and interbreeds. For the Project Area, suitable habitat is common and this species is likely to be present in other riparian locations.

3.3.3.2 Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects

The Quines Creek watershed would continue to provide limited habitat for the western pond turtle. The species would likely continue to decline because of natural mortality, likely continued habitat alteration on private lands, drought, disease, fragmentation and lack of recruitment due to bullfrog predation on neonates throughout the watershed.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Negligible effects to the species are expected from the density management (commercial and noncommercial), road work or creation of CWD, because these actions would not take place in western pond turtle habitat or would likely not focus on woody piles or boulders used by the species.

Placement of boulders and large wood in Tennessee Gulch would likely benefit the species, since it would decrease the stream velocity, thereby creating habitat. Also, such sites serve as basking sites for the species, which depends on solar energy for warmth. Because pond turtles flee the presence of humans, the animals would probably temporarily vacate the immediate area when heavy equipment necessary for boulder and large wood placement is moved in. There is a small possibility that turtles would be burrowed in the bottom of the stream exactly where a structure would be placed, but considering the likely small number of turtles (probably fewer than 10 individuals in the reach where the work is proposed) and the relative size of such structures compared to the space available to the animals, mortality due to boulder or large wood placement would be highly unlikely.

Culvert replacement may temporarily displace any turtles that occupy or are traveling through the stream reach in the immediate vicinity of the work, but such short-term disturbance (less than one operating season) would not be expected to affect the species.

The hazard fuel treatment unit (E2-1) is entirely within 0.5 miles of the species' aquatic habitat and covers 171 acres, except for a 25 foot no-treatment buffer on both sides of the stream (totaling 10 acres.) Treatment includes creating slash piles to be burned along Tennessee Gulch over approximately 161 acres, which may be burned during the period of hibernation of the western pond turtle. Any turtle that hibernates in the slash piles would likely not survive the pile burning as turtles are inactive and vulnerable to mortality. At most, the Proposed Action may cause a small amount of mortality in the local subpopulation should the burning of piles in unit E2-1 occur between October and April. Approximately ten percent of all piles would remain unburned, which would prevent mortality of turtles hibernating under those structures and all existing large down logs. Should the timing of burning these piles occur after the hibernation season (post May 1st), no mortality to pond turtles is likely to occur as a result of the Proposed Action. Since suitable habitat is common and this species is likely to be present in other riparian locations within the Project Area, the Proposed Action would not result in a trend toward federal listing or the need to elevate the level of concern.

Cumulative Effects

The environmental analysis for the Westside Timber Sale reported no effect to the species as the Aquatic Conservation Strategy, Riparian Reserves, and LSR guidelines are expected to provide habitat in the Planning Area and 5th field watershed. Cumulatively the changes caused to the local populations by the proposed current and foreseeable actions would likely not change the current population trends observed in this species because of continued loss of habitat from development on private lands and lack of recruitment due to bullfrog predation on neonates over most of the range of the species.

3.3.4 Northern Goshawk (Bureau Sensitive)

3.3.4.1 Affected Environment

The range of the northern goshawk is quite large (circumpolar over all the Northern continents). Home range of this species is several square miles. Goshawks are most often found nesting in mature stands with abundant platforms in the upper canopy. Because these structures are characteristics of many mature and old growth stands, goshawks frequently occupy the same stands as spotted owls. Juvenile spotted owls are sometimes a prey source to goshawks. Other prey sources for goshawks include passerines, hares, grouse, squirrels, and chipmunks (Marshall 2003). Fledgling goshawks have been observed within the Project Area.

3.3.4.2 Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects

The quality of goshawk habitat would continue to decline within the Project Area as forest conditions become denser and clearance for maneuvering through the sub-canopy encloses.

It is estimated by the silvicultural specialist, that stands would eventually develop into late successional habitat; however, it would take twenty to eighty years longer, depending on current stand conditions such as percent canopy closure and stand density compared to the Proposed Action. More uniform stands would take approximately eight decades longer and stands in which large tree dominance is already present would take approximately two decades longer than without treatment to reach a late successional condition. Some stands would continue to shade/crowd out some or most of the hardwood species, leaving the stands with reduced biodiversity of vegetation and, in turn, of goshawk prey.

In the event of a wildland fire, the lack of fuels treatments would increase the risk of stand replacement fire within the Planning Area. Catastrophic loss of vegetation would threaten late-successionally affiliated species which depend on these forest habitats for survival, reproduction, and dispersal.

Stands would likely be reviewed under future actions for commercial density management and/or hazardous fuels reduction. Temporary and permanent right of way construction would continue on BLM and private lands to allow private harvesting, resulting in removal of habitat.

Treatment of the riparian reserves for accelerating the development of late-successional habitat and benefiting riparian species, goshawks, and their prey species would not occur. Habitat development in the riparian reserves would be reduced as young tree competition increases for nutrients and space.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Up to 2,451 acres of silvicultural treatments, that would not downgrade late successional habitat, would benefit goshawks within the Project Area, as proposed activities would enhance clearance of maneuvering through the canopy. Optimal foraging habitat includes a portion of openings within the forest stand. Fuels treatments would produce the same type of clearing of the sub-canopy as commercial density management units. Habitat for goshawk prey species may decline for 3-5 years after hazardous fuels treatments until hiding cover and habitat for the prey species recovers. In the short term, downgrading 300 acres of late successional habitat may reduce the quality of goshawk nesting for 10-20 years until upper canopy closures are re-established. In the long term (beyond twenty years) proposed treatments would accelerate the development of late

successional stands by twenty to eighty years. Road construction or gating would not affect the species because of the bird's large home range, which is usually several square miles. Inoculation of trees and girdling up to 75 trees to create snags would have a beneficial effect on the species; however, such an effect would be minimal as the treatment is widely distributed throughout Project Area. Viability rating would remain high and unchanged on a provincial scale and would be enhanced on the fifth-field scale for the short term (up to 20 years after treatment until the understory recovers), (USDA/USDI 1994a 3&4 p179), since the species prefers a portion of openings within the forest stand and clearing of the sub-canopy layer for flight mobility. As such, the Proposed Action would not result in a trend toward federal listing or the need to elevate the level of concern.

Cumulative Effects

The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres. While this figure represents suitable owl nesting, roosting, or foraging habitat, its later-successional, closed-canopy conditions also act as an indicator of the relative amount of mature forest habitat available for goshawk nesting and foraging habitat. The cumulative removal and downgrading of 5,287 acres of suitable habitat combined with other foreseeable projects in this watershed is approximately 13% of the baseline. Remaining mature forested habitat on private land is not expected in the future to be suitable for goshawk use except for a limited amount of foraging, given a stand age rotation of 40-60 years. The cumulative degrade of 4,825 acres of suitable owl habitat with other foreseeable projects in this watershed would benefit goshawks by enhancing clearance of maneuvering through the sub-canopy while retaining a high enough canopy closure as to not create a negetative effect to the species. Viability rating would remain high and unchanged on a provincial scale and would be enhanced on the fifth-field scale for the short term (up to 20 years after treatment until the understory recovers), (USDA/USDI 1994a 3&4 p179).

3.4 Soils and Water Quality

3.4.1 Soils

3.4.1.1 Affected Environment

This watershed is located within 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 created steep canyons with slopes averaging 50-60 percent. National Resource Conservation Service (NRCS) Soils Survey Manuals for Douglas, Jackson, and Josephine Counties (1994, 1987, 1978) identify the steepness of the slope as a "Major management limitation" for many soil types and complexes with slopes at or above 30 percent. The Planning Area is mostly the Galice Formation, which is 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. On many of these soils, especially the schists, serpentine,

peridotite, and some sandstones, site productivity is regulated by nutrient inputs obtained from the organic layer. 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.

The NRCS Soil Survey Manual for Douglas, Jackson, and Josephine Counties (1994, 1987, 1978) revealed eight different soil types or complexes specific to the Middle Cow LSR Planning Area including: Acker-Norling, Acker, Josephine-Speaker, Beekman-Colestein, Dumont, Gravecreek, Jayar, and Kanid-Atring. Soils in this watershed are generally moderately deep with depths ranging from 20-60 inches to bedrock. Soil complexes range in slope from 12-30%, for Dumont, Acker, and some Gravecreek, to 50-90% for Acker-Norling, Josephine-Speaker, Beekman-Colestein, Jayar, Kanid-Atring, and some Gravecreek. These soil complexes are well drained with moderately slow permeability, and have a relatively high available water capacity. The Kanid-Atring complex is also well drained but has moderately rapid permeability. All of these soils have "hazard of compaction and erosion" identified as "major management limitations" in the NRCS Soils Survey Manuals (Douglas 1994, Jackson 1987, Josephine 1978). For all complexes except the Jayar, "steepness of slope" is also identified as a "major management limitation". Additionally, the steeper slopes of the Gravecreek and the Kanid-Atring soil complexes, which typically occur on slopes between 60-90%, are "highly susceptible to slope failure" where disturbed. Complexes that occur on slopes between 60-90% are also prone to erosion thus a minimum of disturbance is most suitable for forest management on these soils. Mass wasting and debris flows are uncommon within this Planning Area. Isolated slumps periodically occur on the wetter north and east slopes in these soils, and more regularly along the numerous geologic contact zones, fault zones and in association with midslope roads located on steep slopes. The Umpqua Basin Watershed Council Middle Cow Creek Watershed Assessment and Action Plan (2002) states that "(r)oads across steep slopes have more soil accumulating in the road ditches. The more soil (that accumulates) in the ditch, the greater chance of the ditch blocking, causing standing water and undermining the road surface integrity. In a worst-case scenario, this could cause the road to collapse." Roads across steep slopes are common throughout this Planning Area.

Productivity: Soil productivity is primarily the soil's capacity to support plant growth as reflected by some index of biomass accumulation. Losing a soil's plant growth capacity also means losing the site's ability to sustain timber production and other important ecological values. Litter, humus, soil wood, and certain key properties of the surface mineral layers of forest soils are most easily and commonly disturbed by yarding activities, yet they are crucial to forest productivity. Soil productivity is affected by soil bulk compaction, soil displacement, and by changes and reductions in soil nutrients. Soil compaction reduces soil productivity and vegetation growth rate by decreasing soil porosity and increasing density which in turn inhibits productivity by reducing water and nutrient holding capacity, root respiration, and microbial activity. The Medford District RMP/EIS provides a series of BMPs designed to prevent adverse levels of degradation to the soil resource and related productivity (USDI 1994, p.151). Medford District BMPs limit the amount of compaction to 12% of the harvested area, and limit productivity reductions to 5%.

Currently, within this Planning Area an estimated maximum of 4.3% (770 acres) of the soils within Quines Creek and 4.9% (1076 acres) of Whitehorse Creek Hydrologic Unit Category (HUC) 6 watersheds are disturbed to varying degrees due to past disturbance and road construction on both federal and non-federal lands (Medford Change Detection 1974-2002, field observations, and BLM project data)[3]. Compacted acres within the Quines Creek sub-watershed are currently estimated to be 3% (545 acres) of the sub-watershed, and in Whitehorse Creek 3.3% (727 acres) of the sub-watershed is estimated to be compacted[4]. Productivity loss from past harvest and road construction within these sub-watersheds is therefore approximated to be 2.1% (381 acres) in Quines Creek, and 2.3% (511 acres) in Whitehorse Creek[5]. It is important to note that the percentages listed here are calculated without any mitigating factors, such as Best Management Practices (BMP) or Project Design Features (PDF). For this project some amelioration of compaction and productivity would occur due to the application of BMPs and PDFs.

[3]For past harvests, disturbance was calculated by taking the total acres harvested by each yarding type, multiplied by a research derived percentage for the amount of disturbance created as a result of the various yarding techniques. These values were then converted into the percentage of acres that were disturbed within each HUC 6 sub-watershed (disturbed acres divided by total watershed or sub-watershed acres). Megahan (1980) found that clearcut tractor logging disturbed 21% of the ground and clearcut cable yarding disturbed 7%. For past disturbance the total amount of disturbed soil was calculated assuming that 60% of the units were tractor logged clearcuts, and the rest were cable yarded clearcuts. This method should result in an over-estimate because over 71% of these acres were cut over 10 years ago, so some reduction in bare soil, top soil erosion, and compaction has occurred as a result of revegetation. Additionally on federal land, many of these units were commercially thinned, following the implementation of the NFP in 1994. In commercial thinning units disturbance estimates are reduced by almost 40% when compared to clearcuts (for commercial thins tractor disturbance is 13%, cable disturbance is 4%, and helicopter disturbance is 1%) (Megahan, 1980). For estimated harvested acres observed in the field, and known acres that have been recently harvested between 2002-2006, disturbed ground was calculated using a 40% tractor, 55%, cable, and 5% helicopter yarding estimate to more accurately represent modern logging practices.

[4]For compaction calculations, disturbed ground was estimated to be 75% compacted on tractor units, 60% compacted on cable units, and 33% compacted on helicopter units, based on research from Sidle, 1980 (EPA Non-Point Pollution website). No research was found for compaction values directly related to helicopter yarding. However, dynamic lift balloons were found to "act in the same manner as an aircraft by developing lift as it is pulled ahead" (Logging Systems Guide, 1979). Therefore, for the purposes of this analysis, the relative impacts to soil disturbance found by Sidle (1980) for balloon yarding were used to approximate compaction effects of helicopters. It should be assumed that actual effects of helicopter yarding would be less than those listed for balloons. As such, compaction numbers attributed to helicopter yarding, and the subsequent productivity numbers, would likely be an overestimate. Road acres were assumed to be 100% compacted, and are based on a 20 foot road width.

[5]Productivity loss from timber harvest related compaction and topsoil disturbance was calculated as 50% of the disturbed area within units, based primarily on research by Froehlich and McNabb (1983), and calculated as a 100% reduction of productivity on road acres.

Road densities exceed the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NOAA Fisheries) target of 2 mi/mi^2 for streams to be in properly functioning condition for both sub-watersheds (NOAA Fisheries 2004). Whitehorse Creek sub-watershed road density was calculated using GIS at 4.8 mi/mi^2, and Quines Creek sub-watershed at 5.01 mi/mi^2. Roads were considered, during the analysis of baseline conditions, to be 100% compacted and a 100% loss to productive lands within this Planning Area. Roads acres were included in the above calculations for disturbance acres, compaction acres, and acres of productivity loss.

Fuels treatments, in addition to reducing the risk of uncontrolled fires, reduce the amount of vegetation competing for soil nutrients and water, thereby increasing site productivity.

Hazardous fuel treatments within this Planning Area are implemented to reduce fire danger within Wildland-Urban Interface (WUI) areas, and to improve stand health. These treatments reduce the likelihood of a more intense, uncontrolled wildfire from occurring However, 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). Removal of nutrient rich organic layers by fire, can also affect productivity locally. Between 1962 and 2004, 23 acres of fires were reported in this Planning Area. These were relatively small (size class A or B), with about 83% under 0.25 acres and 17% between 0.26 to 10 acres in size. 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. Acres that resulted in overstory canopy closures being primarily eliminated, and as such, detectable by satellite imagery, were included in the Medford Change Detection analysis. Where a majority of the overstory was not consumed by fire, satellite imagery did not identify open space conditions, and thus these acres were not included. Commercial density management treatments also benefit soil productivity by effectively increasing water and nutrient availability. Many of the stands within this Planning Area are currently showing reduced growth rates as a result of overstocked conditions that are causing competition for soil nutrients and water. Commercial density management units would have a low percentage of short term localized productivity losses where yarding corridors occur. However, these corridors generally only affect a small percentage of the stand and the subsequent overall increase in the vigor and growth rates of the remaining trees makes commercial density management a valuable tool to increase productivity.

Erosion and Sedimentation: Soils in this Planning Area are generally stable on most hillslopes under 65%, in both forested stands and riparian areas and are not actively experiencing a great deal of erosion. However, slopes over 65% are common within this Planning Area. Forest management activities related to timber harvesting such as yarding corridors, skid trails, temporary road construction, road use, culvert replacements, road improvements, and decommissioning, can result in accelerated erosion on all soil types within this Planning Area. The NRCS Soil Survey Manual (Douglas 1994, Jackson 1987 Josephine 1978) states that the steepness of these slopes and the hazard of compaction and erosion associated with timber management activities on these soils is a concern. Timber harvest activities can remove ground litter and topsoil, displace, and compact soils. Where logging operations result in exposed soil, surface erosion can occur when rain splash or overland flow causes the detachment of soil particles during wet conditions (sheet erosion), or when gravitational and wind movement causes detachment of particles during dry whether conditions (dry ravel). In addition to reducing productivity, displaced soil often becomes mobilized, potentially accelerating sediment delivery to streams. Vegetative cover reduces the particle detachment rate, and through the binding capacity of root masses, the sediment transport rate [Spence 1996 (Larson and Sidle, 1981; Harvey et al. 1994)]. Therefore surface erosion, from disturbed soils that are not compacted, is normally greatly diminished within 1-3 years, following the regrowth of vegetation and regrowth/infiltration of root masses. Additionally, there are management techniques that will greatly reduce the amount of erosion from a timber management operation. For example, soils protected by litter are less prone to erosion (SOLO, 2006; Rothacher and Lopushinsky 1974). Therefore by limiting the amount of surface disturbance and the amount of exposed soil, erosion can be reduced. The Medford District RMP/EIS recommends several BMPs to guide federal forest projects that are designed to reduce the

amount of ground that is disturbed during timber management activities, as well as the amount of erosion that moves off-site. Implementation of the PDFs such as waterbars, seeding, and mulching would substantially reduce the erosion potential from rain splash and channeled surface flow at these sites. Subsoiling of skid trails, also a PDF, would ameliorate site productivity up to 80% within one to two years that would otherwise remain unproductive for one or more decades and become chronic sources of sediment where they are in close proximity of the stream.

Because timber harvest activities on non-federal lands generally result in a greater amount of exposed soils, surface erosion from past disturbance activities on non-federal lands would be expected to result in a greater amount of erosion, and an increase in the offsite transport of this erosion, than would occur on federal lands which are managed using more restrictive BMPs and PDFs. This would result in a moderately high risk of stream sedimentation for about 1-3 winters, becoming minimal within 3-6 years following harvest due to rehabilitation measures and the reestablishment of vegetation and organic matter over bare soils. Approximately 4,956 acres (58%) of past disturbance within this planning area is on non-federal lands. Of these acres, approximately 1,215 acres (3% of the combined total acreage of Whitehorse, and Quines Creek HUC 6 watersheds) are estimated to have been clearcut harvested on private land in the last 6 years. Because these sites should be planted within 3 years as required under the Oregon Forest Practices Act, and be “healthy and out-competing other vegetation within 6 years”, it would be expected that these acres cut in the last 6 years (up to 3 years to plant, and up to 3 years for root systems to become established and provide structural support for soils) would be contributing most of the sediment entering streams from non-road related surface erosion.

Roads modify hydrology both through interception of precipitation on the road surface, and through interception of subsurface flow (Wemple and Jones, 2003 [Megahan and Clayton, 1983]). This can cause increased channelization of hillslopes and mass wasting (Wemple and Jones, 2003). Un-maintained and poorly maintained roads, and natural surface roads used for winter haul, are the largest ongoing sediment sources in this watershed (USDI 1999). Un-vegetated ditchlines, road surfaces, and cross drains all mobilize eroded soils. Ditchlines along roads also increase the rate of transport of intercepted water to stream channels. Studies have shown that roads can contribute 50-80% of the sediment that enters streams (Hagans et al., 1986). Over 63% of all roads in the Whitehorse Creek HUC 6, and about 39% of all roads in the Quines Creek HUC 6 are natural surface or rocked roads. In the Middle Cow Creek HUC 5, 53% of streams are within 165 feet of a road. Many of these roads cross streams, or have cross drain culverts that connect with streams and riparian areas, meaning that the hydrologic connectivity between the roads and streams is relatively high in this watershed. Relatively high fine sediment loads, found during ODFW Stream Habitat Surveys in portions of Blackhorse, Tennessee Gulch, Little Bull Run, and portions of Whitehorse Creeks in this Planning Area, would be expected to commonly be a result of erosion from road use and maintenance on these hydrologically connected roads.

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 within the organic matter, microbes, fungal filaments, woody debris, and roots in the soil matrix (Barnett, 1989).

Some signs of accelerated erosion can be seen within this watershed on sites that have previously burned, however, most recent fires within this watershed have been relatively small, and many have been quickly suppressed, reducing the amount of area prone to severe burning. Where present in these watersheds, most of these sites appear to have partially recovered with the re-growth of vegetation and water retaining organic ground cover, such as logs, branches, and other forest debris. Ongoing and proposed fuels treatments in this Planning Area help to reduce the probability of a large scale wildfire event that would result in fire related erosion.

Mass Wasting: Within this Planning Area, slide areas are found primarily at contact points between different geologic formations, near faultlines, or in association with roads. The risk of large scale mass wasting within this Project Area is low, as soils in this region are generally not prone to debris flows or other large scale events. In general, relatively small slumps and slides are the only form of mass wasting that occurs within the Whitehorse and Quines Creek. Roads increase the risk of small slumps or slides, especially if they are not outsloped, or near a ridge, or have poor drainage. Timely culvert and cross drain maintenance is important to keep channelized water from backing up behind the road fill and causing the roads to fail. Road densities are relatively high in these sub-watersheds (Whitehorse Creek 6sw at 4.8 mi/mi^2 and Quines Creek sub-watershed at 5.0 mi/mi^2) and a majority of these roads are located below ridges where subsurface water can be intercepted and re-routed to ditchlines and cross drains, which can increase the risk of failure.

3.4.1.2 Environmental Effects

Alternative 1 (No Action)

Direct and Indirect Effects

Productivity – Under this alternative, existing compacted acres on federal lands would continue to slowly improve over time as tree roots, and other natural processes begin to break apart soil particles and restore porosity. No additional compaction would be created on federal lands by yarding corridors or temporary road construction. However, there would be no reduction in the existing compaction as a result of decommissioning, or from subsoiling of existing tractor and skid trails. Timber yarding and road building would continue to reduce productivity on non-federal lands within this watershed. Road building across federal land may also occur to allow access to private land owners. Fuels and density management treatments that reduce vegetative competition, accelerate LWD development, increase site productivity would not occur. Hazard fuels reduction projects that reduce the likelihood of a higher intensity, large scale uncontrolled burn would also not occur, under this alternative.

Erosion and Sedimentation – The pattern of erosion would be unaltered under the No Action Alternative. Existing chronic sediment sources currently present on hydrologically connected, natural surface roads throughout this Planning Area would continue. Because only scheduled maintenance would occur under the no action alternative many roads would continue to deteriorate and erode over time. This alternative would eliminate the erosion that occurs during road decommissioning, maintenance, and reconstruction, culvert replacement, and stream restoration work (placing boulders and large woody

debris into a stream). There would not be the increased erosion that occurs due to federal timber yarding operations. However, dense, stagnant stands would continue to develop larger amounts of dead and dying trees as stands continue to compete for already limited water and nutrient resources. Clear cutting on non-federal lands would be expected to continue. Long term fire hazard would continue to increase since only minimal hazardous fuels treatments would occur in conjunction with other ongoing projects in this Planning Area. This increased fire danger would slightly increase the chance of dry ravel and rill erosion sites associated with severe fire activity from developing.

Mass Wasting - No roads would be added or removed under Alternative 1. Road maintenance and improvements, such as replacing failing cross drains, that can become clogged, thereby reducing drainage efficiency, and cause roads to slide, would only occur on a limited basis under the Glendale Resource Area transportation maintenance plan. Roads would continue to deteriorate, increasing the likelihood of slumps or slides over time. Without fuels reduction treatments, there would be an increased likelihood of a large scale high intensity fire that could destroy large trees, and their root systems, which typically help to stabilize soils. As such, this alternative would not reduce the risk of mass wasting.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Productivity: Minimizing the amount of soil compaction and top soil displacement would generally improve stand development and watershed hydrology. The Medford District RMP/EIS provides a series of BMPs designed to prevent adverse levels of degradation to soil resources and related productivity (Vol. 2, pp. 30). Following these BMPs keep soil impacts within the guidelines of the RMP. Project Design Features ensure that compaction and productivity loss remain below RMP requirements at the unit scale, therefore this analysis was done to ensure compliance at the Planning Area level. This alternative would result in soil compaction and top soil erosion that would reduce localized areas of soil productivity. For the commercial density management units, proposed under Alternative 2, the amount of disturbed land would result in compaction on approximately 15.9 acres of tractor yarding corridors, 24.2 acres of cable yarding corridors, up to 3.8 new temporary road acres (to be decommissioned after use), and up to 2.5 acres of landing sites (to be decommissioned after use) - all totaling approximately 46.6 additional acres of compaction (or 0.12% of the Planning Area). Together, the incremental effects of compaction caused by these activities would reduce productivity above existing levels in Whitehorse Creek HUC 6 sub-watershed on approximately 26.8 acres (0.13%), and in Quines Creek sub-watershed on about 4.4 acres (0.02%). The amount of productivity loss due to these proposed projects for the Planning Area would include approximately 31.2 acres from yarding impacts, 2.5 acres from landings, and 3.8 acres from temporary road construction- all totaling approximately 37.5 acres of productivity loss (or 0.09%). (See section 3.4.1.1 under Productivity for an explanation of processes to derive productivity and compaction numbers). Scarifying new skid roads and sub-soiling existing skid roads would reduce compaction on these sites by as much as 80% (Froehlich and Miles 1983; Davis 1990), substantially restoring the infiltration and routing of water and nutrients into the soil.

Management of two units (10-1 and 21-2) within the Middle Cow LSR Project Area would require entry through the EPZ to access the unit.

For unit 21-2 a maximum of 24 feet (average of 2 corridor widths) would be opened up in the non-tractor portion of the unit within the EPZ for access. Treatment would require full suspension within the EPZ and would not result in any ground disturbance or compaction. As a result, there would not be any productivity loss. Should entry through the EPZ be needed in a portion of unit 10-1, access would be limited to one corridor (i.e. skid road), and skid road would be ripped and rehabilitated following use. There would be approximately 0.03% productivity loss as a result of compaction.

The proposed hazardous fuel reduction treatments (2,501 acres) and commercial density management treatments (1,236 acres) would reduce the amount of vegetation competing for soil nutrients and water, thus increasing site productivity. Pile burning activities associated with these treatments may result in short term isolated patches of exposed soil where much of the small and large organics in the localized site are reduced. These areas quickly regenerate, usually within the first year, with pioneer species recruited from the surrounding area. Underburning activities are of low intensity and generally leave a large portion of the larger organics and a mosaic of smaller organics on site. In the long term, maintenance underburns help sustain the productivity of the site by preventing future accumulations of competing vegetation. Additionally, hazardous fuel treatments reduce the likelihood of a high intensity, large scale wildfire from occurring, which could have long term detrimental effects to productivity on severely burned acres.

Erosion and Sedimentation: Measuring the amount of sedimentation that results from the movement of eroded materials offsite and into streams has generally been unsuccessful, and there is no known research data, relative to this region, that is able to provide this information. For this reason, erosion, and subsequent stream sedimentation, has been done in this analysis using the Medford District RMP guidance which states that projects will be in compliance with the Oregon water quality standards, and ACS objectives under the NWFP, where BMPs are implemented to minimize the amount of eroded material, and the transport of that material offsite (USDI 1995, p.151).

All disturbed land that results in bare soil conditions or compaction would have the potential for erosion; however, implementing rehabilitation of skid trails, would reduce the amount of erosion that occurs to the point where compaction would not exceed 12%, productivity losses do not exceed 5%, and Oregon Department of Environmental Quality (ODEQ) water quality standards are not exceeded. BMPs and PDFs used in this project would also be expected to keep nearly all erosion resulting from yarding corridors, landings, and temporary road construction, primarily onsite, or within adjacent downslope vegetation and Ecological Protection Zones (EPZ). Ecological protection zones within riparian reserves would further act to keep erosion from entering waterways except in cases where buffers are compromised by hydrologically connected roads. Where hydrologically connected roads occur, other measures such as rocking of the road surface, and seasonal use restrictions would minimize the amount of sedimentation, keeping it within ODEQ water quality standards and levels anticipated within the RMP/EIS. This would also be expected for road maintenance, reconstruction, and use of roads that do not have a direct hydrologic connection to a stream.

Timber harvest and hauling operations would result in an increase in surface erosion within harvested stands and along roads. Additional erosion would be caused by logging traffic on up to 62 miles of unpaved haul roads, construction and decommissioning of 1.6 miles of temporary road, and the reconstruction and building of 2.5 acres of landings. Road maintenance and reconstruction on up to 62 miles of road (natural, rocked, and paved) would also cause some localized erosion. The amount of eroded material created and transported off site from the construction, decommissioning, reconstruction, maintenance, and use of roads would be reduced by implementing BMPs that would seasonally restrict activities where excessive erosion is likely, and rehabilitate or, if needed, winterize landings prior to fall rains, and as a result would be expected to have an immeasurable effect on water quality in the long term (2 or more years). Sediment levels should be undetectable above background levels after the first high water following project completion, which is generally in 1 to 2 years. Erosion should be undetectable above background levels after pioneer vegetation re-establishes disturbed areas and site stabilizes, which is also usually 1 to 3 years). Sediment effects from road activities would not be expected to exceed ODEQ water quality standards due to the use of BMPs during the implementation of these projects. BMPs are designed to minimize erosion and protect water quality and would generally reduce chronic erosion problems produced by poor surface drainage and wet season use, and improve drainage patterns by clearing plugged culverts and replacing insufficient cross drains along roads.

Natural surface haul routes would be spot rocked or seasonally closed, as necessary, to reduce surface erosion. There would also be an increase in erosion from approximately 61 acres of yarding corridors. Erosion from these activities would be moderated by seasonal restrictions, a requirement of one-end suspension for yarding, and the use of erosion control methods such as seeding and mulching. Also, all yarding corridors with more than 50% exposed mineral soil would be rehabilitated following harvest using waterbars, mulch, and seed as necessary to prevent gully erosion. Tractor logging would only occur on slopes less than 35%, and would not occur within ecological protection zones (there are two exceptions to this, see section 2.2 and 2.4.7.1 for a further explanation). As a result, erosion from these actions would be expected to primarily remain on site and would be within Oregon water quality standards.

The decommissioning of approximately 0.8 mile existing road and 1.6 miles of temporary new road, as well as the maintenance and reconstruction of up to 62 miles of roads which are currently in vary in condition and level of deterioration, would be expected to cause some erosion to occur during the implementation of these projects, but would ultimately result in reduced sediment due to erosion. The proposed gating of 3.6 miles of natural surface road, would cause little, if any erosion to occur, and though it would not completely eliminate the erosion from off the site, it would greatly reduce the amount of erosion currently being created by wet season use on these roads.

Fire hazard would increase in the short term on the 1,236 acres of commercial density management acres until the slash is mitigated, usually within six months to two years. This increase in ground fuel load would be mitigated through pile/pile burn/under-burn fuel reduction or lop-and-scatter methods. These activities would be of low intensity, and would leave a portion of the ground cover organics in place. Studies have shown that there are no significant losses of organic matter with light, and moderately-light burns, and/or wet soil conditions (Burnett 1989 [Neal et al. 1965]). Treating timber harvest

slash and an additional 2,501 acres of hazardous fuels treatments would reduce the chance of dry ravel and rill erosion sites developing as a result of the severe fire activity that is associated with heavy fuel loads, and dry weather burning conditions would be reduced for approximately 5-10 years following treatment of these acres. All hazardous fuels treatments are within the Wildland-Urban Interface (WUI) where an increased risk of wildfire ignition exists.

Under this alternative there are four culverts due to be replaced and one in-stream habitat project. These projects would be expected to cause a localized short term increase in sediment that would enter Russell Creek, Whitehorse Creek, and Tennessee Gulch. Effects to these creeks will be discussed under Water Quality (section 3.4.2). Most of the sediment produced from these projects is expected to be removed with the first high water event following completion of the project, usually within 1-2 years. As a result of culvert replacement, and riparian and road restoration activities, a reduction of sediment beyond current levels should be seen within the first year.

Mass Wasting: Alternative 2 could potentially increase the risk of a small, isolated slide or slump occurring, mainly near the fault contacts in units 15-2, and 30-2 or where harvest methods on steep slopes result in a loss of vegetative root structure. The increased risk of slumps or slides would last until vegetative regrowth stabilized the site-generally 1-3 years until root mass structure developed enough to penetrate the soil horizon. It is unlikely that the addition of 1.6 miles of temporary roads would further impact hydrologic drainage patterns given that proposed locations are primarily along ridge tops. Additionally, BMPs for road building, including design techniques to reduce impacts, and the requirement that constructed roads would be subsoiled, mulched, and seeded upon completion of the project, the risk of a slope failure as result of these roads would be minimal. Road and culvert maintenance on up to 62 miles of road, would help to reduce the risk of a road initiated slide by ensuring that cross drains, ditchlines, and culverts are all properly routing water downslope away from the road. Since these activities would generally thin from below and not result in less than 30% canopy cover, and through the close adherence to BMPs, as well as, following management actions/directions listed in the Medford District RMP the chance of a slump or slide occurring as a result of these activities is very small. Implementation of proposed fuels reduction treatments would reduce the risk of a high intensity large scale fire occurring, thus reducing the chance of mass wasting event within and adjacent to the treated acres.

3.4.2 Water Quality

3.4.2.1 Affected Environment

Elevations range from approximately 1,500 feet at the base of the Quines Creek HUC 6 to 5,100 feet on top of King Mountain in the headwaters of Quines Creek. The nature of the landscape within these sub-watersheds is generally steep, narrow ridges with slopes averaging between 30-70%. The transient snow zone (TSZ) in these sub-watersheds occurs from about 2,500 feet on average, to the top of watershed. Precipitation within the Planning Area ranges between 35 and 60 inches per year, primarily between October and March. Designated beneficial uses in this Project Area include private water supplies,

irrigation, industrial water supplies, livestock watering, fish and aquatic life, wildlife and hunting, boating, fishing, and water contact recreation, aesthetic quality, and hydropower.

Canopy closures over 30% are not considered to be open space for the purposes of hydrologic functions such as peak flows or water yield increases (WPN, 1999). Within this project area most commercial density management is expected to be from below and all prescriptions direct canopy closures to remain above 30%. Therefore, it is not expected that either commercial or non-commercial treatments within this project would affect peak flows or water yield.

Sedimentation and Turbidity: Where they are hydrologically connected to streams, all sources of upland erosion, discussed in the soils section, are causing sedimentation within streams to be above natural levels in this Planning Area. The Medford District RMP/EIS contains a list of BMPs and management actions that are designed to both reduce the amount of soil displaced and the amount of sediment that enters the streams as a result of timber harvest, road use, construction, decommissioning, and maintenance, culvert replacement, prescribed fire, and others. These activities would not be expected to cause enough sediment to enter any one stream for ODEQ water quality standards to be exceeded due to the wide distribution of the proposed acres and implementation of PDFs and BMPs that are designed to limit the amount of erosion, subsequent sedimentation, and retain upslope erosion predominately onsite. Currently this standard is based on the turbidity within a stream. A complete description of this standard is available at www.epa.gov/waterscience/criteria/sediment/appendix3.pdf., but effectively states that cumulative increases in turbidity below the project cannot exceed baseline stream turbidities by more than 10%, as measured by a control point immediately upstream of a project. ACS objectives allow for a short term, localized impact, if that impact is intended to result in a long term (as defined by the different resources affected) improvement to water quality and aquatic habitat. Logging activity on non-federal lands is done in accordance with the State of Oregon Forest Practices Act.

Research indicates that roads are the most critical impact to a watershed in regards to hydrology and peak flow changes (Church and Eaton, 2001). Therefore an assessment was done to evaluate the risk of hydrologic changes resulting from roads individually. The analysis completed revealed that Whitehorse Creek sub-watershed currently has a road density of 4.81 mi/mi^2 and Quines Creek has a road density of 5.01 mi/mi^2. This equates to a roaded area of 1.9% in the Whitehorse Creek sub-watershed, and 2% in the Quines Creek sub-watershed. According to a studies by Bowling and Lettenmaier (1997), Harr et al. (1975) and others, measurable increases in peak flows from road acreages alone are generally not seen until roads occupy at least 3-4% of the acres within small (175-750 acres) watersheds (WPN, 1999)- or approximately equivalent to a small HUC 7 drainage (Harr et al. found in one study that 12% is necessary for measurable increases (WPN, 1999)). The USFS, NMFS, and others collaboratively created list of factors and trigger points for assessing watershed health (NMFS 2004). It identifies watersheds to be properly functioning when road densities are less than 2 mi/mi^2 and not properly functioning when road densities reach 3.0 mi/mi^2.

