Brummit Creek Density Management and Restoration Environmental Assessment

Myrtlewood Resource Area

EA No. OR128-03-24

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1 Purpose of and Need for Action

1.1 Introduction and Background

The Bureau of Land Management (BLM) Myrtlewood Field Office proposes a project to implement conifer thinning, hardwood conversion, road construction/decommissioning, down log/snag creation, forage and browse seeding, and instream and riparian restoration projects in the Brummit Creek analysis area. The purposes of these proposed treatments are to: 1) accelerate the development of late-successional characteristics within Late-Successional Reserve (LSR) #261; and 2) restore riparian and stream habitat in the Riparian Reserve (RR) land use allocation. The proposed treatments are necessary to achieve the objectives of the Late-Successional Reserve land use allocation and the Aquatic Conservation Strategy (ACS). This environmental assessment (OR128–03-24) addresses the direct, indirect, and cumulative effects of the alternatives on the affected environment.

The *Coos Bay District Resource Management Plan (RMP)* (USDI 1995) calls for activities to develop and enhance late-successional characteristics in LSR. The RMP and the *South Coast - Northern Klamath Late-Successional Reserve Assessment* (LSRA) (USDA and USDI 1998) provide guidance for determining which forest stand conditions may warrant silvicultural treatment and what types of treatments would be appropriate to achieve desired forest stand conditions. The LSRA listed LSR # 261, which encompasses the analysis area, as a high priority area for management actions based on its

large size, key links to the Late-Successional Reserve network, and its land ownership pattern. Management priorities identified for LSR # 261 in the LSRA include enlarging existing interior late-successional habitat blocks and creating late-successional habitat where absent (USDA and USDI 1998). The action alternative described in this environmental assessment has been designed to promote attainment of the desired future conditions described in the RMP and is consistent with direction in the RMP. Some of the silvicultural prescriptions contained in the action alternative incorporate progressive recommendations from the latest research and were not covered by existing criteria in the LSRA. These prescriptions were reviewed by the LSR working group of the Regional Ecosystem Office (REO); they concurred that the prescriptions were consistent with goals and objectives for LSRs and that they would not retard achievement of these goals or objectives. Their concurrence was based on the following reasons: a) the prescriptions are designed to benefit the creation and maintenance of late-successional forest conditions; b) the treatments are prescribed for stands < 80 years of age; and c) the prescriptions are supported by analysis which considered recent studies, landscape and stand-scale models, historic aerial photo interpretation, stand and fire history, and site-specific modeling.

An interdisciplinary team has developed a proposal that would facilitate the development of late-successional conditions in the analysis area, as required by the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-growth Forest Related Species Within the Range of the Northern Spotted Owl (hereafter referred to as the Northwest Forest Plan or NFP) and its R*ecord of Decision* (USDA and USDI 1994). The team prioritized stands within the analysis area for treatment based on stand developmental stage (age), tree density, growth rates (e.g., radial growth, crown ratios), and management history, and stand and structure data from stand exams. Prescriptions were developed partially to emulate historic disturbance regimes (i.e. fire and wind) and influences of geomorphology. The treatments would be accomplished by a combination of commercial timber sales using skyline cable and ground based yarding systems and other restoration contracts. The proposed projects would include construction of new roads and the renovation and improvement of existing roads. Many roads would be appropriately decommissioned including nearly all of the newly constructed roads and many of the renovated roads as well. The proposed projects could be accomplished by timber sale and other contracts tentatively scheduled for fiscal years 2005 - 2008.

1.2 Purpose and Need for Action

Late-Successional Reserves are managed to protect and enhance conditions of late-successional and old-growth forest ecosystems which serve as habitat for late-successional and old-growth related species including the northern spotted owl (USDA and USDI 1994). Goals in LSRs include: 1) protecting and enhancing late-successional and old-growth forest ecosystems; and 2) maintaining functioning, interacting late-successional and old-growth forest ecosystems (USDI 1995).

The analysis area supports both late-successional stands (approximately 40%) and young conifer stands. Young, dense conifer stands account for > 25% of the cover on BLM-managed lands in the analysis area. The majority of these young stands were regenerated following clearcutting, resulting in high tree density, slow growth, and low diversity. Hardwood and mixed hardwood/conifer stands occupy an additional 22% of the analysis area. Most of these established after conifers failed to regenerate after clearcutting. Both these stand types may have limited potential to develop the desired characteristics for LSRs. Past management activities within these stands were intended to maximize conifer timber production. The resultant stands are characterized by uniform structure, heavy stocking, slowing growth rates, and reduced vigor. Some research suggests that these dense stands (> 100 trees/acre [TPA]) will develop along different successional pathways than stands which eventually developed into old-growth stands, and that thinning may be required to adjust the stand's trajectory so that it is more likely to

develop old-growth characteristics (Tappeiner et al. 1997). Thinnings to about 50 TPA and crown ratios > 60% produced growth in young trees similar to that in natural old-growth stands in early developmental stages (Curtis and Marshall 1986, Poage and Tappeiner 2002). Poage and Tappeiner (2002) suggest that heavy thinning of dense young-growth stands would stimulate rapid diameter growth rates, similar to those reported for old-growth trees when young, and would lead to development of trees with big stems, crowns, and branches, and facilitate development of multiple tree layers, all of which are desired late-successional forest characteristics. Hence, for many forest stands within LSRs in the Oregon Coast Range, density management thinning, combined with snag and down wood creation, may accelerate the attainment of late-successional forest conditions across the landscape. Leaving dense stands in their current condition would prevent or retard the attainment of objectives established in the *Final - Coos Bay District Resource Management Plan and Environmental Impact Statement* and its *Record of Decision* (USDI 1995).

The purposes then of this project are to:

- Implement the Coos Bay District Resource Management Plan (USDI 1995) by planning and implementing silvicultural/fuels treatments in Late-Successional and Riparian Reserves to be beneficial to the creation of late-successional and riparian habitats (RMP ROD pg 19 and E-8).
- Implement the settlement agreement (2003) by producing wood fiber consistent with goals from the RMP (settlement agreement section 3.2).
- Develop management actions which promote the attainment of the objectives for Late-Successional Reserves which include enhancing conditions and maintaining the function of late-successional and old-growth forest ecosystems (RMP ROD pg 18).
- Develop management actions which promote the attainment of the objectives for Riparian Reserves including maintaining and restoring plant species composition and structure, riparian habitats and habitat connectivity, water quality and sediment regimes (RMP ROD pg 6-7).
- Implement specific management opportunities identified in the *East Fork Coquille Watershed Analysis* (USDI 2000) by placing wood in China Creek, treating alder stands along Brummit and China Creeks, thinning conifer stands, creating snags and down logs, closing roads, and replacing culverts.

The following factors suggest a need for action in the analysis area in order to meet the purposes above:

- Failure to act would delay attainment of LSR and Riparian Reserve objectives on thousands of acres.
- Inaction would increase the risk to stands of catastrophic loss from wind and fire disturbance and insect infestation as a result of tree form instability (Wilson and Oliver 2000) and growth stagnation.
- The LSRA listed LSR # 261 as a high priority area for management actions.
- The analysis area possesses a relatively high fraction of area needing management to attain LSR and Riparian Reserve objectives, and as a result, it has the potential to provide wood fiber through commercial thinning.

The proposed treatments include density management thinning (DMT) of conifer stands and hardwood treatments within LSR and Riparian Reserves. Density management thinning within LSR and Riparian Reserves would accelerate the attainment of stand characteristics associated with late-successional and old-growth forests and enhance structural diversity by maintaining or improving tree growth rates and vigor, manipulating species composition, and modifying spatial arrangement. Projects such as snag and habitat tree creation and instream projects would restore important habitat elements necessary to meet resource management objectives. Road renovation, decommissioning, and fill pullback would reduce

risk of future road failures and road-related sedimentation and would reduce the overall road density.

1.3 Management Objectives

- Adjust stand development trajectories to better align with Late-Successional Reserve and Aquatic Conservation Strategy objectives. The RMP states that "forest stands less than 80 years of age within Late-Successional Reserves would be considered for silvicultural treatments where stocking, structure, or composition are expected to prevent or significantly retard development of late-successional conditions" (USDI 1995, pg E-7). In Riparian Reserves, "stands where portions of young, even-aged conifer plantations are located within the Riparian Reserves would be considered for density management treatments…to promote development of large conifers, to recruit large woody debris, to improve diversity of species composition and stand density, and to promote forest health. Merchantable logs would be removed where such action would not be detrimental to the purposes for which the Riparian Reserves were established" (USDI 1995, pg E-8). "Where hardwood stands dominate streamside areas and there is a lack of large conifers to provide inputs of large wood for instream structure, efforts would be made to re-establish scattered conifers within the Riparian Reserve" (USDI 1995, pg E-8).
- Reduce open road density and update and implement the transportation management objectives from the East Fork Coquille Watershed Analysis. The Watershed Analysis indicates that the existing road density exceeds the goal provided in the RMP (RMP ROD, pg 29) and suggests potential roads for closure.
- Reduce road-related impacts to resources.
- Promote retention of wood and gravel/cobble in streams by increasing availability of complex wood structures in streams through density management thinning and instream wood placement.
- Increase availability of snags, down logs, and deformed trees.
- Reduce the risk and severity of potential impacts from fire, wind, insects, and disease.
- Increase availability of desirable grasses, forbs, and shrubs for wildlife forage as opportunities exist.
- Protect rare and key habitats such as wetlands, cliffs, talus, grassy balds, and meadows.
- Retain options for recreational use of closed roads.

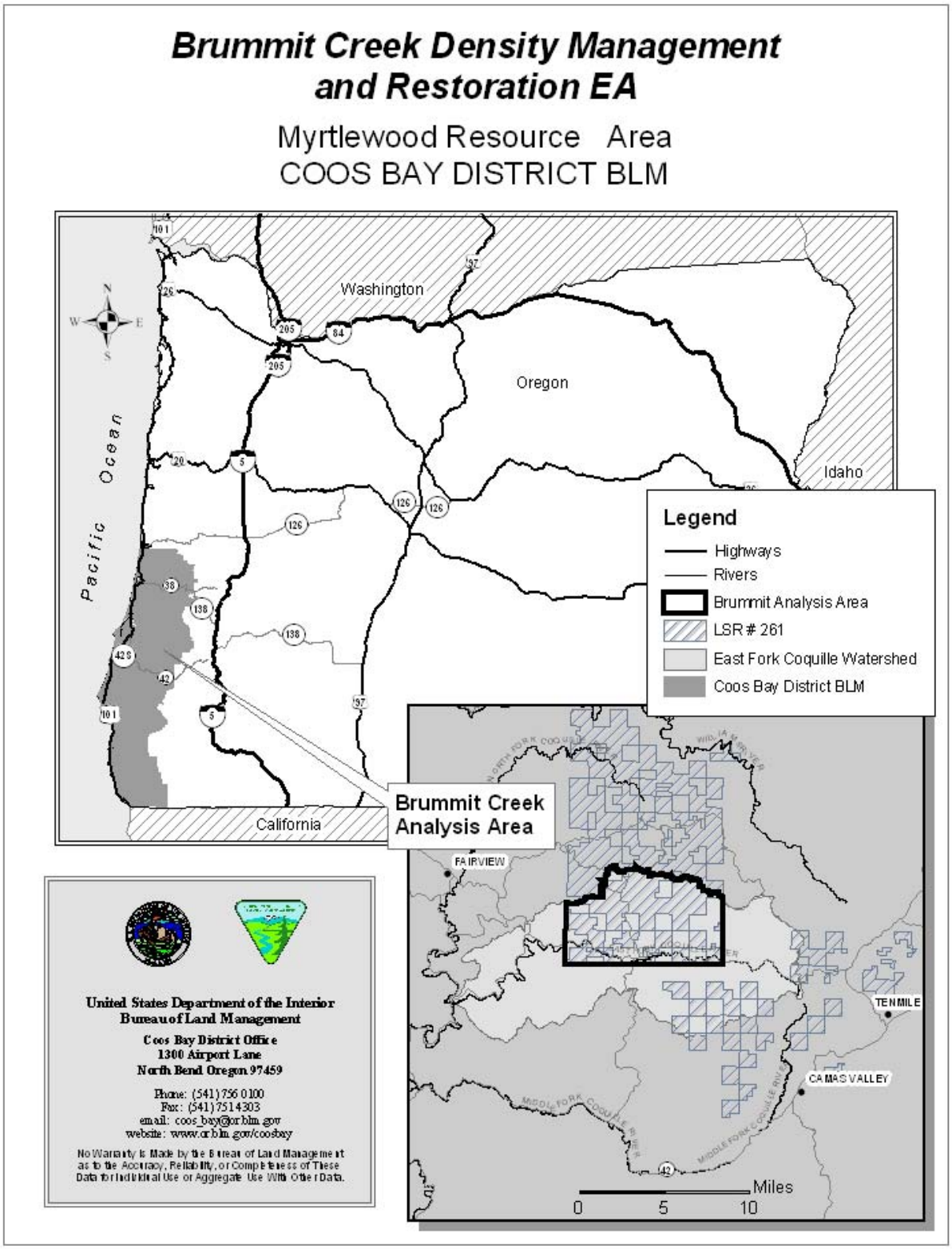
1.4 Location and Analysis Area

The Brummit Creek analysis area encompasses 28,673 acres and is centered on Brummit Creek, near Sitkum, Oregon (see Figure 1-1). The BLM manages 17,665 acres; the remainder (11,008 acres) is primarily privately owned. All the BLM lands are within Late-Successional Reserve (LSR # 261) and Riparian Reserve land use allocations located in Coos County in the following areas:

Sections 13-16, 20-35 of T. 27 S., R.10 W.
Sections 1-12 of T. 28 S., R.10 W.
Sections 19-21, 29-31, and 33 of T. 27 S., R. 9 W.
Sections 4-9 of T. 28S., R. 9 W.
Willamette Meridian. (See additional maps in Appendix section 8.1)

The analysis area lies within the East Fork Coquille fifth-field watershed and includes portions of the Brummit Creek, Brewster Canyon, and Lower East Fork Coquille subwatersheds and small portions of the Camas Creek and Upper East Fork Coquille subwatersheds.

Figure 1-1 Vicinity map.



1.5 Compliance with existing plans

This Environmental Assessment (EA) is tiered to the *Final - Coos Bay District Resource Management Plan and Environmental Impact Statement* and its *Record of Decision* as supplemented and amended, (USDI 1995) which is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for the Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* and its *Record of Decision* as supplemented and amended (USDA and USDI 1994) (i.e. the Northwest Forest Plan). Key management direction from the RMP Record of Decision (USDI 1995) for LSRs includes:

1) "Plan and implement silvicultural treatments inside Late-Successional Reserves to be beneficial to the creation of late-successional habitat. If needed to create and maintain late-successional forest conditions, conduct thinning operations in forest stands up to 80 years of age. This will be accomplished by precommercial and/or commercial thinning of stands regardless of origin (e.g. planted after logging or naturally regenerated after fire or blowdown)" (pg 19).

2) "Construct roads…if the potential benefits of silviculture…and other activities exceed the costs of habitat impairment. If new roads are necessary to implement a practice that is otherwise in accordance with these guidelines, they will be kept to a minimum, be routed through unsuitable habitat where possible, and be designated to minimize adverse impacts" (pg 19-20).

3) "Forest stands less than 80 years of age within the Late-Successional Reserves would be considered for silvicultural treatments where stocking, structure, or composition are expected to prevent or significantly retard development of late-successional conditions. Such stands would generally be composed of trees less than 10 to 20 inches diameter at breast height, and would show no significant development of a multiple-canopy forest structure. Stand that have, or will soon develop, desired late-successional structure would not be treated unless such treatment is necessary to accomplish risk-reduction objectives" (pg E-7).

4) "Silvicultural prescriptions will provide for the retention of down logs necessary for ecological function. Harvest systems utilized will be consistent with the BMPs described in Appendix D [of the RMP ROD]" (pg E-7).

5) "Density management prescriptions would be designed to produce stand structure and components associated with late-successional conditions, including large trees, snags, down logs, and a variable-density, multi-storied, multi-species stands…. Trees cut but surplus to habitat needs would be removed for commercial use…Silvicultural activities would be conducted in suitable stands, whether or not the action would generate a commercial return" (pg E-7).

This EA incorporates by reference the *Integrated Noxious Weed Program EA* (Coos Bay District BLM EA No. OR120-97-11), the *Western Oregon Transportation Management Plan* (USDI 2002b), and the *East Fork Coquille Watershed Analysis* (USDI 2000). Actions described in this EA are in conformance with the Aquatic Conservation Strategy Objectives listed on page B-11 and the Standards and Guidelines for Riparian Reserves on pages C-31 to C-37 of the Northwest Forest Plan (USDA and USDI 1994). A detailed analysis of the consistency of the action alternative with the ACS is contained in section 1.14 of the Analysis File. These documents are available for review at the Coos Bay District Office of the BLM, North Bend, Oregon.

The actions proposed in this EA have been designed to be consistent with the recent Survey and Manage supplemental Environmental Impact Statement (USDA and USDI 2004b), the Port-Orford-cedar management supplemental Environmental Impact Statement (USDA and USDI 2004a), the Aquatic Conservation Strategy clarification supplemental Environmental Impact Statement (USDA and USDI 2004c) and the pertinent Late-Successional Reserve Assessment (USDA and USDI 1998). The action alternative is consistent with the National Marine Fisheries Service's March 18, 1997 Biological

Opinion and Conference Opinion on activities covered in the Coos Bay District's RMP and the Programmatic Biological and Conference Opinion issued on August 8, 2001. The U.S. Fish and Wildlife Service concurred that the proposed action was not likely to adversely affect wildlife species listed under the Endangered Species Act (Concurrence Letter No. 1-15-05-I-0065). Project design criteria identified during consultation have been incorporated into the action alternative.

Management direction from all the documents mentioned above guided unit selection, boundaries, and prescriptions, and the location and design of other restoration projects, and has been incorporated into the Design Features. The Analysis File contains additional information (i.e., public comments, specialists reports, Aquatic Conservation Strategy analysis) used by the interdisciplinary team to analyze impacts and alternatives and is hereby incorporated by reference.

1.6 Scoping

The scoping process identified the agency and public concerns relating to the proposed project and helped define the issues and alternatives that would be examined in detail in the EA. The public was informed of the planned EA through letters to those on the Resource Area's mailing and e-mail lists and to adjacent landowners, the Coos Bay District's web site, and the Coos Bay Planning Update. The scoping letter, mailing list, and public responses are in Section 1.1 of the Analysis File.

1.7 Issues

Scoping identified the following major issues that were used to develop and analyze the action alternative:

<u>Issue 1 – Remnant structures and lightly-managed young stands</u>
Many plant and animal species key in on remnant old-growth trees, large snags, and down logs. These structures are occasionally present as remnants within young (< ~ 100 years old) stands. Within the stands considered for management, they occur most often in the older subset of units that were considered and which are relatively unmanaged. These lightly-managed young stands are less than about 100 years of age and are relatively uncommon in the analysis area. "Lightly-managed" stands are here defined as stands that regenerated naturally which have been subsequently modified by management activity but have not been clearcut. Many of these stands seeded-in naturally after fires. Most lightly-managed stands in the analysis area have had remnant old-growth trees removed (salvaged). Most have had the majority of tall, sound snags removed or cut down, and had some damage to down logs. Compared to planted and thinned stands of comparable or (usually) younger ages, lightly-managed stands have a higher diversity of tree species, higher densities of deformities, and higher stand structural diversity including more gaps and dense patches, and higher densities of large snags and down wood. Lightly-managed stands are generally considered a low priority for density management treatments (USDA and USDI 1998) because they either are already on acceptable trajectories for late-successional conditions, or have low crown ratios and low potential for individual tree response (Tappeiner et al. 1997). Any harvest activities during the density management treatment could damage or require the removal of remnant structures in the stands proposed for treatment which could be contrary to the RMP objective of creating late-successional forest conditions in LSRs (USDI 1995, pg S-10). Density management stand prescriptions could alter the developmental trajectories of these stands. In the context of the action alternative considered below, this issue affects approximately 290 acres of lightly-managed stands.

Issue 2 – Wildlife movements and roads

Roads would be constructed, renovated, or improved as part of the density management and hardwood treatments which would temporarily increase road density during the first 10 years or so of implementation. Some existing closed roads would be reopened. The road work would occur in the analysis area, primarily in the vicinity of the project units. Roads can obstruct the movements of some wildlife species. Road traffic can also discourage wildlife from using habitat near roads, and roads also facilitate poaching. In the context of the action alternative considered below, this issue affects about 10 miles of roads and an associated 800 acres of potential treatment units.

1.8 Other issues identified but not used to develop action alternative

The following other issues were identified during public and internal scoping. Subsequent analysis, modification of the action alternative, and/or the formulation of Design Features eventually resolved each of these issues. As a result, they were not used to differentiate between the final two alternatives. See Appendix section 8.4 for more detail.

- Port-Orford-cedar plant associations
- Water quality for domestic water source
- Visual impacts along the Coos Bay Wagon Road west of China Creek
- Multiple thinning entries
- Minimize helicopter yarding because of high cost and seasonal availability
- Minimize seasonal restrictions to avoid making sales impractical
- Transportation/access (administrative and public)
- Doerner Fir Recreation Site
- Cutting trees > 20 inches diameter at breast height (DBH), treatment of stands approaching 80 years old
- Creation of openings > ¼ acre in size; thinning stands to < 50 trees/acre
- Impacts to adjacent old-growth stands
- Thinning in Riparian Reserves
- Noxious weeds
- Port-Orford-cedar (POC) disease
- Douglas-fir beetle
- Wildlife species associated with dense, young stands
- Special status species
- Deer/elk forage
- Other aquatic species
- Wood routing and recruitment
- Arrangement and quantity of plant associations
- Arrangement and quantity of forest successional stages and type (hardwood verses conifer)
- Forest structure (windthrow, etc.)
- Distinct habitat types (cliff, talus, maple flats, seeps, etc.)
- Soil/slope stability
- Soil productivity
- Soil loss
- Reforestation
- Road-related sedimentation and turbidity

1.9 Alternatives considered but eliminated from further discussion

No treatments in lightly-managed stands and reduced road construction

An alternative was considered in detail which was similar to Alternative 2 except it avoided treatments in most of the lightly-managed stands and excluded most road construction or reopening of roads > 2,000 feet in length; treatments in units associated with the excluded roads were also omitted (primarily density management units but also two hardwood units). Harvest prescriptions and yarding methods were the same as Alternative 2. The alternative consisted of 1,732 acres of density management thinning and 475 acres of hardwood conversion. Approximately 745 acres of the density management thinning and 306 of the hardwood conversion were in Riparian Reserves; 3.7 miles of new road would have been needed, 3.6 of which would have been subsequently decommissioned; 70.6 miles of road would have been renovated or improved, and a total of 49.7 miles of existing road would have been closed or decommissioned. The overall road density would have decreased from 2.50 to 1.94 miles/mile^2. The effects analysis of the alternative, though, showed that the effects were quite similar to the proposed action, and both the acres treated and miles of road work were also not appreciably different than the proposed action. More details and analysis of the alternative are presented in section 1.2 of the Analysis File where it is referred to as "Alternative 3".

Maximum density management thinning and hardwood treatment

An alternative was considered that would have treated additional acres, above and beyond those considered in Alternative 2. The interdisciplinary team considered treatments in these several additional units but field review indicated that treatments at this time were unnecessary to meet Late-Successional Reserve objectives or that the potential ecological cost of treatments would be too high. Table 8-1 lists the additional units that were considered and summarizes the reasons for dropping them from consideration.

No treatments in Riparian Reserves

An alternative was considered which prescribed no thinning or hardwood treatments in Riparian Reserves. Modeling conducted by the Cooperative Forest Ecosystem Research program at Oregon State University and the U.S. Geological Survey Forest and Rangeland Ecosystem Science Center for the Brummit Creek analysis area (see Analysis File section 1.17) suggests excluding Riparian Reserves from treatments reduces the amount of late-successional forest habitat available in the future. Furthermore, no driving issues concerning treatments in Riparian Reserves were identified during scoping.

Thin and leave logs in place

Refer to the Douglas-fir beetle discussion in Appendix section 8.4 for consideration of beetle outbreaks.

A fire risk assessment was also completed to assess the issue of leaving thinned material on site. The results of this assessment determined that leaving thinned trees on site would rate out as an Intermediate Fuel Hazard. If ignition occurred in this fuel loading, it would likely create a stand replacement fire. The cured fuel load would also be completely impassable to firefighters, hampering suppression efforts without the use of large mechanized equipment. Detailed information dealing with fire and insect risks can be found in the Analysis File, section 1.15.

Thinning and leaving logs in place would typically generate a hundred or more logs/acre which far exceeds target levels from the LSRA. Fires leave dead trees as snags which fall over time to become logs. The yarding and sale of logs would generate the funds necessary to implement most of the projects. Furthermore, leaving the majority of logs in place would fail to meet one of the purposes of

the project which is to produce wood fiber and implement the settlement agreement. The RMP states that "trees cut but surplus to habitat needs would be removed for commercial use" (USDI 1995, ROD pg E-7).

Helicopter yarding

Although helicopter yarding was considered for some units, the harvested volumes per unit were too small, stumpage values of harvested logs were low, and yarding distances were too long to be economically viable for commercial timber sales. Additionally, use of helicopter yarding systems requires the construction of numerous landings usually 0.5 acres in size or greater within 0.25 miles of each treatment unit. Therefore, the additional environmental costs, in terms of landing construction, were considered not worth the potential benefit from the use of this yarding system for commercial timber sales. Additionally, the high cost of helicopter logging would result in less money being returned to the government or indirectly available for the purchaser to conduct other restorative activities such as culvert replacements and other road improvements. Helicopter yarding, however, is proposed as a mechanism for moving logs into streams in restoration contracts.

Prescriptions not requiring REO review

An alternative was considered where all thinning prescriptions would be consistent with current exemption criteria in the LSRA so that no review by the REO would be necessary; however, the large-gap and more extensive heavy thinning clearly better reflected the historic range of natural variability in the analysis area. The ecological benefits of the prescriptions were supported by recent studies, and initial discussions with the REO indicated their tentative support.

2 Alternatives including the proposed action

The action alternative was guided by objectives from the RMP (see EA sections 1.2 and 1.3). It was further shaped by more specific guidance from the LSRA including promoting development of old-growth characteristics such as large trees, canopy gaps, snags, and down logs (page 77 [page numbers refer to the LSRA]); preventing large-scale wind, fire, and other disturbances (page 77); closing roads, especially on spur and secondary roads (page 95); and avoiding construction/reconstruction of roads through large, contiguous stands (page 95). Aquatic Conservation Strategy objectives also strongly shaped the action alternative, particularly direction to maintain and restore: diversity and complexity (objective 1), spatial and temporal connectivity (objective 2), water quality (objective 4), and species composition and structural diversity of plant communities (objective 8). Table 2-2 summarizes the key data from each alternative and the maps in Appendix section 8.1 display the location of the various treatment units and other projects. Note that all quantifications (i.e. acreages, mileages, etc.) are based on estimates obtained from geographic information systems (GIS). Final numbers could vary slightly as the plans are translated to the ground.

2.1 Alternative 1 – No action

Under this alternative, none of the actions proposed in the Brummit Creek analysis area would occur. The density management thinning areas identified for treatment would remain on current trajectories and the window of opportunity to achieve LSR objectives through silvicultural treatments may be missed. Stands would continue to move towards instability, growth stagnation, and increased risk from wind, insect, and disease damage. The density management treatments within the Riparian Reserves would not be applied. Current stand compositions would change very slowly over time, and relative tree densities and tree mortality would increase. Growth and development of these stands would continue along present trajectories. None of the proposed new road construction, improvement, renovation, or

culvert upgrades would occur. Road maintenance on seldom-used roads would not occur, increasing the risk of sediment delivery to streams. Existing roads that are currently closed due to vegetation would remain so.

Road decommissioning opportunities identified in this analysis and the East Fork Coquille Watershed Analyses (USDI 2000) would not be undertaken. Road decommissioning could still occur but would require separate analysis of environmental consequences and different mechanisms for accomplishment.

Instream wood placement would not occur with this action. Stream habitat conditions within China and Brummit Creeks would remain degraded.

Road fill that is currently constricting the China Creek stream channel would not be removed, maintaining increased winter stream flow velocities within the constricted channel. The stream channel would continue to lack floodplain area that could be restored if fill was removed from the channel.

2.2 Alternative 2 – Proposed action

The proposed action treats approximately 2,509 acres and reflects a balance between treating as many acres as possible to meet management objectives (section 1.3) and without unduly compromising other resource objectives from the driving issues (section 1.7). Commercial (i.e. timber sale) treatments are not prescribed where such treatments would threaten existing high-value snags (i.e. large, remnant, tall, hard snags) or remnant old-growth trees. This alternative proposes to do approximately 1,996 acres of density management thinning and 513 acres of hardwood conversion. Approximately 811 acres of the density management thinning and 310 of the hardwood conversion would occur in Riparian Reserves. Density management thinning would occur in approximately 290 acres of lightly-managed stands. Approximately 4.8 miles of new road would be constructed, 4.7 of which would be subsequently decommissioned; 74.5 miles of road would be renovated or improved. About 8.4 miles of currently closed roads would be reopened. The road construction and renovation or improvement of existing closed roads would allow access and treatments to approximately 775 acres of potential units. This alternative would decommission a total of 50.7 miles of road. The overall road density would decrease from 2.50 to 1.95 miles/mile^2. Other restorative actions are proposed including instream wood placement, culvert replacements, road-fill pullback, and snag creation. Section 2.3 lists the Design Features to be implemented with the proposed action.