Studies have shown that roads can contribute 50-80% of the sediment that enters streams (Hagans et al., 1986). Roads modify hydrology both through interception of precipitation on the road surface, and through interception of subsurface flow (Wemple and Jones,

2003 [Megahan and Clayton, 1983]). Channelization of this flow across poorly drained natural surface roads, and in ditchlines and cross drains, has led to gully formation and slumping in some hillslopes within this watershed. Un-maintained and poorly maintained roads, and native surface roads used for winter haul, are the largest ongoing sediment sources in this watershed. Currently about 50% of the streams in this HUC5 watershed are within one tree length of roads. Over 14% of the roads within the Whitehorse Creek HUC 6, and about 5.2% of the Quines Creek HUC 6 are natural surface; over 49% of Whitehorse Creek and 33% of Quines Creek roads are rocked. Many of the roads in this project area are in need of resurfacing or drainage improvement. Un-maintained and poorly maintained roads, and natural surface roads used for winter haul, are the largest ongoing sediment sources in this watershed. Studies have shown that roads can contribute 50-80% of the sediment that enters streams (Hagans et al., 1986. Roads also modify hydrology both through interception of precipitation on the road surface, and through interception of subsurface flow (Wemple and Jones, 2003 [Megahan and Clayton, 1983]). Channelization of this flow in ditchlines and cross drains, has led to gully formation and slumping in some hillslopes within this watershed. Roads, due to their connectedness with the stream network, are contributing sediment to streams. Based on habitat surveys, excessive sediment is thought to currently be reducing habitat suitability for fish, amphibians, and other aquatic vertebrate and invertebrate species.

3.4.2.2 Environmental Effects

Alternative 1 (No Action)

Direct and Indirect Effects

Sedimentation and Turbidity – Sediment inputs to streams would not be altered as a result of the No Action alternative. Under the No Action Alternative there would be no instream projects that result in a short-term increase in sedimentation. There would also not be any habitat restoration activities or any projects that would result in a long-term sediment reduction of sediment. No roads would be built, decommissioned, or renovated. There would be no short-term addition of sediment to streams from road construction, maintenance, decommissioning, or hauling. However, the beneficial long-term effects of reducing stream sedimentation by improving road drainage would not occur, and present levels of erosion and sedimentation on BLM lands within the Project Area would continue, and most likely increase over time. Timber yarding, road building, and log haul on non-federal lands would also continue to add sediment to streams within this watershed. The risk of sedimentation from road failure would continue to increase in some locations.

Wildfire hazard would not be reduced within this Planning Area in the long term as a result of this alternative. Within the riparian reserves, severe fire activity that is associated with heavy fuel loads, and dry weather burning conditions would increase the amount of exposed soils thereby increasing the chance of sediment entering the streams from dry ravel and rill erosion.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Sedimentation and Turbidity:

Studies have shown that "the predominant factors which influence the relationship between on-site erosion and sediment delivery (to the streams) are slope and width of effective buffer strip to trap sediment (Amaranthus, 1981)". Once sediment is mobilized and introduced into the drainage network (via roads, ditchlines, and channels) it is transported and routed through streams (generally with gradients >3%) and deposited in streams with low gradients (generally gradients <3%) (Montgomery and Buffington 1993). The Medford District RMP/EIS contains a list of BMPs designed to both reduce the amount of soil displaced and the amount of sediment that enters the streams as a result of timber harvest, road use, construction, decommissioning, and maintenance of roads, prescribed fire, and others (Vol 2, pp.31). The distribution of proposed activities throughout the Planning Area, along with following the management actions/directions in the Medford District RMP/EIS, and the use of BMPs listed in this EA, would limit erosion and the subsequent sedimentation from moving off-site and entering streams. By using the Ecological Protection Width Needs Chart (B-15 of the ROD) and limiting the amount of exposed and compacted soils in each unit, the eroded material that enters streams is considerably reduced. The Ecological Protection Width Needs Chart takes into consideration riparian processes such as "streamside erosion, fluvial erosion of the stream channel, soil productivity, habitat for riparian dependant 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".

BMPs and PDFs used in this project are expected to keep nearly all erosion resulting from yarding corridors (maximum of 63 acres of disturbed ground); 2.5 acres of landings; 1.6 acres of temporary road construction; 0.8 miles of existing road decommissioning; 62 miles of road maintenance and reconstruction; and log hauling on 59.3 miles of native and rocked roads, primarily onsite or within adjacent downslope vegetation and Ecological Protection Zones (EPZ). Ecological protection zones within riparian reserves would further act to keep erosion from entering waterways except in cases where buffers are compromised by hydrologically connected roads. Where hydrologically connected roads occur, other measures such as rocking of the road surface, and seasonal use restrictions would minimize the amount of sedimentation, keeping it within ODEQ water quality standards and levels anticipated within the RMP/EIS. This would also be expected for road maintenance, reconstruction, and use of roads that do not have a direct hydrologic connection to a stream.

Decommissioning of an additional 0.8 miles of road would further reduce sedimentation beyond existing levels, delivered via ditchlines and road surface erosion, by increasing infiltration through subsoiling, dispersing surface flow with waterbars, and increasing vegetative cover on these acres. Road maintenance and reconstruction would also reduce chronic sedimentation by improving surface drainage, rocking or spot rocking native surface and deteriorating roads, and by replacing and upgrading cross drains.

Other sources of stream sedimentation are an instream habitat enhancement project in Tennessee Gulch, and the replacement of four culverts. These projects would be expected to cause a localized short term increase in sediment that would enter Russell Creek, Whitehorse Creek, and Tennessee Gulch. Most sediment is removed with the first high water event following completion of the project- generally within 1 to 2 years. After that time there would not be any measurable affect to water quality as a result of these projects. Solazzi, M.F., Nickelson, T.E., Johnson, S.L., and Rodgers, J.D. 2000. Effects of increasing winter rearing habitat on abundance of salmonids in two coastal Oregon streams. Canadian Journal of Fisheries and Aquatic Sciences 57: 906–914.
These activities would meet all water quality objectives at the HUC 6 scale. When effects are present, they are more apparent at the smaller HUC 6 scale than at the HUC 5 scale. Since measurable effects at the HUC 6 scale are not expected occur as a result of this project, it can therefore be presumed that the effects from this project would be consistent with the ACS objectives at the HUC 5 level, which are designed to maintain and improve aquatic habitat in the long-term at this scale.

Management of units 21-2 and 10-1 could result in treatment within the Ecological Protection Zone (EPZ). For unit 21-2 mobilized sediment would be caused by hauling, along the native surface road (#32-4-20.2), along with landing use, and construction of water dips. Due to the narrow vegetated strip that currently exists between the road and stream it can be expected that some of the mobilized sediment would reach Hogum Creek, but would not exceed ODEQ water quality standards. Sediment increases would be most predominant and concentrated with the first significant high water event following completion of the project (generally 1 to 2 years). However, rocking and installation of water bars would greatly reduce the effects to the stream of any mobilized sediment. For upland treatments, there would be some mobilized sediment until bare areas are sufficiently revegetated and stabilized (most likely within 1 to 3 years). Soil stabilization increases with root growth because established vegetation with deeper and stronger roots has better ability to hold soil when a rain event occurs. Since the treatments within this Project Area would not result in large amount of exposed soil in any one area, then generally well established early seral (“pioneer”) vegetation would be sufficient to prevent soil movement. Since there would not be any ground disturbance within the EPZ any sediment mobilized from upland treatments that was not redirected via waterbars within the unit would most likely be filtered by the vegetation within the EPZ. Any sediment reaching the road would be redirected into a vegetated buffer strip by waterdips.

For unit 10-1 if needed there would be a single corridor constructed within the EPZ. This would result in some ground disturbance. Following the BMPs, along with restricting landing areas to be located outside of the EPZ would limit the effects of sediment to streams.

The proposed activities are not expected to cause any stream in the planning area to exceed Oregon Department of Environmental Quality water standards, and would be within the ACS objectives at the HUC 5 level.

Cumulative Effects to Soils and Water Quality (Alternative 2)

Because ODEQ water quality and soil productivity standards under the RMP are at the project level, cumulative effects of these environmental elements have been analyzed at the scale of the Planning Area, which includes two HUC 6 sub-watersheds for this project. Analyzing these elements of the environment at the HUC 5 scale alone would be too dilute to be measurable or detectable and therefore analyzing at a smaller scale is more effective in detecting the presence of any impacts to natural resources. The project area is evaluated along with other activities within the Planning Area, to determine if effects would degrade aquatic and riparian habitat which would exceed ACS objectives (as measured at the HUC 5 scale). If there are no detectable effects found to be occurring within either of the HUC 6 sub-watersheds that make up this planning area, then there would also be no detectable effects from this project on aquatic species at the HUC 5 scale. Each HUC 6 has been analyzed separately for direct and indirect effects within the sub-watershed. Cumulative effects of this project would therefore be a combination of these past, proposed, and foreseeable activities effects, as well as the effects of any other federal or non-federal projects within these two sub-watersheds.

Open space analysis for this Planning Area was done for the years 1974-2002 using a satellite imagery tool called Medford Change Detection. This tool detects open space acres within watersheds that currently have limited canopy closure conditions (generally less than 30%) and are likely to be affecting hydrologic processes. All disturbance created openings determined to have occurred between the above stated years (last year of Change Detection data), along with data from ODF New Notifications, and estimates from field observations are included as open space under this analysis. Actions that were considered hydrologically relevant were included in this analysis. Only forested acres that would be expected to recover, such as those acres disturbed by timber harvest, newly constructed roads, or wildfire, are considered during this analysis. All “permanent openings” such as historic agricultural lands (older than 32 years), rock outcrops, and other un-forested acres are excluded from this open space analysis based on the determination that channel morphology within these watersheds would have already reached a state of dynamic equilibrium i.e. a condition to which the watershed has previously adapted. The Medford Change Detection tool does not explicitly take into account that hydrologic recovery is occurring as stands age and revegetate. It does however group together a range of years in which the open space was created (1974-1984, 1984-1989, etc.). Forest vegetation is generally considered to be in an advanced stage of hydrologic recovery 20 years after disturbance, and substantially complete by age 30 (Harr, 1989; Adams and Ringer, 1994). Therefore, it is likely that some acres included in this analysis are partially recovered. However, the extent of this recovery is impossible to ascertain without site specific analysis and research. Hydrologic recovery is considered to be the point at which hydrologic processes such as peak flows, runoff timing, and water yields within a harvested stand have returned to pretreatment conditions.

Past events in these HUC 6 sub-watersheds created approximately 12,640 acres, or 31.5%, of open area between 1974 and 2006. Current information on cleared acres since 2002 has not yet been incorporated into the Medford Change Detection GIS system, which was used to assess open space between 1974 and 2002. The estimated number of open space acres that occurred between 2002 and 2005, were based on recent field

observations. Acreage from 2005 to the present was instead based on recent field observations and data from an Oregon Department of Forestry (ODF) New Notifications and Renewals reports for December 1, 2005 and February 2, 2006. It is not likely all acres listed within the ODF New Notifications and Renewals reports would be harvested by the end of 2006. Given that the ODF reports indicate approximately 1090 acres were scheduled for clearcut harvest at the beginning of 2005, and over 1200 acres have been harvested on non-federal lands between 1999 and 2002 (last 3 years of Medford Change Detection), it can be assumed that a majority of those acres will be harvested by the end of 2006. Therefore, for the purpose of analyzing disturbance, compaction, and productivity loss within this Planning Area, all acres listed in the reports were included as current harvested acres and not as future acres. A variety of yarding techniques (cable, tractor, and helicopter), in combination with road construction, account for the calculated increases. Disturbed ground on non-federal land was calculated using a 40% tractor, 55% cable, and 5% helicopter yarding estimate to more accurately represent modern logging practices. Constructed landing and road acres were assumed to be 100% compacted and have 100% productivity loss. Field observations estimate a minimum of approximately 730 additional acres have been harvested on non-federal land since 2002. These acres have resulted in approximately 90 acres of disturbance, 62 acres of compaction, and 45 acres of productivity loss. The ODF New Notifications and Renewals reports estimated approximately 2,610 additional acres from clearcut and commercial thin harvest units and an additional 8.25 constructed road acres. This would result in approximately 263 acres of disturbance,195 acres of compaction, and 140 acres of productivity loss. Together, these operations are estimated to have increased the amount of open space in the Middle Cow LSR Planning Area from approximately 23% in 2002 up to approximately 31.5% by the end of 2006. (Quines Creek increased from 20.5% to 28.6%, Whitehorse Creek increased from 25.4% to 34 %). For future activities on non-federal land, GIS was used to estimate the current number of forested acres of non-federal land within this planning area which are presently at, or nearing, the current rotation age of 40 years. It was determined through this process that based on stand age approximately 16,600 acres could be available for harvest within this Planning Area. Using the maximum number of acres harvested in the past within this Planning Area since the implementation of the NFP (1200 acres over 3 years), it was assumed that up to 2000 acres could potentially be harvested within this Planning Area during the next 5 years (maximum life of this project). Up to 246 acres land disturbance would be expected to occur within this planning area in conjunction with the 2000 acres of future non-federal harvest that was estimated to occur based on GIS and trend analysis, during the next 5 years. These future activities, occurring independently of the proposed Middle Cow or Westside BLM projects would also be expected to result in compaction on up to 170 acres of ground and productivity losses equivalent to up to 123 acres. Some of the 1500 acres of commercial thin and 1080 acres of clearcut harvest that are reported in the ODF New Notifications and Renewals are likely being double counted with the 2000 acres that were estimated for future harvest on non-federal lands using GIS. However, there is no way to determine the number of acres that this would apply to, so all acres have been included to determine the maximum possible disturbance, compaction, and productivity losses that could potentially occur in the next 5 years

The Middle Cow LSR Project proposes commercial density management within the Quines Creek and Whitehorse Creek sub-watersheds. This project would not create open space because canopy cover would not be taken below 30% (a majority of units would

remain above 40%), but would result in approximately 46.6 acres of compaction, 37.5 acres of productivity loss, and 62 acres of disturbed soil (i.e. exposed or displaced top soil) as a result of yarding corridors from commercial density management on 1,236 acres. The Westside project-concurrent with this Middle Cow LSR project proposes a maximum of 3,375 acres of commercial logging; 1,650 of these acres are proposed for regeneration harvest or overstory removal. An additional 11 acres of soil disturbance, 9 acres of compaction, and 7 acres of productivity loss would occur as a result of harvest activities associated with 32 acres of commercial thin and 124 acres of RH/OR within the Quines Creek HUC 6 sub-watershed. The combined percentage of disturbed soils in the Whitehorse Creek and Quines Creek HUC 6 watersheds, including all known past, present, and future operations on federal and private lands, would total a maximum of approximately 2,103 acres, or an increase of 5.2%. Maximum compacted acres would be approximately 1,505, or 3.8%, maximum productivity loss would be approximately 1,068, or 2.7%. Including past harvest that occurred prior to 2005, the proposed harvest for 2006, and all the predicted acres that could potentially be harvested independently of this project in the future, open space for federal and non-federal lands would increase within this Planning Area to approximately 37% (14,796 acres) within the next five years. The effects to productivity as a result of all these federal actions would be a short term loss to all compacted acres; though the extent of this loss would vary based on the project design features used to limit soil compaction. Some of these effects for federal projects would be mitigated on Medford BLM land through rehabilitation (tilling, mulching, seeding) of temporary roads, and skid trails, where possible, which can remove up to 80% of the compaction created. Cumulatively, without taking into account any natural recovery or mitigation, compacted areas and productivity losses within these sub-watersheds, and this planning area, would remain below the maximum of 12% compaction and 5% productivity loss guidelines established within the NFP and the Medford RMP (PRMP Vol.3, Appendix V, p. 18 & 20). Cumulatively, compacted area within these watersheds would remain well below the 12% maximum limit guideline of the NFP and the Medford District RMP.

The Middle Cow LSR Project is also proposing 3,737 acres of activity fuels management and hazardous fuels treatments. The Westside project would add 990 acres of hazardous fuels treatments.

Disturbance from density management and fuels treatments can be beneficial to the productivity of the stand, as well as considerably reduce the risk of a catastrophic wildfire that could result in a long term loss of soil organisms from deep heating of the soil, and an increase in erosion resulting from dry ravel and rilling. It is likely that these activities would result in isolated areas of short term erosion and a minimal loss of productivity (erosion increases, above background levels, would continue until bare areas are sufficiently revegetated and stabilized (generally within 1 to 3 years). These impacts would be within the scope analyzed for under of the Medford RMP, and would generally 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.

Combined, these federal activities are expected to result in a short term increase the amount of erosion occurring in this Planning Area. Much of this erosion is expected to be stored on site where vegetation, and downed organics still remain, and within the riparian

reserve vegetation where it is present. Where this is not the case, all logged sites would be planted within 3 years under Oregon Forestry Practices Act (OFPA), and many sites are often planted sooner. Once vegetation has re-established on a site, the amount of erosion that moves off site is drastically reduced, decreasing the amount of soil mobilized off-site.

Because they are hydrologically connected to streams, roads and areas where recent logging extends into the ecological riparian buffers would likely contribute the major portion of the erosion related sediment to the streams and waterways. Erosion coming from these activities would be expected to pulse during winter months when streams and rainfall are highest. Sediment and turbidity would be expected to remain within the Oregon turbidity standards required under the Clean Water Act, when measured at the HUC 6 or Planning Area scale. There would likely be a localized increase in the percentage of fines immediately downstream of streamside logging operations on non-federal lands, for several winters until the site re-vegetates, due to increased surface runoff. Localized increases in peak flows may result in stream bed and bank erosion, and subsequent increases in sedimentation, changes in channel morphology, and a loss of channel substrate and woody debris. There would likely be a short term increase in percentage of fines and stream turbidity immediately downstream of streamside logging operations. On a smaller, localized scale where cumulative effects from overland flow cause sediment to reach streams (from all actions within the Planning Area) water quality would be degraded until disturbed sites revegetate and stabilize. Effects would not be detectable at the HUC 6 scale and water quality standards would not be exceeded at the HUC 6 sub-watershed or larger scale. Riparian Reserve buffers would be expected to capture most sediment resulting from upslope harvest activities on federal lands, including yarding and road erosion.

Road building, maintenance, reconstruction, and use are all contributing to erosion within this watershed. As is the chronic erosion currently ongoing due to high road densities (4.8 to 5.1 mi/mi^2) and a high percentage of natural surface roads (39% to 63%). Road maintenance activities would mitigate some chronic erosion by improving road surfaces and road drainage. Road decommissioning under this project would also reduce some chronic sediment sources by restoring hydrologic process by which precipitation and subsurface flow move through the system

Both the Westside and Middle Cow LSR projects follow BMPs in the Medford District's RMP which were designed to minimize the effects to water quality and meet all state water quality standards under the proposed alternative. Federal NFP Aquatic Conservation Strategy objectives would also be met. Project benefits to riparian reserves, including the acceleration of large woody debris and multi-story canopy stands, would improve long term water quality and aquatic habitat conditions. In the short term, as a result of this project, productivity would be reduced slightly, and compaction and disturbed ground would be slightly increased, but through mitigation activities such as subsoiling, road decommissioning, and re-seeding these effects would not be measurable in the long term on the HUC 6 scale. In the long term road maintenance, blocking, mulching and seeding, and decommissioning activities would improve aquatic health by reducing chronic sediment problems. Though these effects would be beneficial to species and water quality at the HUC 7 scale or smaller, they would not be measurable in the long term on the project scale.

Because there were no measurable effects on water quality found at the HUC 6 or larger scale, there would also be no measurable effects from this project at the HUC 5 scale

3.5 Fisheries

3.5.1 Affected Environment

Streams within the Planning Area provide habitat for anadromous and resident salmonids, including Oregon Coast coho salmon and Oregon Coast steelhead. There are a total of 296 miles of perennial and intermittent stream within the Middle Cow LSR Planning Area, 48.1 miles of which are fish-bearing streams. Fish-bearing streams are located throughout the Planning Area. BLM lands within Whitehorse Creek sub-watershed account for approximately 52%, and 39% within Quines Creek sub-watershed.

Aquatic Habitat

Fish habitat within the Planning Area has been altered as a result from actions on federal and private land. Such actions include timber harvest, roads, and agricultural practices adjacent to streams. Observations and monitoring suggest these altered conditions are currently limiting salmonid production, specifically rearing and spawning habitat, within the Planning Area. Fish habitat and riparian alterations resulting from past practices include the removal of riparian vegetation, a reduction of LWD, channel straightening, temperature increase, and the addition of sediment. Streams have become ecologically simplified and less effective in dissipating stream flow energy, scouring pools, providing complex habitat for fish, amphibians and invertebrates, and providing organic detritus. Past timber harvest on private and public land, and fire suppression, have altered or removed vegetative communities within the riparian reserves of nearly all streams within the Planning Area, creating many areas of young dense stands. The removal of riparian vegetation has led to increased water temperatures and reductions in the amount of LWD, pool habitat, and stream channel complexity. These stands often lack structural diversity. Elements of structural diversity include but are not limited to large diameter trees, trees with large branches and full crowns, snags & large down logs, a closed canopy with some gaps, multiple canopy layers, a constituent of decadence, and presence of conifers as well as hardwood and shrub species. One consequence of limited structural diversity is the lack of development and recruitment of large woody debris.

Since the implementation of the NWFP in 1994, management activities in riparian reserves on public land have focused on the protection of riparian functions of instream wood recruitment, stream shade, and wildlife corridors. The reduction of logging activity close to streams has led to an improving trend in riparian and aquatic conditions.

LWD is an essential component of fish and aquatic habitat. LWD creates channel structure which creates pools, undercut banks, deflects and breaks up stream flow, and stabilizes the stream channel. Summer and winter juvenile rearing, adult holding, and spawning habitat are dependant on the presence of LWD in streams. LWD often creates log jams which creates pools and cover where adults can rest during migration and spawning. Log jams also accumulate and sort gravels necessary for spawning. The slow

water and pools associated with log jams offers areas for juveniles to drift feed and the debris provides cover and protection from predators and high flows (Meehan 1991). LWD also traps salmon carcasses, which are important sources of nutrients for aquatic organisms, from flowing downstream (USDI 1999).

Water quality is limited on approximately 15.1 miles of stream where the established temperature criterion, of 17.8 degrees Celsius, for anadromous fish rearing is not met. Additionally, 5.0 miles of Whitehorse Creek are listed for habitat modification; meaning the stream does not meet LWD or pool frequency habitat criteria for anadromous salmonids.

Within the Middle Cow HUC 5 watershed, of the 154 miles of fish streams, 143 miles (93 percent) are within 330 feet of a road; 120 miles (78 percent) are within 165 feet of a road. In other words, virtually all the fish streams in this HUC 5 watershed have a road in close proximity, which would provide a continuous source of sediment in most cases (USDI 1999). Roads contributing sediment to streams within the Planning Area are BLM, private, state and county owned and maintained. These roads are sources of sediment into nearby streams, reduce potential LWD, and contribute to the degradation of fish habitat (USDI 1999). Timber related impacts, primarily roads, open condition in the TSZ, and yarding, have resulted in increased amounts of fine sediment within stream substrate interstices, lowering primary production and invertebrate abundance, and decreasing the availability of cover for juvenile salmonids.

High sediment loads can potentially fill pool habitat, cause increased width to depth ratios, cover spawning gravels, and cause streambed embeddedness. Sediment also degrades spawning habitat. Redds, the area in the stream bottom in which fish deposit eggs, need a steady flow of cold, clean water to deliver oxygen and remove waste products.

Oregon Department of Fish and Wildlife (ODFW) aquatic habitat inventory surveys were conducted in the 1990s and are the most recent habitat data available for streams within the Planning Area. Streams are surveyed from the mouth to the upper extent of fish habitat. The surveys include BLM and private land. In some cases access was denied on private property and surveys were not conducted in those reaches. Surveys indicate the amounts of fine sediment (silt/sand) within some fish bearing reaches of streams within this Planning Area are above guidelines (Appendix 6). Guidelines were established by the National Marine Fisheries Service (NMFS) for streams to be considered as properly functioning for anadromous salmonids. The guideline for fines (sand, silt, clay) in streams is 20% fines or less within gravels is considered properly functioning.

Based on current stream habitat data (Appendix 6 and 7), it is believed degraded conditions are currently limiting salmonid production and habitat suitability for other aquatics (USDI 1999).

Habitat access

In the Middle Cow Creek watershed, habitat access for aquatic species was rated as low due to Galesville Dam and many culverts that restrict movement of species (USDI, 1999).

Special Status Species

Oregon Coast Coho (Bureau Sensitive)

A total of 31.5 miles of stream within this Planning Area provide habitat for Oregon Coast coho salmon, a Bureau Sensitive species. The distribution of coho habitat miles within the Planning Area is shown below in Table 3-6.

Table 3-6. Estimated miles of Coho Habitat in the Middle Cow LSR Planning Area.

Stream Name	Miles of coho salmon habitat*
Cow Creek	9.0
Whitehorse Creek	3.4
East Fork Whitehorse Creek (Blackhorse)	0.8
Fizzleout Creek	0.4
Hogum Creek	1.4
Starvout Creek	4.8
Quines Creek	3.4
Tennessee Gulch (Tributary to Quines Creek, sections 35 and 2)	1.1
Bull Run Creek	1.9
Little Bull Run	0.4
Wildcat Creek	1.3
Unnamed Tributary to Cow Creek, section 13	1.4
Clear Creek	2.2
Total	31.5 miles

* Information obtained from BLM GIS layers, ODFW Fish Distribution (http://rainbow.dfw.state.or.us/nrimp/information/fishdistmaps.htm), and Middle Cow Watershed Analysis 1999.

The NMFS ruled on January 17, 2006 Oregon Coast coho salmon were not warranted for listing on the Endangered Species Act (ESA) (50 CFR Part 223). The best scientific and commercial information available was used to determine the Oregon Coast coho Evolutionary Significant Unit (ESU) was not in danger of extinction throughout all or a significant portion of its range, nor was it likely to become so within the foreseeable future. An assessment was conducted in Oregon with efforts from all state natural resource agencies and several federal partners. NMFS used this assessment in the determination for ruling Oregon Coast coho were not warranted for listing. The

assessment was a rigorous analysis of the viability of the Oregon Coast coho ESU, past and continuing threats to coho population and the ESU, and protective efforts under the Oregon Plan aimed at addressing the factors associated with the ESU's decline. The Oregon Plan is a framework of state laws, rules, and executive orders designed to enhance and protect watershed health, at-risk species, and water quality by governing forest and agricultural practices, water diversion, wetlands, water quality, and fish and wildlife protections. The assessment concluded the Oregon Coast coho ESU is currently viable, with the component populations generally demonstrating sufficient abundance, productivity, distribution, and diversity to be sustained under the current and foreseeable range of future environmental conditions (50 CFR Part 223).

A Draft Oregon Native Fish Status Report was released by the Oregon Department of Fish and Wildlife (ODFW) in 2005. ODFW developed six criteria to assess the status of many of the native fish species in Oregon. The six criteria included existing populations, habitat use distribution, abundance, productivity, reproductive independence, and hybridization. The purpose of the report was to flag acute problems and identify priorities for more detailed conservation planning evaluations. Within the Oregon Coast ESU all six of the criteria were met by at least 80% of the smaller populations within the ESA. The smaller population, which the project area is located within, for Oregon Coastal coho ESU is the Upper Umpqua. The Upper Umpqua population met five of the six criteria used to assess the population. Until recently, numbers have been at or near record lows. However, numbers, distributions and productivity have rebounded for most populations within the ESU in the last four years following improved ocean productivity. These improvements have eased near term risks, but it is not clear whether all underlying factors for the recent decline have been addressed or if this is just a temporary response to improved ocean conditions. (http://www.dfw.state.or.us/fish/ONFSR/report.asp#coho)

Oregon Coast Steelhead

Oregon Coast winter steelhead (Bureau Sensitive Species) are found with the Planning Area. In many cases the distribution of steelhead extends upstream of coho salmon into the higher stream gradients. A total of 31.3 miles of stream within this Planning Area are habitat for Oregon Coast steelhead. The distribution of steelhead within the Planning Area are shown below in Table 3-7.

Table 3-7. Estimated miles of Steelhead Habitat in the Middle Cow LSR Planning Area.

Stream Name	Miles of steelhead salmon habitat*
Cow Creek	9.0
East Fork Whitehorse Creek (Blackhorse)	1.0
Bull Run Creek	2.5
Fizzleout Creek	1.2
Hogum Creek	0.6
Quines Creek	4.5

Stream Name	Miles of steelhead salmon habitat*
Starvout Creek	5.0
Tennessee Gulch (Tributary to Quines Creek, sections 35 and 2)	0.8
Whitehorse Creek	4.2
Russel Creek	1.2
Wildcat Creek	1.3
Total	31.3 miles

* Information obtained from BLM GIS layers, ODFW Fish Distribution (http://rainbow.dfw.state.or.us/nrimp/information/fishdistmaps.htm), and Middle Cow Watershed Analysis 1999.

NMFS ruled on March 29, 1998 Oregon Coast steelhead were not warranted for listing under the Endangered Species Act (50 CFR Part 227.) On April 15, 2004 NMFS placed Oregon Coast steelhead on the species of concern list (Federal Register / Vol.69, No73/ April 15, 2004 / Notices/19975.) NMFS uses the term "species of concern" to identify species about which NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. NMFS is not actively considering listing this species under the ESA.

The Draft Oregon Native Fish Status Report, released by the Oregon Department of Fish and Wildlife in 2005, concluded the Oregon Coastal winter steelhead ESU had met five of the six criteria. The smaller population for the Oregon Coastal winter steelhead ESU is the South Umpqua. The South Umpqua population, which the project is located within, met six of the six criteria (http://www.dfw.state.or.us/fish/ONFSR/report.asp#coho).

Oregon Coast Coho
Spawning occurs in the fall to early winter, young fish emerge from redds in the spring, and the juveniles rear in fresh water for one or more years before migrating to the sea (Meehan 1991). Coho adults generally move into smaller streams to spawn during the first couple rain storms which provide enough rain to raise water levels. Because juvenile coho spend one or more years in freshwater, summer and winter rearing habitat is important. High water temperatures and low flows in the summer can limit juvenile survival. Without winter rearing habitat, such as cover, pools, and side channels, juvenile survival could be limited.

Oregon Coast Winter Steelhead
Steelhead juveniles can spend up to four years rearing in freshwater before migrating to the ocean. As with coho, summer and winter rearing habitat for steelhead is important due to the extended length of time juveniles spend in freshwater. Juveniles migrate to the sea in the spring. The winter steelhead found in this Planning Area generally spawn in late winter or spring. In small coastal streams, up to 30% of the adults may survive to spawn a second or third time, but in large drainages where fish migrate long distances, the proportion of fish which spawn more than once is much lower (Meehan 1991).

3.5.2 Environmental Effects

Alternative 1 (No Action)

Direct and Indirect Effects

Aquatic habitat would improve over time as riparian reserves develop naturally and provide more LWD. When trees fall within one site potential tree (165 feet for this Planning Area – USDI, 1999) of stream channels, all or a portion of the tree could be within the steam channel. This would be based on the location of the tree in relation to the channel, the tree height, topography and the direction the tree falls. When a log or a portion of a log is within the active channel width of a stream, it functions as LWD. Leaving the riparian reserves in its presently overstocked condition would lengthen the time for recovery of sufficient large conifers to provide an adequate source of LWD for streams. LWD levels would remain low in most streams for a longer time if left untreated, resulting in lower habitat complexity. Studies show streams with low habitat complexity during winter flows reduces juvenile fish survival because refuge from high flows is either lacking or non-existent (Solazzi, et al. 2000, Pearsons, et al. 1992). Therefore, a reduction of fish survival during winter high flows until LWD levels increase would be expected.

Riparian areas would remain densely stocked under Alternative 1. Existing riparian conditions would continue to slowly improve and reach properly functioning condition over time. However, riparian improvements, such as density reduction would not occur. High fuel loads and dense stocking make these areas prone to disease and fire. These conditions increase the potential for a high intensity or severity type of wildfire to occur within riparian reserves. Such a fire could in the loss of canopy closure, tree mortality, and an increase in soil erosion. This could result in an increase in stream temperature, a loss of future LWD recruitment, and an increase in sediment in streams. These effects could reduce the quality of fish habitat.

The BLM roads proposed for road maintenance, which includes improving drainage and upgrading (replacing) non-fishbearing culverts, and cross drains would not occur under Alternative 1. The 0.8 mile of roads proposed for decommissioning under the Action Alternative would remain. Sediment input from roads occurs when the roads cross streams, are located adjacent to streams, and/or have roadside ditches and cross drains which area connected to streams. Existing sources of sediment from roads would continue under Alternative 1. The risk of culvert failures, due to undersized and failing pipes, would also remain. These effects would have short and long term indirect negative effects to stream sediment levels and fish production. The levels of sediment currently in stream channels within the project area would remain the same or increase in the short and long term. A reduction of sediment would not be expected. Excess sediment would continue to enter streams, resulting in a reduction of spawning production, juvenile rearing survival, and insect production (Waters 1995; Meehan 1991; Everest, et al. 1987; Meyer et al. 2005).

These undersized and failing pipes are at risk of plugging and washing out. This event would lead to inputs of sediment into stream channels including fish bearing streams, thus increasing sediment loads within fish habitat.

Under Alternative 1 the four fish culverts proposed for replacement would not be replaced. The current culverts would continue to block or impede upstream juvenile and adult movement. Additional spawning and rearing habitat within the Planning Area would remain unavailable (in some cases at all flows or only under certain flows) therefore limiting the overall amount of habitat available. These undersized culverts would remain at risk for plugging and washing out during high flow events. In such an event sediment from the road fill would enter the channel, causing an increase in sediment loads within fish habitat.

The habitat restoration project in Tennessee Gulch would not occur under Alternative 1. Habitat conditions would remain at current levels, which is lacking LWD and channel complexity. Fish habitat would be expected to improve over time, but at slow rate.

Habitat conditions for Special Status Species including Oregon Coast coho salmon and Oregon Coast winter steelhead would remain at existing conditions under Alternative 1 in the short term (1-2 years). Existing young/overstocked riparian reserves and sources of sediment from roads and non-federal logging operations would continue under this Alternative. Local fish production levels would continue to improve but at a slow rate because optimal habitat would be limited due to high sediment levels from road sources and winter survival would be limited due to low habitat complexity due to the lack of stream LWD and adequate sources of future LWD in riparian reserves.

Actions such as restoration, fuels reduction, and timber management may occur within this watershed under a different EA at a later time. Selection of this Alternative would not eliminate activities within these watersheds, but may defer them until a later time.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Note to reader: The bold headings below are the proposed actions. The headings in italics are elements of fish habitat having the potential of being affected by the proposed action.

The salmonid species found within the Planning Area which may be affected by the proposed action include Oregon Coast coho and Oregon Coast winter steelhead. These two species have similar habitat requirements and life histories. Therefore, these two species will be grouped together when discussing the effects of the proposed actions and will be referred to generally as fish or fish habitat.

Proposed Action Clarification: The thinning which would occur within the EPZ, would be done in a manner which would not result in ground disturbance. The exception to this rule is for unit 10-1. Unit 10-1 is adjacent to EFH in Whitehorse Creek. One skid trail would be constructed through this EPZ to access this unit and remove timber.

Yarding corridors would be constructed within the EPZ and potentially closer than 60 feet from Hogum Creek in unit 21-2 in order to access and remove timber from the unit. Ground disturbing activities would not be allowed within these corridors within the EPZ or closer.

Other units within the project area would have thinning adjacent to EFH. The activities within these areas would not have ground disturbing activities within the EPZs.

Riparian Reserve Vegetation Management (includes thinning, fuels reduction, and young stand management)

Riparian reserves within this project have 4 different management areas. Each area within the buffers would have different treatments, including a no treatment area. These areas and treatments are described in Chapter 2 (2.2, 2.3, and 2.4). These areas are intended to protect all ecological functions in the long term while allowing for stand management to promote the establishment of ecologically functioning riparian habitat characteristics. Desirable riparian habitat characteristics include but are not limited to a sustainable recruitment of large woody debris, large diameter trees, trees with large branches and full crowns, structural diversity, snags & large down logs, a closed canopy with some gaps, multiple canopy layers, a constituent of decadence, and presence of hardwood species and shrub species. Treatments within riparian reserves would occur adjacent to perennial and intermittent streams which flow into fish-bearing streams. Treatments would also occur immediately adjacent to fish-bearing streams.

LWD

Immediate and future recruitment of LWD to streams would not be negatively affected from the proposed riparian reserve vegetation treatments. The no treatment areas and the ecological protection zone would maintain more than adequate amounts of immediate and future LWD.

Thinning and fuels reduction treatments located within the riparian reserves would help to improve the quality of fish habitat by reducing stand densities, allowing for the development of larger diameter trees faster. There would be a positive effect on fish habitat by increasing the amount of potential LWD.

Loss of some potential LWD would occur due to yarding corridors within the EPZ and riparian thinning. By limiting the number and size of corridors, and utilizing techniques which would thin from below, there should be a negligible effect to current and potential future LWD.

Sediment

Sediment input to fish habitat would not be expected to occur from the vegetation treatments within riparian reserves. The no treatment areas and the ecological protection zone would prevent sediment from entering stream channels and thus fish habitat.

Positive Effects to Fish Habitat

Density management and fuels reduction treatments within riparian reserves would help to improve fish habitat by reducing stand densities. A reduction in stand densities in young dense stands would allow for the development of late successional riparian characteristics. Some of these characteristics include multi-level canopy cover which helps to maintain cool water temperatures. Late successional characteristics in riparian areas also include downed coarse woody debris and LWD which provides nutrient inputs to stream and increases channel complexity. The importance of channel complexity and LWD to fish habitat was discussed in the fisheries affected environment section above. Late successional characteristics in riparian areas also include diverse species composition which provides a variety of chemical and biological inputs to streams.

These treatments also reduce the spread of disease and the risk of a high intensity or severity fire within riparian reserves. Such a fire could result in a reduction in shade and tree mortality. These actions could negatively affect fish habitat by an increase in water temperature, a reduction in future recruitment of LWD, an increase in soil erosion and sediment entering fish habitat.

Timber Harvesting Activities

Sediment

Ground disturbing activities associated with thinning within riparian reserves (outside the EPZs) and in the uplands include cable yarding, tractor yarding and landing use. Ground disturbing yarding activities would not be allowed within the ecological protection zones. The exception to this rule is within unit 10-1 which is discussed below. Because of the PDFs within this document and the BMPs within the Medford District RMP, sediment delivery from timber harvest activities to stream channels would be reduced if not eliminate.

Unit 10-1 is adjacent to fish habitat in Whitehorse Creek. One access point (skid trail) would be constructed through the EPZ within unit 10-1. A road parallels Whitehorse Creek and is between the unit and the stream. Between the road and Whitehorse Creek is a vegetated buffer strip with a mid-seral stand and a well developed understory. The vegetated strip, at its narrowest, is approximately 90 feet. Any sediment mobilized as a result of exposed soil from the skid trail would run down to road #32-4-4, and into the vegetated strip thru crossdrains. This road is well maintained; with a fully rocked running surface and a properly functioning ditchline. The buffer strip should be a sufficient width to filter most of the sediment produced as a result of the skid trail. If any sediment were to reach Whitehorse Creek, it would likely be minimal and not substantially alter the quality of fish habitat.

Hogum Creek is west of unit 21-2. A road parallels Hogum Creek and the unit is located on the east side of the road. Yarding corridors, perpendicular to Hogum Creek, would be constructed. The total width for the corridors would not exceed 24 feet and they would not be continuous. The yarding corridors would end at the road and would be any where from 16 feet to 230 feet from Hogum Creek. Down hill yarding would not occur on these yarding corridors unless full suspension could be achieved. Because full suspension

would be required in these two yarding corridors, sediment would not be expected to occur from the corridors.

The implementation of BMPs, riparian reserve treatments, and seasonal restrictions are expected to reduce the potential for sediment to enter stream channels. The treatment or no treatment areas prescribed within riparian reserves would filter out most sediment derived from harvest and yarding activities from being transported overland.

LWD

The two yarding corridors to be constructed within unit 21-2 would not substantially decrease potential LWD or shade because the total area to be cleared would be a maximum of 24 lineal feet.

Road Work

Road work includes new temporary construction, reconstruction, maintenance, decommissioning, hauling, gating and blocking roads and stream culvert and cross drain replacements. The replacement of existing stream culverts includes 4 fish bearing culverts and 10 non-fish bearing culverts.

Sediment

The road maintenance, reconstruction and hauling are proposed for roads which cross intermittent, perennial, and fish bearing streams. Some of these roads also parallel fish bearing streams as close as 15 feet.

Approximately 0.8 miles of existing roads are proposed for decommissioning. See Table 2-3 for a list of the roads. The proposed decommissioning would take place on five separate roads. As a function of decommissioning, culverts and cross drains may be removed from the road prism. In addition the roads would be sub-soiled and depending on the site could have a portion of the fill pulled back onto the road. These actions would lead to areas of exposed soil. The amount of sediment moving off the road and into stream channels would be minimized by PDFs and BMPS. Specifically a PDF states the road decommissioning would take place during the dry season. BMPs within the RMP state the roads to be decommissioned would be revegetated with native species and mulch would be applied where appropriate. These factors would reduce or eliminate sediment from reaching fish habitat. Thus negative effects to fish habitat from road decommissioning would not be expected. Decommissioning these roads would reduce the risk culverts washing out and sediment from the road surface erosion reaching fish habitat.

The following proposed instream road related actions are expected to release some localized sediment in the short term to fish habitat:

- The replacement of four culverts on fish bearing streams - three in Whitehorse Creek (roads 32-4-22.1 and 32-4-23) and one in Russell Creek (road 32-4-6)
- The replacement of 10 stream culverts (non-fish bearing streams) within ¼ mile of fish habitat

Table 3-8 lists these projects and the associated stream with fish habitat which could be affected.

Table 3-8. In-stream road related activities generating sediment into fish bearing reaches

Project Activity	Fish Stream
6 non-fish bearing culverts within 1/4 mile of fish habitat	Bull Run
3 non-fish bearing culverts within 1/4 mile of fish habitat	Starveout Creek
1 non-fish bearing culvert within ¼ mile of fish habitat	Hogum Creek
3 fish bearing culvert replacements	Whitehorse Creek
1 fish bearing culvert replacement	Russell Creek

Impacts from in-stream projects listed in Table 3-8 would be dispersed over the Whitehorse and Quines Creek HUC 6 sub-watersheds and the activities would all be done using BMPs and PDFs designed to reduce erosion and limit off-site transport of sediment. Because of limited funding the potential for all four culverts to be replaced in the same summer is not likely. Increased sediment levels would not be expected to be detectable above background levels following the first high water event. Therefore, resulting impacts to fish habitat from these actions would be expected to be localized and short term in duration.

Because of the close proximity of the road related activities (excluding new road construction) and in-stream projects sediment would reach fish habitat. This sediment would be expected to be seen in fish habitat during the first winter. Because of the PDFs which include the BMPs within the RMP, the amount of sediment reaching fish habitat from road related activities would be minimal. Fish naturally move around in streams (Kahler, et al. 2001), so it is unlikely this would cause any major change in fish behavior. Such behavior during the first winter when sediment would be entering fish habitat would include spawning, juvenile rearing, and juvenile feeding. The amount of sediment would not cause a reduction in macroinvertebrates, which are a food source for fish. Sediment input would not cause a substantial change in fish habitat. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering fish habitat would decrease to the point of being immeasurable.

One road in particular warrants further discussion, because of the proximity of the road to fish habitat unit in Hogum Creek. Hogum Creek is west of unit 21-2. Road 32-2-20.2, a natural surface road, parallels Hogum Creek. There are 3 perennial stream crossings and one intermittent stream crossing on this road. This road ranges from 16 feet to 230 feet from Hogum Creek. Due to the narrow vegetated strips between the road and the stream some mobilized sediment resulting from road activities could reach Hogum Creek. Because of the PDFs and BMPs the amount of sediment entering Hogum Creek would not substantially alter the quality of fish habitat. PDFs associated with road activities which would reduce the amount of sediment entering Hogum Creek include requiring dry season hauling, logging activities, and road maintenance. The road would be properly

maintained prior and following use. Sediment increases would be most predominant and concentrated with the first substantial, above average, high water event following completion of the project.

Approximately 1.55 miles of new temporary road construction is proposed. The proposed road construction consists of 10 short discontinuous segments of roads. There are no mechanisms for sediment from the new road construction and the subsequent decommissioning to reach fish habitat because

- the roads are located near or on ridge tops
- there would be no stream crossings associated with the new roads
- the new roads are not located within riparian reserves
- the roads would be decommissioned following use
- the closest new road to fish habitat is approximately 0.15 mile

Positive Effects to Fish Habitat

Road maintenance, reconstruction, and decommissioning would generally reduce chronic erosion problems and reduce sediment input to fish habitat. Replacing the 4 culverts in fish-bearing streams would have a long-term positive effect of improving passage for both adult and juvenile fish species. Replacing failing culverts with ones sized to meet 100 year flood events would reduce the risk of culverts plugging and washing out. Culvert failures result in the fill within the road prism entering stream channels, increasing sediment loads in fish habitat.

Fish Habitat Enhancement Project

A riparian restoration project is proposed within Tennessee Gulch (T33S-R5W section 2 unit E2-1). This project would include adding boulders and large alders or conifers to create pools and slow stream current for fish and other aquatic species.

Sediment

Because the work could result in some areas of exposed soil, the restoration projects could result in sediment reaching fish habitat in Tennessee Gulch. This sediment would be expected to be seen in fish habitat during the first winter. Because of the PDFs which include the BMPs within the RMP, the amount of sediment reaching fish habitat would be minimal. Fish naturally move around in streams (Kahler, et al. 2001), so it is unlikely this would cause any major change in fish behavior. Such behavior during the first winter when sediment would be entering fish habitat would include spawning, juvenile rearing, and juvenile feeding. The amount of sediment would not cause a reduction in macroinvertebrates, which are a food source for fish. Sediment input would not cause a detectable change in fish habitat. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering fish habitat would decrease to the point of being immeasurable.

Positive Effects to Fish Habitat

The Tennessee Gulch habitat restoration project would have a long-term positive effect of improving fish habitat in approximately ¾ mile of stream by adding structure which would create pools and enhance spawning and rearing habitat.

Conclusion

Timber harvest activities, road work (including 4 fish bearing culverts and approximately 10 non-fish bearing culverts), and the fish habitat enhancement project in Tennessee Gulch would cause sediment to enter Oregon Coast coho and Oregon Coast steelhead habitat. Because of the Project Design Features (PDF) which include the Best Management Practices (BMP) within the RMP, the amount of sediment reaching fish habitat from these activities would be minimal. The amount entering fish habitat would not cause turbidity to the point of substantially disrupting fish behavior. The amount of sediment would not cause a reduction in macroinvertebrates. Sediment input would not cause a detectable change in fish habitat. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering fish habitat would decrease to the point of being immeasurable. Because of the above explanation the proposed activities would not contribute to the need to list the Bureau sensitive Oregon Coast coho or Oregon Coast steelhead. The proposed actions would not cause a reduction in population within the ESUs or the smaller populations of Oregon Coast coho or Oregon Coast winter steelhead because sufficient quantity and quality of habitat would remain in for coho and steelhead to utilize. Therefore the effects to coho and steelhead habitat would not be expected to contribute to the need to list these species under the Endangered Species Act. The factors which led to this conclusion include 1) the short term nature of the effects, 2) the small scale and localized areas of habitat which would be affected, and 3) the minimal amount of sediment input. The effects would be immeasurable at the HUC 6 or HUC 5 scales;

Cumulative Effects to Fisheries (Alternative 2)

The cumulative effects discussion in section 3.4.2.2 (Cumulative Effects to Soils and Water Quality Alternative 2) discusses the ongoing and future BLM and private projects within the Planning Area. This discussion will not be repeated here. Cumulative effects to Oregon Coast coho and Oregon Coast steelhead will be addressed generally as affects to fish.

Actions proposed under this EA such as timber harvest activities, road work (including 4 fish bearing culverts and approximately 10 non-fish bearing culverts), and the fish habitat enhancement project in Tennessee Gulch would cause sediment to enter fish habitat. Because of the Project Design Features (PDF) which includes the Best Management Practices (BMP) within the RMP, the amount of sediment reaching fish habitat from these activities would be minimal, short term and localized. The proposed activities would not contribute to the need to list the Bureau sensitive Oregon Coast coho or Oregon Coast steelhead. Factors which led to this conclusion include 1) the short term nature of the effects, 2) the small scale and localized areas of habitat which would be affected, and 3) the minimal amount of sediment input.

Following the proposed road maintenance, renovation, and culvert replacements, there would be less sediment entering streams and less risk of mass failures. Future sediment levels in fish habitat would be lower; however several roads adjacent to and crossing streams would remain. Therefore, some streams would have areas of sediment reduction. Such reductions would be immeasurable at the HUC 6 or HUC 5 watersheds.
A greater number of riparian reserves throughout the Planning Area on federal land would be more resilient to high intensity fires. Thinning within riparian reserves on federal land would accelerate larger diameter tree growth and would reduce the competition for light, water, nutrients and growing space for residual trees than if untreated. This would be a net positive cumulative affect to fish habitat.

When the actions proposed under this EA are added with other federal and non-federal actions within the same HUC 6 or HUC 5 watersheds, potential cumulative effects to fish habitat can be analyzed. As the ongoing actions continue to occur on federal and private land, factors which limit fish habitat within the Planning Area would continue to persist. Mechanisms contributing to these factors are attributable to current conditions, past, future, and ongoing actions on private land, and past practices on federal land. Because of the RMP and the NFP fish habitat on federal land would improve over time within the Planning Area. The minimal effects expected from the actions proposed within this EA along with the concurrent Westside BLM project would be short term and in some cases would result in beneficial effects in the short and long term. Beneficial effects to fish habitat would result from actions proposed under the Middle Cow EA and the Westside EA such as road maintenance, road decommissioning, culvert replacement, riparian reserve vegetation management (fuels reduction and thinning), and the stream habitat improvement in Tennessee Gulch. The Oregon Forest Practices Act guides actions on private timber lands. In part, this act is intended to minimize effects on fish habitat from timber harvest activities. Because of management practices on federal land and the laws under the Oregon Forest Practices Act on private land, fish habitat within the Planning Area is expected to remain at current conditions in some areas. Other areas, such as those on federal land, are expected to improve over time. Therefore, the cumulative effects of ongoing and future federal projects combined with private actions within the HUC 6 or HUC 5 would not result in a downward trend in fish habitat. The cumulative effects would not contribute to the need to list the Bureau Sensitive Oregon Coast Coho and Oregon Coast Steelhead on the Endangered Species Act. These cumulative effects are within the scope of anticipated effects to aquatic resources determined in the RMP EIS (pages 4-66).

3.6 Essential Fish Habitat Assessment

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a federal fisheries management plan. One of the management plans is the Pacific Coast Salmon Plan which includes chinook and coho. EFH was established for the Pacific coast salmon fishery for those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. EFH is further defined as "...those waters and

substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Federal Register, Vol. 67, No. 12)."

The threshold for an effect requiring EFH consultation is an adverse effect. As defined under 50 CFR 600.810(a), an adverse effect means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of water or substrate, and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

3.6.1 Affected Environment (EFH)

A total of 31.5 miles of stream within this Planning Area are considered Essential Fish Habitat (EFH). Table 3-9 describes species of fish and life stages with designated EFH in the Planning Area. Table 3-10 lists the estimated miles of EFH per stream within the Planning Area. Chinook salmon are only present within mainstem Cow Creek in this Planning Area.

NOTE TO READER: The discussion in Section 3.5.1 (Fisheries, affected environment) is applicable to EFH, because EFH has similar habitat requirements to the fish (coho salmon and steelhead trout) habitat discussed in section 3.5.1. In addition Appendix 6 (Stream Habitat Survey Data) and Appendix 7 (Aquatic Macroinvertebrate Surveys) have information regarding fish habitat and stream conditions which is applicable to understanding current EFH conditions.

Table 3-9. Species of fishes and life-stages with designated EFH within the Middle Cow Planning Area

Species	Eggs	Larvae	Young Juvenile	Juvenile	Adult	Spawning
Coho salmon	present	present	present	present	present	present
Chinook Salmon*	present	present	present	present	present	present

**Chinook are only present in the mainstem of Cow Creek.*

Table 3-10. Estimated miles of EFH in the Middle Cow LSR Planning Area

Stream Name	Miles of EFH habitat
Cow Creek	9.0
Whitehorse Creek	3.4
East Fork Whitehorse Creek (Blackhorse)	0.8
Fizzleout Creek	0.4
Hogum Creek	1.4

Stream Name	Miles of EFH habitat
Starvout Creek	4.8
Quines Creek	3.4
Tennessee Gulch (Tributary to Quines Creek, sections 35 and 2)	1.1
Bull Run Creek	1.9
Little Bull Run	0.4
Wildcat Creek	1.3
Unnamed Tributary to Cow Creek, section 13	1.4
Clear Creek	2.2
Total	31.5 miles

3.6.2 Effects to Essential Fish Habitat (EFH)

Alternative 1 (No Action)

Effects to EFH under Alternative 1 (No Action) are consistent with those discussed in the fisheries section under Alternative 1. See section 3.5.2 (Alternative 1 -No Action (Fisheries) for this discussion.

Alternative 2 (Proposed Action)

Proposed Action Clarification: The thinning which would occur within the EPZ, would be done in a manner which would not result in ground disturbance. The exception to this rule is for unit 10-1. Unit 10-1 is adjacent to EFH in Whitehorse Creek. One skid trail would be constructed through this EPZ to access this unit and remove timber.

Yarding corridors would be constructed within the EPZ and potentially closer than 60 feet from Hogum Creek in unit 21-2 in order to access and remove timber from the unit. Ground disturbing activities would not be allowed within these corridors within the EPZ or closer.

Other units within the project area would have thinning adjacent to EFH. The activities within these areas would not have ground disturbing activities within the EPZs.

Shade

Fuels and young stand treatments could occur up to 25 feet of stream channels. Angular canopy density would remain within 5% of existing levels to protect stream shading in fuels and young stand management treatments within treated areas between 25-60 feet from stream channels. This would ensure shade characteristics would not change and therefore no effects to stream temperature would occur (NWFP Temperature TMDL Implementation Strategies, US Forest Service and BLM, 2005).

The only exception to this would be in unit 21-2. This unit could have yarding corridors constructed through the EPZ and potentially within 60 feet of the stream channel. Hogum Creek is located adjacent to unit 21-2. A road parallels Hogum Creek and the unit is located on the east side of the road. Yarding corridors, perpendicular to Hogum Creek, would be constructed. The total width of all the corridors would not exceed 24 feet and would not be continuous. The yarding corridors would end at the road and would be any where from 16 to 230 feet from Hogum Creek. Down hill yarding would not occur on these yarding corridors unless full suspension could be achieved. Because of the small amount of space which could be opened and the discontinuous nature of the corridors, a reduction in shade resulting in an increase in temperature would not be expected.

Sediment

Activities associated with harvest, yarding, hauling, instream placement of boulders and large woody debris, and road work (including the stream culvert replacements) could potentially deliver sediment to EFH. Table 3-11 lists the instream projects and associated stream within the planning area which could contribute sediment to EFH.

Table 3-11. Proposed In-stream Activities Affecting Sediment Input to EFH

Project Activity	Associated Stream with EFH
6 non fish-bearing culverts less than ¼ mile from EFH in Bull Run (rd 32-5-6)	Bull Run
3 non fish-bearing culverts less than ¼ mile from EFH in Starvout Creek (rds 32-4-20.3 and 32-4-29)	Starveout Creek
1 non fish-bearing culvert less than ¼ mile from EFH in Hogum Creek (rd 32-4-20.2)	Hogum Creek
3 fish-bearing culverts	Whitehorse Creek
Fish Habitat Enhancement Project	Tennessee Gulch

Stream Culvert Replacements

The stream culvert replacement and associated stream with EFH which could be affected are listed in Table 3-11. Six culverts would be replaced on tributaries which flow into EFH in Bull Run Creek. These streams are located within one lineal mile of Bull Run Creek. Three stream culverts would be replaced on tributaries which flow into Starvout creek. These streams are located within less than one lineal mile of Starvout Creek. One culvert would be replaced on a tributary of Hogum Creek. Three culverts located within EFH on Whitehorse Creek would be replaced. The culverts are located between 50 feet and 0.2 miles upstream from EFH. Because of the close proximity of the culvert replacements to EFH, sediment would likely reach EFH. The sediment would be localized and would not be expected to be detectable above background levels following the first high water event. Sediment input would not cause a substantial change in the quality of EFH. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering EFH would decrease to the point of being immeasurable. These replacements would be done using BMPs and PDFs designed to reduce sediment entering stream

channels and limit off-site transport of sediment following the completion of the project. The resulting impacts to EFH from these actions would be expected to be *minimal*. The proposed stream culvert replacements would have long term positive effects on EFH by replacing undersized pipes. Replacing non-fishbearing culverts would reduce risk of failure. Replacing the fish bearing culverts on Whitehorse Creek would improve access to EFH.

Fish Habitat Enhancement Project

A riparian restoration project is proposed within Tennessee Gulch (T33S-R5W section 2 unit E2-1). This project would include adding boulders and large alders or conifers to create pools and slow stream current for fish and other aquatic species.

Because the work could result in some areas of exposed soil, the restoration projects could result in sediment reaching EFH in Tennessee Gulch. This sediment would be expected to be seen in fish habitat during the first winter. Because of the PDFs which include the BMPs within the RMP, the amount of sediment reaching EFH would be minimal. Sediment input would not cause a detectable change in fish EFH. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering EFH would decrease to the point of being immeasurable.

The Tennessee Gulch habitat restoration project would have a long-term positive effect of improving EFH in approximately ¾ mile of stream by adding structure which would create pools and enhance spawning and rearing habitat.

Road Activities Including Maintenance, Reconstruction and Hauling

Road 32-2-20.2, a natural surface road, parallels Hogum Creek and is adjacent to unit 21-2. There are approximately 3 perennial stream crossings and one intermittent stream crossing on this road. This road ranges from 16 feet to 230 feet from EFH in Hogum Creek. Due to the narrow vegetated strip between the road and the stream some mobilized sediment resulting from road activities could reach Hogum Creek. Because of the PDFs and BMPs the amount of sediment entering Hogum Creek would not substantially alter the quality of EFH. The road would be properly maintained prior and following use. Sediment increases would be most predominant and concentrated with the first substantial, above average, high water event following completion of the project.

Because of the close proximity of the road maintenance and reconstruction within the Planning Area some sediment would reach EFH. This sediment would be expected to be seen in EFH during the first winter. Because of the PDFs and the BMPs within the RMP the amount of sediment reaching EFH road activities would be minimal. Sediment input would not cause a substantial change in the quality of EFH. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering EFH would decrease to the point of being immeasurable. Because of the above explanation the effects from proposed road activities would be minimal and short term to EFH. Road maintenance and reconstruction would reduce chronic sedimentation input by improving surface drainage, rocking or spot rocking natural surface and deteriorating roads, and by replacing and

upgrading cross drains and culverts. Road maintenance and reconstruction would generally reduce erosion problems and, thus, have the overall effect of improving EFH.

Road Decommissioning

Approximately 0.8 miles of existing roads are proposed for decommissioning. See Table 2-3 for a list of the roads. The proposed decommissioning would take place on five separate roads. As a function of decommissioning, culverts and cross drains may be removed from the road prism. In addition the roads would be sub-soiled and depending on the site could have a portion of the fill pulled back onto the road. These actions would lead to areas of exposed soil. The amount of sediment moving off the road and into stream channels would be minimized by PDFs and BMPs. Specifically a PDF states the road decommissioning would take place during the dry season. BMPs within the RMP state the roads to be decommissioned would be revegetated with native species and mulch would be applied where appropriate. These factors would reduce or eliminate sediment from reaching fish habitat. Thus negative effects to EFH from road decommissioning would not be expected. Decommissioning these roads would reduce the risk culverts washing out and sediment from the road surface erosion reaching EFH.

New Road Construction

Approximately 1.55 miles of new, temporary road construction is proposed. The proposed road construction consists of 10 short discontinuous segments of roads. There are no mechanisms for sediment to reach EFH from the new road construction and the subsequent decommissioning because

- the roads are located near or on ridge tops
- there would be no stream crossings associated with the new roads
- the new roads are not located within riparian reserves
- the roads would be decommissioned following use
- the closest new road to EFH is approximately 0.15 mile

Yarding

Ground disturbing yarding activities would not occur within the EPZs, except within units 10-1. The implementation of BMPs, PDFs, riparian reserve treatments, and seasonal restrictions are expected to eliminate most if not all sediment from entering stream channels. The treatment or no treatment areas prescribed within riparian reserves would filter out most if not all sediment derived from harvest and yarding activities from being transported into stream channels and thus EFH. Therefore sediment derived from yarding activities would have immeasurable or discountable effects to EFH.

One skid trail would be constructed through the EPZ of unit 10-1 to access the unit and remove the timber. The unit is adjacent to EFH in Whitehorse Creek. A road parallels Whitehorse Creek and is between the unit and the stream. Any sediment mobilized as a result of exposed soil (during treatment), hauling, or landing areas would run down to road #32-4-4, and into the vegetated strip thru crossdrains. This road is well maintained; with a fully rocked running surface and a properly functioning dithchline. The buffer strip should be a sufficient width to filter most of the sediment produced as a result of the skid

trail. Between the road and Whitehorse Creek is a vegetated buffer strip with a mid-seral stand and a well developed understory. The buffer strip, at its narrowest, is approximately 90 feet. The buffer strip would filter out most if not all the sediment generated from the ground disturbing yarding activities within the EPZ. If any sediment were to reach Whitehorse Creek, it would likely be minimal and not substantially alter the quality of EFH.

LWD

Thinning and fuels reduction treatments located within the riparian reserves adjacent to density management units would help to improve the quality of EFH by reducing stand densities, allowing for the development of larger diameter trees faster. There would be a positive effect on EFH by increasing the amount of potential LWD.

The no treatment buffers, the canopy closure retention of 50% within the EPZ, and 40% outside the EPZ but within the riparian reserve would retain more than enough future LWD.

The two yarding corridors to be constructed within unit 21-2 would not substantially decrease potential LWD or shade because the total area to be cleared would be discontinuous and limited to 24 feet.

Pools

The quality or quantity of pool habitat would not be affected as a result of the riparian thinning. Because the no effects to current and potential future LWD were found, changes in pool habitat would not be seen.

Over the long term (10-20 years), riparian reserves would benefit from riparian treatment and therefore, potential LWD and pool quality and quantity would benefit as well. An increase of large wood in the stream would increase the amount and quality of pools and enhance EFH.

Peak Flows

According to the section 3.4.2 (Water Quality), this project would not increase the amount of effective open area above current levels, and therefore, should not affect hydrologic timing or peak flows. Therefore, there would be no increase in peak flows as a result of the proposed actions.

EFH Cumulative Effects

The proposed actions when added to past, present, and reasonably foreseeable future actions would result in no cumulative impacts on EFH at the HUC 6 or HUC 5 levels.

Road maintenance and decommissioning would reduce some chronic sediment sources. Harvest and fuels reduction treatments within the riparian reserves would help reduce the potential of large scale disease or fire and increase potential LWD in the long term and thus positively affect EFH.

EFH Summary

Activities associated with the proposed action would have minimal, localized, short term (1-2 years) affects on EFH.

Effects to EFH would be minor, short term sediment deposition resulting from road related activities, placement of boulders and large woody debris, stream culvert replacements, and timber harvest activities. The PDFs and BMPs would reduce if not eliminate sediment input to EFH. The PDF and the proposed treatments within the riparian reserves (including the no treatment buffers) would not result in a measurable decrease of potential LWD or shade. Therefore the impacts on EFH would be minimized.

Riparian Reserve protections would maintain primary shade and not cause an increase in stream temperatures. The treatments within the riparian reserves would not result in a reduction in shade or LWD. Riparian reserve protections would also protect stream bank stability and filter out most sediment derived from harvest and yarding activities.

Harvest and fuels reduction treatments within riparian reserves would promote growth of large trees faster, increasing potential LWD, maintaining stream temperatures, and increasing quality and quantity of pools. Road maintenance would reduce chronic erosion problems.

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
Michelle Calvert	Ecosystem Planner	NEPA, Team Lead
Rose Hanrahan	Hydrologist	Soils, Watershed, Riparian
Stephanie Messerle	Fish Biologist	Fisheries
Sharon Frazey	Fish Biologist	Fisheries
Marylou Schnoes	Wildlife Biologist	Wildlife Biology
Donni Vogel	Fire and Fuels Specialist	Fire Risk/Hazard, Air Quality
Rachel Showalter	Botanist	Botany & Noxious weed coordinator
Katie Wetzel	Outdoor Recreation Planner	Visual Quality, Recreation
Amy Sobiech	Archaeologist	Cultural Resources
Jeff Brown	Civil Engineering Technician	Roads & Gates
Jim Brimble	Forester	Silviculture
Laura Quilliams	Forester	Logging systems
Dave Eichamer	Forester	Stewardship

Chapter 5.0 Public Involvement and Consultation

5.1 Public Scoping and Notification

5.1.1 Public Scoping

Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea. Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 11 public responses from either letters or emails. Responses to public scoping comments are found in Appendix 3. Comments were also considered in the development of the alternatives. The Glendale Resource Area also accepts public comment of proposed forest management activities through the quarterly BLM Medford Messenger publication. A brief description of proposed projects, such as Middle Cow LSR, a legal location and general vicinity map are provided along with a comment sheet for public responses. The Middle Cow LSR Project was included in these quarterly publications beginning in fall, 2004.

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 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 activities addressed in this EA. Comments received in the Glendale Resource Area Office, 2164 NE Spalding Ave. 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

In accordance with regulations pursuant to Section 7 of the Endangered Species Act 1973, as amended, consultation with the USFWS concerning the potential impacts of implementing the Middle Cow LSR Project upon the Northern spotted owl was initiated in June 2006 (USDA/USDI 2006). USFWS issued a Biological Opinion in August 2006 (1-15-06-F-0162) and found that the proposed action would not jeopardize the continued existence of the spotted owl, nor result in the adverse modification of spotted owl critical habitat.

5.2.2 National Marine Fisheries Service (NMFS)

Consultation under the Endangered Species Act with NMFS is not necessary as there are no listed species within the portion of the Planning Area within the Umpqua Basin. The road maintenance and hauling activities which would occur within the Rogue Basin and the range of the federally threatened Southern Oregon Northern California coho salmon were determined to have no effect on coho or critical habitat.

Consultation as required under the Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat) was initiated June 20, 2006 with NMFS. The fishbearing culvert replacement and instream habitat improvement activities are included in the Endangered Species Act Section 7 Formal Programmatic Consultation and Magnuson-Stevens Essential Fish Habitat Consultation (Biological Opinion) dated July 12, 2001.

5.2.3 State Historical Preservation Office

The State Historical Preservation Office approved the clearance/tracking form for the Middle Cow LSR Project. The form is contained within the Middle Cow LSR Project Analysis file. Required cultural surveys were completed for the Middle Cow LSR Planning Area. All recorded sites would be protected and buffered using Project Design Features except for one location which has State Historic Preservation Office concurrence to cross a mining ditch with a logging system.

5.2.4 Native American Tribal Consultation

The public scoping letter and subsequent scoping report were sent to local federally recognized Native American tribes interested in Medford District Bureau of Land Management proposed projects. The Cow Creek Band of Umpqua Indians was interested in meeting with the Glendale Resource Area archaeologist. Meetings were held on March 2006 and June 15, 2006. The tribe was provided with a description and location of proposed project activities for the Middle Cow LSR Project. Project activities were found to not affect any areas of concern for this tribe. No other tribes made contact with the Glendale Resource Area about the Middle Cow LSR Project.

5.2.5 LSR Working Group

Hazardous fuel treatments prescriptions to reduce long term risks and the silvicultural prescription for unit 30-4 to reduce the risk of remnant and large tree loss will be submitted to LSR Working Group via the Middle Cow LSR Project EA (EA#OR118-05-022) for review and concurrence that such treatments comply with the objectives of the Northwest Forest Plan (USDA/USDI 2004a, p. S-3).

ACRONYMS AND GLOSSARY

Abbreviations:

BLM	Bureau of Land Management
BMP(s)	Best Management Practices
CARs	Community At Risk
CDM	Commercial Density Management
CHU	Critical Habitat Unit
DEQ	Department of Water Quality
DBH	Diameter at Breast Height
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
EPZ	Ecological Protection Zone
NDNM	Non-commercial density management
NEPA	National Environmental Policy Act
NFP	Northwest Forest Plan
ODF	Oregon Department of Forestry
PDF	Project Design Feature
RMP	Resource Management Plan
RR	Riparian Reserve
WUI	Wildland Urban Interface

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

Backfiring Operations. Used during indirect attack and are implemented by intentionally setting fire to fuels inside the control line in order to slow down the wildfire by consuming the fuels in advance of the wildfire (NWCG, 1994).

Best Management Practices (BMP). 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)).

Biomass utilization (as considered under this project). Wood (< 16 inches dbh non-saw logs) or woody fiber by-products that result from forest and woodland restoration, thinning activities, and fuel treatments to be applied towards bio-energy use and/or products manufactured from material such as posts, poles, and firewood.

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.

Commercial Density Management. The removal of merchantable trees from most often an even-aged stand to encourage growth of the remaining trees. The objective of the treatment would be however, the development of stands with characteristics of older forests rather than yield.

Compaction. Refers to soil becoming consolidated by the effects of surface pressure often from heavy machinery or vehicle and pedestrian traffic.

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 Unit. 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.

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.

Direct Attack. Method of fire suppression in which treatments are applied directly to burning fuel, such as wetting or smothering, in order to limit the amount of oxygen available to the flame, or by constructing fireline for the purpose of removing available fuels (NWCG, 2005).

Drainage. In this document the term refers to the entire area that contributes water to a drainage system or stream at the seventh-field watershed scale (HUC 7).

Ecological Protection Zone (EPZ). For non-ephermal streams within hazardous fuels reduction units, the buffer distance used would be 25 ft from the stream bankful width and commercial density management units would receive a buffer distance between 60 and 125 feet is based on the Ecological Protection Width Needs chart (B-15, Northwest Forest Plan). This 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" (B-15, Northwest Forest Plan). Also included within this buffer is full protection of the primary shade zone, as described in the NFP Temperature TMDL Implementation Strategies (US Forest Service and BLM, 2005), and sufficient canopy closure within the secondary shade zone to maintain or improve microclimate conditions within this portion of the riparian reserve in the long term, without measurably increasing stream temperatures in the short or long term.

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.

Endangered Species. Any species defined through the Endangered Species Act of 1973 as amended, as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

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.

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.

Evolutionary Significant Unit. The National Marine Fisheries Service (NMFS, NOAA Fisheries) definition is as follows: a population must satisfy two criteria to be considered an ESU: (1) it must be substantially reproductively isolated from other conspecific population units; and (2) it must represent an important component in the evolutionary legacy of a species. 69 Fed. Reg. at 31355

Fire Hazard. The ability of a fire to spread once ignition has occurred. Hazard is rated using a numerical point system for each of the following factors: slope, aspect, position on slope, adjacent fuel model, ladder fuels, and estimated fuel loading. A point summary is then calculated and a rating of high, moderate or low is assigned.