2.2.1 Density management

Approximately 1,996 acres of stands 25-78 years of age would be thinned commercially to meet management objectives from section 1.3. Resultant tree densities would range from < 44 trees/acre and relative density 16 to > 197 trees/acre and relative density 65. Identification of target stands and prescriptions generally followed recommendations in the LSRA, including prioritization by stand age, stand density, structural conditions, and stand management history. Target stands for management principally included dense plantations 25-50 years old. Stands > 50 years old were considered for thinning if they needed management to meet LSR objectives and thinning would not threaten desired characteristics such as large snags and remnant old-growth trees. Approximately 290 acres of lightly-managed stands, primarily 74-78 years of age, would be thinned. Silvicultural treatments were designed to roughly emulate the intensity, variability, within-stand spatial extent, and stand composition effects of natural stand-modifying disturbance processes, to the extent practicable. Stands in locations which generally receive frequent, but small scale disturbances (i.e. low-intensity fires, individual tree mortality, disease pockets) were targeted for prescriptions which would result in variable spacing and gaps. Prescriptions for stand locations typically experiencing more intense natural disturbance (i.e. intense

fires, catastrophic wind storms) would result in more open but uniform stand conditions. Prescriptions were also designed to insure that a variety of conditions were represented in each 5-7 square mile area (roughly the size of a drainage). Additional details of prescription development are presented in the Analysis File, section 1.3.1. Prescription types are described below.

Prescription types would include basal area and spacing-limited thinnings, maximum diameter limit (MDL) thinnings, dominant tree retention (DTR) thinnings, and canopy gap creation. Thinnings based on basal area or tree spacing are proposed for areas with south- to west-facing aspects and upper slope topographic positions, to emulate the moderate densities and uniform spacing associated with fire effects in these landscape positions. MDL thinnings were designed to mimic fire disturbance effects on north-facing and lower slope positions. MDL thinnings remove all trees less than a set diameter (e.g., 14 inch DBH). MDL thinning should produce variable tree densities and spacing, leaving remnant trees, and islands of unthinned vegetation.

DTR and gap prescriptions would significantly increase horizontal diversity in stands, emulating fine-scale disturbance effects such as wind, patchy fire behavior, disease, and competition mortality. Canopy gap and DTR prescriptions would generally be applied to ridge and north-facing treatment units. Gap sizes would be based on the crown widths of old-growth trees and the minimum size of gaps needed to establish Douglas-fir trees (Franklin 1977), and would range from 0.25 acre to 0.5 acre in size. DTR prescriptions would be similar to gap prescriptions, but would reserve the single largest tree in the gap, to produce a single open-grown tree. Unthinned areas would be incorporated within several units, in addition to portions of the analysis area dropped from thinning consideration. Full description of the paradigm for treatment proposed as part of the proposed action is presented in the Analysis File, section 1.3.1. Table 8-4 in the Appendix lists the prescription details for each unit.

2.2.2 Non-commercial silvicultural treatments

Three units (units 2, 16, and 33a, approximately 52 acres total) would be thinned and the material left on the ground, left standing as snags, or be helicopter yarded and placed in streams for habitat or decked for future instream wood placement projects. Section 2.2.9 provides details on the instream wood placement project.

2.2.3 Hardwood conversion

Approximately 513 acres of hardwood-dominated stands would be converted back to a mixture of conifer species. No conversion is proposed for natural hardwood stands (based on historic aerial photographs) or in hardwood stands where treatment would threaten other desirable structures such as large, cavity ridden big-leaf maples.

Prescriptions in conversion stands would involve cutting all red alder except for those retained for snags or coarse wood debris. Snags would be located on the perimeters to provide for worker safety during follow-up silvicultural treatments. Other hardwoods would be cut retaining single stem hardwoods such as bigleaf maple and myrtle greater than 20 inches DBH and located no more than 100 feet from the closest like species. All smaller diameter hardwood clumps would be cut. Conifer patches that are scattered throughout many of the hardwood units would be thinned on 25 foot spacing for trees > 7 inch DBH. Trees < 7 inch DBH and all competitive brush would be slashed during site preparation. Healthy, vigorous, undamaged dominant or co-dominant conifer would be favored for retention when applying the spacing criteria. Subsequent manual maintenance including cutting of competing vegetation, thinning, and replanting/underplanting would be done as necessary to facilitate reestablishment of target species (subject to funding).

2.2.4 Harvesting systems

All units except the non-commercial ones (see section 2.2.2) would be harvested using a combination of skyline cable (including multi-span) and/or ground based equipment (see Maps 2.2). Cutting of trees would either be done manually with chainsaws or with a mechanical harvester. One-end log suspension would be required during inhaul for the skyline cable system. Full suspension is required across streams and other areas, as designated in Table 8-5 in the Appendix section 8.6.

Ground based equipment would transport logs with one end suspended above the ground during dry soil conditions (25% soil moisture or less) to prevent soil compaction. Skid trails would be designated on the ground with the objective of having less than 12 percent of the harvest area affected by compaction. Existing skid trails would be used to the extent practical.

Approximately 2,364 acres would be harvested using a skyline cable system and 101 acres would be harvested using ground-based equipment. Operating season restrictions would be in place for many units to reduce impacts to marbled murrelets, tree damage due to bark slip, soils, and water quality. See Maps 2.2 and Table 8-5 for details.

2.2.5 Road construction, renovation, and decommissioning

Approximately 4.8 miles of new road would be constructed. Roads would be natural surface or rocked depending on operating season and have minimal clearing widths. All new road construction would occur on stable ridge top or bench locations and 4.7 miles would be decommissioned after use (see Appendix section 8.2). These temporary roads are expected to be opened for 3-4 years, but seeded, mulched, properly drained and blocked prior to each wet season (i.e., winterized). During final layout and implementation, additional short spurs and landings may become necessary to facilitate harvest operations. Any additional road construction would be similar in type and location as described and analyzed in section 4 of the EA. Up to 74.5 miles of existing road would need renovation or improvement, 10.9 miles of which are private roads. Renovations could include blading and brushing and, at times, adding a layer of rock. Approximately 33 perennial stream crossing culverts would be replaced. Approximately 8.4 miles of currently closed roads would be renovated; many would be closed again after harvest. Road improvements involve applying rock to the unimproved surfaces and improving drainage. The road construction and renovation or improvement of existing closed roads would allow access and treatments to approximately 775 acres of potential units (see

Table 2-1). Most of these renovated and improved roads would be closed or decommissioned after use (see Maps 2.1 and 2.2 and Table 8-2). In total, 50.7 miles of existing road would be closed or decommissioned, including many roads not associated with timber sales. Decommissioning and closing would be accomplished through the timber sale actions and through separate restoration efforts.

Table 2-1 Approximate acres of treatments facilitated by new road construction or renovation/improvement of existing roads which are currently closed and "healed". Note, numbers are fairly gross approximations due to the difficulty in predicting precisely how much area would be yarded to a particular road and the subjectivity of identifying "healed" roads.

Unit	Primary Road Work	Miles	Associated Unit Acres	Acres of Unit/Mile of Road
12w	New	0.025	17	663
13	New	0.160	14	86
15	New	0.235	12	53
20	New	0.225	29	128
21	New	0.050	19	391
26	Improvement	0.659	13	19
29	New	0.765	86	113
36	New	0.215	29	135
37	Renovation	1.467	42	29
39	New	0.180	20	110
42	New	0.274	16	59
43	New/reno	0.172	24	140
45	New	0.173	20	116
49	New/reno	0.173	6	35
49	New	0.621	17	28
5	Improv/new	0.408	9	23
50	New	0.067	18	265
51	Renovation	0.430	28	65
52e	Renovation	0.295	17	58
57e	Renovation	0.138	9	65
57w	Renovation	0.255	11	43
66w/90	Reno/improv	0.722	30	41
66e/86	Reno/new	0.533	10	18
68/69	Improv/reno	0.731	7	10
72	New	0.553	79	143
74	New	0.047	10	222
78	New	0.223	10	45
78w	New/reno	0.424	41	96
81	Reno	0.565	19	34
87	New	0.058	9	150
88	New/improv	0.138	17	125
89ne	New	0.137	20	146
89	New	0.326	59	181
91	New	0.054	8	142
	TOTALS	**11.498**	**775**	

2.2.6 Treatments within Riparian Reserves

All intermittent and perennial, non fish-bearing streams would retain the interim Riparian Reserve widths of 220 feet (one site potential tree height on each side of stream channels). All fish-bearing streams would retain the interim Riparian Reserve widths of 440 feet on each side of stream channels.

There are approximately 8,765 acres in Riparian Reserve in the analysis area. Alternative 2 includes 811 acres of density management thinning and 310 acres of hardwood conversion within Riparian Reserves.

Alternative 2 would involve 1.11 miles of new road construction within Riparian Reserves. Of this amount, 8% are within 55 feet and 27% are within 110 feet of the streams. There are also three intermittent stream crossings in the Riparian Reserves; one in unit 74 and two in unit 29.

No treatment areas would occur immediately adjacent to perennial streams. The widths of these no treatment areas would vary by site based on stream type, presence or absence of floodplains, wet or seep areas, fish presence, and unstable hillslope conditions. In general, resident fish bearing streams would receive 50 foot no-harvest buffers (30 feet in hardwood units). Outside the no-harvest buffer but within 100 feet of the streams, conifers would be thinned and left on-site. The no-treatment areas would be designed to maintain stream temperature, bank stability, and prevent sediment delivery during and after treatment. Within the analysis area, six miles of stream channels would be designated no-treatment areas.

Additionally, Alternative 2 would include unit prescription 'thin through' treatments along a total of 12 miles of intermittent and ephemeral stream channels where thinning could occur up to the stream channel edge. The non-stream portions of the Riparian Reserves would receive the same treatment as surrounding upland areas. Prescriptions would generally result in removal of much of the smaller red alder and conifer, and would retain larger conifers. See Maps 2.1 for locations of no treatment areas and thin-through streams. Buffer widths for individual units are included in the Design Features (section 2.3.2).

2.2.7 Site preparation

Approximately 473 acres of the hardwood conversions would be prepared for planting by either lop and scatter of heavy fuel concentrations or hand piling followed by winter burning of the piles. In addition, 40 acres would be machine piled during the dry season and burned. The Analysis File section 1.15 lists the recommended fuels treatments for each unit. A fuels treatment of lop-and-scatter, swamper burning, or hand piling and burning maybe completed in units planned for under planting (in density management treatments) or in small areas where heavy accumulations of fuel exist (through a natural disturbance or by project design). All burning would comply with Oregon smoke management guidelines. Slash loading in these sites is expected to average four tons per acre resulting in approximately 2,052 tons of fuel being burned.

Burning would not occur within no-harvest buffers along fish-bearing streams.

2.2.8 Road related restoration in China Creek

Road fill pull back: In order to improve spawning and rearing habitat and reestablish a floodplain in China Creek, approximately 2,900 cubic yards of material would be removed from approximately 1,700 feet along the roadside adjacent to the channel (see Maps 4.0). The road would be shifted to the east in some areas converting the current nonfunctioning ditchline into an outsloped road of similar width. The road is currently graveled and of very low grade until it crosses the third culvert upstream on the East Fork of China Creek. This road could be outsloped or have water dips installed to manage the drainage of runoff water across the road surface.

Fish Passage: The first two culverts have been identified as barriers to passage for spawning fish and would be replaced with short span bridges or properly sized and installed culverts (see Maps 4.0).

2.2.9 Instream wood placement

The action alternative proposes to place large wood, in the form of logs and/or logs with rootwads, into the lower mile of the main stem and right fork of China Creek (T28S R10W section 8), three miles of Brummit Creek (T27S R10W sections 21, 22, 27), and the lower half mile of Karl Creek (T27S R10W section 22) (see Maps 4.0). Logs placed within the aforementioned creeks would be a minimum of 14 inches in diameter and range in length from 25 to 60 feet. Wood placement densities would range from 40 to 80 pieces of wood per mile. At least half of the logs placed would be 40 feet or greater in length. The wood for these projects would be obtained through thinning conifer stands in non-commercial units 16 and 33a.

Wood would be introduced into the channel in such a way as to imitate natural wood delivery and accumulation within the channel and floodplain areas. This would include placement of single logs or small log complexes to simulate wood input events such as windthrow or bank undercutting. Wood placement would also include the creation of wood-jam complexes at tributary junctions and other channel nick points. The creation of wood complexes would be placed at tributary junctions and would simulate wood deposits from debris flows. Wood complexes at other channel nick points would simulate complexes that are created by the entrainment of wood during flood events and then subsequently deposited during receding flow. Some jams would be established with the intent of re-directing a portion of the stream flow in order to facilitate the re-connection of existing abandoned side channels and floodplain areas.

Large wood complexes would be created to replace the large wood jams removed by past management practices and to begin rebuilding the associated sediment and nutrient storage that was lost during stream clean-out and management related debris flows. Stream clean-out and the subsequent streambed erosion caused China and Brummit Creeks to become highly simplified throughout much of their fish-bearing waters.

The size of wood to be used, its location in the channel and its orientation to the flow of water is assumed to preclude the need for anchoring systems. The stability of wood in stream channels is strongly linked to the size of the wood, its orientation to flow, and the percentage of the piece that is in the active channel. The presence of rootwads and branches on instream wood also plays a role in increasing its stability, as these features increase the overall mass of the wood and increase its ability to "hang up". Wood used in jam complexes (at nick points) would be keyed into stable channel features such as large diameter stream-side trees, boulders, and bedrock outcroppings. These complexes may also be keyed into large wood that is already present in the channel. The largest of the logs obtained for this project would be used as anchor logs for jam complexes. Single logs and smaller complexes (not associated with nick points) would be placed "conservatively" in the channel with most pieces having less than half of their length in the bank full width.

Logs would be obtained from the treatment units in the analysis area. Logs may be yarded as described above in the "Harvesting systems" sections and stockpiled for later transport to the instream project locations. Heavy-lift helicopters could also be used to yard logs from the non-commercial (i.e. no timber sale) units (units 2 and 16) or from blind areas in the remaining units for stockpiling or direct placement into streams.

Wood would be placed into the China Creek stream channel using ground based log yarding systems. This may include cable-based yarding system or an excavator or similar piece of equipment. Wood would be placed in the identified reaches of Brummit Creek and Karl Creek using ground-based systems or a heavy lift helicopter. Wood would be staged along road and /or on landings within the China Creek and Brummit Creek watersheds prior to beginning wood placement activities.

2.2.10 Habitat tree creation

Up to 1,038 acres were identified as having high or medium potential for benefiting from snag and habitat tree creation projects. See Maps 4.0 (Appendix section 8.1) and Table 3-2 and Figure 3-1 in the wildlife report (Analysis File section 1.11) for details and locations of the stands. Up to five snags or habitat trees could be created per acre in these stands. Habitat trees are defined as live broken-topped trees or live trees with heart rot. Snags/habitat trees would be created singly or in clumps, so the actual density on any given acre may be much higher. A variety of treatment techniques would be used including tree topping which leaves few, if any, limbs on the tree and creates immediate snags; to mid-crown topping which creates a broken top live tree; to inoculation with heart-rot fungi, with or without topping, to eventually create hollow trees. Coos Bay District BLM EA OR128-00-18 contains a discussion of the pros and cons of various snag creation techniques.

2.2.11 Forage Seeding

Native grasses and forbs could be seeded along all fully decommissioned roads. Species could include blue wild rye, tufted hair grass, and California brome. Shrubs would not be planted because of the relatively poor success of shrub plantings without aggressive maintenance. Other potential seeding opportunities exist in waste disposal areas or other large roadside/landing openings including, but not necessarily limited to the end of the 27-10.14.0 road in unit 51, and the 27-9-29.0 road adjacent to unit 66w.

2.3 Design features for Alternative 2

2.3.1 Harvest methods and prescriptions

- Trees > 20 inches DBH will generally be reserved from harvest, except in units 15, 16, 52, 74, 88, and 89 where some trees > 20 inches DBH need to be removed to meet prescription. Unit boundaries, spur roads, landings, and yarding corridors will be designed to avoid and protect large residual trees wherever possible.
- No Port-Orford-cedar trees larger than 20 inches DBH would be cut or removed.
- Trees larger than 26 inches DBH would be reserved from harvest (includes fish instream habitat logs).
- Cutting and yarding activities are seasonally restricted as described in Table 8-5 and Maps 2.2 and 3.2.
- Protect tailhold and guyline anchors in adjacent late-successional forests by using protective straps, plates, etc.
- Trees within the ACEC adjacent to units 9, 10, 11, and 20 will be reserved from harvest.
- Retain several trees/acre (generally < 3/acre) with defect (e.g. broken or forked tops, damaged trees, wolf trees, etc.), if present.
- Within alder conversion /conifer restoration units, releasable conifers will be reserved from cutting when feasible. In these units, some large bigleaf maple and myrtle, greater than 20 inches DBH, will be reserved for habitat diversity.

- Conventional falling with chain saws and yarding during high sap flow, April 1 through June 30th, may be restricted to reduce bark damage.
- Damage to residual trees during logging will affect less than 10% of the residual trees. Damage is defined as any tree having greater than twelve (12) square inches of the bark removed down to the cambium layer from the bole of the tree, any tree with top diameter broken at three (3) inches in diameter or greater, any visible bark removal on tree roots, or any tree being visually root-sprung due to falling or yarding operations.
- Directional felling to the lead of yarding corridors or skid trails is required in all thinnings.
- Units adjacent to the Bonneville Power Administration (BPA) power corridor right-of-way would be treated to reduce the risk of hazard trees falling on powerlines and help ensure long term line reliability.
- The location, number, and width (maximum of 12 feet) of cable yarding corridors and skid trails will be specified prior to yarding.
- For ground based yarding systems: Equipment shall not operate on slopes greater than 35 percent. All designated trails will be pre-approved by the Authorized Officer and use the existing network to the extent possible. Directional fell to the lead of skid trails. No more than 12% of the harvest area will remain in a compacted state after operations conclude. Skid trails will be a minimum of 95 feet apart and shall not exceed 11 feet in width, unless they are pre-existing. The leading end of logs will be suspended above the ground during skidding, (except during lateral yarding). Operate during dry season of the year when soil moisture content is less than 25% at a depth of 2 to 4 inches below the organic layer. Decommission skid trails not needed for future entry with approved equipment by the Authorized Officer in conjunction with the District soil scientist. Block all access trails upon completion of projects to discourage all-terrain-vehicle use in the future.
- Keep litter and garbage cleaned up to reduce attraction to corvids (i.e. crows, ravens, jays).

2.3.2 Stream protection

- In unit 26, maintain 50 foot no-harvest buffer beginning at edge of valley bottom (toe of slope). The no-harvest buffer can be reduced to 30 feet where hardwoods dominate (> 70%) the stand. In both cases, conifers outside the no-harvest buffer but within 100 feet of the stream can be thinned as necessary to meet silvicultural objectives; however the trees should be felled in the direction of the stream and left on site to meet upslope and instream down wood needs.
- In units 9, 35, 35s, 66, 85, 86, 88, 89n, and 90, maintain 50-foot no harvest buffer beginning at edge of valley bottom (toe of slope). Conifers 50-100 feet of the stream can be thinned as necessary to meet silvicultural objectives; however the trees should be felled in the direction of the stream and left on site to meet upslope and instream down wood needs.
- In units 25h, 29r, 34s, 37, 41, and 64, maintain 30 foot no harvest buffer would beginning at edge of valley bottom (toe of slope). Conifers 30-100 feet from the stream can be thinned as necessary to meet silvicultural objectives; however the trees should be felled in the direction of the stream and left on site to meet upslope and instream down wood needs. However, the need for falling and leaving is expected to be minimal to non existent because of the conversion of the stands from hardwood to conifer. Non-merchantable conifers may be damaged during falling yarding operations within recommended buffers. This recommendation may be altered if in the opinion of the fuels specialist, fine fuels (< 9 inches diameter) will be elevated to an unreasonably high density, thus endangering the integrity of the riparian reserves land allocation.
- In unit 4 maintain a 100 foot no-harvest buffer along the East Fork of China Creek.
- Directionally fall trees away from stream channels if there is a high probability of trees entering the stream.
- When feasible, directionally fall trees away from no-harvest buffers in riparian areas to protect

vegetation in the reserves as well as protect stream banks and in-channel large woody material. In some locations, it may be desirable to fall conifers that will be retained on site into the yarding corridors that may cross through no-harvest buffers to provide a large wood component into the stream.

- Maintain suspension above stream channels and banks with the objective of full suspension, or as much as the logging feasibility and yarding system used will allow.
- Trees in no-harvest buffers or fall-and-leave areas adjacent to fish-bearing streams will be left on site.
- The number and width of yarding corridors in Riparian Reserves will be minimized in order to reduce potential effects to riparian conditions while assuring feasible yarding operations.
- The road sidecast pullback option along China Creek (BLM road no. 28-10-5.1), shall be completed during summer low flow conditions and meet DEQ turbidity standards by using appropriate Best Management Practices to prevent disturbed soil material from entering the stream. This may include sand bags, silt fence or other methods that keep soil material from entering the waterway. All disturbed banks above the active channel will be mulched and seeded at project completion.
- The contractor will take special care to prevent contamination of water at the work sites from mechanical equipment operations or spills. This will include daily inspection and cleaning of equipment as appropriate.
- The handling of hazardous materials is subject to State of Oregon Administrative Rule No. 340-108, *Oil and Hazardous Materials Spills and Releases,* which specifies the reporting requirements, cleanup standards and liability that attaches to a spill or release or threatened spill or release involving oil or hazardous substances. A Spill Prevention, Control and Countermeasures Plan conforming to the standards of OAR 340-108 is required when working under BLM procurement and service contracts. The Spill Prevention, Control and Countermeasures Plan (SPCC) should also correlate to the Coos Bay District Hazardous Materials Contingency Plan and the District Spill Plan for Riparian Operations (as applicable).
- The Spill Prevention, Control and Countermeasures Plan requires an Oil Spill Kit to be onsite during operations involving the handling of hazardous materials. This kit shall be sized and contain absorbent materials suitable for the products and quantities being used onsite, e.g. petroleums. The contents and use of the Spill Kit are to be detailed in any **non-timber sale contract** used in implementation. Timber sale contract provisions are currently being developed and will be incorporated into timber sale contracts when completed. A minimum of one employee trained and familiar with the use of the spill kit shall be present at all times operations are active. Notification and response processes are detailed in the District plans. An example of a typical kit rated for a minimum 50 gallons of oil-only absorbency is as follows:

<u>Spill Kit for Petroleum Products</u>

1. 60 feet of 8-inch connecting absorbent boom for use on-water (can also be used for land dams to contain spilled product);
2. One 50 count bundle of minimum 24x24 inch one-quarter inch thick absorbent pads;
3. Minimum of 12 each 24 x 24 inch or equivalent sized absorbent pillows, 2 inch thickness.
4. Sufficient heavy-duty leak-proof bags or other containers for soiled absorbents.

- Potential spill containment locations within China Creek, Brummit Creek, and the east Fork Coquille River will be identified by the project inspector/COR with the assistance of the District Hazardous Materials Coordinator and will be designated in contracts as part of implementation. These would be suitable locations to deploy spill containment boom.
- Refueling of heavy equipment will be done 100 feet or more from wet areas and surface water.

2.3.3 Snags

- All existing snags will be retained and protected during logging operations to the extent possible. Snags will be reserved from cutting except those that must be felled to meet safety standards.
- Any snags felled or accidentally knocked over will be retained on site.
- Snags will be created at the density prescribed in Table 8-4. Snags will be created after yarding (and site preparation, if applicable), and preferably after the unit has over wintered, if possible. Existing damaged trees, either from the January 2004 storm or from logging, may count towards these totals as can damaged trees in the treated buffer along fish-bearing streams. Trees will generally be selected from the larger, but not largest, size classes represented in a unit. Typically the largest cut trees will be topped to meet snag requirements. Hardwood snags will generally be left along the edges of units to leave a safe working environment during planting and subsequent maintenance.
- In all units except 2 and 16, snag creation methods will include topping at approximately mid tree height with no live limbs retained (to create immediate snags) and topping above 4 whorls of live limbs (to create snags in 5-10 years) in approximately equal proportion. Girdling could also be used to create immediate snags. In units where slash will be piled and burned, piles can be placed near leave trees to create snags through burning. Snag and habitat tree creation methods for the remaining areas (units 2 and 16 and areas identified in Maps 4) will employ a wider variety of methods including mid-crown topping and inoculation with heart rot fungi.
- Snags created near the Bonneville Power Administration powerline right-of-way will not be able to strike the lines should they fall.

2.3.4 Down wood

- All existing down logs will be reserved from cutting and removal during logging operations.
- Down logs will be created at the density prescribed in Table 8-4. Existing recently-downed trees, either from the January 2004 storm or subsequent blowdown, may count towards these totals as can downed trees in the treated buffer along fish-bearing streams. Trees will generally be selected from the larger, but not largest, size classes represented in a unit. Typically the largest cut trees will be left to meet down wood requirements.
- Down logs will be created after yarding, and preferably after the unit has over wintered.
- Fresh blowdown inside treatment units will be counted toward meeting the down wood recruitment targets if they meet or exceed the size requirements.

2.3.5 Special status species

- Conservation strategies, use of existing management plans and recommendations and other formalized conservation mechanisms would be used to protect, manage, and conserve any special status species or habitat found in any of the proposed units so as not to contribute to the need to list any of these species. In the absence of species specific management recommendations, mitigative measures have been incorporated into the project design based on current literature and professional judgment of the project biologists and botanist.

2.3.6 Port-Orford-cedar and Pacific yew

- Reserve Pacific yew from harvest wherever feasible.
- For all hardwood conversion units: Planting mix would approximate the species mix prior to harvest. Port-Orford-cedar would only be planted where POC was found previously in the stand and on only Low Risk Sites. Resistant stock will be used if available.
- Roadside sanitation (cutting of all POC 25 feet on each side of the running surface) of POC would occur on road segments with high stocking of POC. This would occur primarily on 27-10-26.3, 27-

9-21.0, and 27-9-29.0 roads. This work would be accomplished by contract work or BLM cutting crews, prior to haul.

- Ground-based yarding and hauling on dirt roads will occur only during the dry season.
- Port-Orford-cedar will be spaced 50 feet from each other in density management units and approximately 50 feet away from roads and 25 feet from streams. Wash all equipment before arriving on BLM lands and exit wash all ground based equipment prior to moving to a new unit with POC presence.

2.3.7 Culverts and hauling

- All in-stream work, such as stream crossing removal and large wood placement, will be limited to Oregon Department of Fish and Wildlife's (ODFW) instream work period, or those periods of time for which ODFW has allowed an extension or exemption.
- Road building and stream crossing operations (i.e. culvert replacement) where live stream flow is involved will use commonly applied Best Management Practices to be in compliance with the DEQ turbidity standard. This may include but is not limited to: working under dry conditions within the ODFW in-stream work window, working within a contained area, diverting incoming stream flow around the work area either by gravity or pumping, controlling sediment by using straw bales or filter fabric, management of excavated soil materials so that it will not enter the stream, and completing the task without undue starts and stops.
- Culverts will be designed to pass the 100-year theoretical storm without headwater ponding at the inlet. Culverts will be sized to accommodate natural flow characteristics including nearly normal width and depth. Drift of debris should be considered in culvert sizing, with application of an oversizing factor, such that a debris jam is not likely to result from a flood flow.
- When replacing culverts on perennial streams, allow for unobstructed passage of fishes. Provide passage for other aquatic-dependant species, unless technologically impossible or cost prohibitive for benefit gained.
- Ditch relief culverts will be replaced during the dry season.
- Road ditch maintenance will be completed during the dry season (May 15 –October 15).
- If winter haul on gravel roads is planned, then the following Best Management Practices will be implemented to prevent sediment delivery to or near stream crossings along the haul route. The sediment prevention measures must be in place before winter haul begins. They include:

  Apply an additional lift of rock to the area of road that can negatively influence the stream if rill erosion is evident in the road tread near live stream crossings.

  Contain any offsite movement of sediment from the road or ditch flow near streams with silt fence or sediment entrapping blankets. Such control measures must allow for the free passage of water without detention or plugging. These control structures and applications should receive frequent maintenance. At the completion of haul, sediment retained in the traps and the traps themselves should be removed.

2.3.8 Roads

- Minimize road corridor clearing width for all road renovation and new construction. Typical road corridors will be < 30 feet in width.
- Minimize running surface widths on all new road construction. Typical running surface width will be less than or equal to 12 feet.
- Waste areas will be located outside the 100 year floodplain and, if greater than 500 cubic yards, be approved by the District Soil Scientist or Geologist.

- Disperse collected water in areas capable of withstanding increased flows without gullying, or route water to a stream channel through an appropriate vegetative or sediment filter (e.g. a catch basin).
- For roads to be less than fully decommissioned after project completion, use currently accepted storm proofing practices that will result in road segments being passively maintained for hydrologic function (infiltration and runoff) in the short-term. This may include (but is not necessarily limited to) selected BMPs such as installing water bars or dips in the running surface, installing dips downhill from any stream culvert (regardless of flow duration) if a diversion potential exists from a plugged culvert, seed and mulch disturbed areas and blocking road entrances to vehicular traffic.
- For roads to be closed or fully decommissioned, use currently accepted storm proofing practices that will result in the road segments being passively maintained for hydrologic function (infiltration and runoff) in the short-term. This may include (but is not necessarily limited to) removing fills and culverts at stream crossings, restoring banks and channel bottoms to stable grades, de-compacting road surfaces to regain naturally high infiltration rates, mulch tilled surfaces using surrounding forest slash if possible or straw and seed (see District native seed policy), and blocking all de-compacted surfaces to traffic. Pull slash over roads or plant native grasses, forbs, or shrubs to provide cover and forage for wildlife.
- Close and winterize any new road construction needed for more than one season by applying a mulch layer to prevent surface erosion and blocking entry to traffic This will be completed before the onset of persistent winter precipitation, generally October 15 of each year.