Fire Intensity. Rate of heat energy released during combustion per unit length of fire front, measured in British Thermal Units (Btu) per foot per second (NWCG, 1994).

Fire Return Interval. Number of years between two successive fire events for a given area (NIFC-B, 2006).

Fire Risk. The probability of ignition. A rating of high, moderate or low is assigned based on the concentration and/or frequency of human presence and on historic lightning occurrence.

Fire Severity.

Low- Less than 75% of the dominant overstory vegetation is replaced
Mixed- Combination of Low and High severity in patches
High- More than 75% of the dominant overstory vegetation is replaced

Flame length. Distance measured from the tip of the flame to the middle of the flaming zone at the base of the fire. It is measured on a slant when the flames are tilted due to effects of wind and slope (NWCG, 1994).

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

Forage. All browse and non-woody plants that are available to livestock or game animals and used for grazing or harvested for feeding.

Forest canopy. Stratum containing the crowns of the tallest vegetation present in the stand, usually above 20 feet in height (NWCG, 1994).

Forb. Any herb other than grass.

Fuels. Combustible wildland vegetative materials present in the forest which potentially contribute to a significant fire hazard.

Fuel Load. Measure of the amount of fuel in a given area, generally expressed in tons per acre (NWCG, 1994).

Fuels Management. Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

Handpile burning. Prescribed fire used to remove man-made or natural collections of concentrated woody debris. Generally the fire is hotter than in broadcast burning or underburning.

Hardwoods. A conventional term for broadleaf trees and their wood products.

Hazardous fuels reduction. Existing vegetation that is a fuels hazard.

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

Indirect Attack. Method of fire suppression in which the fireline is located a considerable distance away from the fire's active edge. Generally employed in the case of fast moving or high intensity fire. The fuel between the control line and the fire's edge is usually backfired, but occasionally the main fire is allowed to burn up to the fireline, depending on conditions (NWCG, 2005).
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.

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.

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).

Peak Flow. The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Streams. Streams that flow continuously throughout the year.

Prescribed Burning. The intentional application of fire to wildland fuels in either their natural or altered state. Burning is conducted under such conditions as to allow the fire to be confined to a predetermined area and to produce an intensity of heat and rate of spread required to meet planned objectives (e.g., silvicultural, wildlife management, reduction of fuel hazard, etc.).

Prescribed Burning. The intentional application of fire to wildland fuels in either their natural or altered state. Burning is conducted under such conditions as to allow the fire to be confined to a predetermined area and to produce an intensity of heat and rate of spread required to meet planned objectives (e.g., silvicultural, wildlife management, reduction of fuel hazard, etc.).

Prescription. Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.

Productivity (soil). Soil productivity is primarily the soil's capacity to support plant growth as reflected by some index of biomass accumulation, such as litter, humus, soil wood, and certain key properties of the surface mineral layers of forest soils. Soil productivity is affected by soil bulk compaction, soil displacement, and by changes and reductions in soil nutrients. Soil compaction reduces soil productivity and vegetation growth rate by decreasing soil porosity and increasing density which in turn inhibits productivity by reducing water and nutrient holding capacity, root respiration, and microbial activity.

Rate of Spread (ROS). Speed at which the fire is advancing and is influenced by wind, slope, and the fuel type through which it is burning. ROS is usually measured in chains per hour (one chain equals 66 feet).

Resource Management Plan (RMP). A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act. (See USDI, BLM 1995).

Riparian Reserves. Designated riparian areas found outside Late-Successional reserves.

Riparian Areas/Habitats. Areas of land that are directly affected by water, usually having visible vegetation or physical characteristics reflecting the influence of water. Streamsides, lake edges, or marshes are typical riparian areas.

Riparian Zone/Habitat. Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Sediment. Any material carried in suspension by water, which would ultimately settle to the bottom. Sediment has two main sources: from the water channel itself and from disturbed upland sites.

Seral Stages. Series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. There are five seral stages (BLM, 1994):

> Early (0 to 10 years) -the period from disturbance to the time when the crowns close and conifers or hardwoods dominate the site. This stage is initially dominated by grasses and forbs which are gradually replaced by trees.
>
> Mid (10 to 40 years) -the period from crown closure to the time when conifers begin to die from competition. Stands are dense and dominated by conifers, hardwoods, and brush.

Late (40 to 80 years) -the period from when the conifers begin to die from competition to the time when stand growth slows. Canopy closure approaches 100%. Stand is dominated by conifers and hardwoods.

Mature (80 to 200^{+}) -the period from when stand growth slows to the time when the forest develops structural diversity. Conifers and hardwoods gradually decline. Understory development is significant in response to canopy openings created by disturbance. Secondary succession begins again near the end of this period.

Slash. The residue on the ground following felling and other silvicultural operations and/or accumulating there as a result of a storm, fire girdling, or poisoning of trees.

Snag. A standing dead tree usually without merchantable value for timber products, but having characteristics of benefit to cavity nesting wildlife species.

Soil Compaction. An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Productivity. Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

Stand of trees. Contiguous group of trees sufficiently uniform in species composition, arrangement of age class, and condition to be a distinguishable unit.

Subwatershed. 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 two sixth field watersheds within the Middle Cow LSR Planning Area are Whitehorse (21,930 acres) and Quines Creek (18,292 acres).

Surface Erosion. The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills or dry rattle.

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

Underburning. The use of prescribed fire, most often below an overstory canopy to remove excess forest fuels. Generally conducted in the spring months and a cooler fire than broadcast burning.

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

Watershed. Entire area that contributes water to a drainage system or stream. The term refers to the fifth-field scale (HUC 5) in this document. The Middle Cow LSR Planning Area is contained within a portion of the Middle Cow Creek fifth field Watershed.

Wildland Urban Interface. Private residences within 1.5 miles of federal land may be classified under this designation, as described by the National Fire Plan, and are ranked as the highest priority for fuels reduction treatment.

Yarding. The act or process of moving logs to a landing.

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APPENDIX 1 - ALTERNATIVE DEVELOPMENT SUMMARY

Environmental Assessment Number OR-118-05-022

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.*

   There are no unresolved conflicts concerning alternative uses of available resources. The rationale for this finding follows.

   As a result of scoping, the Glendale Resource Area received 11 comment letters and/or e-mails concerning the Middle Cow LSR Project. The Bureau of Land Management (BLM) response to substantive public comments is provided in Appendix 3 (Environmental Assessment Number OR-118-05-022). Relative to "unresolved conflicts concerning alternative uses of available resources" the BLM received a scoping response letter from Klamath Siskiyou Wildlands Center on the behalf of the Cascadia Wildlands Project, the Oregon Natural Resources Council, Umpqua Watersheds and the Siskiyou Project. This letter stated: *Temporary logging road construction, tractor logging, and mid-seral logging are not appropriate practices in this LSR as it will not contribute to the attainment of late-successional characteristics. We formally request development, consideration, and implementation of an alternative that prioritizes the treatment of young plantations* [0-40 years] *while avoiding new road construction."* This alternative was considered but eliminated from further consideration for the following reasons.

   There are several recent and foreseeable projects on BLM and Forest Service land that have treated or are proposing to treat young plantations within this LSR. Pursuant to the purpose and need for action identified for the Middle Cow LSR Project, the proposed action focuses treatment on stands between the ages of 40-

80 years of age consistent with guidance contained in the South Umpqua/Galesville Late Successional Reserve Assessment (LSRA, 2004). Specifically, the LSRA supports treating stands of 40-80 years of age where key late-successional characteristics are missing such as: multi-level stories, multi-aged stand, diverse stand species, ground vegetation, and a component of hardwoods. This LSRA notes treating stands of this age class would optimize habitat for late-successional forest related species in a shorter time frame than stands of a younger age class that would take several more decades to achieve late-successional habitat characteristics after treatment (USDA/USDI 2004a, p.76).

Temporary road construction is proposed to access treatment units where no roads exist or road conditions are overgrown/inaccessible without opening up roads. The placement of proposed temporary road construction would be kept to a minimum and designed to minimize adverse impacts. As stated in the Northwest Forest Plan (p.C-16) and the Medford District Resource Management Plan (pp.34, 87), "Construct roads in Late-successional reserves if the potential benefits of silviculture, salvage, and other activities exceed the costs of habitat impairment."

Units without current accessibility were first evaluated to determine if helicopter logging would be an economically feasible method to remove commercial timber. Those proposed treatment units found to be economically feasible were identified for helicopter logging (62 acres) while the units found to be uneconomical for helicopter logging were evaluated for temporary road construction as another means to access suppressed stands in need of thinning. This evaluation resulted in the reduction of temporary road construction from three (3) miles to 1.55 miles. The proposed temporary road construction was designed to reduce impacts through implementation of Best Management Practices such as placement of roads on or near ridgetops; avoiding placement within riparian reserves; and decommissioning after use. The total temporary road construction is 1.55 miles or approximately four acres of new ground disturbing activity. This is equivalent to 0.1% of the proposed activity acres of the Middle Cow LSR Project.

The no action alternative provides the environmental impact analysis of deferring treatment in mid-seral stands and no new temporary road construction and/or tractor logging.

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.*

   No further development of alternatives is needed as the proposed action does not contain unresolved conflicts concerning alternative uses of available resources. 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 further development of alternatives is needed as the proposed action does not contain unresolved conflicts concerning alternative uses of available resources. See response to Question #1.

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 further development of alternatives is needed as the proposed action does not contain unresolved conflicts concerning alternative uses of available resources. See response to Question #1.

APPENDIX 2 - ENVIRONMENTAL ELEMENTS

Environmental Assessment Number OR-118-05-022

In accordance with law, regulation, executive order and policy, the interdisciplinary team reviewed the elements of the human environment to determine if they would be affected by the alternatives described in Chapter 2 of the EA (environmental assessment). The following three tables summarize the results of that review. Those elements that are determined to be "affected" will define the scope of environmental concern, Chapter 3 of the EA.

Table 1. Critical Elements of the Environment. This table lists the critical elements of the human environment (BLM Handbook 1790-1) which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary teams predicted environmental impact per element if the action alternative described in Chapter 2 of the Environmental Assessment were implemented.

Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Air Quality (Clean Air Act)	Not Affected	Activity and hazardous fuels would be burned 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. Dust created from vehicle traffic on gravel or natural-surfaced roads, road construction, 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.
Areas of Critical Environmental Concern	Not Affected	The King Mountain ACEC is located within the Planning area, however no project activities are proposed within the ACEC.

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Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Cultural, Historic, Paleontological	Not Affected	Cultural resource surveys were completed for the project winter 2005. Guidelines for the survey followed compliance procedures for cultural resource survey set forth by Section 106 National Historic Preservation Act (NHPA). Surveys were conducted using Oregon State Historic Preservation Office (SHPO) protocol. Cultural surveys revealed some cultural sites. All recorded sites would be protected and buffered using Project Design Features except for one location which has State Historic Preservation Office concurrence to cross a mining ditch at one location with a logging system. As such, cultural resource values would not be affected. If cultural resources are found during project implementation; the project may be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the resource area archaeologist with concurrence from the Glendale Field Manager and State Historic Preservation Office. All such sites would be evaluated and protected by the BLM under the following Federal laws: Federal Land Policy and Management Act of 1976, National Historic Preservation Act (Section 106) of 1966, Antiquities Act of 1906, Archaeological Resource Protection Act of 1979, Reservoir Salvage Act of 1960, American Indian Religious Freedom Act of 1978, National Environmental Policy Act of 1960, and Native American Graves Protection and Repatriation Act of 1990.
Energy (Executive Order 13212)	Not Affected	Powerlines are present within the Planning Area however, the Proposed Action would have no effect on energy development, production, supply and/or distribution because unit and logging system design would not interrupt the distribution of power.
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 within the Planning Area.
Flood Plains (Executive Order 11988)	Not Affected	The Proposed Action does not involve occupancy and modification of floodplains, and will not increase the risk of flood loss. As such, the Proposed Action is consistent with Executive Order 11988.
Hazardous or Solid Wastes	Not Affected	There would be no environmental effects associated with this element due to the implementation of the Best Management Practices contained in the Medford RMP and the terms/conditions of the timber sale contract.

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Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Invasive, Nonnative Species (Executive Order 13112)	Not Affected	Units within the Middle Cow Planning Area were surveyed for noxious weeds in the spring of 2004 and 2005. The Planning Area is known to have noxious weeds along many roadsides, and 4 populations of *Cirsium arvense* (Canada thistle), 9 populations of *Cytisus scoparius* (Scotchbroom), 6 populations of *Rubus discolor* (Himalayan blackberry), 6 populations of *Senecio jacobaea* (Tansy ragwort), 2 populations of *Chondrilla juncea* (Rush Skeleton weed), and 13 populations of *Centaurea pratensis* (aka *C. debeauxii*) (Meadow knapweed) were documented within or directly adjacent to 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 proposed to treat known weed populations within the Glendale Resource Area, including the Westside Planning Area, under an agreement with the Douglas County Soil and Water Conservation District, using Title II funds obtained in 2004. There are three main reasons why potential weed establishment is not expected to result in a detectable effect to overall ecosystem health from the implementation of the Proposed Action. 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 are proposed for weed treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14.* Third, Project Design Features (PDFs) (see section 2.4) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources. 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 will 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 8.

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Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Native American Religious Concerns	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 based on recommendations from the Resource Area Archaeologist. Native American groups were contacted and no proposed activities were found to affect any areas of concern for tribes that responded to the Glendale Resource Area.
T/E (Threatened or Endangered) Fish Species or Habitat	Not Affected (Southern Oregon/Northern California coho salmon Evolutionarily Significant Unit (ESU))	Salmon are listed under the Endangered Species Act by ESUs. An ESU is a stock of Pacific salmon that is 1) substantially reproductively isolated from other conspecific populations units; and 2) represents an important component in the evolutionary legacy of the species. The northern most extent of the federally listed threatened Southern Oregon Northern California (SONC) coho salmon ESU is the Rogue River Basin. SONC coho salmon are not located within the watersheds with proposed vegetation management activities. Only road maintenance and haul would occur within the Rogue River Basin, in which SONC coho salmon are found. There are no federally listed threatened or endangered fish species located within portions of the project area which drain into the Umpqua River. The Proposed Action would not affect Endangered Species Act (ESA) listed Southern Oregon Northern California (SONC) coho salmon (Threatened). SONC coho salmon are not located within the Planning Area but road maintenance and haul would occur within the Rogue River Basin, in which SONC coho salmon are found. The 2.1 miles of road maintenance and haul proposed within the Rogue River Basin would have no effect on SONC coho salmon or coho critical habitat (CCH). The closest stream crossing from coho is more than 2.0 miles away. Because of the PDFs, BMPs and the distance of road maintenance activities and hauling, sediment would not affect SONC coho or CCH. .
T/E (Threatened or Endangered) Plant Species or Habitat	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. Although a few units of the Middle Cow project area are within the range and habitat of *F. gentneri*, as determined by the US Fish and Wildlife Service, vascular plant surveys were conducted in the spring of 2004 and 2005, and no *Fritillaria gentneri* populations were found. There would be no anticipated effect from the proposed action on any federally listed plant.

Table 1. Critical Elements of the Environment. This table lists the critical elements of the human environment (BLM Handbook 1790-1) which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary teams predicted environmental impact per element if the action alternative described in Chapter 2 of the Environmental Assessment were implemented.

Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
T/E (Threatened or Endangered) Wildlife Species, Habitat and/or Designated Critical Habitat	Affected (NSO & Fisher Habitat including NSO Critical Habitat)	Affected: Most of the Project Area is comprised of NSO Critical Habitat (3,692 acres out of 3,737 acres). In the immediate future (up to two decades), the proposed action would impact suitable habitat for the NSO (northern spotted owl), Threatened, and fisher (Candidate). The unit of measures are: the stand acres of suitable habitat (downgraded and degraded) and dispersal habitat (removed and degraded) in the short term (up to two decades) within the CHU (critical habitat unit) OR-32 and a narrative description of impacts to the function of CHU. In the long term (beyond 2 decades after treatment), Critical Habitat would be maintained and enhanced. *Refer to Section 3.3 of the EA for a discussion of the affected environment and environmental effects of the proposed action related to this element of the environment.*
	Not Affected (Bald Eagle)	Not Affected: The proposed action would not affect bald eagles, their roost or nest trees, or their foraging areas since nesting, roosting and foraging sites for the species are more than a mile from any unit or road reconstruction or construction.
	Not Present (MAMU, including Critical Habitat)	Not Present: Marbled murrelets are not present within the Planning Area. The proposed action would not occur within designated marbled murrelet Critical Habitat.

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Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Water Quality (Surface and Ground)	Not Affected (water temperature, chemical/nutrient contamination)	The Oregon Department of Environmental Quality has listed 3 streams within the project area as water quality limited: 6 miles in Quines Creek and 9 miles in Cow Creek for water temperature; and 5 miles in Whitehorse Creek for habitat modification- generally due to deficiencies in Large Woody Debris (LWD), pool frequency, or other habitat criteria for either anadromous salmonids or other Bureau Sensitive fish species. The overall effects of the Proposed Action on water quality would be neutral or positive in the short-term (1 year to a couple of decades) and long-term (decades to a century). The State of Oregon water quality standards would not be exceeded at the HUC 6 and larger scale. Streams in the project area are generally well shaded on public lands. Where thinning occurs within the riparian reserves, full protection of the primary shade zone would be retained (the one exception is unit 21-2, which would have corridor crossing of the EPZ but not to exceed a total of 24 feet). Generally, sufficient canopy closure within the secondary shade zone would be retained. The resultant condition of the primary and secondary shade zones should maintain riparian microclimate conditions and protect streams from further increases in temperature in the short and long term. See section 2.2.1, Riparian Thinning, and, section 2.4.6 project design features, for parameters and direction used to ensure water temperature would be maintained, or improved in the long term, in accordance with ACS objectives. Hand-pile and under-burning could increase nitrogen levels within the stream and riparian reserve in the short term. These would be highly localized, low level increases and would not be expected to be large enough to have any measurable affect on water quality. Due to Project Design Features regarding burning, and restrictions on equipment use (e.g. no re-fueling within 150 ft of stream crossings) the proposed action is not expected to have any affect on chemical or nutrient contamination.
	Affected (Sediment/ Turbidity)	<u>Affected:</u> The Proposed Action (e.g., log haul roads, yarding, temporary road construction and road decommissioning, culvert replacement, and instream habitat improvement) would result in soil disturbance, thereby increasing the potential for soil erosion, localized turbidity, and sedimentation in streams in the short-term. The unit of measure is a narrative on whether an action would cause sedimentation to streams that would be in excess of the Environmental Protection Agency's criteria for surface water quality standards under 304 a(1) of the Clean Water Act. *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.*
	Not Present (Ground aquifers)	There are no known groundwater aquifers in the project area.

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Critical Element of the Human 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 to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Wetlands (Executive Order 11990)	Not Present	
Wild and Scenic Rivers	Not Present	
Wilderness	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 teams predicted environmental impact per element if the action alternative described in Chapter 2 of the Environmental Assessment were 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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Essential Fish Habitat [Magnuson-Stevens Fisheries Conservation and Management Act (MSA)]	Affected EFH within the Umpqua Basin	Affected: Some streams within this Planning Area are designated as EFH (Essential Fish Habitat) under the Magnuson-Stevens Fishery Conservation and Management Act. The Proposed Action (road related activities, harvest activities and the replacements of fish-bearing and non fish-bearing culverts would cause minimal effects to EFH. The unit of measure is a narrative which describes whether the action would result in adverse effects to EFH. *Refer to Section 3.4.5 for a discussion of the effects of the proposed action related to this element of the environment.*
	Not Affected EFH within the Rogue River Basin	Not Affected: The Proposed Action would not adversely affect EFH for coho or chinook salmon in the Rogue River basin. The 2.1 miles of road maintenance and haul proposed within the Rogue River Basin would have no effect on EFH. The closest stream crossing from coho is more than 2.0 miles away. Because of the PDFs, BMPs and the distance of road maintenance activities and hauling, sediment would not affect EFH.
Fire Hazard	Affected	Hazardous fuel treatments would reduce fire hazard in the long term while the CDM prescriptions could increase fire hazard in the short term. Flame length is the unit of measure for fire hazard. *Refer to Section* 3.2 *of the EA for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
Fire Risk	Not Affected	There is no expected affect regarding fire risk because no new permanent road construction is proposed that could increase human presence. *Refer to Appendix 10 for further information.*

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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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Late-Successional Forest	Proposed action is in compliance with the 15% Standard and Guideline	Federal ownership of late-successional forest is approximately 49% (USDI 1999) of the federal land in Middle Cow Creek fifth-field watershed. The Northwest Forest Plan standards and guidelines state that at least 15% of fifth field watersheds should be managed to retain late-successional patches (ROD, C-44). The proposed action would not remove late-successional forest stands. As such, the proposed action is in compliance with the 15% Standard and Guideline.
Migratory Birds (Species of Concern)	Not Affected	The proposed action will not remove late-successstional habitat and is designed to enhance late-successional characteristics, therefore Migratory Birds (Species of Concern) will not be affected. See the Specialist Report in Appendix 11 for a detailed explanation.
Port-Orford-Cedar	Not Present	Project area is outside the natural range of Port-Orford-cedar.
Recreation	Not Affected	The proposed action would not affect the recreation activities within this area. Recreation activities in the Planning Area include driving for pleasure, hiking, camping, hunting, OHV use, horseback riding, and bicycling. While there might be increased logging truck traffic during the operational months, this type of activity is typical for the area because of harvesting on private and other government owned lands. Proposed activities such as decommissioning 0.84 miles and gating 3.6 miles of existing roads would reduce the opportunity of non-designated off-road vehicle use for those areas but is not expected to have a measurable effect on this type of recreational use since the road density in the Planning Area is more than 4.9 miles per square mile.
Rural Interface Areas	Not Affected	Rural residents in the Planning Area would experience short-term noise, dust, and traffic congestion due to logging operations. These types of activities are common because of management practices occurring on private and other public lands. Concerns such as dust abatement, and traffic congestion would be mitigated through the application of Project Design Features addressed in Chapter 2 of this document.
Special Areas (not including ACEC)	Not Present	

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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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Survey & Manage and Special Status Species (not including T/E): Fish Species/Habitat	Not Present Survey & Manage	There are no Survey and Manage fish species listed in the *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and* Guidelines (FSEIS, 2000 and ROD, 2001) including any amendments or modifications in effect as of March 21, 2004. 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.
	Affected Oregon Coast (OC) coho salmon ESU and Oregon Coast (OC) steelhead ESU	<u>Affected (Oregon Coast Coho):</u> The Proposed Action may affect Oregon Coast coho salmon, a Bureau Sensitive Species. Activities which would impact OC coho include road related activities, harvest activities, a fish habitat enhancement project and replacements of culverts (fish bearing and non fish bearing culverts.) The unit of measure is whether the action would contribute to the need to list the species as a result of habitat alteration. *Refer to section 3.4.4 for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.* <u>Affected (Oregon Coast Steelhead):</u> The Proposed action may affect OC steelhead, a Bureau Sensitive Species. Activities which would impact OC steelhead include road related activities, harvest activities, a fish habitat enhancement project and replacements of culverts (fish bearing and non fish bearing culverts.) The unit of measure is whether the action would contribute to the need to list the species as a result of habitat alteration. *Refer to section 3.443 for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
	Not Affected Special Status Species within the Rogue River Basin	<u>Not Affected (Special Status Species within the Rogue River Basin):</u> The 2.1 miles of road maintenance and haul proposed within the Rogue River basin would not affect any special status species found within the Rogue River basin. Species include Southern Oregon Coast/California Coast fall chinook (sensitive) and Southern Oregon Coast/California Coast spring chinook (assessment). Summer and Winter Klamath Mountain Province (KMP) steelhead are Bureau Assessment. Fall chinook are located approximately 8 miles downstream from the proposed haul roads within the Rogue River Basin. Spring chinook are located approximately 19 miles downstream from the proposed haul roads within the Rogue River Basin.

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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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Survey & Manage and Special Status Species (not including T/E): Fish Species/Habitat	Not Affected Special Status Species within the Rogue River Basin (continued) No management requirement: Pacific lamprey and coastal cutthroat trout	Summer and winter KMP steelhead are located in Wolf Creek. A proposed haul route would be used within the Wolf Creek area. The closest stream crossing of the gravel road is an intermittent stream approximately 350 feet upstream from steelhead habitat in Wolf Creek. The other stream crossings are over 0.25 miles from steelhead in Wolf Creek. The PDFs and BMPs for road maintenance and haul, the rocked road surface, and the distance of the crossings from steelhead habitat would prevent sediment from affecting steelhead habitat. Sediment would either not enter stream channels or would be filtered through vegetative strips prior to reaching steelhead habitat. Therefore steelhead habitat in Wolf Creek would not be affected. Pacific lamprey and Oregon coastal cutthroat trout, Bureau Tracking species, are also found within the Planning Area. Bureau Tracking species are not considered special status species for management purposes. These species do not require management or mitigation (IM OR-2003-054). Because of the Project Design Features which includes the Best Management Practices within the RMP, the amount of sediment reaching fish habitat from the proposed action (timber harvest, road work, and fish habitat enhancement) would be minimal, short term and localized. As such, potential impacts to these species from proposed activities would not adversely affect the populations and result in the need to list under the Endangered Species Act.

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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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Survey & Manage and Special Status Species (not including T/E): Plant Species/Habitat	Not Affected (Bureau Special Status Plants)	Vascular plant surveys were conducted in the spring of 2004 and 2005, and surveys were completed in the spring of 2005 for lichens and bryophytes. Surveys revealed 2 Survey and Manage vascular plant sites, both of which are *Eucephalis vialis*. Surveys also revealed two sites of the Bureau Assessment species *Carex gynodynama*. Two bureau tracking species sites (1 *Astragalus umbraticus*, and 1 *Mimulus douglasii)* were also documented during pre-disturbance surveys. Nonvascular surveys, completed in spring 2005, resulted in 2 new bureau special status nonvascular plant sites, both of which are Assessment species (1 *Tripterocladium leucocladium* and 1 *Tayloria serrata*). One Bureau tracking species site (*1 Leptogium teretiusculum)* was also documented, and has dual status as a Survey and Manage E species. Within timber harvest units, bureau sensitive and assessment species and survey and manage category C species would be protected by buffers, which would vary in diameter depending on unit prescription. Bureau tracking species do not require mitigation, and would not receive buffers. However, sites harboring tracking species which also have a S&M Category B or E designation would be managed. Within the Middle Cow Planning Area, the only species to fall into this scenario is *Leptogium teretisculum*, which would receive a 100 ft buffer. Sites within units slated for fuels treatments would be protected, but since the overstory is not typically affected by prescribed burning activity, and fire is a naturally-occurring disturbance, buffer sizes would be less.

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 teams predicted environmental impact per element if the action alternative described in Chapter 2 of the Environmental Assessment were 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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Survey & Manage and Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Affected (Bureau Special Status Plants) (continued)	Buffers would vary from none to 5-30 feet in diameter depending on 1) the prescribed fuels treatment, 2) the time of year treatment will occur, and 3) whether or not that species has demonstrated a tolerance to fire-related disturbance. For instance, if a species such as *Camassia howellii*, which has consistently demonstrated a favorable response to introduced fire, is within a prescribed burn unit and the burn is scheduled for late fall or very early spring (when the plant is dormant), that population would not receive a buffer. Given these protection measures, proposed prescribed burning activity would not trend these species toward federal listing and should assure persistence.
	Not Affected (Bureau Special Status Fungi)	The project area was not surveyed for fungi, as pre-disturbance surveys for Special Status fungi are not practical, nor required per BLM – (USDA/USDI 2001, p.64-67)." Current special status fungi were formerly in the aforementioned S&M categories which did not consider surveys practical, and are therefore exempt from survey requirements. With the recent re-instatement of Survey and Manage Protocols, these species were placed back into their respective S&M categories (9 species in B, 1 species in F) – none of which require surveys under S&M protocol. District wide, the Medford BLM has ten Bureau Sensitive (BSO) fungi species; six are suspected to occur here, while the remaining four have been documented. Of the four documented species, only one, *Phaeocollybia olivacea*, has been found in the Glendale Resource Area, approximately 8.9 air miles away from the Planning Area. Although this site and the Planning Area reside within the same HUC 5 Middle Cow Watershed, the fungi site is topographically far removed from the project area; several ridges and the I-5 corridor separate the two geographic vicinities. In addition, the microhabitat of the fungi site differs from the microhabitat of the closest Middle Cow units; the west-facing riparian-influenced habitat surrounding the fungi site differs from the north-northwest-facing habitat of the closest Middle Cow unit.

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Survey & Manage and Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Affected (Bureau Special Status Fungi) (continued)	Based on the outcome of utilizing the 'Likelihood of Occurrence Key' provided from the BLM Oregon State Office, there is a "low likelihood of occurrence and low risk to species viability or trend toward listing," for sensitive fungi species potentially located in the Planning Area. 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). Based on the above information, the likelihood of a Bureau Sensitive fungi species in this Planning 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.
Survey & Manage and Special Status Species (not including T/E): Wildlife Species/Habitat	Affected (Northwestern pond turtle and northern goshawk)	Northwestern pond turtle (Bureau Sensitive) – There is one known site within the Planning Area boundary. Pond turtles hibernate under debris up to 0.5 miles from their aquatic habitat and may choose piled fuels for hibernacula. Fuel treatments are proposed within the 0.5 miles of this know site, but they may take place when the animals are no longer hibernating (after May 1st). At most, the proposed action may cause a small amount of mortality in the local subpopulation of pond turtles. Northern goshawk (Bureau Sensitive) – There is one known site within the Project Area. Goshawks have also been observed near Azalea and at King Mountain (one mile outside of the planning area boundary). Silvicultural prescriptions that would not downgrade late successional habitat would benefit goshawks within the Planning Area, as proposed activities would enhance clearance of maneuvering through the canopy. Downgrading habitat would reduce canopy closures required for nesting and other habitat characteristics to create a negetative temporary effect. Viability rating would remain high and unchanged on a provincial scale and would be enhanced on the fifth-field scale for the short term (up to 20 years after treatment until the understory recovers), (USDA/USDI 1994a 3&4 p179). The unit of measure for both the western pond turtle and northern goshawk is a narrative that describes whether the action would result in a trend toward federal listing or need to elevate the land of concern. *Refer to Section 3.3.3 (western pond turtle) and 3.3.4 (northern goshawk) of the EA for a discussion of the affected environment and environmental effects of the alternatives related to these elements of the environment.*

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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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Survey & Manage and Special Status Species (not including T/E): Wildlife Species/Habitat (continued)	Not Affected (Oregon shoulderband snail, Townsend's big-eared, bat Pacific pallid bat, Fringed myotis, northern goshawk, Great Gray, and Red Tree Vole)	Oregon shoulderband (snail) (Bureau Sensitive) – There are no known sites in proposed units; however, this snail is likely to occur in Planning Area. Typical rock talus, rock outcrop, and grass-hardwood meadow habitat would not be removed or suitability degraded. Townsend's big-eared bat (Bureau Sensitive, Pacific pallid bat (Bureau Assessment) – There are no known sites within project area that would affected by the proposed activities. Its typical habitat of rock outcrops and cliffs is not found in units, and harvest treatments are not expected to affect this habitat. Some suitable snags may be removed due to safety concerns in the commercial density management of 1,236 acres of late-successional habitat. No caves/ rock structures with crevices supporting roosting or hiburnacula would be disturbed. The viability level would be maintained as the NFP with Standards and Guidelines would provide 80% or greater likelihood of sufficient distribution of habitat (1994a p.3&4-187). Fringed myotis (Bureau Assessment) - This species utilizes old growth habitat. There is one known site within the Planning Area however, it is located on private land and as such would not be affected by the Proposed Action. This project is expected to maintain the viability level, and create or accelerate the development of suitable habitat within the Planning Area. Great gray owls have not been observed in the Planning Area, and proposed treatments would not occur within 200 meters of natural openings. Red Tree Vole (removed from Survey & Manage) – This species is likely to be present within project units and the action could potentially remove some habitat trees. However, this species was removed from the Survey and Manage list for this geographic area (mesic zone) through the 2003 Survey and Manage Annual Species Review (IM OR-2004-034), because the species was found to be more plentiful and widely distributed in the mesic zone. The red tree vole was not re-assigned as a Special Status Species; therefore, surveys, protecting known sites, other management, or mitigation are not required. Potential impacts to the red tree vole from project activities would not affect the persistence of the local subpopulation since density management would be primarily from below and the larger trees retained are more likely to contain red tree vole nests than trees proposed for removal.
	Not Present Foothill yellow-legged frog,	Not present: Foothill yellow-legged frog (Bureau Assessment) – There are no known sites present within proposed treatment areas, most historic sites are quite distant and the site closest to the project area is over 12 miles away (T34S, R3W, section 27.

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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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Survey & Manage and Special Status Species (not including T/E): Wildlife Species/Habitat (continued)	Not Present American peregrine falcon, black-backed woodpecker, flammulated owl, Lewis' woodpecker, three-toed woodpecker, white-headed woodpecker, Siskiyou short-horned grasshopper, Chase sideband (snail), Siskiyou hesperian, traveling sideband (snail), Clark's grebe, white-tailed kite, and Del Norte salamander)	Not present: white-tailed kite (Bureau Assessment) Bureau Sensitive – American peregrine falcon, black-backed woodpecker, flammulated owl, Lewis' woodpecker, three-toed woodpecker, white-headed woodpecker, Siskiyou short-horned grasshopper, Chase sideband (snail), Siskiyou hesperian, traveling sideband (snail), and Clark's grebe Del Norte salamanders (Survey and Manage) - This species is listed as a Category D species under the Survey & Manage ROD from 2001 (*Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, January 2001). Under this designation "pre-disturbance surveys are not practical or not necessary to meet objectives for species persistence" (p. 11 of the Standards & Guides). The project activities are not expected to affect this species as it is outside the known range of the salamander. Del Norte salamanders are associated with older, closed-canopy forests with rocky substrates dominated by cobble-sized pieces of rock (Welsh and Lind 1995). Since there is very little talus in the Planning Area, and no treatments are planned in this habitat, it is expected that this project would have no effect on Del Norte Salamanders.
Soil (productivity, erodibility, mass wasting, etc.)	Affected (Sediment/ Turbidity)	The Proposed action (e.g. yarding, temporary road construction, road decommissioning, and fuels treatments) would result in soil compaction/disturbance that may reduce soil productivity. Compaction would not exceed 12% within any one unit or on a project level, keeping impacts from compaction within those levels assessed under the RMP. The unit of measure is a narrative description of erosion and mass wasting, and a calculated, research derived percentage for compaction and productivity. *Refer to Section 3.4.1 of the EA for a discussion of the affected environment and environmental effects of the proposed action related to this element of the environment.*
Visual Resources	Not Affected	The Planning area is located within VRM (Visual Resource Management) Class I-IV category lands. These VRM categories allow for varying amounts of modifications to the existing character of the landscape. Additionally, manage rural interface lands using visual resource management Class III standards unless otherwise classified as Class I or II (p. 88). The Proposed Action is consistent with these visual resource management objectives as stated in the Medford District Resource Management Plan (page 70). Visual Contrast Rating sheets have been completed and are located within the Project File Record.