2.3.9 Site preparation

- All prescribed burning will comply with the guidelines established by the Oregon Smoke Management Plan, (OAR 629-43-043), as addressed in the RMP. To reduce the amount of material consumed, hand pile and machine burning will be scheduled during periods of high rainfall (November to April) when burning will be confined to piles only.
- In units not planned for pile burning, continuous concentrations of fuels resulting from ground-based processor and cable operations would be broken up and scattered before equipment is removed from the site. On roads scheduled for decommissioning, woody material could be scattered across the road surface to further the decommissioning process.
- Directional falling away from project area boundaries, mainline roads or roads not planned for closure or decommissioning, property lines, no-harvest buffers, and special status species site buffers would be required.
- Along roads and landings, hazardous fuels reduction may include: slashing of undesired vegetation, pullback, or hand piling, cover and burn. All slash greater than 2 feet in length and up to 6 inches diameter at the large end will be piled or pulled back within 20 feet each side of those roads not identified for closure or decommissioning. Piles would be covered with black plastic and burned in the following late fall/early winter when fire danger is low. Material pushed off the landing during the operation will be pulled back to the landing and stacked in a manner to promote best burn results.
- Hand piling and burning will be used for site preparation and will be conducted during the rainy season to minimize the potential for a wildfire situation. Slashing may be completed in units where continuous vegetation could impede planting. Logging residue and slashed brush material greater than 2 feet in length and up to 6 inches diameter at the large end will be piled and covered with black plastic and burned in the following late fall or early winter. Piles will be distributed throughout the stand to provide opportunity for micro-site planting and tree spacing. In areas where hand piling is not feasible, a lop-and-scatter treatment could be used to create planting spots.
- Burn piles, either hand or machine will be located away from existing snags and down wood to prevent fire charring. Where snag creation is prescribed in Table 8-4, piles can be located near or around leave trees in order to kill the trees and create snags.

- All harvest and post-harvest activities will be in compliance with applicable Oregon State Fire Regulations. Disposal of slash through various burning methods will be conducted under the direct oversight of Bureau of Land Management personnel.
- In conjunction with hand piling and burning, swamper burning may be used in areas of heavy fuel concentrations. These areas will be covered with plastic and burned during the wet season. Further reduction of fuels will be accomplished by throwing adjacent fuels into the burning concentrations. Swamper burning will not be used if a possibility for negative impacts to snags and coarse woody debris exist.
- Leave one brush pile per acre unburned to serve as habitat for wildlife.
- In units that will be piled using a machine (excavator), operations will be conducted such that the machine operates on a layer of slash when accessing the site and during the piling. Piles shall be free of dirt to enhance combustion. Piles will be covered with plastic to allow burning later in the wet winter weather.
- Burning will not occur within no-harvest buffers along fish bearing streams.

2.3.10 Planting

- Tree planting will occur in hardwood conversion units, gaps ≥ 1 acre and in selected density management thinning units (under planting). The planting stock will include desired species of mostly Douglas-fir, western hemlock, western redcedar, and grand fir. Priority will be placed on the use of genetically improved stock when it is available. Port-Orford-cedar will be planted in limited areas based on stream and road buffers and frequency in the area initially.
- A post-harvest plantability survey will be conducted to determine appropriate seedling assignment and amount of site preparation needed. Sites that receive adequate light and have minimal brush competition will be planted with a higher density of Douglas-fir along with minor species. Sites that have a more competitive brush component and more limited light will receive a higher percentage of tolerant minor species such as western redcedar and western hemlock. Within the red alder stands, scattered individual healthy dominant or co-dominant conifer that can respond to release will be reserved when feasible. Planting will be a conventional 10 foot spacing (435 trees per acre) using 1-1 transplants and will likely receive vexar tubing. Larger three and four year old transplant seedlings will be planted in areas with heavy brush competition, if available. Thinning units that are under planted will be planted at approximately 20 foot spacing (109 trees per acre). Seedling allocation assigned to specific units is located in the Analysis File section 1.9.

2.3.11 Noxious weeds

Any surface disturbing activities will increase the risk of new populations of noxious weeds to occur. More importantly, the use of heavy equipment may provide a means to spread. The following prevention practices (primarily from the *Integrated Noxious Weed Program EA No. OR120-97-11*) will help minimize these effects:

- Wash all equipment before arriving on site.
- Remove or treat all broom and gorse species that may be discovered along haul routes and landings before beginning any operations. Mature populations of noxious weeds (if present) may be spread during the height of seed dispersal period (generally August – September). If possible, these will be cut before seedpods are present.
- Following any surface disturbing activity, monitor and treat any noxious weed starts following District noxious weed prevention management guide.
- All disturbed sites will be seeded with an approved grass species mix to provide competition against new noxious weed starts.

2.3.12 Roads/Trails

- On roads that are decommissioned or seasonally/temporarily closed, treatments will be accomplished so that non-motorized recreational use of the road including hiking, biking, horseback riding, and hunting on foot can occur. See Appendix section 8.2 for a definition of road closure standards. Table 8-2 and Maps 2.2 provide details on the location of roads proposed for closure.

2.3.13 Cultural

- To protect unforeseen cultural and archaeological resources, include the following stipulations in any contracts that result in ground-disturbing activities:

  NAGPRA (Native American Graves Protection and Repatriation Act) concerns
  Pursuant to 43 CFR 10.4(g) the holder of this authorization must notify the authorized officer, by telephone, with written confirmation, immediately upon discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), you must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer.

  ARPA (Archaeological Resources Protection Act) concerns
  If, in connection with operations covered by this contract, any employees or contractors discovers; encounters; or becomes aware of any objects or sites of potential cultural resource value on the project area, (such as historic or prehistoric ruins, fossils or artifacts), operations shall immediately be suspended in the vicinity of the discovery site and the District Archaeologist shall immediately be notified of the findings. No objects of cultural resource value may be removed. Operations may resume at the discovery site upon receipt of written instructions, if so ordered.

2.4 Summary and comparison of alternatives

Table 2-2 Summary of key data for the analysis area, the alternatives, and their effects. All numbers are estimates derived from GIS. Actual numbers could vary slightly as projects are translated to the ground.

Analysis area (acres)	28,673	
BLM – Late-Successional Reserve (acres)	17,665	62%
– Matrix (acres)	0	
Private (acres)	11,008	38%
Riparian Reserves on BLM (acres)	8,765	50% of BLM
China Wall ACEC (acres)	240	1% of BLM
	No Action	**Alternative 2**
Density management thinning (acres)	0	1,996
Hardwood treatment (acres)	0	513
Total treatment acres (DMT + Hwd)	0	2,509
Skyline yarded (acres)	0	2,364
Tractor yarded (acres)	0	101
Unyarded (acres)	0	52
Riparian Reserve treatments		
Density management thinning (acres)	0	811
Hardwood treatment (acres)	0	310
Total R.R. treatments (acres)	0	1,121
Treatments to lightly-managed stands (acres)	0	290
New road construction (miles)	0	4.8
Subsequently decommissioned (miles)	0	4.7
Remain open (miles)	0	0.1
Reopened roads that are currently closed (miles)	0	8.4
Road renovation and improvement (total)(miles)	0	74.5
Road renovation and improvement (private roads)(miles)	0	10.9
Road decommissioning (miles)	6.8	50.7
Full decommissioning (miles)	0	8.5
Decommissioned (miles)	0	29.4
Self closure (miles)	6.8	3.3
Temporary/gate (miles)	0	9.5
Open road density (miles/mile^2)	2.50	1.95
BLM	2.55	1.74
Private	2.42	2.27
Total road miles (BLM & pvt)	181	172
Snag creation in units (# snags)	0	5,087
Snag creation outside units (acres)	0	1,037
Down log creation	0	2,568
Road fill pullback (from streams)(miles)	0	0.3
Stream crossing culvert replacement (# culverts)	0	33
Instream wood placement (miles)	0	4.5
Native grass/forb seeding along roads (miles)	0	8.6

3 Affected Environment

3.1 Remnant structures and lightly-managed stands (Issue 1)

A number of stands in the analysis area (e.g. units 52, 88, 89) regenerated naturally following fires or other natural disturbances in the early 1900s and range from 38-104 years in age (74% are 74-84 years old). Many of these stands seeded in after fires but have been lightly managed in that they have had remnant old-growth trees removed (salvaged) and most snags removed or cut down, but they have not been clearcut harvested. Tree density is often very high with relative densities > 70. Many of these stands already contain some important late-successional forest characteristics in the form of remnant old-growth trees, snags, and down logs, but the level and distribution of these structures are quite variable. These lightly-managed stands comprise about 1,124 acres of the analysis area. Some of the stands contain numerous remnant snags and down logs, but others have very few remnant structures in them. Few, if any, natural or lightly-managed young conifer stands remain on private land in the analysis area.

3.2 Wildlife movements and roads (Issue 2)

Currently there are approximately 181 miles of roads in the analysis area on BLM-administered land. The open road density is 2.50 miles/mile^2 (see Table 2-2 and Table 3-1). There are approximately 0.8 miles/mile^2 of closed roads and about the same in an unknown open or closed condition. The total density of roads across the analysis area is 4.04 miles/mile^2. Roads that are overgrown with vegetation are less likely to restrict movements of wildlife because the vegetation provides cover for wildlife and also renders the roads impassable to vehicles and therefore limits the wildlife harassment associated with vehicular traffic. The analysis area is within the Tioga big game management unit where the open road density goal is 1.1 miles/mile^2 (USDI 1995). This target density is less than other areas on the District because of concerns over harassment to big game animals. Probably the main barriers to wildlife movements are the Coos Bay Wagon Road, the East Fork Coquille River, the BPA powerline corridor, and the agricultural valley above Brewster Gorge, all which run east-west through the southern part of the analysis area. Other barriers to movements include the numerous cliff faces found along the river and throughout the analysis area.

Table 3-1 Open road densities

	BLM Lands		Non-BLM Lands		Action Area Totals	
	Area (ac) =	17,665	Area (ac) =	11,008	Area (ac) =	28,673
Road	Area (sq. mi.) =	27.6	Area (sq. mi.) =	17.2	Area (sq. mi.) =	44.8
Status	Miles	Density	Miles	Density	Miles	Density
Open	70.35	2.55	41.64	2.42	111.99	2.5
Closed	23.38	.85	11.89	0.69	35.27	0.78
Unknown	8.90	.32	25.11	1.46	34.01	0.76
Overall	**102.63**	**3.72**	**78.64**	**4.57**	**181.27**	**4.04**

3.3 Forest resources

3.3.1 Landscape

The analysis area is dominated by the Western Hemlock vegetation zone (USDA and USDI 1998). Douglas-fir is the primary sub-climax species, and western hemlock is a significant understory species. Other overstory trees in the analysis area include (roughly in order of constancy) western red cedar,

Port-Orford-cedar, grand fir and Pacific yew. Hardwood species present in the understory and frequently in the overstories of young stands include (roughly in order of constancy) red alder, big leaf maple, myrtlewood, golden chinquapin, and tanoak. Vegetation in the analysis area has been described using plant series/associations and association groups, vegetation zones, and current vegetation/structure types, and habitat types (Analysis File section 1.7). Highly-disturbed and lightly-disturbed Port-Orford-cedar associations are present in the southeastern portion of the analysis area, in and adjacent to units 57w, 57e. The limited historical extent of this Port-Orford-cedar association type can be interpreted from 1930s cover type data (Harrington 2003). Riparian areas in the analysis area support plant associations best described by the salmonberry/sword fern association (McCain 2004).

3.3.2 Habitat types in the analysis area

The analysis area is dominated by westside lowland conifer-hardwood forest and westside riparian-wetland habitat types (Johnson et al. 2001). Several distinctive structural variants of these habitat types occur in the analysis area which could be influenced by the proposed action, including: young, dense conifer stands, hardwood stands, older lightly managed stands, and special areas. These habitat types are described below.

Young conifer stands account for > 25% of the cover in BLM-managed lands in the analysis area; early or mid-seral stands occupy most of the private forest lands in this watershed (USDI 2000). The majority of these young stands were regenerated following clearcutting, resulting in high tree density, low horizontal structural diversity, negligible legacy structures (down wood, snags, wolf trees, large hardwood trees), and low tree species richness. Western red cedar (*Thuja plicata*) is mostly missing from these modified stands, although it occurs in 47-80% of unmanaged association types comparable to those in the analysis area, averaging 3-16% cover in these types (Franklin and Dyrness 1973). Western red cedar has negligible volume in young natural forests, but averages 13 feet^2/acre basal area in mature natural forests (Spies 1991). Very few young, open conifer stands are present in the landscape (see section 1.7 of the Analysis File).

Cover by pure and nearly-pure hardwood communities in the analysis area is relatively low, with cover in BLM holdings < 10%; hardwood in mixed stands is higher (Table 3-2). The abundance of red alder has increased 20-fold in the northwest since the 1920s, but is being quickly and substantially reduced by modern forest practices (Niemiec et al. 1995). Hardwood communities in the analysis area occur in association with moist, disturbed soils, primarily: a) in riparian contexts; b) in lower slope positions (especially in the southwestern portion of the analysis area); c) associated with poorly-regenerated fillslopes, or in some combination of the above contexts. Most of these hardwood communities are < 50 years old, and are associated with anthropogenic or fluvial disturbance. Hardwood communities older than 80 years are uncommon in the analysis area and would not be treated; they are often present in wet landscape positions (e.g., rotational slumps, seeps), in areas maintained by infrequent fluvial disturbance, or in areas with poor soil conditions.

Table 3-2 Hardwood cover as a percent of the analysis area. *Hardwood cover* includes stands < 80 years old dominated by hardwood species (e.g., red alder, myrtlewood, big leaf maple). *Old mixed hardwood* includes hardwood or mixed hardwood stands > 80 years old or in a mature (or more advanced) structural stage. *Mixed hardwood cover* includes young stands with hardwood a secondary species. Total analysis area size is 28,673 acres.

	Cover Type			
	Hardwood cover **%** (acres)	Old mixed hardwood cover **%** (acres)	Mixed hardwood cover **%** (acres)	**Total with hardwood present** **%** (acres)
Ownership				
BLM	**4.3** (1,250)	**0.6** (170)	**4.1** (1,155)	**9.0** (2,575)
Private	**1.7** (470)	**1.7** (483)	***26.4*** *(7,585)*	**29.7** (8,538)
Analysis Area (Total)	**6.0** (1,720)	**2.3** (653)	**30.4** (8,740)	**38.8** (11,113)

Special habitat areas include structural components limited on the landscape and used by wildlife, plants, fungi or other taxa. Special habitat areas may include talus fields, cliffs, wetlands, seeps, flats, or individual structures (e.g., large diameter hardwood trees). Landscapes within the analysis area are dominated by forested habitat types (USDI 2000). A few units (e.g. unit 47) contain seeps and small emergent wetland areas; lower slope areas below the treatment units support additional seeps and hydric features. Limited brushfields and unforested areas (< 100 acres), rocky outcrops (e.g., areas above unit 26, as well as Brewster Rock and many smaller features), meadows (e.g., China Wall) and other special habitats make up < 5 % of the analysis area.

3.3.3 Structural stages

Forest structural stage composition in the analysis area prior to European influence was determined principally by fire return intervals and intensities (USDI 2000). Wind may have had a frequent (decadal-scale return interval) influence on fine-scale diversity in stands, and an occasional (century-scale return interval) stand replacement/legacy creation role. Modeling of the historic amount of late-successional forests (Wimberly et al. 2000) suggests that within recent geological time, westside Oregon probably supported a range of late-successional forests, with old-growth cover ranging between 25% and 75% at the province-level, and averaging about 50% across spatial scales. This modeled cover by older stands is roughly comparable to studies of conditions in the northwest prior to widespread logging (Ripple et al. 2000). Forest cover maps from the 1930s suggest old-growth forests covered > 60% of the analysis area, young forests covered approximately 30%, and mature forests covered only minor areas.

Federal portions of the analysis area are dominated by advanced structural stages, especially the Vertical Diversification and Fully Functional/Horizontal diversification stages (Analysis File section 1.7), corresponding to historic disturbance periods from the 1700s and the late 1500s, respectively (USDI 2000). Advanced structure types account for >55% of federal lands in the analysis area. Young structural stages (from stand initiation through canopy closure) and mature stages (biomass accumulation and competitive exclusion) have roughly similar cover in the analysis area (23% and 20% of the analysis area, respectively) in federal lands in the analysis area. Approximately 8% of private

lands in the analysis area are > 80 years old; the remaining stands are young, dense stands.

3.3.4 Treatment unit histories/ treatment priorities

The LSRA proposes a priority for density management treatments based primarily on the level of expected biological responses to the treatments and stand age (USDA and USDI 1998). Most of the units proposed for treatment fall into the Medium-priority category (30-49 years of age). Approximately 235 acres (<1% of analysis area) are proposed from the High-priority (< 30 years old) treatment group to be addressed through commercial density management thinning. Additionally, the BLM has an active pre-commercial thinning program independent of this EA which targets High-priority stands in the LSR with the goal of adjusting stand conditions to better meet LSR goals. Stands in the High- and Medium-priority categories have been intensively managed. These stands were initiated through clearcut timber harvest and subsequent dense plantings (> 350 trees/acre) of primarily Douglas-fir; many stands later received precommercial thinning, reducing densities to 150-250 trees/acre. All units in the High and Medium-priority categories have densities far above densities in stands on late-successional trajectories (Poage and Tappeiner 2002), and have very limited structural and species variability. Few snags, down logs, and legacy trees were left in these stands, and gaps are infrequent. Approximately 300 acres (1%) of analysis area is proposed for treatment from the Low-priority treatment group. Stands in the Low-priority category are lightly-managed stands which regenerated after fires (described above, section 3.1). Finally, a group of stands in the analysis area (e.g., units 4, 17, others) have a history including clearcut harvest followed by conifer regeneration failure, leading to hardwood-dominated stands.

3.3.5 Unit developmental trajectories

Priority for treatment proposed in the LSRA is based on level of expected biological responses to treatment. The ability of trees to respond to thinning is based partly on crown size, while bole size is a correlate of developing late-successional conditions. Two simple metrics suggesting that stands are on a trajectory towards developing late-successional conditions are: a) stand mean crown ratio ≥ 50% by age 50; and b) mean stand DBH > 20” between 50-60 years (Tappeiner et al. 1997, USDI 2002a). Crown ratios for (measured) units in High and Medium priority age groups are currently 52%. These stands are predicted to have crown ratios of 47% (range: 22-52%) and mean DBH of 17.7 inches (range: 10.0-22.0 in.) by age 50. Crown ratios for (measured) units in the Low priority age groups, with ages > 50 years old, are currently 46% (range: 36-53) and with a mean stand DBH of 15.4 inches (range: 10.1-21.0).

3.3.6 Unit vegetation types and structural characteristics

Units chosen for treatment include both conifer and hardwood-dominated cover types. Conifer units include primarily (> 1,700 acres) planted stands, dominated by Douglas-fir with minor western hemlock and hardwood components. Several units are portions of naturally-regenerated conifer stands. This group includes lightly-managed stands in which Douglas-fir became dominant (units 88, 89), stands with a strong component of Port-Orford-cedar (units 57e, 57w), and stands with primarily western hemlock overstories (unit 52). Approximately 500 acres (16 units) of hardwood stands have been identified for treatment. The majority of these units represent failed conifer regeneration following clearcut harvesting in the 1970s. Most of these units are in lower slope positions with mesic influences.

Units proposed for treatment generally support only a single true canopy layer. Portions of some units are approaching understory reinitiation, but have not developed competent second layers. The understory tree component is absent to patchy with western hemlock the dominate tree species.
Units proposed for treatment have limited forest structure. Gaps for units in all age groups are relatively infrequent, averaging < 8% of total stand area (see Analysis File section 1.7); late-successional stands average 13-18% gap area (Spies and Franklin 1991, Spies et al. 1990, USDA 1993). Large pieces of

competent (decay class < 4) down wood average 2/acre and 3.7/acre for young and older proposed units, while moderately high-value snags (≥ 16 feet tall, > 20 inches DBH, decay class < 4) average 0.3/acre in young proposed units and < 2/acre in older units (see Analysis File section 1.7); late-successional stands generally support far higher densities of down wood and higher densities of snags (see Tables 8-11 in the LSRA). The large logs found in many of the units are generally fire-scarred and highly decayed. Down logs harbor the majority of the bryophyte diversity particularly when they are uncharred. These depauperate legacy levels are consistent with the stand histories for these units, which include clearcutting without retention and dense replanting, or natural heavy seeding and subsequent salvage/removal of legacy structures.

3.3.7 LSR 261

LSR 261 includes > 40% mature and late-successional habitat (USDA and USDI 1998). This cover by older forests is less than the estimated mean historic old-growth cover ((Ripple et al. 2000, Wimberly et al. 2000). Cover by young (sapling) forest types in LSR 261 is twice as high as in historic landscapes (Ripple et al. 2000). Late-successional forest types in LSR 261 have little interior habitat (14% of total), and include degraded private land in (approximately) every third section. Private forest types cover approximately 11,008 acres, approximately 38% of the analysis area. The fire return interval for LSR 261 at the drainage level is 50-75 years, but fire return interval for individual stands is 150-350 years (USDA and USDI 1998). LSR 261 is crucial for LSR network connectivity, providing a provincial link between the Coast Range and Klamath Provinces (USDA and USDI 1998). It is the second largest reserve in the two provinces, and the most isolated LSR block identified (USDA and USDI 1998), bounded by the Millicoma Tree Farm (north) and checkerboard private/federal lands (south). Due to these characteristics, this LSR has been designated a high priority for management action.

3.4 Botanical resources

There are no Threatened or Endangered plant species known or suspected to occur in the project area. Of the 106 Bureau sensitive and Bureau assessment species known or suspected of occurring on Coos Bay BLM, 16 species are known or suspected of occurring in the Brummit analysis area (see Analysis File section 1.5). This determination is based on the proposed project overlapping the known or suspected range of a species as well as the likelihood that potential habitat is present. Potential habitat is determined by aerial photographic interpretation, review of information on each species habitat requirements, and proximity to known site locations.

Bryophyte and lichen diversity is distinct in dense young conifer stands proposed for treatment and in the hardwood stands proposed for treatment. Overall bryophyte diversity is low in densely stocked, conifer-dominated units. Lichen diversity is variable in these stands but tends to be low also due to limited light conditions resulting from the densely stocked conifer overstory. Lichens are typically more abundant on the edges of these units, in areas where there is a hardwood component, in units with remnant old-growth trees, and where there are canopy gaps that allow sunlight to penetrate into the lower canopy and onto the forest floor. Green-algal lichens dominate the lichen community in all these plantations with alectorioid lichens being uncommon and cyanolichens almost absent except in units with remnant legacy trees.

The hardwood conversion units are generally dominated by red alder with very few conifer trees present and range in age from 29 to 74 years old. Minor amounts of the following hardwood tree species also occur in these stands: bigleaf maple, myrtlewood, golden chinkapin, rhododendron, and vine maple. Understory shrub species are similar to the density management units but are generally denser and

distributed more uniformly throughout the units due to the many gaps in the overstory canopy which allow more sunlight to reach the forest floor. Bryophyte and lichen diversity varies in these units. Those with the greatest diversity have some conifer trees scattered through them, an abundance of large down, uncharred, conifer logs, and frequent canopy gaps. Conversely, pure red alder stands with no conifer component, few down logs, and evidence of a hot burn (e.g. charred down logs and stumps) have the least diverse bryophyte and lichen communities.

3.5 Wildlife

The analysis area is home to at least nine Threatened or Endangered or other special status wildlife species (peregrine falcon, bald eagle, marbled murrelet, northern spotted owl, fringed myotis, Townsend's big-eared bat, tailed frog, red-legged frog, and foothill yellow-legged frog) and potentially five others (goshawk, Oregon vesper sparrow, purple martin, fisher, and western pond turtle). Many of these are associated with old-growth forests or cliffs and rocky outcrops. Others occupy the East Fork Coquille River valley, openings, or grasslands. Other noteworthy species include deer and elk. The analysis area is a popular hunting destination, especially for elk hunters. Bureau Tracking wildlife species known or potentially occurring in the analysis area include clouded and southern torrent salamanders, band-tailed pigeon, pileated woodpecker, silver-haired bat, red tree vole, and marten. Key wildlife habitats managed by BLM in the analysis area include nearly 6,900 acres of old-growth forests > 200 years of age, at least 9 cliffs and numerous rocky outcroppings, over 300 miles of streams and the associated riparian areas, and small areas of meadows.

3.6 Soils and Disturbance Processes

The analysis area is categorized by the geological and climate processes typical of a maritime coastal area. An overview of these processes can be found within the watershed analysis document for the East Fork of the Coquille River (USDI 2000 Section III.3 and Map A-5). The analysis area is largely located on the Tyee formation east of a ridge that separates China Creek from Brummit Creek. West of that ridge encompassing the China Creek area, the Roseburg Formation dominates the soil formation and landscape processes. Areas of hard bedrock and sandstone occur throughout the Brummit sub-watershed but are most visible in the upper west portion of the Brummit drainage.

3.6.1 Disturbance processes and events

The analysis area has several disturbance processes that affect the creation, movement and distribution of sediment and woody debris from first and second order drainages. The mass movement potential was described in the watershed analysis (USDI 2000 Section III.7). Road-related landslides occurred mainly on the Tyee formation (70% of all slides), although this formation accounted for about 18% of the sampled land area. There was no correlation between landslide location and stream channels as sampling was conducted from aerial photos and "landslide inventories based solely on aerial photographs have limited use for identifying those landslides most common in steep forested terrain, especially in areas with dense forest cover"(Robison et al. 1999, pg 108). A closer inspection of the 1950s aerial photos does reveal that several large scale fire events occurred across the analysis area. One occurred in the Brewster Rock area in the 1930s. Another natural fire spread across the entire top portion of the Burnt Mountain area from Cherry Creek on the west to the upper portion of the West Fork of Brummit Creek most likely in the late 1860s. Extensive burning occurred to create a mosaic of high to low severity burns that provided landsliding opportunities across the landscape.

The watershed analysis (USDI 2000) pointed out that landslides occur at a high rate most frequently on three different soil map units: 58F, 38F and 15F and at somewhat moderate rate for map units 14F, 46F and 50E. Slope gradient above 65% with soils that have shallow depth to bedrock are most prone to

landsliding within the 5th field watershed.

Harvest activity and the subsequent disturbance that accompanies it were very limited in 1950. China Creek was entered into by private landowners with a few spar pole and downhill yarding operations. Also the creek was crossed at about the half mile location to the west, then north to section 32. The Brewster Lookout road was constructed from Brummit Creek in section 3 using several steep switchbacks to get to the broader ridge on top. Only that portion of the right-of-way needed to construct the road was cleared. The disturbance event of the Brewster Rock fire 20 years prior shows clearly on the aerial photos. Some harvest activities were started in the Camas Creek sub-watershed with road building adjacent to the creek and timber removal very extensively spread just south of the analysis area. Private landowners were also entering the Deadhorse area, but it was largely confined to road construction not harvest. The conversion of the Sitkum valley and lower Brummit Creek areas from wetlands or lake bed to agriculture lands was complete by the 1950s. Some streamside vegetation was retained along the East Fork Coquille River and Brummit Creek. Overall the analysis area was largely undisturbed.

Harvest activity by 1970 had opened most ridges to harvest of the old burned areas in what appears to be salvage like operations. It is clear that removal of dead or dying trees was the driving force opening up the land. Some large areas on Skeeter Ridge were harvested as part of the Columbus Day windstorm which occurred in 1962 (e.g. proposed units 32, 49, and 50). Most harvest operations appear to have been skyline in technique with little ground based operations noted across the analysis area. Relic structures were left in some harvest/salvage areas, but not all. Blowdown units were typically harvested clean, leaving no remnant structures. This level of disturbance appears to have placed large volumes of woody debris into adjacent small perennial and intermittent stream channels, and it was able to filter sediment from the slopes above. Removal of the debris was not undertaken until later into the 1970s. Only those units where yarding did not achieve one-end suspension is it evident that sediment and stream channel functions were altered. Alder has colonized these areas next to roads, stream channels and even on hillsides over time.

3.6.2 Soil types

The soil types most often encountered within the proposed units are the Umpcoos-Milbury-Bohannon association (38F), the Preacher-Blachly association (44 D and E) and the Preacher-Bohannon loams (46 E or F). Details of the individual soil series that make up these soil map units are found in the Analysis File section 1.8.

3.7 Water and stream channels

3.7.1 Physiography and Morphology

The restoration units are within the East Fork Coquille 5th field watershed, one of the four major tributaries of the Coquille River. The hydrologic unit code (HUC) is 1710030503. The drainage area of the East Fork Coquille at the downstream (west) side of the planning area is 89.78 miles^2. The planning area principally includes portions of Brummit Creek subwatershed (HUC 171003050303) and Brewster Canyon subwatershed (HUC 171003050304). Drainages partly or wholly within the planning area include Steel Creek (2.02 miles^2), Bills Creek (0.96 miles^2), China Creek (2.46 miles^2), Brummit Creek (24.13 miles^2), Deadhorse Creek (2.88 miles^2), and Lost Creek (11.65 miles^2). Brummit Creek is divided into the west fork (9.9 miles^2) and the middle/east fork (12.62 miles^2). The west fork has named tributaries including Karl Creek (0.79 miles^2) and Reeves Creek (1.04 miles^2).

The analysis area is characterized by a high drainage density in conjunction with limited soil water storage capacity causing rapid inputs to the channel network from rainfall. Stream channels are generally headwater, steep cascading, and step-pool channels confined by hill slopes. The analysis area has a drainage density of approximately 7.0-8.0 miles/mile^2. About 80% of the total drainage density consists of 1st and 2nd order intermittent upland tributaries. In contrast to these streams on the southern boundary of the analysis area is the East Fork Coquille River, a relatively large, moderate to high gradient (through Brewster Canyon) 7th order river, that is fully to moderately entrenched with occasional floodplains.

3.7.2 Water Yield

The forested watersheds of the Coos Bay District yield large volumes of water, as storm flow, from precipitation during the winter months. January produces the highest monthly runoff, with approximately 60% of the runoff occurring between December and February. June through October contribute only 4% of the annual runoff which results in very low stream flows. High drainage density (7.0-8.0 miles/mile^2), shallow porous soils, and low transmissivity of the underlying bedrock are physical properties of the watershed that indicate a lack of storage and greatly influence runoff efficiency.