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Water Resources (not including water quality)	Not Affected	The proposed action is not anticipated to have a measurable effect on watershed hydrology, or beneficial uses associated with the quantity or timing of water within this project area. Designated beneficial uses in this project area include private water supplies, irrigation, industrial water supplies, livestock watering, fish and aquatic life, fishing, boating, water contact recreation, aesthetic quality, and hydro power. These beneficial uses would not be affected by this project because there would be less than 0.01% (6.3 acres) increase in the amount of open area within this Planning Area. Open space would be increased in the Quines Creek HUC 6 sub-watershed by approximately 0.6 acres (0.003% of this HUC 6) and within Whitehorse HUC 6 sub-watershed by approximately 3.2 acres (0.014% of the Whitehorse HUC 6) due to the building of temporary roads, and an additional 2.5 acres of landings. Because this project involves only harvest prescriptions that do not allow canopy closures to be taken below 30 percent in any area (e.g. no regeneration harvest), road and landing construction would be the only aspect of this project that would increase open space. Canopy closures over 30% are not considered to be open space for the purposes of hydrologic functions such as peak flows or water yield increases (WPN, 1999). Peak flows and water yields within small watersheds (250-8400 ac) are affected by clear cut harvest or commercial thin harvesting where canopy closures are taken below 30%; especially when done in conjunction with road building, or in watersheds where high road densities exist (Church and Eaton, 2001). Within the transient snow zone (TSZ), rain-on-snow events can accelerate snow melt in forest openings, further increasing the rate of delivery and enhancement of peak flows within a watershed. Watersheds with open space in excess of 25% have a greater potential for increased water yields, and in instances where more than 25% of the TSZ is also in open condition, the potential for peak flow augmentation is also increased. Studies show that the magnitude of the peak flow is increased as the size of the watershed is reduced (Church and Eaton, 2001). Compaction from yarding corridors, heavy equipment, and roads reduce infiltration capacity (Johnson and Beschta, 1980) increase subsurface water interception at cutbanks, and increase the rate of delivery of water to stream channels via ditchlines.

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 teams predicted environmental impact per element if the action alternative described in Chapter 2 of the Environmental Assessment were 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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm
Water Resources (not including water quality) (continued)	Not Affected	Approximately 36% of the acres within the Quines Creek watershed and 48% of the acres within the Whitehorse Creek watershed fall within the TSZ. Open space in this Planning Area is primarily a result of disturbances such as logging, fire, and roads. Currently, the Quines Creek HUC 6 watershed has approximately 22% in open condition, with over 21% open space within the TSZ. As such, the Quines Creek watershed would not be at risk for peak flow or water yield increases resulting from baseline open space conditions. Additionally, because only 0.6 acres of open space would occur under the action alternative, the Quines Creek HUC 6 sub-watershed would not be at risk for increases peak flows or water yields as a result of this project. Currently, the Whitehorse Creek watershed has approximately 27% in open condition, with 25% open space within the TSZ. A 25% maximum for open condition is recognized in most literature for maintaining an immeasurable effect to hydrologic timing and peak flow increases of small watersheds. When watersheds exceed this trigger point, further analysis should be done to determine if effects may be measurable. Since this HUC 6 sub-watershed was right at this trigger point, an assessment was done to determine how many of these open space acres were in an advanced stage of hydrologic recovery. Forest vegetation is generally considered to be in an advanced stage of hydrologic recovery 20 years after disturbance, and substantially complete by age 30 (Harr, 1989; Adams and Ringer, 1994). It is possible the existing amount of open space within the Whitehorse Creek watershed is currently affecting small tributary streams at a HUC 7 level or smaller. However, on a HUC 6 or larger scale, this Planning Area would currently be at a low risk of peak flows or water yields solely as a result of the amount of open acres within the TSZ, and the percentage of TSZ within both of these watersheds (Watershed Professional Network, 1999). Additionally, data from Medford Change Detection shows that approximately 1,330 acres (3.3%) of the Planning Area is 22 years or older, and therefore, it is likely that some acres included in this analysis are partially recovered. This project would only increase the amount of effective open area above current levels by 0.01% (6.3 acres), and therefore, it would not be expected that activity associated with this project would cause a measurable difference in hydrologic timing, magnitude of peak flows, or by extension, in the quantity of ground water storage. Scarifying new skid roads and sub-soiling existing skid roads would reduce compaction on these sites by as much as 80% (Froehlich and Miles 1983; Davis 1990), substantially restoring the infiltration and routing of water and nutrients into the soil. As such, temporary roads are expected to have a short term effect on open area, productivity, and compaction.

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 teams predicted environmental impact per element if the action alternative described in Chapter 2 of the Environmental Assessment were 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, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Water Resources (not including water quality) (continued)	Not Affected	Since the current conditions of the sub-watersheds do not exceed 25% within the open space in the TSZ, all proposed treatment areas would leave canopy closures of 30 percent or above, and the increase of open area above current levels would only be 0.01% for the Planning Area; the risk of peak flow or water yield increase would not occur as a result of this project. The maximum amount of affected area in any alternative would be limited to 1,236 acres of commercial density management, and 2,501acres of fuels treatments, all of which would be dispersed over the 40,222 acre Planning Area. Roads currently occupy 1.96 % of the Quines Creek watershed, and 1.88 % of the Whitehorse Creek watershed (or 1.91% of the Planning Area). According to a studies by Bowling and Lettenmaier (1997), Harr et al. (1975) and others, measurable increases in peak flows are generally not seen until roads occupy at least 3-4% of the HUC 7 drainage (Harr et al. found that 12% is necessary). There is no literature that illustrates effects of road percentages at the HUC 6 sub-watershed scale. However, since effects are generally amplified at a smaller scale and diluted at a larger scale it would be expected that these road percentages would have less effect at a HUC 6 sub-watershed scale. There are no new permanent roads proposed under this project. A maximum of 1.6 miles of temporary road is proposed for access to some treatment areas but would be decommissioned and rehabilitated following use; therefore, it would not contribute to overall road density. Beneficial uses would further be protected by riparian buffers which would be placed on all streams and springs to protect all ecological and biological functions along streams and springs, as required under the NFP and the Medford RMP. Harr (1976) found that patch cutting within a watershed, combined with riparian buffers of 50-100 feet can reduce increases in water yield. Localized changes in water quantity in small, isolated springs within units could occur as stocking levels change during the first decade. However, due to canopy cover retention and type of treatment (i.e. commercial density management) it is not expected that these management activities would affect any water rights within these proposed units.

Table 3. Aquatic Conservation Strategy Summary. This table lists the four components of the Aquatic Conservation Strategy (RMP, p.22) and the interdisciplinary team's predicted environmental impact per component if the proposed action described in Environmental Assessment OR-118-06-003 was implemented.

Riparian Reserves	Consistent	Habitat would be improved through treatments designed to reduce the occurrence of tightly spaced, even aged stands, and accelerate the creation of late-successional characteristics and future large woody debris. The primary shade cover would be retained on streams. Wetlands would not be affected. Also refer to Chapter 2 for Project Design Features consistent with the NFP and Medford District RMP.
Key Watershed	Not Present	The proposed action is not located within a Tier 1 Key watershed.
Watershed Analysis	Consistent	Middle Cow Creek Watershed Analysis, 1999. Watershed Analysis recommendations included in the design of the proposed action includes thinning stands to promote the creation of late-successional characteristics, reducing hazardous fuels, adding large woody debris and boulders to streams to create habitat and gating and maintaining roads to minimize sedimentation.
Watershed Restoration	Consistent	Control and prevention of road related run-off and sediment production: The proposed action entails road maintenance and net road mileage reduction within the watershed that in the long-term would reduce road related run-off and sediment production. Restoration of the condition of riparian vegetation: Riparian Reserves would be thinned to promote the creation of late-successional characteristics on an accelerated timeframe. This would occur with no new permanent road construction. Restoration of the condition of streams: Boulders and large alders and conifers (<20 inches in diameter) would be added in Tennessee Gulch to create pools and slow stream current for fish and other aquatic species. The replacement of four fish-bearing stream culverts would re-establish passage of fish and other aquatic species.

APPENDIX 3 - PUBLIC COMMENT TO MIDDLE COW LSR LANDSCAPE PLANNING PROJECT SCOPING REPORT AND BLM RESPONSE

Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 11 public responses from either letters or emails from April 28, 2005 to July 11, 2005. BLM response to substantive comments are presented in this Appendix to the EA.

George Sexton, Conservation Director, Klamath Siskiyou Wildlands Center

comment a: *"We urge the BLM to focus on active management in the South Umpqua/Galesville LSR on thinning the existing plantations and reducing the extreme road density."*

BLM response: There are several recent and foreseeable projects on BLM and Forest Service land that have treated or are proposing to treat young plantations within this LSR over the next five to ten years e.g. Galesville Valley Project, Wildcat Thin, Slim Jim Timber Sale, Cow Creek Shaded Fuel Break Project (Forest Service), and a categorical exclusion pre-commercial thinning (PCT) totaling approximately 6,245 acres.

There are also opportunities to develop and enhance stands within this LSR between the ages of 30-80 years of age, as the Middle Cow LSR Project proposes. The South Umpqua/Galesville LSR Assessment recommends mid-seral thinning for treatment where the following characteristics are missing: multi-level stories, multi-aged stand, diverse stand species, ground vegetation, and a component of hardwoods. Priority areas based on landscape-level criteria notes, "[t]reatment of large areas of mid-seral stands could result in large late-successional blocks within 10-40 years, particularly in the south central portion of the LSR on Medford BLM," (USDA/USDI 2004a, p.54). "Treatments would take advantage of opportunities to optimize habitat for late-successional forest related species in the short term…This will shorten the period of time needed for the creation of large diameter trees," (USDA/USDI 2004a, p.76). The Middle Cow LSR is located within this central range of the LSR.

The interdisciplinary team identified and prioritized potential decommissioning for 0.8 miles of roads and gating or barricading locations that would close traffic on 3.60 miles of roads. Areas of greatest concern are where roads are located along streams

(particularly fish streams) and sub-watersheds where road densities are high. Many of the roads within the Middle Cow LSR Landscape Project Planning Area are not public roads and are under reciprocal right-of-way agreements with private landowners because of the checkerboard ownership pattern. The BLM does not have the option to close these roads due to the reciprocal right-of-way agreements.

comment b: *"'Temporary' logging road construction, tractor yarding, and mid-seral logging are not appropriate practices in this LSR. We formally request development, consideration, and implementation of an alternative that prioritizes the treatment of young plantations while avoiding new road construction."*

BLM response: Your concern is acknowledged. Temporary road construction is currently proposed to access treatment units where no roads exist or road conditions are overgrown and inaccessible without opening up roads. The placement of proposed temporary road construction has been be kept to a minimum and designed to minimize adverse impacts. As stated in the NFP (p.C-16) and RMP (p.87), "Construct roads in Late-successional reserves if the potential benefits of silviculture, salvage, and other activities exceed the costs of habitat impairment. Alternative access, such as aerial logging, should be considered to provide access for activities within reserves. Road maintenance may include felling hazard trees along rights-of-way. Leaving material on site should be considered if available coarse woody debris is inadequate."

Units without current accessibility were first evaluated to determine if helicopter logging would be an economically feasible method to remove commercial timber. Those proposed treatment units found to be economically feasible were identified for helicopter logging (62 acres) while the units found to be uneconomical for helicopter logging were evaluated for temporary road construction as another means to access suppressed stands in need of thinning. This evaluation resulted in the reduction of temporary road construction from three (3) miles to 1.55 miles. The proposed temporary road construction was designed to reduce impacts through implementation of Best Management Practices such as placement of roads on or near ridgetops; avoiding placement within riparian reserves; and decommissioning after use. The total temporary road construction is 1.55 miles or approximately four acres of new ground disturbing activity. This is equivalent to 0.1% of the proposed activity acres of the Middle Cow LSR Project. The effects of constructing proposed temporary roads on late-successional habitat are analyzed in Chapter 3 of the EA.

The South Umpqua/Galesville LSR Assessment notes priority should be given first to early seral stands for precommercial thinning, then to mid-seral stands. Currently the Glendale Resource Area is implementing young stand density management through a categorical exclusion (see response to comment a).

comment c: *"We bring to your attention that the Northwest Forest Plan, the Middle Cow Creek Watershed Analysis and the South Umpqua/Galesville LSR Assessment all indicate that younger stands (rather than native mid-seral forests) should be the focus of silvicultural manipulation in the LSR…Page 59 of the LSRA identifies stands from 0-40*

years old as 'high' priority for density management while indicating that mid-seral stands are a 'low' priority for treatment."B-7 of the Northwest Forest Plan states that 'Stand management in Late-Successional Reserves should focus on stands that have been regenerated following timber harvest or stands that have been thinned. Page 36 of the WA indicates that 45% of the LSR is in younger seral stages due to past BLM logging activity; these are the stands that would most benefit from thinning, and that currently provide little value to late-successional associate species."

BLM response: See response to comment a second paragraph regarding treatment of younger seral stages. As stated in response to comment b, priority areas based on landscape-level criteria notes the central portion of the Medford BLM part of the LSR and mid-seral stands that would benefit from treatment to achieve late-successional characteristics within the next 10-40 years. Though the priority is low, this does not imply that there will not be management activities in these stands (USDA/USDI 2004a, p. 61). There are also stands that due to the exclusion of fire have developed differently than natural stands would have when fire was still a part of the ecosystem. A white fir understory has developed in these stands due the absence of fire," (USDA/USDI 2004a, p.78). "Management activities designed to reduce risk levels are encouraged in those Late-Successional Reserves even if a portion of the activities must take place in currently late-successional habitat," (USDA/USDI 2005, p.C-13). Risks include moisture stress (loss of water availability due to competition from young vegetation) and large-scale disturbances such as insects, disease, and/or fire. One unit (30-2) proposes silvicultural prescriptions to reduce the risk of remnant and large tree loss in a stand greater than 80 years old. This activity will be subject to LSR Working Group review for approval (USDA/USDI 2004a, p. S-3).

comment d: *"Page 64 and 65 of the LSRA direct the agency to seriously consider the present connectivity function of mid-seral forests in the LSRA before authorizing activities that may reduce connectivity values."*

BLM response: The present connectivity function of mid-seral forests has been evaluated in the development of treatment selection. Activities proposed within LSR mid-seral stands are being developed to enhance the present connectivity function. The LSRA notes, "The age classes for dispersal habitat (41-80 years) also approximate where density management could occur depending on stand characteristics," (p.61). Stands are being selected, as explained in the response to comment b, where multi-level stories, ground vegetation, and a component of hardwoods are missing and entry is needed to develop absent late successional characteristics.

"It will take more than 40 years for these young stands to grow into late-successional habitat and reach the desired condition of at least 60% of the LSR in late-successional habitat. Treatments to accelerate stand conditions to late-successional characteristics should occur while balancing the need to maintain connectivity," (USDA/USDI 2004a, p. 59).

Thus, mid-seral stands that would achieve late-successional characteristics within 10-40 years after treatment and currently do not contain the structural or species composition to continue towards late-successional development without entry were also considered for treatment.

comment e: *"Page 68 of the LSRA estimates that up to 5,000 acres of the LSR could be treated per decade in order to accomplish risk reduction or habitat manipulation. Please note that the LSRA anticipates that 80% of the treatment areas would be subject to fuels/risk reduction while 20% would be subject to habitat manipulation. The scoping notice does not reflect those priorities. Instead the scoping notice proposes 2,288 acres of density management and 2, 748 acres of hazardous fuel reduction. Our organizations support proposed hazardous fuels treatment consisting of slash/hand pile/burn methods. We bring your attention that the 2,288 acres of (predominately mid-seral) habitat manipulation would impact more than double the acreage anticipated by the LSRA. The current ratio of density management to fuels/risk reduction does not reflect the findings or projections of the LSRA."*

BLM response: The 5,000 acres guideline is referencing hazardous fuels reduction. The LSRA also suggests the following treatment acreages within the next 10 years: 2,000 acres in 40-80 year old stands, 7,000 acres in sapling stands (20-40 years), and 3,000 acres in 10-20 year old planted stands. The total of these acreages is 22,000 acres. The 20% habitat manipulation noted in your comment relates to the use of prescribed fire in hazardous fuels reduction treatments where areas would not be commercially harvested at this time, such as underburning, handpile & burning, lop & scatter, creation of buffers and fuel breaks, or burning of meadows. The combined use of hazardous fuels reduction in this LSR approximates at 3,160 acres, from the 2,500 acres proposed under this project and 660 acres of current and foreseeable projects on BLM and Forest Service within this LSR.

comment f: *"It is extremely disappointing that the BLM is proposing to build yet more roads into this highly roaded late-successional reserve. The agency should follow the letter, intent and direction of the Northwest Forest Plan and reduce, rather than increase the short-term road density. Please note that while the new road construction is described as "temporary" that all road construction results in long-term impacts to soil health and productivity."*

BLM response: See response to comment b for direction of the Northwest Forest Plan and comment a (last paragraph) concerning road decommissioning and road closures. Proposals for temporary road construction will not exceed the RMP/ROD and RMP/EIS guidelines of 12% compaction (pp. 166) and 5% productivity loss (RMP/EIS p. 4-13);" (EA, p.6). The impacts to soil health and productivity are analyzed in Chapter 3 of the EA.

comment g: *"We are very skeptical that ground-based yarding systems will contribute to the attainment of late-successional characteristics."*

BLM response: No downhill cable yarding is proposed in this project. Ground based tractor yarding would be limited to slopes less than 35% in order to prevent excessive soil disturbance. The effects of ground-based yarding systems is analyzed in Chapter 3 of the EA.

comment h: *"The impacts of yarding corridors on late-successional habitat, 'edge' effects, and connectivity should be analyzed and disclosed in the EA."*

BLM response: The impacts of yarding corridors are analyzed and disclosed in the EA.

comment i: *"Large diameter trees in the LSR and the riparian reserves should not be logged in order to facilitate yarding."*

BLM response: Project Design Features would provide the following for large diameter trees (≥20 inches dbh): minimize yarding corridor widths to protect crowns of such trees; would be designated as reserve trees (including in Riparian Reserves) and would not be cut as part of density management operations; if such trees are felled for safety reasons or accidentally knocked over during logging operations, they would be left on site.

The Regional Ecosystem Office (REO) produced an exemption (July 9, 1996) that supports silvicultural treatments within the LSR; however it does not permit harvesting of trees greater than 20 inches in diameter in the Klamath Province except for the purpose of creating openings, providing other habitat structure such as downed logs, eliminate a hazard from a standing danger tree, or cutting minimal yarding corridors. Where trees larger than 20 inches dbh are cut, they will be left in place to contribute toward meeting the overall coarse woody debris objective. Cutting of trees exceeding this diameter, for any purpose, would be the exception not the rule. The Proposed Action is consistent with this REO exemption.

comment j: *"Please note that the 2004 ROD eliminating the survey and manage program assumed that LSRs and riparian reserves would provide refugia for this species [Del Nortes]. If logging practices are authorized that harm this species, the assumptions and findings of the 2004 ROD will not be valid. The Middle Cow Creek Watershed Analysis indicates that 'the exact limit of their distribution is uncertain'. WA p.45. It is particularly important to avoid impacts to a species that may result in extirpation from a portion of its range. The WA also concludes that 'An extensive inventory of Survey and Manage species should be conducted to better understand habitat requirements, determine the affects of past management actions, determine distributional limits for species and establish baseline conditions for LSR, Riparian Reserves and other areas.' WA p.71. Rather than follow the advice of the WA, it appears that the agency is proposing to log Del Norte habitat in reserve land-use allocations without conducting surveys to inform your decision-making."*

BLM response: The Middle Cow LSR EA is compliant with the 2001 Survey and Manage EIS and subsequent Annual Species Reviews. Appendix 2 of the EA considered

how the Del Norte Salamander and other Survey and Manage species are effected, being managed, and what surveys would or would not occur.

Doug Heiken, Oregon Natural Resources Council

comment k: *"Thinning must be done very carefully (and in many cases avoided) in order to avoid, minimize, and mitigate logging's numerous adverse ecological effects including: (1) removal of large trees that are disease and fire resistant (Frost 1999); (2) increased levels of fine fuels and short term fire hazard (Weatherspoon 1996; Huff et al. 1995, Wilson & Dell 1971, Fahnestock 1968); (3) increased mortality of residual trees due to pathogens and mechanical damage to boles and roots (Filip 1994, Hagle & Schmitz 1993); (4) damage to soil integrity through increased erosion, compaction, and loss of litter layer (Harvey et al. 1994, Meurisse & Geist, 1994); (5) creation of sediment that may eventually be delivered to streams and harm fish (Grant & Wolff 1991, Beschta 1978); (6) retention of insufficient densities of large trees and woody debris to sustain viable populations of cavity-nesting and wood debris dependent species (Della Sala et al. 1996); and (7) reduced habitat quality for sensitive species associated with cool, moist microsites or closed canopy forests (FEMAT 1993, Thomas et al. 1993)."*

BLM Response: Through the planning process project design features (Section 2.4) have been developed to avoid or minimize impacts and protect resources and are incorporated into treatment prescriptions. Also see project objectives of Chapter 1, Appendix 2, and Chapter 3 for the impact analysis of proposed activities.

comment l: *"The proposed action does not disclose the ages of the stands slated for commercial thinning. Be sure that you do a site-specific analysis of individual stands and the effects of your thinning prescription…we support variable density thinning which allows young stands to develop into more complex and resilient forests. This means that thinning should be done in a way that creates ¼ to ½ acre gaps, dense patches, lightly thinned, moderately thinned, and heavily thinned patches in every stand. Some of the more current science on young stand thinning is summarized in Matthew Hunter's "Management of Young Forests," available at http://www/fsl.orst.edu/ccern/pdf/Comque3.pdf. Caery's GTR 457, available at http://www.fs.fed.us/pnw/publications/gtrs.shtml, provides excellent specific guidelines on creating variable density prescriptions."*

BLM Response: The silvicultural prescriptions are included in the EA (Appendix 4) and disclose the ages of stands proposed for commercial density management. Variable density management techniques are a part of this prescription to enhance the development of late successional characteristics and have been applied in other recent Glendale Resource Area projects within LSRs such as the Galesville Valley Project and Slim Jim. Some of these techniques include variable spacing, creating small openings (canopy gaps) by marking two-three adjacent trees, and quarter acre openings within units where all but 2-4 conifers are removed. Where the openings are applied, conifers retained would be those that are most likely to remain standing after wind and/or snow events. Openings may not be circular in shape.

comment m: *"In Late Successional Reserves, we only support thinning of young stands if there is no road construction. In young stands in Riparian Reserves, we support thinning activities that enhance the development of trees to shade streams and become sources of coarse woody debris, as long as these activities do not result in yarding corridors, roads, or other yarding activities impacting water quality and aquatic habitat."*

BLM Response: See response to comment b regarding road construction. See Chapter 3 of the EA for a complete analysis of yarding corridors, roads, and other yarding activities on water quality and aquatic habitat.

comment n: *"Recent research by Tappeiner, Poage, and others indicates that a substantial portion of a tree's size and character at several hundred years of age can be explained by the tree's rate of growth at age 50. This leads to a tentative conclusion that thinning stands younger than 50 years old should be a higher priority than thinning stands older than 50 years. Thinning the harvest units that are less than 50 years old will hopefully have minimal impact on the environment (especially soil, water, and wildlife) and thinning such young stands will likely have long-term ecological benefits in terms of accelerating late successional forest characteristics. However, thinning the harvest units that are over 50 years old is more likely to change the trajectory of the stands. The agency should refocus its efforts on younger stands where the results are likely to be on balance more beneficial."*

BLM Response: Stands proposed for treatment within the Middle Cow LSR Project are a combination of natural, previously entered, and regenerated after a fire event. Therefore, age composition of individual stands is not uniform. As, stated in the Final Medford District Resource Management Plan EIS, "the forests of southwestern Oregon are uneven-aged and clear definition of habitat characteristics cannot be made based on age alone," (p.3-34). See response to comment a (4^{th} paragraph).

comment o: *"The road density in the project area is already very high. More roads will only contribute more to the negative environmental impacts of roads already seen throughout the Medford BLM land. Nothing is worse for sensitive wildlife than a road. Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity – habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting – are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as access corridors that encourage development, logging and poaching of rare plants and animals. Road building in National Forests and other public lands threatens the existence of de facto wilderness and the species that depend on wilderness. (Noss, Reed: The Ecological Effects of Roads; http://www.wildrockies.org/WildCPR/reports/ECO-EFFECTS-ROADS.html)...*

The agency lacks the funds to maintain existing roads, so it is arbitrary and capricious to build more…Temporary roads still cause serious adverse impacts to soil, water and wildlife, and spread weeds. Decommissioning such roads is not entirely successful and the soil compaction effects can last decades. The agency should consider avoiding building spurs by treating some areas non-commercially (e.g. thin lightly, create lots of snags, and leave the material on site). If young stand thinning (the type ONRC supports) requires construction of temporary raods, the agency should do an analysis that illuminates how many acres of thinning are reached by each road segment so that we can distinguish between short segments of spur that allow access to large areas (big benefit, small cost) and long spurs that access small areas (small benefit, big cost)."

BLM Response: The proposal to construct temporary roads has been reduced from 3 miles (original proposal in 2005). The 1.55 miles would be decommissioned after use (ripped with a winged subsoiler, waterbarred, mulched and seeded) and would not become a part of road maintenance needs. See Chapter 3 and Appendix 2, 8, and 9 of the EA regarding the effects of the temporary road construction on multiple resources.

comment p: *"The Middle Cow LSR Landscape Planning Project area is designated critical habitat for the Northern spotted owl (CHU OR-32). Any treatments done as part of this project should contribute to the recovery of the owl, not to further destruction of its habitat."*

BLM Response: See Chapter 1 for the project's purpose, need, and objectives as well as Chapter 3 for analysis on the short and long term effects of proposed actions on critical habitat.

comment q: *"The scoping notices does not include how many active owl sites there are in the project area. Is this part of the LSR being actively used by owls? The EA must address any impacts of the project on spotted owl habitat and prey base, including cumulative impacts of other nearby projects such as the Westside Project in the same watershed."*

BLM Response: Chapter 3 of the EA discloses the current number of active owl sites within the Middle Cow LSR Planning Area, as well as impacts to spotted owl habitat, its prey base, and cumulative impacts of other nearby projects such as the concurrent Westside and foreseeable projects in the same Section 7 (Cow-Upper) watershed. The planning process developed project design features to avoid or minimize impacts to spotted owl habitat and are incorporated into treatment prescriptions.

comment r: *"New information about the threatened northern spotted owl indicates that there are significant new uncertainities for the owl that have not been fully considered in any NEPA document at the regional or local scale. As recognized by FWS' recent spotted owl status review, all existing suitable habitat may be critical to the survival of the spotted owl.*

Significant new information includes:

- *Competition and displacement from the barred owl….*
- *The effects of West Nile Virus which is fatal to the owl;….*
- *The potential loss of habitat from Sudden Oak Death syndrome;….*
- *Greater than expected loss of habitat to wildlfire over the last several years;…*
- *The potential effect of climate change on regional vegetation patterns;…*
- *Misapplication of the Healthy Forests Initiative…*
- *The 9th Circuit's ruling in Gifford Pinchot Task Force v. USFWS…*

The status review shows that habitat loss has been greatest in Oregon. Before 'taking' any more spotted owls and before adversely modifying any more suitable habitat, the agencies must prepare a new EIS that considers all the new information and considers whether to increase protection for spotted owl strongholds in Oregon."

BLM Response: The *Evaluation of the Medford District Resource Management Plan Relative to Four Northern Spotted Owl Reports* (August 2005) accurately addressed significant new information on the NSO. Specifically considered were the following four reports:

- *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney et al. 2004);
- *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony et al. 2004);
- *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and
- *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005).

In producing the evaluation, the BLM, Forest Service (FS), and US Fish and Wildlife Service (USFWS) conducted a coordinated review which summarized key findings of these four documents. These key finding were reviewed by report authors Dr. Steven P. Courtney and Dr. Robert G. Anthony to ensure that it accurately reflects their findings. In addition, agency representatives Terry Rabot and Joseph Lint reviewed the document to verify that the USFWS five-year review and the ten-year NSO status and trend report, respectively, were appropriately incorporated. *The Evaluation of the Medford Resource Management Plan Relative to Four Northern Spotted Owl Reports* contains the interagency review and summary of the findings from those reports.

The BLM planning regulations require that the District Manager monitor and evaluate the plan at "established intervals … and at other times as appropriate to determine whether there is sufficient cause to warrant amendment or revision of the plan" (see 43 CFR 1610.4-9). As a key element of the NFP monitoring strategy, completion of the NSO status and trend portion of *The First Ten Years* monitoring report, as well as the other timely studies pertinent to the NSO, is considered appropriate to warrant this focused evaluation. The monitoring report and this evaluation carry out the process of monitoring

and adaptive management envisioned by the Northwest Forest Plan, as adopted and implemented through the Medford District RMP.

In summary, although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with barred owls, and habitat loss due to wildfire were identified as current threats; West Nile virus and Sudden Oak Death were identified as potential new threats. Complex interactions are likely among the various factors. The status of the NSO population, and increased risk to NSO populations due to uncertainties surrounding barred owls and other factors, were reported as not sufficient to reclassify the species to endangered at this time. The reports did not include recommendations regarding potential changes to the basic conservation strategy underlying the NFP, however they did identify opportunities for further study.

The Medford District Manager found the effects on NSO populations identified in the four reports are within those anticipated in the RMP EIS, and that the RMP goals and objectives are still achievable in light of the information from the reports. As such, the Medford District Manager found that the latest information on the NSO does not warrant a change in RMP decisions pertinent to the NSO, and therefore does not warrant amendment or revision of the Medford RMP. The Medford District Manager also found that the underlying analysis in the Medford EIS remains adequate for purposes of tiering NEPA analyses of NSO effects from proposed actions implementing the RMP.

comment s: *"Special status species surveys must be completed prior to developing NEPA alternatives and before the decision is determined. On-the-ground field reconnaissance surveys must be done and used to develop NEPA alternatives."*

BLM Response: Special status species surveys including Survey and Manage surveys (as defined by the 2001 Survey and Manage EIS and subsequent Annual Species Reviews) have been completed. See Appendix 2, 8, and 9 for the results. Project design features have been developed to ensure the protection of special status species.

comment t: *"Project analysis should separately discuss each of the Aquatic Conservation Strategy objectives (under the Northwest Forest Plan). Any commercial harvest or road construction in key watersheds or municipal watersheds should be avoided in order to protect water quality."*

BLM Response: See Chapter 3 and Appendix 2 for the discussion on project activities obtaining Aquatic Conservation Strategy objectives. The Middle Cow Creek Watershed is not a key watershed or municipal watershed.

comment u: *"A full range of action alternatives should be considered for this sale. These alternatives should include wildlife enhancement, restoration, old growth protection (minimum fragmentation), and non-motorized recreation."*

BLM Response: Alternatives proposed must meet the purpose and need, as stated in the scoping report, for this project, "implementing the Medford RMP through density management, fuels reduction, and watershed restoration." Developing non-motorized recreation is not an objective for late-successional habitat conditions.

Umpqua Watersheds, Inc.

comment v: *"Some LSRs in the Project Area are not providing spotted owl habitat. Consider an alternative that restores LSRs before removing currently functioning habitat."*

BLM Response: See response to comment a and c regarding priority of treatment and other guidelines for selecting stands for density management treatments. See Chapter 3 (Section 3.3) on effects to spotted owl habitat. This project does not propose any removal of suitable (nesting, roosting, foraging) habitat.

Francis Eatherington

comment w: *"If this project involves commercial logging in Late Successional Reserves, please leave the largest of trees that would be removed for thinning, as snags for wildlife instead. A native old-growth forest has a large component of snags. In late successional reserves, these snags are retained for wildlife and not removed for their (so-called) fire hazard."*

BLM Response: The South Umpqua/Galesville Late Successional Reserve Assessment (2004) provides recommendation levels for snags and coarse woody debris within the LSR. Snag retention is a project objective, is incorporated into the project activities, and achieving the project objectives are a decision making factor for selecting an alternative for implementation. The project also proposes to create and recruit additional snags.

comment x: *"Do not build new roads in the reserves for the purpose of restoring the reserves. Even temporary roads have lasting effects. If you are considering temporary roads, please consider these lasting effects in the EA, such as an early seral corridor, lasting soil compaction, cutbanks, etc. New roads will set back restoration, not accelerate it. If you feel new roads are necessary, please include an alternative that uses helicopter yarding instead."*

BLM Response: See response to comment b regarding road construction and the use of helicopter yarding.

Marcia Rodine

comment y: *"Refrain from building new roads on reserves for the purpose of restoring reserves- including helicopter logging instead."*

BLM Response: See response to comment b regarding road construction and the use of helicopter yarding.

comment z: *"Please consider leaving the largest of trees in LSR areas to leave as snags to restore old growth forest characteristics."*

BLM Response: See response to comment h and w regarding the retention of the largest trees in this LSR.

Harold and Sharon Guilland

comment aa: *"Concerning the proposed Westside and Middle Cow LSR Landscape Projects …I vote 'No'. Thank you. I like this area 'natural' and not 'managed'."*

BLM Response: Your comment has been noted. However, neither of the project areas are primarily unentered stands or natural. Late Successional Reserves were designated under the Northwest Forest Plan (NFP) in 1995 to provide a future or current source of habitat for late successional associated species. Treatments within LSRs are to "protect and enhance conditions of late-successional and old-growth forest ecosystems" (USDI 1995, p. 32). The stands within this project area range from previously harvested stands prior to the NFP and mixed stands. Of the stands that have been previously entered, they were planted for optimal timber production (long before designation as a LSR). Such plantings have resulted in densely packed and shaded stands. Had these stands been planted with late successional conditions in mind, there would be wider tree spacing. Silvicultural treatments are proposed to release the dense conditions, provide adequate spacing for tree diameter development and sufficient light for hardwood species.

For more information on Westside and matrix lands please review Westside Project Environmental Assessment (EA#OR118-05-021) available for public review at the Grants Pass Interagency Office, 2164 NE Spalding Ave, Grants Pass, OR 97526 as of June 15, 2006.

Perpetua Forests Company

comment bb: *"Perpetua strongly encourages the BLM to proceed with their proposed project. Perpetua owns land adjacent to and in the same vicinity as this proposed project that is vulnerable to catastrophic stand replacement events due to the lack of management of BLM lands in the recent past. By implementing this project forest health will increase, thus protecting the governments land as well as ours."*

BLM Response: We acknowledge your concern and have addressed that in the purpose and need section of the EA. One of the objectives of the Middle Cow LSR Project is to reduce the probability that large-scale late-successional habitat loss would occur.

comment cc: *"Funds generated from this project should be used to help maintain resources such as roads that have been deferred in the recent past due to decreasing budgets, making roads accessible to the public for recreation and for managers to protect these lands."*

BLM Response: Even as dollars from timber sales can generate funding for road maintenance, the overall budget for the BLM is declining. Therefore, the criteria for funding road maintenance are based on the Transportation Management Objectives. Roads connected to arterial roads receive the most maintenance dollars. Roads that do not pose a significant risk to safety or the environment and are usually roads for single purpose resource management are not slated as priority for maintenance dollars.

Rough & Ready Lumber Company

comment dd: *"Rough & Ready would like to strongly encourage the BLM to proceed with their proposed action, which would supply a much-needed quantity of wood fiber into markets that have been anemic of reliable government wood in the recent past. Management of these forests will greatly increase their health and help to make them more resilient to catastrophic stand replacement events."*

BLM Response: We acknowledge your concern and have addressed that in the purpose and need section of the EA. The primary objective of the Middle Cow LSR Project is to "enhance and/or maintain late-successional forest conditions" within Late Successional Reserves as identified in the Medford District RMP (USDI 1995, p.21) and to offer thinning sales where the development of late successional or riparian habitat is the primary objective as described in the 2003 O&C Settlement Agreement.

Dave Streeter

comment ee: *"I live adjacent to one of your proposed Density management thins. I have asked BLM personnel repeatedly to treat this area, so I am pleased to see it is slated for treatment. Your current stand is approximately 20 feet from my outbuildings and 50 feet from my residence. The lack of management in this stand has led to an increased risk from blowdown and increased fuel loading that may lead to an uncontrollable fire, placing mine and other residence at risk. I have attached with this letter a map showing the specific area in which I am talking. In addition, it would be greatly appreciated if road 32-5-23.1 could be gated to try and limit the amount of shooting and littering that occurs around our residences. I would much appreciate it if someone could contact me in regards to your proposals in this particular stand so my concerns can be voiced."*

BLM Response: The BLM is pleased that we could incorporate hazardous fuels treatments that would accomplish your objectives as well. However, at this time the

BLM can not gate road 32-5-23.1 as it is under a reciprocal road use agreement and authorization to gate the road has not been obtained.

William O'Leary

comment ff: *"I live adjacent to Eakin Road…Fruit Grower Supply Co. also has property adjacent to mine. I was recently informed that they are going to log their property. Access to their property is though BLM via BLM road 32-5-23.1. Right now this road is in bad shape and needs repair to facilitate getting logs out. I would like to see this road gated and locked after logging their property and thinning on BLM property is completed. This would help keep people from coming in and trespassing on my property and shooting towards my home. Myself and a couple of the neighbors might be willing to help with the expense of the gate."*

BLM Response: See response to comment ee regarding gating road 32-5-23.1.

Patrick and Christine Leonard

comment gg: *"We are most concerned about the management of the land designated as Township-Range-Section 32-4-17, Unit 17 that is 3 acres in size, on the South side of Unit 17-1, with the South- West corner being around 20 feet from our house…A number of culverts come under Starveout Creek Rd and empty the water from the road, the hill drainage and the trenches along Starveout into the 3 acres of Unit 17-1. Th[r]ough out the rainy season a large volume of water is diverted into this unit and it is important to maintain the lands ability to absorb this excess water. If this unit could not absorb this diverted runoff major damage could be done to our residence, outbuildings an our property. Unit 17-1 is the major and in some places the only barrier between our residence/property and the traffic and noise of Starveout Creek Rd. Currently there is heavy traffic and noise from gravel trucks being used to build rocks for the upcoming logging in this area. We have owned this residence for around 25 years and plan on living out our lives here. We are therefore hopeful that when you are deciding how to manage this unit that you tread lightly and work to maintain its beauty and integrity, drainage and its ability to be a visual/sound buffer from the road."*

BLM Response: During field investigation Unit 17-1 was found to be a stand greater than 80 years of age. As a result it was deferred from treatment since the Medford District Resource Management Plan limits thinning in Late Successional Reserves (LSR) to stands up to 80 years of age.

Appendix 4 - Middle Cow LSR Forest Development Project

INTRODUCTION

The Middle Cow project proposes forest and stand development treatments, timber harvest, and fuels reduction treatments in 40 units within the portion of the Middle Cow fifth field watershed that is allocated as Late Successional Reserve. This prescription assesses stand conditions and recommends treatments for selected stands within the project area. Treatments within Late Successional Reserves are proposed so that desired late successional stand characteristics can develop, desired stand components may be retained, and to promote stand growth/vigor. Removal of commercial size conifers as a by-product of the treatment is proposed for some of these areas. Riparian reserves are being proposed for treatment under this project. Areas proposed for treatment are outside of any Tier 1, Key watersheds. Areas proposed for treatment are outside of the natural range of Port-Orford-cedar.

Stands proposed for treatment can be categorized as being Mixed Conifer or Mixed Evergreen as described by Franklin and Dyrness in Natural Vegetation of Oregon and Washington (1973). Douglas-fir is the primary conifer species. Ponderosa pine, sugar pine, white fir, western hemlock and incense cedar occur within the project area. Primary hardwood and shrub species include Pacific madrone, golden chinquapin, canyon live oak, rhododendron, and salal.

OBJECTIVES

Land Use Allocation Objectives:

Objectives for lands allocated to Late Successional Reserve:

-Protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest-related species including the northern spotted owl and marbled murrelet.

-Maintain a functional, interacting, late-successional and old-growth forest ecosystem.

Objectives for lands allocated to Riparian Reserve:

-The objectives of the Aquatic Conservation Strategy.
-Provide habitat for terrestrial species associated with late-successional forest habitat.

-Provide dispersal habitat for northern spotted owls.

-Implement strategies to achieve the goals established in the BLM's Riparian Wetland Initiative for the 1990s.

Unit Specific Objectives

Commercial Density Management Units (CDM): 3-1; 8-1; 9-1; 10-1; 10-2a,b,c; 10-3; 13-2; 15-1; 15-2; 15-5; 21-2; 30-2; 30-4; 29-1; 29-3; 29-4; 28-1; 28-4; 3-2; 31-2; 31-4; 31-5; 11-4

The objective of Commercial Density Management treatments is to reduce stand densities so that the competition for light, water, nutrients and growing space is decreased on desired leave trees. Density management treatments would be designed to enhance, promote, and retain desired stand characteristics for wildlife or other non-production objectives. Long-term stand vigor and growth (forest health) within these stands are a concern. Reduction of stand densities would promote long-term stand vigor and growth. While wood volume would result from the treatment, production of wood volume at the present time or for the future is not a primary objective. Wood volume produced would be a by-product of the treatment. While these units have been identified for commercial density management treatments, treatment (harvest) involving merchantable trees may not take place across all acres. Areas not treated commercially may be suitable for a non-commercial density management treatment (NDNM or NDNM/Fuels) to meet stand development and/or risk reduction (fuels) objectives. NDNM and/or NDNM/Fuels treatments would be done where appropriate pending available funding. These units are allocated to Late-Successional Reserve (LSR) by the NW Forest Plan.

Non-Commercial Density Management /Fuels (NDNM/Fuels): E31-1; E32-1; E1-1; E13-1; E23-2; E19-1; E27-1; E25-1; E30-3; E33-1; E35-1; E31-3; E3-3; E3-5; E2-1

The objective of Non-Commercial Density Management / Fuels (NDNM/Fuels) treatments is the same as for CDM treatments, to reduce stand densities. In these units, the accumulation of fuels is a concern. In addition to maintaining or promoting desired older forest characteristics, treatments in these units would consider treatment of fuels. Treatments would be designed to maintain adequate conifer regeneration as well as hardwoods so that reserve objectives can be achieved in the future. No wood volume would be produced.

Non-Commercial Density Management (NDNM):

While no units have been identified specifically for a Non-Commercial Density Management treatment, there may be portions of the above units where those treatments would not be done due to factors such as nature of the stand, location, accessibility, and economics. A NDNM treatment that reduced stand density may be done. Treatment objectives would be similar, to enhance, promote, and retain desired stand characteristics for wildlife or other non-production objectives.

EFFECTS OF PROPOSED TREATMENTS

The following tables project short- and long- term effects of proposed treatments compared to no treatment. Projection of short-term effects has a higher degree of certainty compared to the projection of long-term effects. Stand condition and stand characteristics of stands treated at this time, 10-100 years into the future are highly dependant upon uncontrollable variables such as: climate stability or change, extreme weather, wildfire, future management direction, societal pressures, available funding for follow-up treatments, and random events.

Vegetation Effects – Short-term (0-10 years)

Stand Characteristic / Condition	No Treatment	Density Management
Vigor	No change to decrease	No change to increase
Growth Rate	No change to decrease	No change to increase
Live Crown Ratio	No change to decrease	No change to increase
Branching	Continued loss of lower limbs	Retention of lower limbs
Ability to Respond to Release Treatments	No change to decrease	Increase, however due to low Live Crown Ratios (LCR), some retained trees probably won't respond much if at all in short-term
Stability	No change to decrease	No change to potential rapid decrease in areas where height /diameter ratios are currently high; probable loss of some retained trees or groups of trees in some units
Coarse woody debris	No change to increase (small pieces)	Depending on fuels treatment, decrease or increase
Snags	No change to increase	Decrease
Conifers species	No change to slight decrease	No change
Hardwood species	Continued decrease	No change
Shrubs/Brush/forbs	Continued decrease	No change to slight decrease where shrubs are cut
Development of late successional stand characteristics	Continued decrease	None to slight increase
Canopy Gaps	No change to decrease	Slight increase. Potentially large increase if parts of stand collapse
Multiple Canopy Layers	No change to decrease	Slight increase. Potentially large increase if parts of stand collapse
Differentiation	Little to no additional	Little to no additional, possibly

Stand Characteristic / Condition	No Treatment	Density Management
		some decrease as smaller trees are thinned

Vegetation Effects –Long-term, 10+ years

Stand Characteristic / Condition	No Treatment	Density Management
Vigor	Continued decrease. Vigor for some trees may increase as mortality in stand occurs	Increase
Growth Rate	Decrease. Growth rates for some trees may increase as mortality in stand occurs	Increase
Live Crown Ratio	Continued decrease	Increase
Branching	Continued loss of lower limbs	Retention of lower limbs
Ability to Respond to Release Treatments	Decrease to potential lost for the majority of the trees	Increase
Stability	No change to continued decrease, possible stand collapse (or parts) in future	Increase
Coarse woody debris	Increase – smaller pieces, short-term	Increase – larger pieces, longer lasting
Snags	Increase – smaller snags, short-term	Increase – larger snags, longer lasting
Conifer species	Principal species remains Douglas-fir. Minor species shift from pine to white fir and incense cedar. Larger amounts of hemlock on north aspects	Principal species remains Douglas-fir. Increase of white fir, incense cedar, and hemlock (northern aspects) as it seeds in.
Hardwood species	Decrease	No change to decrease depending on growth
Shrubs/Brush/forbs	Decrease	Slight decrease
Development of late successional stand characteristics	Possibly never to gradual	Increase overall. Parts of these stands may never develop certain characteristics such as large branches
Canopy Gaps	May have a gradual increase if trees fall out of the stand	No change to slight decrease as existing layers age and grow to increase
Multiple Canopy Layers	Decrease, possibility of some layering if canopy gaps form	No change to slight decrease as existing layers age and grow
Differentiation	No change to slight decrease as existing layers age and grow	No change to slight decrease as existing layers age and grow

STAND DESCRIPTIONS / ANALYSES / RECOMMENDED TREATMENTS

Units Recommended for a Commercial Density Management Treatment

UNIT 3-1: T.32S., R.4W., section 3

Stand Description: Unit 3-1 is a young stand that has resulted from past timber harvests. The unit is from the Whitehorse Creek and Thinhorse sales. The western part of the unit is Whitehorse Creek #2 that was clearcut in 1962. The unit was aerially seeded, planted, precommercially thinned at a 12'x12' spacing and aerially fertilized. The eastern portion of the unit is Thinhorse #7. This unit was clearcut in the mid 1980s, was planted, precommercially thinned at a 13'x13' spacing, and aerially fertilized. Unit 3-1 is currently a single-storied, Douglas-fir stand composed of small-size poles generally 6-14" dbh with an estimated average diameter of 10" dbh. Canopy closure within the unit is 90%+. Live crown ratios (LCR) of more dominant trees range from 15-40%. Hardwood species present include madrone and big leaf maple. Shrub species include hazel/oceanspray and evergreen huckleberry. Salal and sword fern are present.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing dominant pole size conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. However, as the canopy continues to close, this ability to respond to a release treatment will decrease. For some trees the ability to respond to release has passed. While precommercial thinning has taken place within the unit, those treatments were designed primarily to produce wood volume. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps. Height diameter ratios on some trees are approaching point where some instability in the stand (collapse of individual trees or small groups of trees) is anticipated.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 30% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase where the stand is opened and would be maintained where the stand is currently more open. Mortality of remaining conifers and hardwoods would decrease. The stand would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will also

help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 3-1**. Mark to retain an average 30% canopy cover across areas to be treated. Retain 40-50% canopy (more trees) within a 150' strip along boundary of recently cut private land to allow for some windthrow or wind damage to occur while still meeting desired stocking levels. This strip of higher retention should gradually taper from retention of all trees next to the private cutting to retention of 30% canopy 150' into the unit. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Create quarter acre openings at a rate of not more than one opening per ten acres within unit 3-1 where all but 2-4 conifers are removed. Conifers retained in the openings should be those that are most likely to remain standing after wind and/or snow events. Situate openings on stable slopes and a minimum of 180 feet from streams. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Cable yard with one end suspension below the road and areas above the road too steep to tractor yard. Tractor yard areas above the road where slope permits. Retain hardwoods. For this unit as well as other CDM units, retained hardwoods may compose up to a quarter of the recommended canopy closure.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on an 18'x18' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 8-1: T.32S., R.4W., section 8

Stand Description: Unit 8-1 is a mixed stand. The western aspect consists of a single-storied stand of Douglas-fir poles generally 10-20" dbh over scattered 6-12" dbh chinquapin. Some larger Douglas-fir exists as do limited numbers of madrone. Hardwoods are showing signs of being overtopped and some are dying out of the stand. The understory is open except for limited Douglas-fir regeneration and oceanspray, primarily near the road where light can reach the ground. Canopy closure is 70-80% and live crown ratios (LCRs) of more dominant trees are 30-50%. Stand conditions on the southern aspect are different. This area consists of a multi-storied stand of scattered remnant Douglas-fir and ponderosa pine (36-48" dbh) over smaller 8-12" dbh Douglas-fir and 1-4" dbh Douglas-fir regeneration. LCRs of Douglas-fir poles are 20-30%. The area contains scattered clumps of madrone and limited black oak. Hardwoods are being shaded out in places.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing pole size conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. Areas within the unit contain large numbers stems. With current stocking levels there is increased chance of mortality of remnant trees, particularly pine. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 40% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. In areas that are currently single-storied, understory vegetation would develop. The stand would be two-storied. Areas that are currently multi-storied would retain this quality. In the long-term, stand vigor would be maintained. In parts of the unit, crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. Instead consisting of numerous smaller trees, the stand would consist of fewer but larger trees. Large hardwoods would be part of the stand. The unit would be multi-storied.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM**) treatment that thins from below is the recommended treatment for **unit 8-1**. Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of

conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Retain hardwoods. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Cable yard with one end suspension.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. 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. Retain a component of hardwoods. Evaluate for need to treat fuels. Handpile slash and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 9-1: T.32S., R.4W., section 9

Stand Description: Unit 9-1 can be considered a mixed stand. Portions of the unit, particularly near the upper road consist of a mix of pole-sized Douglas-fir 8-14"+ dbh, madrone, and chinquapin over evergreen huckleberry, rhododendron, salal, and areas of Douglas-fir regeneration. Scattered larger remnant Douglas-fir are present. These areas are largely unentered or have been lightly entered. Live crown ratios of dominant trees are 30-50%. Other portions of the stand have resulted from past clear cut harvest in 1961 (Whitehorse Creek unit) followed by aerial seeding and later precommercial thinning and aerial fertilization. These areas are for the most part single-storied stands of Douglas-fir 6-16" dbh over areas of rhododendron, sword fern, salal, and deciduous huckleberry. Some western hemlock and some big leaf maple are present, particularly near draws. Average conifer diameter is estimated to be 8-10" dbh with diameters being smaller away from draws. Canopy closure is 80%. Live crown ratios are 10-30%.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing pole size conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. While precommercial thinning has taken place within much of the unit, the treatment was designed primarily to produce wood volume. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps. Unthinned areas are overstocked.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 40% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. The stand would be two-storied and in areas where it is already multi-storied it would retain that quality. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. Instead consisting of numerous smaller trees, the stand would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 9-1**. Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of

conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Cable yard with one end suspension the southern portion of unit and manually remove trees in the northern half of unit as vehicle access is limited. Some areas may require full suspension or a different yarding system to carry logs across streams. Retain hardwoods.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. 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. Retain a component of hardwoods. Evaluate for need to treat fuels. Handpile slash and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 10-1: T.32S., R.4W., sections 10, 11

Stand Description: The majority of unit 10-1 is a stand that was recently thinned under the Wildcat habitat development project or was thinned under another thinning project. In these areas, the unit consists of Douglas-fir 16-20"+ dbh with scattered larger remnant Douglas-fir. These areas are single-storied with a canopy closure of 60-70%+. Live crown ratios are 20-40%. Some incense cedar can be found in the stand. Limited numbers of hardwood and shrubs exist. There is some big leaf maple and madrone. Hardwoods are dying out. The remainder of the unit consists of hardwoods, principally madrone, mixed with Douglas-fir.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Recent thinning did not open canopy to desired levels. Canopy will soon close with current levels of stocking and unit will remain single-storied. Hardwoods will continue to be suppressed and die. Desired understory vegetation will not develop. While release from recent thinning will provide release to remaining trees, effects of release will be relatively short-lived. In areas of older thinning, canopies have closed.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had an average 50% canopy cover retained over treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease and an understory would develop. The stand would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 10-1**. Mark to retain an average 50% canopy cover across areas to be treated. Retain 50-60% canopy (more trees) within a 150' strip along boundary of recently cut private land to allow for some windthrow or wind damage to occur while still meeting desired stocking levels. This strip of higher retention should gradually taper from retention of all trees next to the private cutting to retention of 50% canopy 150' into the unit. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty

inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Retain hardwoods Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Tractor yard where slope permits. Cable yard with one end suspension and helicopter yard remainder of unit.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. 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. Evaluate for need to treat fuels. Handpile slash and burn piles as appropriate.

Silvicultural Options Considered: Retaining a slightly higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. The economics of retaining 50-60% might not have allowed treatment. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNITS 10-2a, 10-2b, 10-2c, 10-3: T.32S., R.4W., sections 10, 11

Stand Description: These units can be described as mixed stands. While there has been past harvest entry in some parts, the units are largely unentered. Portions consist of pole-sized Douglas-fir 10-16" dbh mixed with large numbers of madrone and canyon live oak. Conifers are generally above the madrone. The madrone is being shaded out in some areas, as is some of the canyon live oak. These areas typically are single-storied with small amounts of oceanspray/hazel, sword fern, and Oregon grape. Canopy closure is 80-90%. Live crown ratios (LCRs) are 30-40%. Portions consist of 4-10" dbh madrone and canyon live oak mixed with scattered Douglas-fir poles. Patches of Douglas-fir regeneration are present with oceanspray, manzanita, and Oregon grape. Greater numbers of Douglas-fir are in draws. Other portions consist of Douglas-fir 14-20" dbh with some being larger. Canopy closure is 80%+. LCRs are 30-40%. For the most part these areas are single-storied. Some commercial thinning has occurred in the past. Understory vegetation include limited amounts of oceanspray/hazel, rhododendron, and big leaf maple. Evidence of soil movement in the past is present.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. The unit is overstocked. Growth will slow with current stocking levels. Hardwoods are dying out in portions of the unit.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 50% canopy cover (for unit 10-2c, 40% canopy cover) retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would contain fewer but larger trees.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **units 10-2a, 10-2b, 10-2c, and 10-3**. Buffer unstable areas (if any) according to RMP guidelines. In areas remaining, mark to retain an average 50% canopy cover (for **unit 10-2c**, retain 40% canopy cover) across areas to be treated. For unit 10-2a, retain 50-60% canopy (more trees) within a 150' strip along boundary of recently cut private land to allow for some windthrow or wind damage to occur while still meeting desired stocking levels. This strip of higher retention should gradually taper from retention of all trees next to the private cutting to

retention of 50% canopy 150' into the unit. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. In areas containing only non-commercial size conifers space conifers on a 20' x 20' spacing. Retain all hardwoods/hardwood clumps in areas with less than 25 hardwoods/hardwood clumps per acre. In areas with greater numbers of hardwoods, retain hardwoods 10" dbh and larger. In the absence of a larger hardwood ($\geq$10" dbh), space small hardwoods/hardwood clumps on a 40'x 40' spacing. Thin hardwood clumps retaining 2-4 of the larger stems per clump. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree also retain 50% canopy. Cable yard with one end suspension unit 10-2c. Helicopter yard units 10-2a, 10-2b, and 10-3.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. 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. Evaluate for need to treat fuels. Handpile slash and burn piles as appropriate

Silvicultural Options Considered: Retaining a higher level of canopy cover considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 13-2: T.32S., R.5W., section 13

Stand Description: Unit 13-2 is a young stand that has resulted from past timber harvest. The unit consists of pole-sized Douglas-fir 12-18" dbh. The unit is not uniform. There are areas where the poles are over rhododendron and salal. There are areas where the poles are widely spaced and mixed with big leaf maple, oceanspray/hazel, dogwood, willow, and salal.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. In areas where there is little understory, the current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 30% canopy cover retained over treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease and an understory would develop. The stand would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 13-2**. Mark to retain an average 50% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Retain hardwoods. Tractor yard upslope of the road.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Handpile slash and burn piles as appropriate.

Silvicultural Options Considered: Retaining a lower level of canopy cover considered but was not proposed due to the nearby stream.

UNITS 15-1, 15-5: T.32S., R.4W., section 15

Stand Description: Unit 15-1 contains a variety of stand types. The southwest aspect of the unit consists of a single-storied stand of Douglas-fir. Douglas-fir ranges from 12-32" dbh. Average diameter is estimated to be 18" dbh. Madrone comprises a high percentage of the hardwoods. Some Douglas-fir regeneration, oceanspray/hazel, and Oregon grape are present. Canopy cover is 80% and live crown ratios are 30-40%. Evidence of past soil movement is present. The southern part (southern aspect) of unit 15-1 is a mixed stand of Douglas-fir 10-32" dbh, canyon live oak, and madrone. Hardwoods comprise the majority of the stand. While there is enough differentiation between canopy layers to call this area multi-storied, the understory is relatively open. Soils are shallow and rocky.

Unit 15-5 is a mixed stand. The upslope part is single-storied and has been previously thinned. It generally consists of large (20-28" dbh), widely spaced Douglas-fir with scattered, larger remnant Douglas-fir. The understory is open except for small amounts of sword fern, oceanspray/hazel, madrone, and Douglas-fir regeneration in canopy caps. Some Oregon grape and canyon live oak is present. Tree condition is good. Live crown ratios are 40-50% with 60-70% canopy cover. The lower portion of this unit is an unentered stand of Douglas-fir poles generally 14-18" dbh. Scattered larger remnant Douglas-fir are present. This area is also single-storied with limited numbers of hardwoods mainly along the road. Canopy cover is 80-90%. Live crown ratios are 20-30%.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Portions of the unit are single-storied with little understory vegetation and structure. Portions of the unit contain large numbers of hardwoods and few conifers.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a set of stands that had been treated to meet LSR objectives. Areas that are predominantly Douglas-fir would have an average 50% canopy cover retained over treated areas (40% canopy cover on most southerly south aspect). Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease and an understory would develop. These areas would be two-storied. Areas that were a mix of hardwoods and conifers would have densities reduced. Competition would be reduced and the stands would retain their multi-storied qualities. In the long-term in all areas, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with

characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for portions of **units 15-1 and 15-5** with single-story, Douglas-fir. Buffer unstable areas (if any) according to RMP guidelines. Mark to retain an average 50% canopy cover (40% on most southerly south aspect) across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree also retain 50% canopy. Cable yard with one end suspension where possible. Helicopter yard remainder of unit. Retain hardwoods.

A non-commercial density management treatment is recommended for no-harvest areas. Retain a 25 foot no-treatment buffer on streams in these areas. Space conifers on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Handpile slash and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNITS 15-2: T.32S., R.4W., section 15

Stand Description: Unit 15-2 is a mixed unit. Portions of the unit have been previously entered and currently consists of Douglas-fir 2-8" dbh with limited numbers of large Douglas-fir remnants mixed with Douglas-fir regeneration, rhododendron, canyon live oak, western hemlock, sword fern and salal. These areas are multi-storied and are situated immediately upslope of Whitehorse Creek in the southern portion of the unit. In the southern portion of the unit there is an area of large Douglas-fir mixed with Douglas-fir poles and over rhododendron and salal. The remainder of the unit consists of single-storied Douglas-fir generally 8-20" dbh over limited amounts of western hemlock, sword fern, and rhododendron. Some white fir is present in the understory. Canopy cover in these areas is 80%. Live crown ratios are 30-40%.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing pole size conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. Throughout much of the unit, the current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 40% canopy cover retained across of treated areas. Areas containing single-storied Douglas-fir would have densities reduced. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. An understory would develop. The stand would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand. Remaining areas would have also been treated to reduce stand densities.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will of also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for areas within **unit 15-2** that consist of Douglas-fir <80 years of age**.** Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past

snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Cable yard with one end suspension where possible. Helicopter yard remainder of area to be harvested. Retain hardwoods.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 16'x16' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 30-2: T.32S., R.4W., section 30

Stand Description: Unit 30-2 is a mixed unit. Portions of the unit have been previously entered. The southern aspect consists of Douglas-fir generally 2-14" dbh with limited numbers of large remnant Douglas-fir. The vast majority of the stems consist of the smaller diameter Douglas-fir. Understory vegetation is generally absent although the number of stems makes the area hard to walk through. Live crown ratios on the more dominant conifers are 30-40% with areas containing trees with LCRs of 10-30%. Canopy closure is 80%. Some incense cedar and canyon live oak is present. The northern aspect consists of Douglas-fir 8-16" dbh mixed with 2-4"dbh Douglas-fir, madrone, and canyon live oak. Large remnant conifers are present. The understory is open.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. Throughout much of the unit, the current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps. Some hardwoods are dying out from being overtopped.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 40% canopy cover retained across of treated areas. Conifer densities would be reduced. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. An understory would develop. The stand would be two-storied and in some areas multi-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will of also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 30-2.** Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and

larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. If streams are present, thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Tractor yard where slope permits. Cable yard with one end suspension remainder of unit Retain hardwoods.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 30-4: T.32S., R.5W., section 25

Stand Description: Unit 30-4 is older stand of approximately 160 years of age. It is an unentered single-storied stand of Douglas-fir with scattered remnant Douglas-fir and ponderosa pine. Douglas-fir stem diameters generally range from 10-32"dbh. The average diameter is estimated to be 18". An understory is almost non-existent. There are scattered canyon live oak, limit Douglas-fir regeneration and evergreen huckleberry. Many of the overstory Douglas-fir show signs of stress, such as thin and dead tops. Live crown ratios are 20-40%.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Unit 30-4 is an older stand that contains limited numbers of large remnant Douglas-fir and ponderosa pine. It is desired to keep these larger, remnant trees in the stand. Existing Douglas-fir is showing signs of stress. Loss of remnants is a concern as is overall stand vigor.

Desired Future Condition/Results: Treatment of the unit would be for the purpose of risk reduction, not stand development. Therefore the desired future condition resulting from this action would change unit conditions only slightly. Large remnant Douglas-fir and ponderosa pine would be somewhat isolated from other trees within the unit. Stress on these trees would be reduced. The remainder of the unit would receive a light thinning treatment that reduced stand density and reduced competition for remaining trees. Some understory development may occur within canopy gaps and around isolated trees. Canopy cover would be a 60%.

Prevention/Avoidance Strategies: Treatment that reduced stand density would reduce stress within the stand and would help to keep remnants and leave conifers alive within the stand.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below and helps to maintain large remnant Douglas-fir and ponderosa pine is the recommended treatment for **unit 30-4**. Treatment should focus on reducing the risk of large structure loss by reducing stress to remnants and larger conifers within the unit. Creation of small holes (~1/8 acre, approximately a circle with a 40-45 foot radius) centered on existing remnants, particularly the pine is recommended. Within the remainder of the unit, mark to retain an average 60% canopy cover across areas to be treated. While trees representing a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are desired within LSR stands, care should be taken because of the age and general condition of the unit to retain the healthiest trees also so that widespread mortality within the unit can be avoided. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Cable yard with one end suspension. 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. Evaluate for need to treat fuels. Handpile and burn piles as appropriate.

Silvicultural Options Considered: A treatment that only focused on risk reduction of remnant Douglas-fir and ponderosa pine was considered but was rejected because it did not address vigor concerns within the remainder of the unit.

UNITS 28-4, 29-1: T.32S., R.4W., sections 28, 29

Stand Description: These units can be described as mixed stands. The majority of the area consists of single storied stands of Douglas-fir. Diameters vary as to size and uniformity within a given area but generally range from 8-16"dbh with areas of smaller Douglas-fir poles 8-10" dbh and less throughout. Live crown ratios are 20-30%. Understories are generally open with some rhododendron, salal, and hazel. Portions of these units contain widely spaced Douglas-fir over hardwoods, Douglas-fir regeneration, and shrubs. Diameters of the Douglas-fir are generally smaller here. The understory is open with limited amounts of madrone, rhododendron, vine maple and sword fern. Portions of the area consist almost entirely of hardwoods, principally madrone with scattered Douglas-fir poles and Douglas-fir regeneration.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 40% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. Treated areas would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The units would contain fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **units 28-4 and 29-1**. Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve

marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Cable yard with one end suspension areas too steep to tractor yard. Tractor yard areas where slope permits. Retain hardwoods within harvested areas.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain all hardwoods/hardwood clumps in areas with less than 25 hardwoods/ hardwood clumps per acre. In areas with greater numbers of hardwoods, retain hardwoods 10" dbh and larger. In the absence of a larger hardwood ($\geq$10" dbh), space small hardwoods/ hardwood clumps on a 40'x 40' spacing. Thin hardwood clumps retaining 2-4 of the larger stems per clump. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 29-3: T.32S., R.4W., section 29

Stand Description: Unit 29-3 is a mixed stand that has had some harvest entry in the past. The southwest aspect (SW part of unit) consists of widely spaced Douglas-fir poles over smaller Douglas-fir 3-6" dbh and Douglas-fir regeneration. Chinquapin, madrone, hazel/oceanspray, evergreen huckleberry, manzanita, and salal are present. Live crown ratios of overstory trees are 30-50%. The northeastern aspect near the ridge is mixed. The area contains Douglas-fir poles 6-20" dbh mixed with scattered sugar pine and incense cedar. Similar understory species are present. Hardwoods are dying out from being overtopped. Areas of slick leaf ceanothus and Douglas-fir regeneration mixed with hardwoods are also present. Downslope is a multi-storied stand of large remnant Douglas-fir 28-40" dbh over widely spaced Douglas-fir poles 6-16" dbh, Douglas-fir regeneration, and hardwoods. Hazel, big leaf maple, evergreen huckleberry, Oregon grape and sword fern are present. Hardwoods are dying out in some areas.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Areas exist within the unit where existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps in portions of the unit.

Desired Future Condition/Results: While stand densities would be reduced across the unit as a result of a treatment, desired future conditions within unit 29-3 would be mixed and would vary on current stand conditions. An average 50% canopy across treated areas would be maintained however. In areas that currently contain larger remnant conifers the desired future condition would be one in which understory conifer densities had been reduced allowing more light to reach the forest floor and allowing hardwoods to remain in the stand longer. In areas of pole-size Douglas-fir, the desired future condition would be a two-storied stand in the short-term turning to more of a multi-storied stand as trees and shrubs within gaps grew. In areas that are currently conifer regeneration and shrubs the desired future condition would be well-space free-to-grow conifers mixed with hardwoods. Overall, reduction of densities would result in reduced competition on retained trees. Growth rates of the remaining trees would be maintained or would increase. Mortality of remaining conifers and hardwoods would decrease. There would be a hardwood component within the stand. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would contain fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for areas within **unit 29-3** containing pole-size Douglas-fir. Mark to retain 50% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. If streams are present, thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. Cable yard with one end suspension. Retain hardwoods.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: A treatment that retained a lower level of canopy cover was considered but was not proposed as it was desirable to maintain habitat qualities in areas that contained larger conifers.

UNIT 29-4: T.32S., R.4W., section 29

Stand Description: Unit 29-4 is a previously entered stand of Douglas-fir 4-14" dbh. The unit is mixed with some areas being multi-storied and some areas containing almost only Douglas-fir. Scattered Douglas-fir remnant trees 24-36" dbh are present as is a limited amount of western hemlock. Understory species include madrone, chinquapin, dogwood, rhododendron, hazel/oceanspray, evergreen huckleberry and salal. Canopy closure is 70-90% depending on location in unit and presence of canopy gaps.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps in portions of the unit.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand with two or more canopy layers with an average of 40% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The units would contain fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 29-4**. Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Create quarter acre openings at a rate of not more than one opening per ten acres within unit 29-4 where all but 2-4 conifers are removed. Conifers retained in the openings should be those that are most likely to remain standing after wind and/or

snow events. Situate openings on stable slopes and a minimum of 180 feet from streams. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Tractor yard. Retain hardwoods.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNITS 28-1, 21-2: T.32S., R.4W., sections 11, 20, 21, 28, 29

Stand Description: Units 28-1 and 21-2 are mixed stands. These units consist of Douglas-fir with diameters ranging from 6-18" dbh. Portions of the unit contain large remnant Douglas-fir some with diameters to 48"dbh. Areas are single- and sometimes two-storied with open understories or understories with madrone, canyon live oak, chinquapin, oceanspray/hazel, rhododendron, evergreen huckleberry, salal and patches of Douglas-fir regeneration. These units also contain areas that are predominantly hardwoods (madrone and chinquapin) with scattered Douglas-fir poles and regeneration.

Analysis: Units are in a designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps in portions of the unit.

Desired Future Condition/Results: The desired future condition resulting from this action would be areas that have two very distinct canopy layers. For the short-term, treated areas of the unit would have a 40% canopy cover retained. The upper canopy layer would consist of primarily Douglas fir. Large hardwoods would be retained. The understory would consist of hardwoods, shrubs and Douglas-fir regeneration that are currently present and those that became established within canopy gaps created by the thinning. Areas that are currently dominated by hardwoods would remain dominated by hardwoods.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of forest stands with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **units 28-1 and 21-2**. Mark to retain an average 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Where possible mark so that a variety of spacing of residuals will result. Tractor yard where slope permits. Cable yard with one end suspension remainder of units. Create quarter acre openings at a rate of not more than one opening per ten acres where all but 2-4 conifers are removed. Conifers retained in the openings should be

those that are most likely to remain standing after wind and/or snow events. Situate openings on stable slopes and a minimum of 180 feet from streams. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Retain hardwoods in harvested areas.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain all hardwoods/hardwood clumps in areas with less than 25 hardwoods/hardwood clumps per acre. In areas with greater numbers of hardwoods, retain hardwoods 10" dbh and larger. In the absence of a larger hardwood ($\geq$10" dbh), space small hardwoods/hardwood clumps on a 40'x 40' spacing. Thin hardwood clumps retaining 2-4 of the larger stems per clump 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: A treatment that would have retained less canopy cover was considered but was rejected due to wildlife habitat concerns.

UNITS 31-2, 31-4, 31-5: T.32S., R.4W., sections 31, 32

Stand Description: These units are composed primarily of Douglas-fir 10-16" dbh. Much of the area is single-storied with little understory. The remainder is two-storied with madrone, canyon live oak, hazel, and vine maple in the understory. Madrones are dying from being overtopped. Portions are heavily influenced by serpentine soils. In these areas overstory trees are more widely spaced with understories containing Douglas-fir and incense cedar regeneration.

Analysis: These units are in a designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps. Soils are of low productivity in portions of the unit.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a two-storied stand that had a 40% canopy cover. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would be maintained or would increase. Mortality of remaining conifers and hardwoods would decrease. There would be a hardwood component within the stand for a longer period of time. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The stand would contain fewer but larger trees. The stand would contain scattered large hardwoods.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped. Timely treatment will also help to maintain stand stability by creating conditions where tree diameter growth rates are enough to support the weight of the tree.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **units 31-2, 31-4, and 31-5**. Mark to retain 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would

not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Retain hardwoods. Tractor yard where slope permits. Cable yard with one end suspension remainder.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: A treatment that would have retained less canopy cover was considered but was rejected due to wildlife habitat concerns.

UNIT 3-2: T.33S., R.5W., section 3

Stand Description: Unit 3-2 is a young stand that has resulted from a past timber harvest. The unit was clearcut in 1958. The unit was Tennessee Gulch #1. The unit was planted after harvest, was precommercially thinned, and was aerially fertilized. Unit 3-2 is currently composed of small-size Douglas-fir generally 6-14" dbh with an estimated average diameter of 10" dbh. The understory is relatively open. Hardwood species present include madrone and big leaf maple. Shrub species include hazel/oceanspray and sword fern. Hardwoods are dying out from being overtopped as are a limited number of ponderosa pine. Live crown ratios on dominant Douglas-fir are 20-40%.

Analysis: This area is designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. While precommercial thinning has taken place within the unit, the treatment was designed primarily to produce wood volume. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 30% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. The stand would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. The unit would consist of fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 3-2**. Mark to retain an average 30% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh. Retain ponderosa pine if tree condition indicates that it will remain in the stand. Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance

determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Retain hardwoods. Tractor yard where slope permits. Cable yard with one end suspension remainder of unit.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. Throughout unit, open up area around big leaf maple to the extent of three maples per acre where they exist. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

UNIT 11-4: T.33S., R.5W., sections 10, 11

Stand Description: Unit 11-4 is a young stand that has resulted from past timber harvests. Parts of the unit were clearcut in 1950. The remainder of the unit was cut in 1962. The unit was aerially seeded, planted, precommercially thinned at a 14'x14'spacing, and aerially fertilized. Unit 11-4 is currently composed of Douglas-fir generally 10-16" dbh with an estimated average diameter of 12" dbh. Some incense cedar is present. The understory is relatively open. Hardwood species present include madrone, chinquapin, and big leaf maple. Understory species include hazel/oceanspray, deciduous huckleberry, Oregon grape, wild rose and sword fern. Manzanita "skeletons" can also be found within the unit. Salal and bracken fern are present. Canopy cover is 70-80%+. Live crown ratios on dominant trees are 20-50%. Some snow and/or wind damage has occurred in the past. The northwest portion of the unit contains more understory vegetation.