Evapotranspiration is the water lost to evaporation and water transpired into the atmosphere by plants. It is common for evapotranspiration in coniferous forests of western Oregon to reach 25 inches per year (Beschta and Boyle 1995). Water yields in western Oregon have been found to return to that of a mature forest stand in about 30-40 years after clearcut harvest (Beschta and Boyle 1995, Harr and Cundy 1990, Stednick and Kern 1992). Most planned thinning units within the analysis area consist of forest plantations with an average age of 41 years; re-established following previous harvest. These stands have reached hydrologic maturity where the losses from evapotranspiration on the annual water budget can no longer be attributed to past harvest and are within the historic range of natural variability.

3.7.3 Peak Flow/Flow Regime

A peak flow is the instantaneous maximum discharge that is generated by an individual storm event. Because of the shallow soils and underlying bedrock in the analysis area, the time to peak is swift from the onset of precipitation. Streams normally have steep rises and fairly uniform recession as the storm passes. Flows that are high enough to mobilize appreciable amounts of sediment from channel sources, or change the shape of the bed or banks, occur only a few times each year.

Paired watershed studies in various climate regimes have found that the first precipitation events and peak flows in the fall are usually minute and thus geomorphically inconsequential to channel morphology (Lewis et al. 1998, Ziemer 1981). Statistical increases to the already small fall peak flow events have not been proven to modify stream channel form or increase risks to flooding. Large peak flows occur during midwinter after the soil moisture deficits are satisfied and coincide with large storms. The runoff that corresponds to the discharge at which channel dimensions can change are normally associated with a bank full stage, the incipient elevation on the bank where flooding begins (Rosgen 1994). These are the flows that tend to modify stream channels while transporting most of the sediment (Lewis et al. 1998, Ziemer 1998).

Brummit Creek flow estimate for a 2 year 24 hour recurrence interval event (near bank full) is 1,916 ft^3/sec, and a 100 year flow estimate is 4,666 ft^3/sec (USDI 2000). Other analysis area drainages should have similar runoff profiles in the range of 79 ft^3/sec/mi^2 for a 2 year storm and 193 ft^3/sec/mi^2 for a 100 year event.

The Brummit Creek analysis area includes 11,182 acres (39% of the analysis area) within the precipitation-dominated low elevations and 17,491 acres (61% of the analysis area) within the transient snow zone (TSZ). The TSZ includes the upper extent of the West, Middle and East Fork Brummit Creek subwatershed above the 1,800 foot contour line. These accumulation elevations are based on direct district employee observations over the past 20 years of where snow falls, and may persist for up to a few weeks. Based on current forest vegetative age classes, risk of peak flow enhancement by rain-on-snow is low, in Brummit Creek and the remaining East Fork Coquille subwatersheds.

3.7.4 Water quality

The two components of water quality that are pertinent to the analysis are sediment and water temperature. Natural processes have always contributed sediment to the stream channels. This includes landsliding, channel erosion, and effects of fire and floods. The rate of sediment produced from forested basins can be highly variable due to differences in storm patterns, steepness of topography, and varying geology (Swanson et al. 1987). There are several factors in the analysis area that may be contributing slightly more sediment to stream channels than normal. They include: a lack of sufficient volume and pieces of large woody debris in the steep stream channels to break flows, dissipate energy and store sediment, and existing roads that are maintained too infrequently. Perennial stream crossings along roads built in the 1970s are also of concern because the culverts are rusted and nearing the end of their design life. This increases the risk of road failures which would contribute sediment to the stream.

Turbidity monitoring was undertaken in the analysis area drainages in 1995-96 in advance of the preparation of the East Fork Watershed Analysis. Baseline water clarity was excellent, < 1 nephelometric turbidity unit (NTU), while during storms, turbidities increased to 8-70 NTU. This condition is temporary, and the streams normally clear within 1-3 days of the storm's passing.

The East Fork of the Coquille River on the southern boundary of the analysis area is listed on the Oregon Department of Environmental Quality's (ODEQ) 303(d) list of water-quality-limited streams for exceeding the standard of 64° F for summer water temperature from the mouth to Lost creek (river-mile 26.2). The removal of riparian vegetation on private agricultural lands in the valley bottom, along with deficiencies in large woody debris, which contribute to creation and maintenance of deeper and larger pools, are two factors that have likely affected stream temperatures (USDI 2000). The majority of the stream channels in the analysis area are generally intermittent during the summer and therefore do not contribute to the high summer water temperatures in China or Brummit Creeks or the East Fork Coquille River.

The stream cover is adequate to maintain summer stream temperatures throughout the planning area along intermittent and surveyed perennial and fish bearing streams (USDI 2000). However, the East Fork Coquille mainstem has a high level of solar exposure from the mouth to Lost Creek, based on a through review of the 1997 aerial photography. A water quality restoration plan for the watershed was drafted by the BLM and sent to the ODEQ in 2000 for their review and acceptance, but the DEQ has yet to establish a TMDL (total maximum daily loads [temperature]) for the Coquille sub-basin.

For a more in-depth discussion of area hydrology the reader is referred to the East Fork Coquille River Watershed Analysis (USDI 2000).

3.8 Aquatic species

A variety of aquatic vertebrate and invertebrate species can be found within the analysis area. For this discussion, aquatic species are defined as those species that reside within the aquatic environment for their entire life or during a critical part of their life history. Aquatic vertebrates found in the analysis area include several species of fish and amphibians. Aquatic invertebrates present within the analysis area include a wide variety of insects, mollusks, and at least one species of aquatic worm, crayfish, and an aquatic mite.

From a fisheries standpoint, streams in the analysis area contain a relatively diverse assemblage of salmonid species including coho salmon, steelhead trout, chinook salmon, coastal cutthroat trout, and rainbow trout. Oregon Coast coho salmon are currently proposed for listing as "threatened" under the Endangered Species Act. Oregon Coast coho salmon, Southern Oregon spring chinook salmon, and Oregon Coast steelhead are currently considered Special Status Species by the BLM.

In general, anadromous fish are limited to a few miles of stream in the southwestern corner of the analysis area below Brewster Gorge (Maps 2.2). Stream channel habitat within the gorge is dominated by a high gradient, boulder cascade that prohibits the passage of coho and chinook salmon, as well as cutthroat trout. In the mid-1980s a series of fishways or bypasses were built in Brewster Gorge in order to allow salmon and steelhead access to the streams above the Gorge. Salmon and steelhead were able to use the structure for several years, but the structure eventually fell into disrepair, and it no longer facilitates fish passage into these upstream areas. A few (< 50) steelhead may negotiate the gorge annually, but this is highly dependant upon stream flow and migration timing (Bill Hudson, BLM Coos Bay District Fisheries Biologist, personal communication, 2004). Resident trout are the most abundant fish found in the streams above Brewster Gorge.

Streams in the analysis area also provide habitat for a variety of non-salmonid fish species including, Pacific lamprey, speckled dace, and at least one species of sculpin. A variety of non-native fishes, including pet store variety goldfish, can also be found within the heli-dip ponds in the Brummit Creek watershed.

Amphibians expected to be found within the analysis area include two species of salamander, four species of frogs, one toad species, and one species of newt. Salamander species include Pacific Coast salamander and southern torrent salamander, with the Pacific Coast salamander being the most abundant. Native frog species found in the planning area include tailed frog, foothills yellow-legged frog, Pacific tree frog, and red-legged frog. It is probable that non-native Bullfrogs have also been introduced into the analysis area. Western toads are also believed to be present within the analysis area. Rough-skinned newts have been observed in streams and breeding in ponds within the Brummit Creek watershed.

While they have not been documented within the analysis area, western pond turtles may be present within lower elevation ponds or inhabiting slower water areas along stream channel margins within the mainstem of the East Fork Coquille River.

There are a wide variety of aquatic macro-invertebrates (insects) present within the analysis area. Aquatic insect varieties include stoneflies, mayflies, caddis flies, dragonflies, alderflies, true flies, and beetles. These species can be found in both ponds and stream / river habitats.

Aquatic mollusks that have been documented in the East Fork Coquille River, and that may be found in the analysis area, include one snail species (*Juga*) and one species of freshwater pea clam.

The initial construction of the 28-10-5.0 and 5.1 roads adjacent to China Creek placed much of the cutbank over the side of the road sub-grade or used it for making turn outs on the creek side of the road. This encroachment of and deposition in the channel of rock and woody debris has caused a narrowing of the stream channel and an increase in the grade in select locations. Flows in this system are high in the winter and not conducive to fish spawning or accessing the full potential of the system. Channel alteration has adversely affected habitat conditions for fish and other aquatic organisms within China Creek. These changes likely include a loss of spawning gravel, calm water holding areas, and available floodplain.

3.9 Air quality, smoke management

Air quality is generally clear with no known pollutants. In the spring, prescribed burning commences on private timber lands and farm field burning which contributes to particulate emissions into the surrounding air shed. There are 9,930 acres (35% of the analysis area) designated as Wildland Urban Interface (WUI). WUI is identified in the Southwest Oregon Fire Management Plan (BLM et al. 2004). Management actions within the WUI follow those identified in the RMP for rural interface areas.

4 Environmental Consequences

Note that Table 2-2 contrasts the key data for each alternative. Table 4-1 lists some of the main cumulative effects present in the 5th field watershed and adjacent areas.

Table 4-1 Summary of some of the main cumulative effects in and near the analysis area. The table includes BLM commercial thinning/density management thinning actions in the East Fork Coquille 5th field watershed completed since 1994 or planned plus the Tioga Density Management project immediately north of the analysis area. The effects of completed private actions and earlier BLM actions produced the affected environment described in section 3 of the EA.

	Project	Status	Location relative to Brummit action area	Road Impact	Forest Impact
Tioga Density Management EA (No. OR125-99-05)					
	Shotgun DM timber sale	FY04, not sold	3 mi north	net reduction	491 ac DMT
	West Tioga DM timber sale	active	adjacent to north edge		235 ac DMT
	Burnt Out DM timber sale	active	adjacent to north edge		601 ac DMT (130 ac is adjacent)
	Other sales	various	adjacent to north edge		1,209 ac DMT 321 ac hwd
Camas LSR EA (No. OR128-1999-23)					
	Weaver Woad DM timber sale	awarded	3.5 mi south	net reduction	56 ac DMT
	Camas Central DM timber sale	FY04, unawarded	1.5 mi south		420 ac DMT
	Camas East timber sale	completed	3 mi southeast		221 ac DMT
East Fork Coquille EA (No. OR128-03-17)					
	EA No OR128-03-17	EA nearly complete	EF Coquille 5th field watershed	6.7 mi new 21.0 mi decom	467 ac regen 1,249 ac CT 981 ac DMT 73 ac hwd

Lower East Fork Coquille EA (No. OR128-2002-01)					
	Dora Dora Dora and Dora Ridge CT timber sales	sold, awarded	EF Coquille 5th field watershed	0.5 mi new 1.8 mi decom	125 ac CT 53 ac DMT
Harrys Road Thinning					
	Harrys Road Thinning	complete	2 mi east		106 ac CT
Coquille Tribe					
	none				
Natural gas pipeline					
		almost complete	11.9 mi in Brummit action area 20.7 mi in 5th field watershed	Increased turbidity during heavy haul and rains.	
Private timber harvest – current harvest across the E.F. Coquille 5th field watershed in many locations, assumed continued harvest on 35-45 year rotation					

4.1 Remnant structures and lightly-managed stands (Issue 1)

4.1.1 Alternative 1 (No action)

Direct/Indirect Effects

With Alternative 1, no management would occur in any of the lightly-managed young (i.e. < ~ 100 years old) conifer stands. Because of high tree densities, trees in these stands would continue to grow very slowly. Tree height/diameter ratios and crown rations would worsen and fuels would continue to increase. These trends would increase the risk of a stand-replacing disturbance (either wind or fire) in the future. The availability of small-diameter snags and down wood would increase as suppression mortality killed understory and intermediate trees. Large, hard snags and down logs would remain at low densities in most of the lightly-managed stands (other than unit 52), and would decrease (slowly) as existing remnant structures continued to decay. Tree mortality from competition would eventually produce replacement snags and down wood, but these structures would have smaller diameter than the legacies they replace. The decreased availability of large hard snags in the near-term would lead to a decrease in availability of large soft snags in the future.

The objectives for Late-Successional Reserves include maintenance and enhancement of late-successional forests and creation of late-successional forest conditions if needed (USDI 1995). High tree density in these lightly-managed stands would lead to slow tree growth, deteriorating height/diameter and crown ratios, increasing susceptibility to catastrophic disturbance, and future deficits of large snags and down logs. LSR objectives from the RMP might not be met in many of these lightly-managed young stands.

Cumulative Effects

Several other BLM thinning projects are planned for the East Fork Coquille 5th field watershed (see Table 4-1), but none of them would thin lightly-managed young stands. The Tioga Density Management EA proposed thinning in approximately 361 acres of lightly-managed young stands immediately north of the analysis area (just outside the East Fork Coquille 5th field). Most of these Tioga Density Management EA units are part of larger stands which would have portions left unthinned. Few, if any, lightly-managed young conifer stands exist on private land in the analysis area. Lightly-managed young stands comprise about 1,124 acres (4%) of the analysis area. These stands are 38-104 years of age, with most around 80 years old. The RMP prohibits density management thinning in stands > 80 years old, so management in these stands subsequent to the proposed action is unlikely. Lightly-

managed stands have not been systematically thinned; these stands have the highest relative densities of all the stands considered for management in this EA, and are currently in Competitive Exclusion stand trajectories as described in Franklin et al. (2002).

The cumulative effects of Alternative 1 would include maintaining all 1,124 acres of lightly-managed young stands in the analysis area on late Competitive Exclusion trajectories. Without manipulation, succession through Maturation stages and into Vertical diversification stages (Franklin et al. 2002) would require significant time, perhaps up to 100 years. Significant natural disturbance (wind, fire, disease) would be required to facilitate gap creation, understory reinitiation, and the creation of dominant trees in these stands. Lightly-managed stands would lack some late-successional characteristics, and would likely not meet LSR objectives for a long time. Thus, Alternative 1 would maintain this currently uncommon development stage on the landscape, but would take longer to produce late-successional conditions across the analysis area than Alternative 2. No studies have documented species strongly-associated with lightly-managed stands in the late Competitive Exclusion developmental stage, specifically.

4.1.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

Lightly-managed young stands occupy about 1,124 acres (4%) of the analysis area. These stands are 38-104 years of age; most (74%) are 74-84 years old. Alternative 2 would thin approximately 290 acres (26%) of the lightly-managed young stands. The potential treatment units would target areas with few remnant trees, tall snags, or down wood. Approximately 834 acres (74%) of the lightly-managed young stands would not be treated under Alternative 2 and would remain unthinned to continue on their current developmental trajectories. An additional 615 acres (55%) of the lightly-managed young stands outside of the treatment units would have snags created in them (approximately 5/acre) to help restore some of the snags that were felled in them in the 1970s and 80s. Note that 15% of the density management units proposed in this alternative are lightly-managed young stands (290 acres out of total 1,996 acres of density management thinning). The remaining 85% of the proposed density management thinning units are managed plantations which regenerated after clearcut harvesting.