Analysis: These units are in a designated Late Successional Reserve. Objectives for this land use allocation are focused on late successional habitat and the wildlife that it supports. Existing conifers are capable of responding to a treatment that reduces competition from adjacent vegetation. While precommercial thinning has taken place within the unit, the treatment was designed primarily to produce wood volume. The current stand development trajectory will result in a loss of desired late successional stand characteristics such as: long crowns; large diameter branches; a mix of conifers, hardwoods, and shrubs; and canopy gaps.

Desired Future Condition/Results: The desired future condition resulting from this action would, in the short-term, be a stand that had 40% canopy cover retained across treated areas. Reduction of canopy would result in reduced competition on retained trees. Growth rates of the remaining trees would increase. Mortality of remaining conifers and hardwoods would decrease. The stand would be two-storied. In the long-term, stand vigor would be maintained. Crowns of existing trees would become fuller and canopy cover would increase from post harvest levels. There would be fewer but larger trees. Large hardwoods would be part of the stand.

Prevention/Avoidance Strategies: Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of a forest stand with characteristics of older forests. Timely treatment will prevent growth from slowing and hardwoods from dying out of the stand by being overtopped.

Recommended Treatment: A **commercial density management (CDM)** treatment that thins from below is the recommended treatment for **unit 11-4**. Mark to retain 40% canopy cover across areas to be treated. Unlike prescriptions designed to increase or accelerate the growth of trees for wood volume, trees of a variety of conditions such as those containing decay, trees that have numerous and large branches, and trees with broken tops or past snow damage are to be retained in addition to trees that would be retained in a "traditional" commercial thin. Retain trees twenty inches and larger dbh.

Where possible mark so that a variety of spacing of residuals will result. Mark so that small openings (canopy gaps) are created. This may involve marking two-three adjacent trees. Thin and harvest cut stems to sixty (60) feet of streams or to the distance determined as needed to provide for ecological protection based on slope and rock type (figure B-l, page 15, NFP). Areas closer than 60 feet or the determined ecological protection distance from streams would not receive a harvest treatment. In the area between the no harvest area and one site potential tree retain 50% canopy. Cable yard with one end suspension. Retain hardwoods.

Thin no harvest areas and areas of non-commercial conifers to twenty-five (25) feet of streams on a 20'x 20' spacing. In these areas, employ a 10" upper diameter cut limit. Girdle excess conifers 7-10" and retain as snags. Fall excess conifers that are 7" dbh and less. Retain a component of hardwoods. 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. Evaluate for need to treat fuels. Slash brush, handpile and burn piles as appropriate.

Silvicultural Options Considered: Retaining a higher level of canopy cover was considered but was not proposed as it was desirable to move the stand to one with characteristics of older forests as quickly as possible. Retaining a higher level of canopy would have also increased the possibility of additional entries being needed to develop a desired stand.

STAND DESCRIPTIONS / ANALYSES / RECOMMENDED TREATMENTS
For Units Recommended for a Non-Commercial Density Management / Fuels Treatment

UNIT E31-1: T.31S., R.4W., section 31

Unit 31-1 consists of a variety of stand types. The western and southwestern portions of the unit developed after timber harvest in 1957. In this area, planting was done after harvest in selected areas. The area contains scattered large, remnant Douglas-fir as well as groups of large, remnant conifers. There are areas of thick post and pole-size conifers that are primarily Douglas-fir. Areas of closely-spaced, small diameter (1-3" dbh) Douglas-fir are present. White fir and incense cedar are also present. Principal shrub species within the stand include madrone, chinquapin, and canyon live oak. The eastern portion is largely unentered and consists of overstory Douglas-fir and limited numbers of ponderosa pine over Douglas-fir poles and advanced regeneration. Shrub species are similar with greater numbers of manzanita and ceanothus.

UNIT E32-1: T.31S., R.4W., section 32, T.32S., R.4W., section 35

Unit 32-1 consists of a variety of stand types. Portions of the unit are single-storied. There are areas of Douglas-fir 8-14" dbh with little or no understory. There are areas of large Douglas-fir 20-36" dbh over limited amounts of Douglas-fir regeneration. In other areas, overstory Douglas-fir is slightly more widely spaced and understory vegetation such as madrone, oceanspray, big leaf maple, and vine maple are present. Other areas containing a middle canopy layer of Douglas-fir exist. Scattered large ponderosa pine is present as is manzanita and blue blossom ceanothus on hotter aspects. Scotch broom along roads leading to the unit.

UNIT E1-1: T.32S., R.5W., section 1

Unit E1-1 consists of a variety of stand types. Southern portions of the unit consist of Douglas-fir 2-10" dbh mixed with madrone and scattered larger ponderosa pine. Areas composed almost exclusively of 2-6" Douglas-fir are present. Black oak, canyon live oak, blue blossom ceanothus, chinquapin mixed with Douglas-fir regeneration and ponderosa pine regeneration are present. Unit E1-1 contains areas of Douglas-fir 20-40"+dbh over smaller Douglas-fir and Douglas-fir regeneration mixed with madrone, manzanita, oceanspray, and canyon live oak. Extreme western portions of the unit are wetter. White fir, western hemlock, incense cedar, big leaf maple, deciduous huckleberry, and salal exist under an overstory of Douglas-fir. Scotch broom is scattered along roads within the section.

UNIT E13-1: T.32S., R.5W., section 13

Unit E13-1 consists of a variety of stand types. The majority of the unit is a mixed stand containing older dominant Douglas-fir, ponderosa pine and sugar pine. Diameters on these trees generally ranges from 20-40" dbh with some being larger. This canopy layer is over areas of advanced Douglas-fir regeneration, madrone, tree form chinquapin, canyon live oak, big leaf maple, oceanspray/hazel, and blue blossom ceanothus. Spacing of large conifers is variable. In some areas, spacing is narrow and there is little or no understory. In other areas, the large conifers are more widely spaced and an understory is present. The southwestern corner of the unit consists of a young stand of Douglas-fir that has resulted following past timber harvest. This area contains Douglas-fir 12-18" dbh over rhododendron and salal. There are areas where spacing is wider with big leaf maple, oceanspray/hazel, dogwood, willow, and salal.

UNIT E27-1: T.32S., R.5W., section 27

Unit E27-1 is one of the smaller non-commercial density management / fuels units in the project. It still, however, contains a variety of stand types. The majority of the unit consists of large overstory Douglas-fir 20-36" dbh. In areas, these trees are closely spaced with little understory. Where spacing is wider there is an understory of madrone, incense cedar, tree and brush form chinquapin, canyon live oak, and advanced Douglas-fir regeneration. There are areas of Douglas-fir 4-8" dbh mixed with madrone. Blue blossom ceanothus, manzanita, tanoak and big leaf maple are present. Some overstory conifers have thinning tops. Stand vigor is a concern.

UNIT E3-5: T.33S., R.5W., sections 3, 10

Unit E3-5 is a unit that has resulted from a past timber harvest. The northern portion of the unit contains scattered large Douglas-fir over oceanspray, madrone, manzanita and sword fern. There are areas of tightly spaced Douglas-fir regeneration. The southern portion of the unit consists of Douglas-fir 5-10" dbh.

UNIT E25-1: T.32S., R.5W., section 25; T.32S., R.4W., section 30

Unit E25-1 consists of a variety of stand types. The unit contains areas of large mature Douglas-fir 20-40"+ dbh. Widely scattered large ponderosa pine are present. Understories are generally open with limited madrone, canyon live oak, and tree form chinquapin. There is some incense cedar and where there are canopy gaps there are patches of Douglas-fir regeneration and manzanita. These areas are for the most part unentered. Unit E25-1 contains areas of more widely space large Douglas-fir. These areas have been entered in the past for timber harvest. There is an established understory of similar shrub and hardwood species. The unit contains areas of Douglas-fir 4-10" dbh mixed with madrone and manzanita.

UNIT E31-3: T.32S., R.4W., sections 31, 32

Unit 31-3 consists of a variety of stand types. The unit contains large Douglas-fir mixed with madrone, tree form chinquapin, canyon live oak, Douglas-fir 8-20" dbh and Douglas-fir regeneration. In more open areas there is a well-established layer of shrub and hardwood species that includes manzanita, slick leaf ceanothus, evergreen huckleberry, canyon live oak, oceanspray/hazel, and poison oak. The unit contains areas consisting almost exclusively of Douglas-fir 8-20" dbh. There is little or no understory vegetation. Hardwoods, primarily madrone and big leaf maple, are dying out from being overtopped. Some western hemlock and incense cedar is present. Knobcone pine is also present. Scotch broom exists along roads within this section.

UNIT E33-1: T.32S., R.5W., section 33

Unit E33-1 consists of a variety of stand types. Portions of the unit contain an overstory of widely spaced, Douglas-fir 20-36" dbh over madrone, tree and brush form tanoak and Douglas-fir regeneration. There are limited amounts of incense cedar and manzanita. Portions of the unit consist of Douglas-fir 8-20" dbh with little understory in places. Understory when present in these areas consists of smaller diameter Douglas-fir and limited incense cedar regeneration. Scotch broom exists along roads in this unit.

UNIT E35-1: T.32S., R.5W., section 35

Unit E35-1 consists of a variety of stand types. Portions of the unit contain large Douglas-fir, ponderosa pine, and sugar pine 20-40" dbh over smaller Douglas-fir, madrone, tree form chinquapin, and Douglas-fir regeneration. Where overstory trees are closely spaced there is little or no understory. Where overstory trees are more widely spaced Douglas-fir regeneration, canyon live oak, manzanita, blue blossom ceanothus, and evergreen huckleberry can be found. A large portion of the unit consists of Douglas-fir generally 10-20" dbh mixed with madrone and tree form chinquapin. Unit E35-1 contains past harvest unit Quines Creek #4. Portion of unit recently received a precommerical thin/release treatment. No further cutting of conifers in this area.

UNIT E2-1: T.33S., R.5W., section 2

Unit E2-1 is a stand of Douglas-fir generally 12-24" dbh. Understory vegetation is variable. In places where the canopy is more closed, there is little or no understory. Where sunlight comes through the canopy there is madrone, deciduous huckleberry, sword fern, and salal. Portions of the unit are composed almost entirely of Douglas-fir 4-14" dbh. Some western hemlock and white fir is present. Fall selected large alders and conifers (conifers <20 inches dbh) into stream to provide fish and aquatic habitat. Scotch broom exists along roads within this section.

UNIT E30-3: T.32S., R.4W., section 30

Unit 30-3 is a multi-storied stand. Portions of the unit have been previously entered for harvest. The overstory consists of scattered large Douglas-fir up 48"dbh with limited numbers of large incense cedar. These trees are mixed with areas of Douglas-fir 6-12" dbh, big leaf maple, dogwood, hazel/oceanspray, chinquapin, canyon live oak, and Douglas-fir and incense cedar regeneration. In areas hardwoods are dying out from being overtopped.

UNIT E23-2: T.32S., R.4W., section 23

Unit E23-2 consists of a variety of stand types. The area north of road 32-5-23 consists of Douglas-fir generally 12-24" dbh mixed with limited smaller Douglas-fir and 5-8"dbh incense cedar. The understory consists of oceanspray/hazel, vine maple, and some big leaf maple. The area south of the road contains three stand types. The area immediately south of the road is similar to that north. South of that to the unit boundary, the unit consists of a multi-storied stand containing large, remnant Douglas-fir and incense cedar to 40"+dbh, scattered smaller Douglas-fir, large white fir, vine maple, pacific yew, and salal. The unit contains two Douglas-fir "plus-trees" that have been isolated from the remainder of the stand. Some understory has begun to become established in these gaps. Retain vegetation in these gaps. If retention of vegetation would negate effectiveness of the fuels treatment in remainder of unit, treat in a manner to retain as much vegetation as possible in these gaps. Unit also contains an irrigation ditch. Treat unit but maintain integrity of ditch.

UNIT E3-3: T.33S., R.5W., section 3

Unit E3-3 consists of a variety of stand types. Portions of the unit contain an overstory of widely spaced, Douglas-fir and limited sugar pine to 40"+ dbh over areas of thick Douglas-fir regeneration 1-8" dbh. There are areas within the unit that contain large numbers of hardwoods such as madrone, chinquapin, canyon live oak, oceanspray/hazel, and willow. Douglas-fir dwarf mistletoe is present. Portions of the unit have resulted from past timber harvests. Areas in the north and northeast (Tennessee Gulch #2 and #3) were clearcut in 1958. After harvest they were planted, precommercially thinned and aerially fertilized. These areas now contain Douglas-fir 6-14" dbh.

ANALYSIS: These units are within an area designated as Late Successional Reserve. These units are within the Wildland Urban Interface (WUI). Fuels build-up and the possibility of wildfire resulting in the loss of late-successional habitat and damage to private property has been identified by the public and BLM as a major issue. Nearby areas have been designated as Communities at Risk. Portions of the units are overstocked. Portions of the units contain ladder fuels.

DESIRED FUTURE CONDITION/RESULTS: Late Successional Reserve objectives and Fuels management objectives can sometimes be in conflict with each other. If too

much vegetation is cut and treated to meet fuels management objectives, the value of late-successional habitat can be reduced. If fuels treatments are not done or are done ineffectively, then the probability that habitat will be lost to wildfire is not reduced, especially in areas with ignition sources such as near residences and people. These risk reduction treatments would seek to balance these objectives. In terms of stand composition and condition, the desired future condition resulting from this action would be to maintain the health and presence of an overstory of large diameter conifers where they exist and to create room for existing smaller conifers within the stand to grow. The units would continue to be a mix of different stand types, including untreated areas. Reduction of competing vegetation through a non-commercial density management / fuels treatment would result in reduced competition on retained trees. Vigor and growth rates of remaining trees would be maintained or would increase. Mortality of retained conifers and hardwoods would decrease. Treatment would reduce the time areas of smaller diameter, generally younger conifers are most vulnerable to wildfire. The vigor of larger diameter and remnant conifers would be maintained or would increase. These large trees would be better able to recover after less intense fire in the future and would be more resilient to insects and disease. In terms of fuels within the units, live and dead fuels within units would be decreased. Fuel ladders would be decreased. There would be less risk of catastrophic fire occurring.

PREVENTION/AVOIDANCE STRATEGIES: Treatments that allowed canopy cover to recover while reducing ladder fuels would reduce stand vulnerability to wildfire. Treatments would slow/prevent the establishment and growth of competitive vegetation and the re-establishment of fuel ladders. Enlarging growing space through a density management treatment while trees are capable of responding will allow more rapid growth to occur and will result in a quicker attainment of forest stands with characteristics of older forests.

RECOMMENDED TREATMENTS: Units within the project area proposed for **non-commercial density management /fuels (NDNM/Fuels)** treatments represent many different stand types. Rather than do a stand type by stand type prescription for each unit, the following direction should be used.

General (to be applied to all NDNM/Fuels units except as described below):

- Provide for a mix of treated and untreated areas. Situate untreated areas locations where fuels objectives are not lessened by the untreated area. Maintain a minimum of 10% of the treatment area in an untreated condition. (Except units E3-5 and E23-2 where because of their size and location may all be treated)
- Where possible define treatment type boundaries on stand type changes and on existing Operations Inventory (OI) boundaries.
- Utilize a 7” dbh upper diameter limit for cutting of vegetation.
- Provide for a 25’ no treatment buffer on streams. Where stand type permits, treat riparian portions of unit consistent with the uplands.

- Provide for a variety of spacings to result across treated units. Spacing of leave vegetation within a particular unit or sub-unit may be constant but large areas of same spacing should e avoided.
- Space conifers 16'x'16' to 20'x 20'. Retain hardwoods on an overlapping "grid" with spacing ranging from 25'x 25' to 40'x 40'. Vary spacing by ± 25% to select "best" tree.
- Thin from below with the emphasis on retaining vigorous, well-formed conifers and hardwoods. Retain trees with large crowns over those with small crowns. As with the commercial density management treatments, some retention of trees with "defects" such as broken tops and crooks should be made.
- In project units containing a variety of conifer species, select leave trees to approximate the species composition of the plant series of the site.
- Retain dogwood, Oregon ash, and pacific yew.
- Where possible, preference for retention should be given to western hemlock, white fir, site adapted pine, big leaf maple and oak species. When retained, these trees should be able to remain in the stand. They should be vigorous and should be able to respond to the release provided by the treatment.
- Prune leave trees within selected areas to reduce ladder fuels.
- Handpile newly created slash and older slash in recently treated areas (unless slash has decomposed to the point where it is no longer a fuels management concern). Burn piles.
- Burn in a manner that minimizes damage to reserve trees, duff, and soil organic material. Minimize the loss of large, coarse woody material.
- Seed selected areas, particularly in areas with known populations of noxious weeds, with a mixture of native forage plants if seed is available.
- Evaluate for fuels build-up 3-5 years after harvest. Do follow-up fuels treatments such as slashing/handpiling/ burning piles or underburning (where it does not conflict with objectives of the land use allocation) as needed to slow development of ladder fuels.

Large overstory trees /open understories (see general direction above):
Treatments in this type of stand would generally be limited to light underburns that removed fine fuels and reduced sprouting vegetation that could later become ladder fuels. Some pruning may be needed to keep fire at ground level. Objective of the treatment would be to maintain current conditions reducing risk of fire moving from these stands to adjacent and potentially untreated sands. In stands where a lower canopy includes conifers 7"dbh and less but at the ground level is open, space conifers and hardwoods, handpile and burn piles. Objective of the treatment in this type of stand would be to reduce overall fuel loadings and reduce future mortality within the stand.

Stands with shrub understories, hardwoods, and/or conifers (see general direction above):
This category would comprise the majority of treated stands. These stands may or may not have an overstory of large diameter conifers. Space conifers and hardwoods. Slash shrubs. Slash vegetation ≤7"dbh from around large overstory pine to a point ten feet past the drip line. Handpile slash. Burn piles. Objective of the treatment would be to reduce fuel loadings within units and where large overstory trees existed to reduce fuel ladders and competition. Large overstory trees would remain in the stand longer.

Small diameter conifers (see general direction above):
Within proposed units to be treated are stands of small diameter conifers, principally Douglas-fir. Some of these stands are natural and have received no past treatment or a light treatment in the past. Some of these stands have resulted after past timber harvest. Some stands have been precommercially thinned as well as aerially fertilized. Understories are generally open and hardwoods and shrubs are scarce in these units. In units with these conditions, space conifers. If live crown ratios are small (10-25%) and/or height/diameter ratios are high space at a closer spacing 14'x14'to 16'x16'. Retain hardwoods and shrubs. Handpile slash. Burn piles. Objective of the treatment would be to reduce fuel loadings as well as possible stagnation of stand followed by possible collapse of stand or parts of it.

Unit specific details:

E35-1: Portion of unit was recently received a precommercial thin/release treatment. No further cutting of conifers in this area.
E2-1: Fall selected large alders and conifers (conifers <20 inches dbh) into stream to provide structure.
E23-2: Unit contains two Douglas-fir "plus-trees" that have been isolated from the rest of the stand. Some understory has begun to become established in these gaps. Retain vegetation in these gaps. If retention of vegetation would negate effectiveness of the fuels treatment in remainder of unit, treat in a manner to retain as much vegetation as possible in these gaps. Unit also contains an irrigation ditch. Treat unit but maintain integrity of ditch.

Noxious weeds, including Scotch broom, may occur near other units. Treatments should be done in a manner that does not contribute to spread.

SILVICULTURAL OPTIONS CONSIDERED: Treatments that focused on stand development within younger stands and did not include risk reduction fuels treatments were considered. These treatments would not have addressed fuel and fire concerns within stands older than 80 years or within stands less than 80 years of age.

Appendix 5 - Road Hauling Routes and Maintenance for Alternative 2.

Table A-5 Miles of Road Hauling, Reconstruction, and Maintenance.

Road Number	Road Name	Length/Control	Surface	Proposed	Hauling Period
32-4-4A	Whitehorse	3.26 BLM	ASC	Maintenance	5/15-10/15
32-4-4B1	Whitehorse	1.20 BLM	ABC	Maintenance	5/15-10/15
32-4-4B2	Whitehorse	3.16 BLM	PRR	Maintenance	5/15-10/15
32-4-7	Starveout Whitehorse Dv	4.81 BLM	GRR	Maintenance	5/15-10/15
32-4-8.2	Koehler P.O.	0.75 BLM	GRR	Maintenance	5/15-10/15
32-4-9A	Whitehorse Ck Sp	5.04 BLM	ASC	Maintenance	5/15-10/15
32-4-9.1	**Lower Whitehorse**	**0.50 BLM**	**PRR**	**Maintenance-remove crossing**	5/15-10/15
32-4-9.1	**Lower Whitehorse**	**1.00 BLM**		**Reconstruction-remove crossing**	5/15-10/15
32-4-9.4	Koehler Perky Sp	0.25 BLM	GRR	Maintenance	5/15-10/15
32-4-11	Gauge Station Sp	0.92 BLM	GRR	Reconstruction	5/15-10/15
32-4-11.5	Rocking Horse	2.05 BLM	NAT	Maintenance-**Replace gate**	5/15-10/15
32-4-15A	Blackhorse Crk	0.75 BLM/ Private Improvement	PRR	Maintenance	5/15-10/15
32-4-15.1	W Whitehorse P1 Sp	0.09 BLM	ABC	Reconstruction	5/15-10/15
32-4-20A	Starveout Crk	0.10 BLM	ASC	Reconstruction	5/15-10/15
32-4-20B	Starveout Crk	0.66 BLM	ASC	Reconstruction	5/15-10/15
32-4-20C	Starveout Crk	0.48 BLM	ASC	Reconstruction	5/15-10/15
32-4-20D1	Starveout Crk	1.92 BLM	ASC	Reconstruction	5/15-10/15
32-4-20D2	Starveout Crk	0.98 BLM	ASC	Reconstruction	5/15-10/15
32-4-20.1A	Fizzleout Crk	0.65 BLM	GRR	Maintenance	5/15-10/15
32-4-20.1B	Fizzleout Crk	0.48 BLM	GRR	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Hauling Period
32-4-20.2A	Hogum Crk	0.41 BLM	PRR	Maintenance	5/15-10/15
32-4-20.2B	Hogum Crk	0.76 BLM	NAT	Reconstruction	5/15-10/15
32-4-20.3A	Goodwin Creek	1.00 BLM	PRR	Maintenance	5/15-10/15
32-4-20.3B	Goodwin Creek	2.00 BLM	GRR	Reconstruction	5/15-10/15
32-4-21A	Boulder Crk	0.50 BLM	PRR	Reconstruction	5/15-10/15
32-4-22.3	Whiteview	0.76 BLM/Private Improvement	ABC	Maintenance	5/15-10/15
32-4-22.4	W Whitehorse	1.25 BLM	ASC	Maintenance	5/15-10/15
32-4-28	Jones Crk	1.19 BLM	PRR	Reconstruction	5/15-10/15
32-4-29A	Old Starveout Crk	0.65 BLM	NAT	Reconstruction	5/15-10/15
32-4-29B	Old Starveout Crk	0.12 BLM	NAT	Reconstruction	5/15-10/15
32-4-30	Starveout Jones	0.42 BLM	PRR	Reconstruction	5/15-10/15
32-4-30	Starveout Jones	0.88 BLM	PRR	Reconstruction	5/15-10/15
32-4-30.2	Bull Run Spur 80E	0.16 BLM	ASC	Reconstruction- **Barricade after use**	5/15-10/15
32-4-30.3	Bull Run Spur 80F	0.14 BLM	ASC	Reconstruction- **Re-rip after use**	5/15-10/15
32-4-30.4	Lost Bull	0.73 BLM	GRR	Maintenance- **Replace barricade**	5/15-10/15
32-4-31.2	Upper Bull Run P2 Spur	0.46 BLM	ABC	Reconstruction	5/15-10/15
32-4-32.2	B Spur	0.27 BLM	ABC	Reconstruction	5/15-10/15
32-4-32.4A	Starveout Mainline	0.89 BLM	PRR	Maintenance	5/15-10/15
32-5-13.1	Wild 1	0.24 BLM	GRR	Reconstruction- **Replace barricade**	5/15-10/15
32-5-23A	Eakin Road	0.35 BLM	BST	Maintenance	5/15-10/15
32-5-23B	Eakin Road	1.07 BLM	ASC	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Hauling Period
32-5-23C	Eakin Road	1.78 BLM	GRR	Maintenance	5/15-10/15
32-5-25A	Bull Run	2.03 BLM	ASC	Maintenance	5/15-10/15
32-5-25B	Bull Run	1.02 BLM	ASC	Maintenance	5/15-10/15
32-5-25C	Bull Run	1.33 BLM	ASC	Maintenance	5/15-10/15
32-5-25.1	Bull Run P2 SP	0.38 BLM	GRR	Maintenance	5/15-10/15
32-5-25.4	Jeep Road	0.47 BLM	GRR	Reconstruction	5/15-10/15
32-5-25.5	Big Bull	0.76 BLM	NAT	Reconstruction- **Replace barricade**	5/15-10/15
32-5-26A	Bull Run Ck	0.70 BLM	BST	Maintenance	5/15-10/15
32-5-26B1	Bull Run Ck	0.50 BLM	BST	Maintenance	5/15-10/15
32-5-26B2	Bull Run Ck	0.87 BLM	ASC	Maintenance	5/15-10/15
32-5-26C1	Bull Run Ck	1.09 BLM	ASC	Maintenance	5/15-10/15
32-5-26 C2	Bull Run Ck	0.68 BLM	GRR	Maintenance	5/15-10/15
33-5-3.1	Tennessee Ridge Spur	0.64 BLM	PRR	Reconstruction	5/15-10/15
33-5-3.3	Juliette	0.60 BLM	PRR	Reconstruction	5/15-10/15
33-5-10A	Wolf Creek Rd	0.24 BLM	ASC	Maintenance	5/15-10/15
33-5-10B	Wolf Creek Rd	0.38 BLM	ASC	Maintenance	5/15-10/15
33-5-10.1A	Tennessee Gulch	1.20 BLM	PRR	Maintenance	5/15-10/15
33-5-10.1B	Tennessee Gulch	1.90 BLM	PRR	Maintenance	5/15-10/15
33-5-10.4A	Tennessee Ridge	0.80 BLM	PRR	Maintenance	5/15-10/15
33-5-10.4B	Tennessee Ridge	0.80 BLM	PRR	Reconstruction	5/15-10/15
Powerline Road	T32S, R4W, NE1/4, SW1/4, Sect 8	0.10 BLM	NAT	Reconstruction	5/15-10/15

Legend

NAT = Natural PRR = Pit Run Rock ASC = Aggregate Surface Course BST = Bituminous Surface Treatment

Appendix 6 - Stream Habitat Survey Data

Table A6-1. Whitehorse Creek HUC 6

Stream	Reach #	Length (m)	Gradient (%)	LWD-Key pieces/100m	Silt/ Sand (%)	Residual Pool Depth	Active Erosion	Pool Area (%)	Pool Freq.
Blackhorse	1	482	2.7	0.2	8	0.3	22	17	13
	2	1369	5.5	0.1	21	0.4	38	10	27
	3	433	15.5	0	30	0.3	45	5	160
Fizzleout	1	1426	1.8	1	15	0.4	10	30	28
	2	1896	5.4	1.1	15	0.4	31	7	78
Hogum	1	1608	3.9	0.2	16	0.3	21	18	19
	2	2103	11.8	0.5	15	0.4	38	1	305
Starvout	1	3092	0.8	0	15	0.7	15	38	9
	2	1178	1.7	0.2	15	0.5	9	23	15
	3	951	2.6	0	15	0.4	9	26	12
	4	1949	3.9	0.2	15	0.4	5	13	20
	5	2248	11.5	2.8	15	0.4	1	12	26
Whitehorse	1	2820	2.1	0.2	7	0.5	8	18	12
	2	1374	4.1	0.2	10	0.5	4	25	9
	3	554	4.1	0.2	16	0.4	0	17	11
	4	807	5.3	0.9	14	0.4	0	14	15
	5	838	6.2	0.8	23	0.3	7	9	30
	6	1268	12.3	0.4	No riffles	----	5	11	39
Whitehorse Tributary A	1	2078	12.2	0.3	15	0.3	8	7	49
Whitehorse Tributary A1	1	823	20.3	0.5	15	0.4	12	3	137
Whitehorse Tributary B	1	2012	18	0.1	15	0.5	24	7	69

Table A6-2. Quines Creek HUC 6

Stream	Reach #	Length (m)	Gradient (%)	LWD-Key pieces/100m	Silt/ Sand (%)	Residual Pool Depth	Active Erosion	Pool Area (%)	Pool Freq.
Bull Run	1	2821	3.4	0.4	15	0.6	37	19	17
	2	2006	16.4	2.2	15	0.3	4	5	112
Little Bull Run	1	1474	6.7	1	15	0.4	48	17	27
	2	1501	16.2	1.3	23	0.3	17	11	58
Quines	1	2304	1.4	0	15	.6	19	53	5
	2	3022	3.4	.4	15	.7	2	33	9
	3	2242	4.6	0	15	.4	0	27	10
	4	2508	12.7	.8	14	0	5	Dry	Dry
Quines trib 1	1	2585	21.8	0.7	15	0.3	28	5	113
Tennessee Gulch	1	1223	4.8	0.1	37	0.4	9	21	24
	2	690	13.5	0.7	30	0.3	0	2	190
Windy	1	2531	1	0	0	.6	8	61	5
	2	3088	1	0	3	.8	21	57	7
	3	847	.3	0	Dry	0	0	Dry	Dry
	4	4983	1.2	.2	6	.5	26	47	10
	5	2923	2.3	.2	4	.5	15	40	13
	6	1162	3.6	0	39	.4	22	17	40
Wood	1	891	.7	0	18	.5	26	43	8
	2	3588	2	.1	18	.4	6	20	16
	3	1431	.7	.5	24	.4	17	14	16
Bear	1	824	1.1	.1	20	.7	32	59	11
	2	2581	4.2	.2	22	.4	47	12	39
	3	900	8.7	.2	25	.3	54	10	56
Lawson	1	1708	2.7	.1	32	.5	18	32	27
	2	1860	7.9	.8	15	.3	30	6	105
Fortune Branch	1	2472	2.6	.2	16	.5	38	46	11
	2	2854	8	.4	23	.5	25	25	25

Table A6-3. Units adjoining fishbearing streams

Unit #	Treatment Fuels/CDM
E31-1	F
15-1	CDM
15-2	CDM
E13-1	F
13-2	CDM
E25-1	F
29-4	CDM
29-1	CDM
28-1	CDM
21-2	CDM
E35-1	F
E2-1	F

Legend

F – Hazard fuels treatment
CDM – Commercial Density Management

Table A6-4. Units hydrologically connected* to fishbearing streams.

Unit #	Treatment Fuels/CDM
3-1	CDM
10-1	CDM
E23-2	F
E19-1	F
31-4	CDM
E31-3	F
E33-1	F
E3-3	F
11-4	CDM
E1-1	F

* unit has a perennial stream flowing through it that then directly connects to a fishbearing stream.

Appendix 7- Habitat Integrity rating using aquatic macroinvertebrates as Indicators. (Middle Cow Creek Watershed Analysis 1999 and Oregon Department of Fish and Wildlife Physical Habitat Surveys).

Stream	Year Sampled	Habitat Type		
		Erosional	Margin	Detritus
Blackhorse Creek	2000	78.2	68.4	76.0
Blackhorse @ mouth	1996	79.0	82.6	68.0
Bull Run @ BLM boundary	1996	66.1	61.6	74.2
Fortune Branch 0.2 miles Upstream of Rd. 32-5-7	1995	70.2	73.5	82.3
Hogum near mouth	1995	58.9	54.1	61.5
Quines Creek	2000	65.3	66.3	63.5
Quines @ lower BLM Boundary	1996	68.5	74.7	61.9
Starvout above bridge on Rd. 32-4-20 near Hogum Cr.	1995	66.1	80.6	80.2
Tennessee Gulch @ mouth	1996	56.5	76.8	67.7
Windy Cr. @ Glendale High School	1996	54.0	72.7	62.9
Whitehorse @ mouth	1992	63.0	61.0	77.0

Biological Condition Categories			
Biotic Integrity	**Erosional**	**Margin**	**Detritus or CPOM**
Very High	90-100	90-100	90-100
High	80-89	80-89	80-89
Moderate	60-79	70-79	70-79
Low	40-59	50-69	50-69
Severe	<40	<50	<50

APPENDIX 8 - Noxious Weeds Specialist Report Memo

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Rachel Showalter, Botanist, Glendale Resource Area
Re: Noxious Weeds Rationale Report for the Middle Cow Planning Area
Date: June 20, 2006

Middle Cow – Noxious Weeds – NOT AFFECTED

Units with the Middle Cow Planning Area were surveyed for noxious weeds in the spring of 2004 and 2005. The Planning Area is known to have noxious weeds along many roadsides, and 4 populations of *Cirsium arvense* (Canada thistle), 9 populations of *Cytisus scoparius* (Scotchbroom), 6 populations of *Rubus discolor* (Himalayan blackberry), 6 populations of *Senecio jacobaea* (Tansy ragwort), 2 populations of *Chondrilla juncea* (Rush Skeleton weed), and 13 populations of *Centaurea pratensis* (aka *C. debeauxii*) (Meadow knapweed) were documented within or directly adjacent to proposed units (Table 1-1). 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 / fuels treatment / road construction /decommission acreage harbor noxious weeds. The maximum square footage occupied by all noxious weed species is approximately 24,560.2 sq. ft (0.56 acres), or 0.02% of the treatment unit acreage in Alternative 2 (3739 acres). For the purposes of this report, treatment units were considered as acreage within the Planning Area subject to any ground-disturbing activity, including timber harvest activities, stand-alone fuels treatments, and road construction/decommission. The calculation of 0.02 % is at the high end, as it assumes 100% coverage within a given population which is rarely attained, with the exception of Himalayan blackberry.

Table A8-1. Plant Surveys Revealing Noxious Weed Species in the Middle Cow Planning Area

2004/5 Plant Surveys Revealing Noxious Weed Species in the Middle Cow 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**
31-4-32 32-4-8 32-5-4 32-5-5 32-5-8 32-5-17 32-5-25 32-5-31 32-5-35	Scotch broom	32.4 2000 32.4 11 54 1026 1200 35 97.2	B*	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).
32-4-3 32-4-8 32-4-19 32-5-3 32-5-4 32-5-5	Himalayan blackberry	100 1400 200 324 54 108	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).
32-4-3 32-4-8 32-4-11 32-4-28 32-5-3 32-5-4 32-5-5 32-5-9 32-5-13 32-5-25 32-5-35 32-5-35 33-5-11	Meadow knapweed	50 400 1620 1200 108 2160 1080 43.2 2500 2500 108 540 11 (Pulled)	B*	Meadow 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 (King Co., DNR, 2004).
31-4-32 32-4-8 32-4-10 32-4-11 32-4-15 32-5-3	Tansy ragwort	150 100 15 1296 32 (Pulled) 108	B*	Tansy ragwort, a biennial herb, requires sunlight and a disturbed site to establish. It is often found on roadsides, contributing to the spread of new infestations. Tansy ragwort will establish in disturbed sites including roadsides, pastures, and forested areas recently harvested for timber (Sweeney et al. 1992). The cinnabar moth (*Tyria jacobaeae*) is the biological agents effectively used to control tansy ragwort in Oregon, California, and Washington (Rees et. al, 1996).
33-6-9 32-5-10 32-5-9 32-4-8	Canada thistle	230 1620 1080 400	B*	Generally, Canada thistle establishes and develops best on open, moist, disturbed areas, including ditch banks, overgrazed pastures, meadows, tilled fields or open waste places, fence rows, roadsides, and campgrounds; and after logging, road building, fire and landslides in natural areas (Romme et al, 1995). Canada thistle is an early seral species, susceptible to shading, and grows best when no competing

				vegetation is present (Donald, 1994). Canada thistle growth may be discouraged in disturbed natural areas if suitable native species are seeded densely enough to provide sufficient competition (Haber, 1997).
31-4-32 32-5-25	Rush skeletonweed	600 (Pulled) 578	B*	Rush skeletonweed is a long-taprooted biennial/perennial which prefers two soils types found in the pacific northwest: the sandy to gravely and well drained soils, and the shallow soils over bedrock, typical in the channeled scablands (Old, 1981). Rush skeletonweed is primarily a species of disturbed roadsides although it is also found on river banks, dry river beds, degraded coastal dunes, and eroded ground (McVean, 1966). Seeds are commonly transported via wind currents, and are often carried up to 20 miles from the original seed source (McLellan, 1991).
Total Sq. feet		24560.2 sq. ft = 0.56 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 1970's 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, including the Middle Cow Planning Area, under an agreement with the Douglas County Soil and Water Conservation District, using Title II funds obtained in 2004. This agreement is separate of the Middle Cow LSR Planning effort and was analyzed under the Medford the District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14*.

Environmental Consequences of the Middle Cow 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 (Northwest Area Noxious Weed Control Program EIS, p. 59). The following table (1-2) illustrates how each of these activities affects noxious weed dispersal.

Table A8-2: 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 are for 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 checkerboarded 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.

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 1-2 - 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 Middle Cow 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 1-2.

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 1-2 on the spread of noxious weeds. Openings, caused by logging (1,236 acres), stand-alone fuels treatments (2,501 acres), and road construction/decommissioning (2.4 miles (~ 6 acres)), would provide suitable habitat for 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 1-3 delineates the project design features and their expected implementation results.

Table A8-3. 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), tree canopies will eventually expand and reduce light levels, which in turn will prevent weeds from growing and expanding within treated areas, because 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 1-2. 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 Planning Area units - are affected by noxious weeds. Second, these sites located in units proposed for treatment have been reported during predisturbance surveys, and are proposed for weed treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14,* which means that known populations will be treated, bringing the acreage in the Planning Area affected by noxious weeds closer to 0% until ongoing activities listed in Table 1-2 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) Cumulative Effects

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 will 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, 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 will 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 will 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.

There is no available data on the background rate of weed spread, and additional data collection on the rate of weed spread would not reduce the inherent speculation in predicting the future activities of private parties and wildlife and the resultant rate of weed spread. Further, additional 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 will 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 Middle Cow project occurs, and that rate will not be altered to any detectable degree by the proposed action.

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Appendix 9 - Botany 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 Middle Cow Planning Area
Date: June 20, 2006

T/E 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 and habitat which extends into the Glendale Resource Area. Although a few units of the Middle Cow project area are within the range and habitat of *F. gentneri*, as determined by the US Fish and Wildlife Service, vascular plant surveys were conducted in the spring of 2004 and 2005, and no *Fritillaria gentneri* populations were found. There will be no anticipated effect from the proposed action on any federally listed plant.

Bureau Special Status Plants – PRESENT, NOT AFFECTED

Vascular plant surveys were conducted in the spring of 2004 and 2005, and surveys were completed in the spring of 2005 for lichens and bryophytes. Professional botanists surveyed the planning area units using intuitive controlled methodology, wherein areas supporting high potential habitat were surveyed more intensively. Surveys revealed 2 Survey and Manage vascular plant sites, both of which are *Eucephalis vialis*. Surveys also revealed two sites of the Bureau Assessment species *Carex gynodynama*. Two bureau tracking species sites (1 *Astragalus umbraticus*, and 1 *Mimulus douglasii)* were also documented during pre-disturbance surveys.

Nonvascular surveys, completed in spring 2005, resulted in 2 new bureau special status nonvascular plant sites, both of which are Assessment species (1 *Tripterocladium leucocladium* and 1 *Tayloria serrata*). One Bureau tracking species site (*1 Leptogium teretiusculum)* was also documented, and has dual status as a Survey and Manage E species (Table 1-1).

Table 1-1. Bureau special status species, species status, general habitat, and number of occurrences in the Middle Cow LSR planning area.

Lifeform	Scientific name	Common Name	Status	Habitat	Occurrences in project area vs. in actual timber units
Moss	*Tayloria serrata*	serrate dung moss	BAO	8	1/0
Moss	*Tripterocladium leucocladium*	tripterocladium moss	BAO	2,4	1/0
Lichen	*Leptogium teretiusculum*	terete skin lichen	BTO	4	1/0

Vascular	*Astragalus umbraticus*	Bald Mountain milkvetch	BTO	4,7	1/0
Vascular	*Carex gynodynama*	hairy sedge	BAO	1,3	2/0
Vascular	*Eucephalis vialis*	wayside aster	STO/ S&M A	4,5	2/0
Vascular	*Mimulus douglasii*	purple mouse ears	BTO	3	2/0
Habitat definitions: 1 = drainage, **2** = rock outcrops, **3** = meadows and open areas, **4** = coniferous forest, **5** = woodland, **6** = shrubland/chaparral, **7**= roads/roadsides **8**= previously disturbed open areas like shaded roads and pastures, most often found on dung. Only a few populations (less than 10%) were found in those habitats enclosed in parenthesis.					

Within timber harvest units, bureau sensitive and assessment species and survey and manage category C species would be protected by buffers, which would vary in diameter depending on unit prescription. Bureau tracking species do not require mitigation, and would not receive buffers. However, sites harboring tracking species which also have a S&M Category B or E designation would be managed. Within the Middle Cow Planning Area, the only species to fall into this scenario is *Leptogium teretisculum*, which would receive a 100' buffer.

Sites within units slated for fuels treatments would be protected, but since the overstory is not typically affected by prescribed burning activity, and fire is a naturally-occurring disturbance, buffer sizes will be less. Buffers would vary from 5 to 30 feet in diameter depending on 1) the prescribed fuels treatment, 2) the time of year treatment will occur, and 3) whether or not that species has demonstrated a tolerance to fire-related disturbance. For instance, if a species such as *Camassia howellii*, which has consistently demonstrated a favorable response to introduced fire, is within a prescribed burn unit and the burn is scheduled for late fall or very early spring (when the plant is dormant), that population will not receive a buffer. Given these protection measures, proposed prescribed burning activity will not trend these species toward federal listing and should assure persistence.

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 (USDA/USDI 2001, p.64-67)." Current special status fungi were formerly in the aforementioned S&M categories which did not consider surveys practical, and are therefore exempt from survey requirements. With the recent re-instatement of Survey and Manage Protocols, these species were placed back into their respective S&M categories (9 species in B, 1 species in F) – none of which require surveys under S&M protocol.

District wide, the Medford BLM has ten Bureau Sensitive (BSO) fungi species; six are suspected to occur here, while the remaining four have been documented. Of the four documented species, only one, *Phaeocollybia olivacea*, has been found in the Glendale Resource Area, approximately 8.9 air miles away from the project area. Although this site and the project area reside within the same HUC 5 Middle Cow Watershed, the fungi site is topographically far removed from the project area; several ridges and the I-5 corridor separate the two geographic vicinities. In addition, the microhabitat of the fungi site differs from the microhabitat of the closest Middle Cow units; the west-facing riparian-influenced habitat surrounding the fungi site differs from the north-northwest-facing habitat of the closest Middle Cow unit.

Based on the outcome of utilizing the 'Likelihood of Occurrence Key' provided from the BLM Oregon State Office, there is a "low likelihood of occurrence and low risk to species viability or trend toward listing," for sensitive fungi species potentially located in the project area. 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 (USDA/ USDI 2004b, pp 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 percent 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 (this is one of the criteria for inclusion in Survey and Manage) 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 percent 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.

Based on the above information, the likelihood of a Bureau 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

Special Status Vascular Plants
There would be no direct effects to Special Status vascular plants under Alternative 1 because no physical disturbance would occur that could impact them. However, under the No Action Alternative, stands identified as needing fuels reduction would remain overstocked, resulting in deterioration of stand health and reduced resiliency to disturbance events. In the event of wildfire, stands with high canopy cover and fuel ladders generally burn at higher intensity, potentially resulting in stand-replacement and greater damage to plants and soil. Under Alternative 1, the risk of damage to Special Status vascular plants from intense wildfire would remain unchanged from current conditions. Under Alternative 1, no timber harvest would occur in late-successional stands on BLM-managed lands. In the absence of fire, they would continue to provide habitat for late-successional associated Special Status vascular plants.

Special Status Nonvascular Plants
No direct or indirect effects would occur to Special Status nonvascular plants because no activities would occur that could impact them.

Special Status Fungi
There would be no direct or indirect effects to Special Status fungi under Alternative 1 because no physical disturbance would occur that could impact them if present. There would be no loss of late-successional forest which provides suitable habitat for the 10 Medford District BLM Sensitive fungi. However, as discussed under the effects of Alternative 1 to Special Status Vascular Plants, the potential for stand-replacing fires resulting from overstocked forests and subsequent risk of damage to Special Status fungi still exists.

Cumulative Effects
Information is not available about rare plant populations in the Middle Cow 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. Special Status species do not receive protection on privately-owned lands, but will continue to be protected and conserved on federal lands, according to BLM policy and the Medford District RMP.

Alternative 1 would not contribute additional cumulative effects to Special Status vascular / nonvascular plants, or fungi. The amount of late-successional forest on BLM-managed lands would remain unchanged, in the absence of wildfire, and would continue to provide habitat for late-successional associated plants and fungi. Mid-seral stands would continue to develop toward a late seral stage. Current trends toward overstocking would continue as a result of fire exclusion. The potential for intense, stand-replacing fires and the risk of direct mortality or damage to Special Status plants or fungi or loss of suitable habitat from high severity wildfire would further persist from current conditions.

Alternative 2

Direct and Indirect Effects

Special Status Vascular Plants
In Alternative 2, special status plant sites do not reside in units proposed for timber harvest (Table 1-1). Prescriptions for harvest include commercial density management, accomplished by a variety of harvest methods such as tractor, cable and helicopter logging systems. Commercial density management retains 40-60% canopy closure, canopy closure. If special status plants were present, protection measures for species requiring management are described in the Affected Environment. Establishing these site management measures protects plants against potential direct and indirect effects, including:

- damage or mortality from logging equipment
- damage or mortality from heat or fire during post-harvest slash pile burning
- reduced population vigor or reproductive success or mortality from increased light, temperature, and reduced relative humidity when overstory trees are removed
- reduced population vigor or reproductive success or mortality as a result of breaking mycorrhizal connections and disrupting food cycling between conifers and plants when overstory trees are removed

Another potential indirect effect to Special Status vascular plants in the project area as a result of harvest activities is the introduction or spread of noxious weeds. Weeds could spread during construction of temporary and permanent roads and during ingress and egress of equipment, particularly off system roads. Weeds compete with rare plants for space, water, light, and nutrients. Treating noxious weeds in the watershed, washing logging equipment before moving it onsite, and using native grass seed and straw in post-treatment restoration would reduce the risk of spreading noxious weeds that could impact Special Status vascular plant populations which prefer a similar environment.

Under Alternative 2, 1,236 acres of mid-successional forest would be thinned for density management, retaining 40-60 percent canopy cover. Removing some trees would free up water, light, and nutrients, resulting in accelerated growth and resiliency in the remaining trees. After treatment of post-harvest slash, these stands would be less at risk of high

intensity wildfire, resulting in less potential damage to Special Status vascular plants in the treatment areas in the event of wildfire.

Two special status species sites (2 *Eucephalis vialis,*) (Table 1-1) are located in proposed understory thin/handpile/burn units. The proposed prescription would remove some understory shrubs and trees, but would retain over-story conifers greater than 8 inches diameter. Because large conifer and hardwood trees would be left, the overstory canopy cover in the units would remain. No treatment buffers, ranging from 5 – 30 feet around the sites would protect plants against potential direct and indirect effects of the fuels reduction treatment, including:

- damage or destruction of above or below ground plant parts during handpile burning
- reduced population vigor or reproductive success or mortality as a result of increased light, temperature, and reduced relative humidity from removing understory trees and shrubs
- reduced population vigor or reproductive success or mortality if mycorrhizae connecting conifers and plants are damaged during handpile burning

Fuels reduction treatments would reduce the risk of high intensity wildfire in the treated stands, which would also reduce potential damage to Special Status vascular plants in the treatment units in the event of wildfire. Thinning dense, overstocked mid-seral stands would accelerate development of late-successional characteristics and improve stand health in those stands, making them more resilient to catastrophic damage from wildfire, insects or pathogens. Although Special Status plant sites would be buffered, burning handpiles in the surrounding areas would remove vegetation and open up areas for potential invasion by noxious weeds, which compete with Special Status vascular plants for light, water, and nutrients. Treating noxious weeds in the watershed in 2006 and using native plant material for post-treatment seeding and mulching would reduce the risk that noxious weeds would be introduced or spread during fuels reduction treatment.

Special Status Nonvascular Plants

Three assessment species sites (*1 Tripterocladium leucocladum, 1 Leptogium teretiusculum, and 1 Tayloria serrata)* (Table 1-1) were found during pre-disturbance surveys. All of these sites reside in fuels treatment units.

Potential direct / indirect impacts and subsequent precautionary management measures taken to protect these species are similar to those outlined in the vascular plant section. However, there are two main differences; the first is that noxious weeds do not pose as much of a threat to nonvascular species as they do to vascular species because nonvascular species grow on a variety of substrates which are inhospitable to vascular species. The second difference pertains to the management of one nonvascular S&M species – *Tayloria serrata*. This site is located on the margin of the road accessing the unit targeted for fuels treatment. Instead of receiving a 100 foot buffer, the substrate that hosts *T. serrata* will be relocated in close proximity to its current locale, safely situated away from vehicle traffic.

Special Status Fungi

No fungi surveys have been conducted in the Middle Cow project area, therefore, it is unknown if Sensitive fungi are present in the treatment units. Potential habitat for all 10 Sensitive species exists in the project area because both Douglas-fir and white fir components are present, 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.

Harvest can have varying degrees of adverse impacts on fungi, depending on the level of tree 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 timber harvest, construction or ripping of roads or landings, 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 the greatest potential risk of impacting Special Status fungi, if present, because it proposes temporary road construction/decommission, and timber harvest.

Fungi could also be directly impacted from radiant heat during burning of post-harvest slash piles. 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 because acres would be harvested, and the debris from this action would be subsequently piled and burned.

Fuels reduction treatments present a trade-off of potential beneficial and adverse effects to fungi when their presence in the treatment areas is unknown. On one hand, reducing tree densities and ladder fuels reduces the potential for high intensity wildfire which causes greater impacts to fungi than less intense fire. On the other hand, burning handpiles creates a risk to fungi of damage to mycelia and spores if they occur beneath or adjacent to the handpiles. Fungi could also be indirectly affected by changes in environmental conditions resulting from thinning mid-story and understory trees and shrubs. Alternative 2 would reduce hazardous fuels on 3,737 acres.

Cumulative Effects

Information is not available for rare plant populations in the Middle Cow project area prior to BLM botanical surveys, which began during the last 25 years. However, it is assumed that 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 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. Special Status 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.

Special Status plants would not be directly impacted by the activities proposed in Alternative 2 because surveys have been conducted and Sensitive and Assessment plant sites would be protected. Project design features would reduce the risk of introducing or spreading noxious weeds during project implementation, which could potentially impact Special Status vascular plants. No Special 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 projects on Sensitive fungi would be the risk of impacting rare populations on 1,236 plus 2,501 (fuels treatments) acres during timber harvest and fuels reduction treatments. However, the proposed harvest would occur on Late Successional Reserve (LSR) lands, which are designated to attain late-successional characteristics, which would benefit potential Sensitive fungi. Across the Northwest Forest Plan area, approximately 14 percent of the 8 million acres of late-successional forest are in matrix and are available for harvest, while 86 percent 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, 109-111). 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 percent late seral (80-plus years old) conifer forest must be maintained in each 5th field watershed (USDA/USDI 1994, p. C-44). Because of their rarity across the Pacific Northwest Forest Plan Area, it is unlikely Sensitive fungi are present in the Middle Cow timber harvest or fuels 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 2004b, 5-2).

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Appendix 10
Fire and Fuels Specialist Report

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Donni Vogel, Fire and Fuels Management Specialist, Glendale Resource Area
Re: Fire Risk and Regeneration Harvest Discussions for the Middle Cow LSR Project
Date: June 23, 2006

Fire Risk

Fire risk is the probability of a fire starting which is determined by the presence of ignition sources and is proportional to human presence. New permanent road construction has the potential to increase fire risk because new roads allow for an increase in human presence by providing easier access into previously inaccessible areas. No new permanent road construction is proposed in the Middle Cow LSR project, therefore there is no expected related increase in fire risk associated with this project. The Westside project proposes new permanent road construction under both action alternatives. The miles of new road construction and increased human presence do not correlate on a one-to-one basis because many factors aside from access contribute to increased human presence. The most important factor is how appealing the areas are into which the new roads provide access. The new roads in the action alternatives are proposed in order to access timber sale units. These are generally short spur roads that do not lead to appealing recreational areas. Also, the amount of new permanent road construction is minimal and partially offset by proposed road decommissioning. So, while there is new permanent road construction proposed within the fire analysis area, it is not likely that fire risk will be affected by either of these two planning projects.

Regeneration Harvest (RH, OR, SW, GS)

The Middle Cow LSR project does not propose any regeneration harvest activities. The Westside project proposes 1,515 acres under Alternative 2 and 1,338 acres under Alternative 3. This discussion is included in this appendix due to the fact that regeneration harvest activities may take place within the fire analysis area used in the Middle Cow LSR Environmental Assessment, but would not take place within the Middle Cow LSR Planning Area.

Methodology

This report uses the Scott and Burgan fuel model set from the "Standard Fire Behavior Fuel Models" publication of 2005. The 2005 fuel models were derived from the 1982 models that were used in Chapter 3. The 2005 set expands the number of fuel models, enabling the user to more accurately describe the stands under consideration. This allows for more accurate predictions when running computer models to determine fire behavior, which is done in this report to understand the effects of regeneration harvest activities on fire behavior.

Table 10-1 shows the cross-walk from the 1982 fuel models to the 2005 fuel models used to analyze the effects of regeneration harvest activities on fire behavior. Table 10-2 shows the flame lengths expected for each of the 2005 fuel models used in the analysis regarding effects of regeneration harvest on fire behavior.

Table 10-1. Fire Behavior Fuel Model Cross-Walk

1982 Fuel Model Group	1982 Fuel Model	2005 Fuel Model Group	2005 Fuel Model
Shrub	6	Shrub	SH2, SH4
Timber	8	Timber Litter	TL4
Timber	9	Timber Litter	TL8
Timber	10	Timber Understory	TU5
Slash	11	Slash/Blowdown	SB1, SB2
Slash	12	Slash/Blowdown	SB1, SB2
Slash	13	Slash/Blowdown	SB2

Table 10-2. 2005 Fuel Models with Flame Lengths

2005 Fuel Model	Flame Length (in feet)
SH2	1-4
SH4	4-8
TL4	1-4
TU5	4-8
SB1	1-4
SB2	4-8

Computer modeling provides a method for comparing the effects of various management prescriptions on fire behavior. Two computer models were used in this analysis: Behave3 and Fuels Management Analyst Plus 2 (FMA^+ 2). Behave3 allows the user to input local stand characteristics and weather parameters in order to determine flame length and rate of spread. The FMA^+ 2 model uses similar input data to determine the thresholds at which surface fire will be sustained, passive crown fire will occur, or active crown fire will initiate.

Modeling runs were made using these models to compare the potential fire behavior in regeneration harvest stands in their current condition versus post-harvest condition. Runs were not made for treatment types other than regeneration harvest (RH, OR, SW, GS) because thinning treatments (CT, SC, HFT, CDM) do not reset the stands from their current seral stage, making their effects more predictable.

Runs were conducted for each of the following scenarios: (1) the current condition of the stands in their mature seral stage; (2) the condition of the stands once the regeneration harvest activity has taken place and the stand is reset to an early seral stage; (3) the stands after they have reached the mid-seral stage with a closed canopy of greater than 40%; (4) the stands after they have reached the mid-seral stage with an open canopy of less than 40%; and (5) the stands once they have reached the late seral stage.

Two runs were made for each of the five seral stages in order to show a range of potential fire behavior of Low or High (Chart 10-1). The ranges were defined by assigning two fire behavior fuel models to each seral stage. The High range for the mid-seral stages was calculated as if slash was present on site, created by brushing, pre-commercial thinning, or other maintenance activities. The Low range for the mid-seral stages was calculated as if the slash had been mitigated through fuel treatments and therefore not present on site. The range for the early seral stage was calculated by assigning fuel models that represent the range of fuel loads expected in these stands and did not factor in slash as stands younger than 10 years of age are too young to receive many maintenance treatments and when they do, not enough slash is produced to drastically increase fire behavior. The ranges for late and mature seral stages were calculated by assigning fuel models that represent the range of fuel loads expected in these stands and did not factor in slash as fuel treatments to mitigate activity slash are generally implemented within six months to two years and therefore have short term effects.

Weather data was collected from a local RAWS (Calvert remote automated weather station) to determine the 98 to 100 percentile range of extreme weather in the area. The extreme range was chosen in order to produce a worse case scenario of fire behavior in the area. The range of weather was taken for the last 100 days of fire season (from mid July to the end of October) because this is the hottest and driest time of the year and therefore the most likely time period to produce extreme fire behavior.

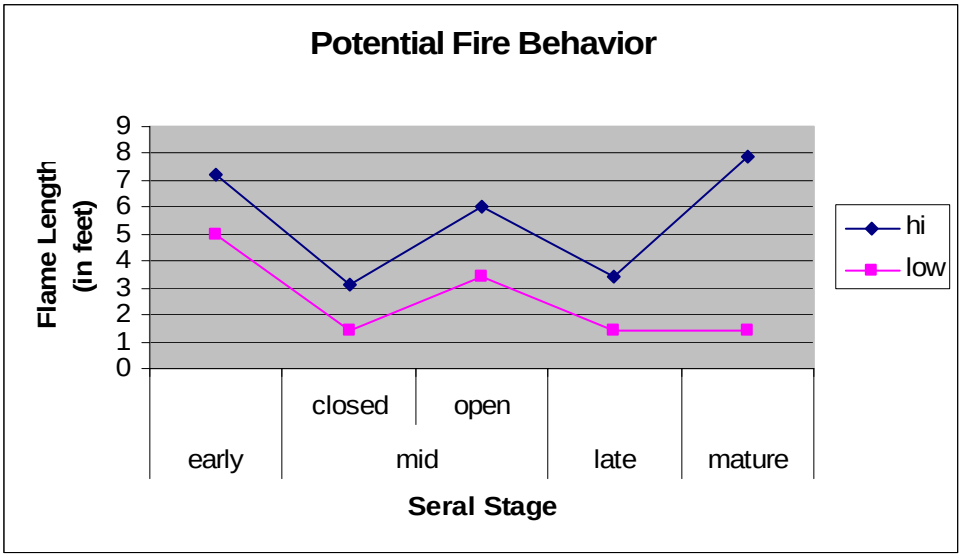
The topography in the fire analysis area varies greatly in slope, aspect, and elevation. Slope is an important factor in fire behavior and a topographical parameter needed to run Behave3 computer models. Slope was held constant at 50% in the Behave3 modeling runs as a mid-point in the range of slope within the fire analysis area.

Analysis

The purpose of this analysis is to demonstrate the effects of regeneration harvest activities on fire hazard as mature seral stage stands are reset to early seral stage stands. The range of flame length was calculated using the fire behavior computer models and parameters described in the methodology section. The range for the early seral stage was derived based on stand conditions as they change between the first and tenth year of growth. For the Low end of the early seral stage, the 2005 fuel model SH2 was used, and for the High end SH4 was used (Chart 10-1). TL4 was used for the Low end of the mature seral stage and TU5 for the High end, based on the range of conditions currently

found in mature seral stage stands. Fuel models SB1 and SB2 were used to represent slash on site.

Chart 10-1. Comparison of Flame Lengths between Seral Stages



Although the regeneration harvest prescriptions proposed in the action alternatives are not specifically designed to affect fire behavior, they do have short term and long term effects. In the short term, the slash created causes the stands to transition from their current fuel models TL4 or TU5 to SB1 or SB2, with potentially over 35 tons of slash produced per acre. This transition does not necessarily translate into an increase in fire hazard however, as the flame lengths associated with these fuel models are comparable (between 1 and 8 feet). Short term refers to the six month to two year period from when the slash is produced to the time it is mitigated by being disposed of through removal and/or prescribed fire.

In the long term, concerns have been raised, at both the stand level and landscape level, regarding older, mature stands being replaced by younger plantations through the implementation of regeneration harvest prescriptions. The long term, in this context, refers to the time between when the slash is mitigated to the time when the stand reaches the mid-seral stage.

At the stand level, the concern seems to be that younger trees are more susceptible to fire than older trees. This is generally true because younger trees are smaller, both in height and diameter, than older trees and therefore require a lesser degree of fire intensity and shorter flame lengths to sustain lethal damage from fire (Agee, 1993).

At the landscape level, the concern seems to be that the existence of plantations may create the potential for catastrophic fires. The probability of this concern occurring is heavily dependant on many spatial and temporal variables, such as the location of the

plantations in respect to slope, aspect, elevation, and position on slope, along with weather conditions occurring as the fire ignites and advances. Other critical factors in catastrophic fire development relate to the availability of fire suppression resources, their response time to the fire, and their effectiveness given the environmental factors present.

Plantations, although they may present an area with increased fire rates of spread due to the presence of flashier fuels, may also provide areas in which effective and efficient fire suppression operations can occur (Martin, 2006). For example, air attack operations with air tankers and helicopters are generally less effective in stands with taller trees and closed canopies. Also, access through managed areas is already in existence, meaning mechanical equipment such as dozers can be used in a much more efficient manner. Existing fire barriers, such as roads and firelines, may also already exist in managed areas, meaning fire control lines take less time construct than in older stands, in most instances (Martin, 2006).

Scientific evidence exists supporting the notion that plantations are vulnerable to fire and may exacerbate fire behavior, particularly during times of dry conditions and in stands that have received slash-producing maintenance treatments (such as pre-commercial thinning) where the slash remains on site and is not mitigated (Martin, 2006). However, in most instances, monitoring plots taken in older stands in the local area reveal that the number of small trees (up to 8 inches dbh) with varying heights are at such levels of abundance that these stands are also vulnerable to fire and have the potential to produce catastrophic fire behavior during dry conditions (Martin, 2006). As Chart 10-1 shows, the high end of the range for flame lengths in mature stands (8 feet) exceeds the high end in early seral stands (7 feet) and mid-closed stands (3 feet) that are indicative of plantations.

The Medford District RMP/EIS took the implications of creating plantations on fire hazard into account, along with the expected condition of private lands, when analyzing for the effects of regeneration harvest. The RMP/EIS analyzed the effects of 1,140 acres of regeneration harvest on a District-wide average annual basis the first decade. Less than 500 acres annually of regeneration harvest have been implemented District-wide in the past decade. These acres combined with the acres proposed for regeneration harvest in the Westside project under either action alternative fall below the number of acres analyzed for in the RMP/EIS. The Middle Cow LSR project proposes no regeneration harvest activities.

Summary

The effect of regeneration harvest activities within the fire analysis area may be a potential increase in fire behavior due to the presence of slash on site. This may effect up to 1,515 acres under Alternative 2 and 1,338 under Alternative 3 of the Westside project. This does not necessarily translate into an overall increase in fire hazard however, as the stands prior to harvest have the potential to produce flame lengths from 1 to 8 feet, which is comparable to the stands with slash on site and the stands once they have been reset to an early seral stage until they mature into mid-seral stage.

APPENDIX 11

SPECIALIST REPORT- MIGRATORY BIRDS

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Marylou Schnoes, Wildlife Biologist, Glendale Resource Area
Re: 'Not Affected' rationale regarding migratory birds
Date: 30 August 2006

Analysis of Proposed Action Effects on Birds of Conservation Concern
for
Revised Westside Landscape Planning Environmental Analysis
EA # 0R-118-05-021
Revised Middle Cow LSR Planning Project Environmental Analysis
EA # 0R -118-05-022

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 U.S.D.I. 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 (U.S.D.I. 1995) and the Northwest Forest Plan (U.S.D.A./U.S.D.I. 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 Westside Landscape Planning Environmental Analysis and Middle Cow LSR Planning Project 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** (Kemper 2002)	**presence in Westside Project Area and effects**
peregrine falcon	cliffs	Unknown, habitat not present in project area
flammulated owl	ponderosa pine forests with closed overstory and open subcanopies	Unknown, habitat not present in project area
olive-sided flycatcher	green coniferous forests with snags	Present in project area. Habitat present. Habitat is relatively broken-canopied coniferous forest from sea level to Cascades up to 9,000' 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). 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.[U.S.D.A./U.S.D.I. 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	Foraging habitat: Early successional stages with flowering plants. Nesting habitat: Shrubs and trees near foraging habitat.	Present in the Project Area. Foraging habitat present over less than 10% of areas within timber harvest units, as units are forested and not in early successional stages. Fuels units are dense with woody vegetation, and thus contain relatively little early successional habitat and nectar-producing vegetation. Earlier successional stages and therefore, new foraging habitat would be created by proposed action over most acres in units for at least 10 years. 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 result in more woody vegetation being in close proximity to hundreds of acres of newly created foraging habitat. Thus, these actions would indirectly create more potential nesting habitat for at least 10 years; over several hundred acres. 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.
Lewis' woodpecker	ponderosa pine stands	Unknown, habitat not present in project area
white-headed woodpecker	large ponderosa pines, rarely true fir stands	Unknown, habitat not present in project area

Species with "Unknown" Presence.
The four species with "unknown" presence are birds that are considered rare in all of southwest Oregon, have extremely specialized habitat requirements and whose nesting habitat is not likely to occur in the project areas. Only the peregrine falcon would be expected to pass through the project area. Such use would be ephemeral, as hunting forays and would not likely be affected to any observable level by the proposed actions or post-action changes in habitat.

Because there would be no observable impacts on the use they may be making of the project areas, the proposed actions would not affect the populations of these migratory Birds of Conservation Concern.

Species Present in the Project Area.
The olive-side flycatcher is known to use older (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). Such stands are found in the proposed actions and their suitability would be affected by the proposed actions. However, considering the large amount of habitat suitable for the species, found in the region (listed in Table 1); the partial, listed acreage of which totals approximately 3 million acres; the population trends at state and regional levels would not be affected by proposed actions.

The rufous hummingbird forages on nectar-producing flowers, which occur in early successional areas. Within the project areas, these occur mostly outside the heavily forested proposed units. The proposed actions would create new foraging habitat within sale and fuels units. Nesting habitat for this species is in woody vegetation in close proximity to foraging habitat. Because the proposed actions would create hundreds of acres of new foraging habitat, which would be in close proximity to woody vegetation, the proposed actions would indirectly create more nesting habitat than existed before project were implementation. However, since the forest would gradually recover and progress to a purely forested condition, units would eventually revert to non-habitat conditions. The time required for such succession would vary with the silvicultural prescription (e.g., regeneration harvest vs. group select cut) and individual characteristics of the stand (e.g., soil type, aspect). All treated stands would be expected to provide some early successional habitat containing nectar-producing plants for at least ten years. However, such changes would not be expected to affect population trends at the state or regional level.

Regional Strategies.
Both the U.S.D.I. Fish and Wildlife Service (2002) 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	%
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

Projects occurring within Late Successional Reserves are subject to review by the Regional Ecosystem Office to ensure that the treatments are beneficial to the creation of late-successional forest conditions. The Middle Cow LSR Planning Project Environmental Analysis meets the intent of the Medford District RMP to manage late-successional reserves to "enhance and/or maintain late-successional forest conditions" (USDI 1995, p.21) and would not negatively effect the population trends at state or regional levels.

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, 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.

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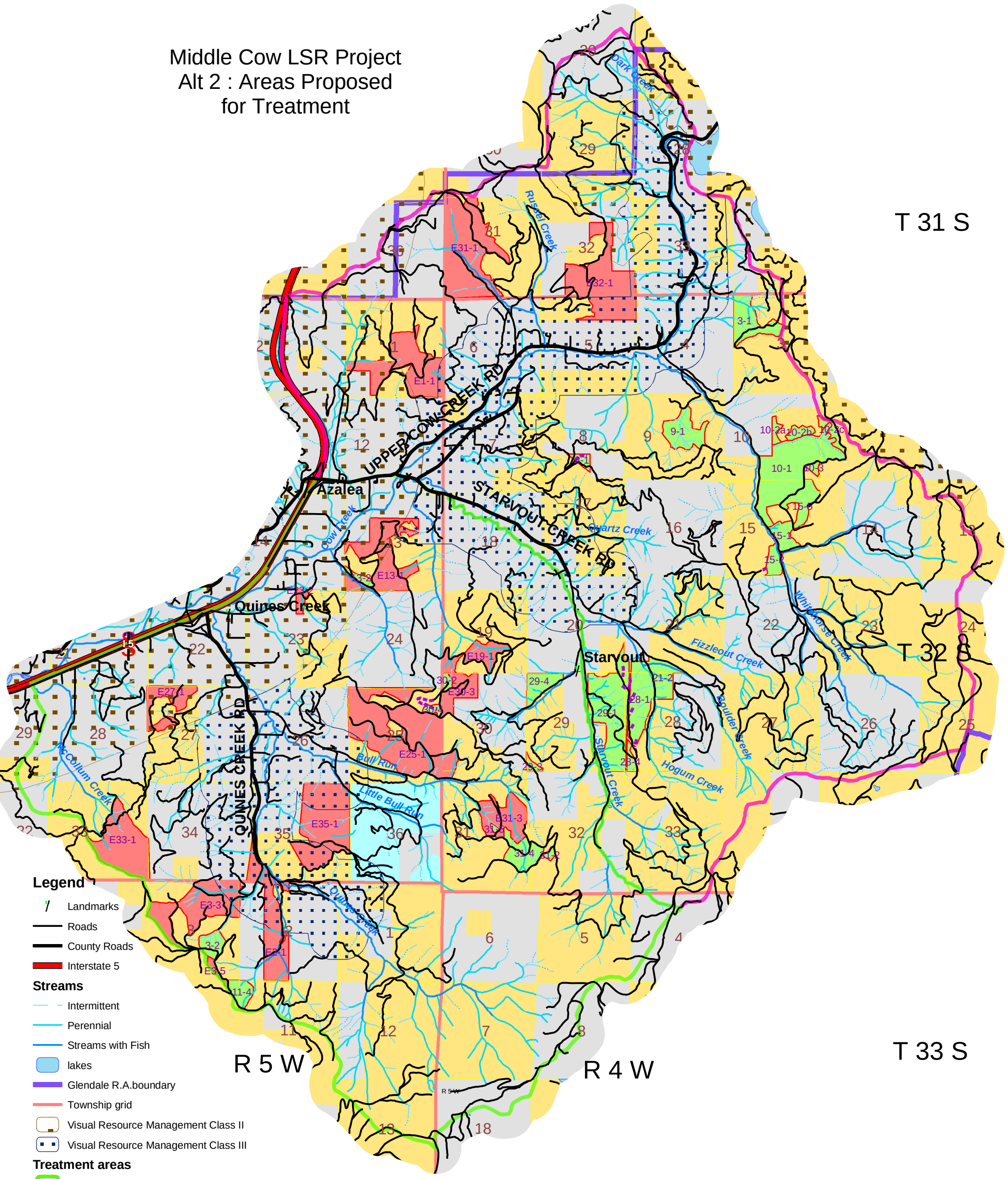
Middle Cow LSR Project
Alt 2 : Areas Proposed for Treatment



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Prepared by: stimmons
Last Modified: 2/6/2006