At the stand level, treatment would have short-term effects on structural conditions and long-term effects on developmental trajectories in treated lightly-managed units. In the short-term, treatment would remove codominant (and some dominant) trees, release some understory shade-tolerant trees, and increase horizontal variability in these units by creating gaps. Some existing snags would likely be felled for safety or operability during treatment in units or along haul routes; few high-value snags (i.e. tall, hard snags with at least some bark still intact) are present in units, so loss of these structures would be minimal. Similarly, some (mostly low quality) down wood would be damaged during harvest. Densities of hard (class 1-2) snags and down wood would be increased through snag and down wood creation, residual tree damage, and some increased blowdown. In the short-term, Alternative 2 would increase the density of temporary uninventoried roads in these lightly-managed units, creating edge habitat and decreasing interior habitat conditions until canopies closed and compaction was ameliorated by natural soil aeration.

In the long-term, thinning would improve tree growth rates, crown ratios, and height/diameter ratios, and would increase structural and spatial diversity in treated units. Developing large tree boles would eventually provide better live structures (deep furrowed bark, epicormic branches) and dead structures (large class 1 snags). Creation of gaps and release of understory shade-tolerant trees and individual overstory pioneer cohort trees could accelerate the transition from Biomass Accumulation to Maturation

structural stages in these units.

Cumulative Effects

No lightly-managed stands would be manipulated by Federal agencies in the analysis area, other than with the proposed action. Few, if any, lightly-managed young conifer stands exist on private land in the analysis area. As described above, other Federal actions propose thinning approximately 360 acres of lightly-managed young stands immediately north of the analysis area (just outside the East Fork Coquille 5th field). Most of these Tioga Density Management EA units are part of larger stands which would have portions left unthinned. At the landscape scale (in the 5th field watershed and the surrounding area to the north), some lightly-managed young conifer stands would be thinned to promote development of late-successional forest characteristics to meet LSR objectives but a larger fraction would remain untreated, to develop as described for Alternative 1.

There is some environmental risk (exposure to a chance of loss) with treatment of lightly-managed stands. Loss dimensions (Cleaves 1994) could include: a) retarding development of some late-successional characteristics (through degradation of existing snags and down wood snag/down wood pools, degradation of interior conditions), and b) degrading an uncommon habitat type (late Competitive Exclusion-stage stands). Exposure to this risk would extend over two seres (estimated range: 50-100 years). The chance of loss has not been quantified, but is assumed to be small due to the nature of the action, and the observation that few late-successional associates utilize late Competitive Exclusion-stage stands. No studies have documented (late-successional or other) species exclusively using late Competitive Exclusion stage stands. Environmental risks would be ameliorated by treating only 26% of the lightly-managed stands in the analysis area. Also, the proposed treatment units exclude the most ecologically valuable portions of lightly-managed stands by targeting specific areas where remnant trees, snags, and logs are relatively rare. Few, if any of these stands, have ever been thinned. Many are close to 80 years of age, after which age the RMP prohibits density management thinning, so Alternative 2 capitalizes on a closing window of opportunity to thin some of these lightly-managed young stands. Remnant soft, short snags exist in many of these units; however, experience shows that short snags typically survive thinning harvest operations. Large, soft down logs exist in many of these stands as well; however, they are also present in many of the younger, managed plantations targeted for thinning. Therefore, these large, soft down logs are less limiting on the landscape. Road construction or renovation would not remove any trees > 80 years of age or tall, remnant snags.

The cumulative effects of Alternative 2 on lightly-managed stands, considered in conjunction with other federal, state and private actions in the analysis area and surrounding landscape, would therefore include: a) short-term and long-term modification of structural conditions in 650 acres of lightly-managed stands (described above); b) faster conversion of 650 acres from the late Competitive Exclusion stage to the Maturation stage; and c) maintenance of 834 acres in the analysis area (and additional areas outside it) as lightly-managed late Competitive Exclusion-stage stands; and d) low risk of degradation of an uncommon habitat type or impacts to late-successional associates. Conversion of some stands from the late Competitive Exclusion stage to the Maturation stage would represent an enhancement of late-successional conditions in and adjacent to the analysis area, leading to faster development of structural complexity (e.g., gaps, large boles, large hard snags). The proposed treatment units protect the most ecologically valuable lightly-managed young stands by targeting specific areas where remnant trees, snags, and logs are relatively scarce, so the cumulative effects to the particular attributes of concern are even less. The RMP anticipated thinning in stands "regardless of origin (e.g. planted after logging or naturally regenerated after fire…)" (USDI 1995, ROD pg 19).

4.2 Wildlife movements and roads (Issue 2)

4.2.1 Alternative 1 (No action)

Direct/Indirect Effects

The ability of wildlife to move around the analysis area would remain unchanged under Alternative 1. No roads would be constructed or reopened, but neither would any be decommissioned or gated. The habitat for wildlife susceptible to road-related disturbance and fragmentation would continue to be impacted in the vicinity of roads otherwise identified for decommissioning in the action alternative. There would continue to be about 181 miles of roads in the analysis area and an open road density of 2.55 miles/mile^2 on BLM-administered land (2.50 miles/mile^2 across the entire analysis area). Approximately 6.8 miles of road would continue to self close. Open road density would remain well above the target level of 1.1 miles/mile^2.

Cumulative Effects

The effects of past BLM and private road activities have resulted in the road mileages and densities mentioned above. Several other BLM projects would affect road densities in the East Fork Coquille 5th field watershed (see Table 4-1). Overall, these BLM projects decommission far more roads than they propose to construct, so open road densities would continue to decrease on BLM-administered land within the 5th field watershed. The decrease on BLM-administered land would be offset to an unknown degree by continued road construction and road reopening on private lands.

4.2.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

Roads can affect wildlife by creating a physical or perceived barrier to movement, acting as avenues for edge species to utilize interior habitats, and by encouraging harassment via vehicle traffic and hunting (Clark et al. 2001, Cole 1996, Cole et al. 1997, Gaines et al. 2003, Gibbs 1998, Pope 1994, Rittenhouse et al. 1994, Wisdom et al. 1986). Alternative 2 would result in a short-term (~ 5 year) increase in road density but a net overall long-term decrease. In the short term, 4.8 miles of new roads would be constructed and 8.4 miles of currently closed (i.e. healed) roads would be reopened. In the long term (> 5 years), 50.7 miles of road would be closed through decommissioning, gating, or self-closure including decommissioning all but 0.1 mile of the new road construction. Open road density would decrease to 1.74 miles/mile^2 on BLM-administered land and 1.95 miles/mile^2 across ownerships. Although the open road density would remain above the target of 1.1 miles/mile^2, the density would decrease appreciably over Alternative 1 levels. The RMP states that new road construction could be considered "if the potential benefits of silviculture… and other activities exceed the costs of habitat impairment" and that they should "be routed through unsuitable habitat where possible, and be designated to minimize adverse impacts" (USDI 1995, ROD pg 19-20). Nearly all the new road construction in this alternative would occur within unit boundaries or adjacent young plantations. No new roads would be constructed through forest stands > 80 years of age, and all would utilize minimum road corridor clearing widths. The new road construction and renovation or improvement of existing closed road would provide access to approximately 775 acres of treatment units.

Three kinds of road impacts to wildlife are assessed: traffic, canopy gaps, and ground cover gaps.

<u>Traffic</u>

Although road traffic impacts often center around direct mortalities (road kill), a greater traffic impact of the gravel forest road system in the analysis area is probably harassment and poaching, since road traffic is relatively light and sporadic in this remote area. Harassment and poaching impacts are especially

detrimental to big game (Cole 1996, Cole et al. 1997, Gaines et al. 2003, Pope 1994, Wisdom et al. 1986). The new road construction and reopening of currently closed roads associated with this alternative is not expected to appreciably increase harassment or poaching since these roads would be open to traffic for < 3 years and the roads would be constructed incrementally over a period of 4+ years; most would then be decommissioned. Once roads are closed, there may be an increase in non-motorized recreational use along the roads; although the overall road use by people is expected to decrease. In the long term (> 5 years), there would be a net reduction in open road density on BLM land (from 2.55 miles/mile^2 to 1.74) which would reduce harassment and poaching impacts to wildlife.

Canopy gaps

New road construction through forest could create new gaps in the forest canopy and fragment otherwise contiguous stands. However, no new roads would be constructed through forest stands > 80 years of age, and Design Features require minimal clearing widths on all new road construction. Typical clearing widths (25-30 feet) are less than the average tree spacing proposed in the thinning units; therefore, the impact of road-related canopy gaps should be minimal.

Ground cover gaps

New road construction and the reopening of currently closed roads creates gaps in ground cover (i.e. the shrub and herbaceous layer, duff, woody debris) which could impede movements of small mammals and amphibians (Clark et al. 2001, Gaines et al. 2003, Gibbs 1998, Rittenhouse et al. 1994). Without ground cover to hide them, these small species may be reluctant to cross roads and risk predation. In the long term (> 5 years), far more roads would be decommissioned or fully decommissioned under this alternative than would be constructed or reopened. Ground cover should be restored rather quickly on these decommissioned roads as vegetation reestablishes. Fully decommissioned roads would have slash pulled onto the road surface and/or grasses seeded to more quickly restore ground cover. Most (67%) of the new roads constructed under this alternative are short spurs < 0.25 mile long which presumably have less of a barrier effect than longer roads which completely bisect habitat patches. The barrier effects of roads are probably independent of road length for small, less mobile wildlife species because of the smaller scale of their movements.

Cumulative Effects

Road density on private lands would likely continue to increase as roads are constructed or reopened to facilitate harvest. Several other BLM projects would affect road densities in the East Fork Coquille 5th field watershed (see Table 4-1). Overall these projects, together with the Brummit Density Management and Restoration EA, decommission far more roads than they propose to construct; although there would be a temporary increase in roads over the short term (< 5 years) as new roads are constructed before others are decommissioned. Open road densities would continue to decrease on BLM-administered land within the 5th field watershed. The cumulative effect of road construction and renovation associated with this EA and other BLM projects, together with the effects of roads on private lands are not expected to seriously impede wildlife movements in the 5th field watershed and neighboring areas because, a) the impacts would be spread across a wide area, b) most of the road construction on BLM land would be low standard, short, temporary roads, c) the impacts would be largely confined to a relatively short period of time (< 5 years) until the road surfaces begin to accumulate ground cover, d) most of the BLM road construction would occur within harvest units where the impacts to overstory vegetation are driven primarily by the harvest prescription, e) private road construction generally does not occur on BLM-administered land, and f) overall, the BLM actions result in far more road decommissioning than road construction or road reopening. In the long term, the proposed action would reduce road barrier effects by appreciably reducing road density.

4.3 Effects on forest resources

4.3.1 Alternative 1 (No action)

Direct Effects (immediate within-stand)

There would be no immediate changes in within-stand forest conditions with the No Action Alternative. In the short-term young, dense conifer cover would remain > 55% in the analysis area; federal young, dense conifer stands would retain > 24% cover. Late-successional (> 80 years old) cover in the analysis area would remain approximately 40%. Hardwood stands < 80 years old would cover approximately 7% of the analysis area, including both riparian influenced areas and disturbed, mesic upland areas. Dense young stands would retain low horizontal and vertical diversity, few canopy gaps, limited dominance differentiation, and few structural legacies. Relative densities in these stands would remain high (> 60), suggesting competition, mortality and stagnation of tree growth. In the short term distinct stand types, including lightly-managed stands and hardwood stands, would remain as described in Section 3.3. Existing road ecotones would remain at current densities; no additional temporary roads would be built, and none would be closed or restored.

Indirect Effects (temporally or spatially-disjunct)

Indirect effects of Alternative 1 would include those effects predicted to occur in the reasonably foreseeable future, as well as effects occurring at larger spatial scales (landscape scale). Indirect temporal effects of Alternative 1 on untreated stands in the analysis area would include: a) continued slow tree growth and suppression, retarding development of late-successional tree characteristics; b) maintenance and creation (through suppression) of deformities and snags at tree- and stand-levels; and c) slow development of stand structure (slow stand development), retarding achievement/creation of late-successional conditions (an RMP goal)(USDI 1995, pg 2-33). Without treatment (or other disturbance), most individual trees within dense stands would experience strong competition for light; competitive exclusion would become increasingly intense, leading to decreased height and diameter growth, loss of lower limbs, and suppression mortality. Without treatment (or other disturbance), competition in dense stands would eventually lead to crown recession, poor height/diameter ratios, and suppression mortality for many individual trees (Figure 4-1). Mean stand DBH would only be marginally > 20" by age 80. Crown ratios at age 80 would average < 50%, suggesting few trees would develop dominant size and structures. Low crown ratios and high height/diameter ratios (> 90) could lead to large areas of blowdown (Oliver and Larson 1996) as competitive exclusion intensified. Only individual trees in open microsite locations (local gaps) would retain sufficient crown to develop massive growth forms. Considering current dense conditions in these stands, few existing trees would become massive, and very few trees from the existing cohort would develop large limb structures (key habitat features for some late-successional species). Large disturbance and a new, lower density cohort of trees might be required to eventually produce the densities of large trees with structures associated with late-successional stands (Poage and Tappeiner 2002).

Under Alternative 1, stand structure (including late-successional characteristics) would be slow to develop. Increases in vertical diversity would require release of shade-tolerant individual understory trees and gaps large enough to allow second canopies to develop. Horizontal structure would also increase slowly. Fine-scale gaps would develop as codominant trees succumbed to competition; larger gaps would only develop with larger disturbances (large blowdown events, fire, or disease). Dense, young stands would remain in the early Competitive Exclusion stage of stand development, producing moderately high amounts of pole and young conifer snags, but few large trees and few large snags or large down wood. Snags would in general be the smaller trees in the stand with somewhat limited wildlife utility (e.g., lacking deep, fissured bark). In summary, Alternative 1 would not enhance

development of late-successional conditions in dense young stands.

At the landscape-level, changes in cover over time by different structural types in the analysis area have been modeled, assuming no federal management, fine-scale natural disturbances, and 60-year rotations in private holdings (Analysis File section 1.17). If no treatment or other large disturbance occurred in the analysis area, federal lands in the analysis area would continue succession towards late-successional conditions. Most young conifer stands would follow dense successional pathways, taking long periods to enter Maturation stages, the onset of late-successional conditions (Figure 4-2). In hardwood stands not maintained by fluvial disturbance, unstable soils, or very moist conditions, succession towards conifer dominance could eventually occur. Succession to conifer dominance in these stands could require up to 100 years, and might not occur where mixed stands had low conifer densities and high salmonberry (or vine maple) cover. Federal lands in the analysis area in Competitive Exclusion structural stages would increase from 11% to approximately 25% by 2029; this cover would decrease subsequently. Cover by stands in Vertical Diversification or more advanced structural stages in federal lands would remain > 50%, becoming approximately 70% by 2104. The analysis areas as a whole would retain approximately 33% cover by advanced structural stages, approaching 46% cover by 2104.

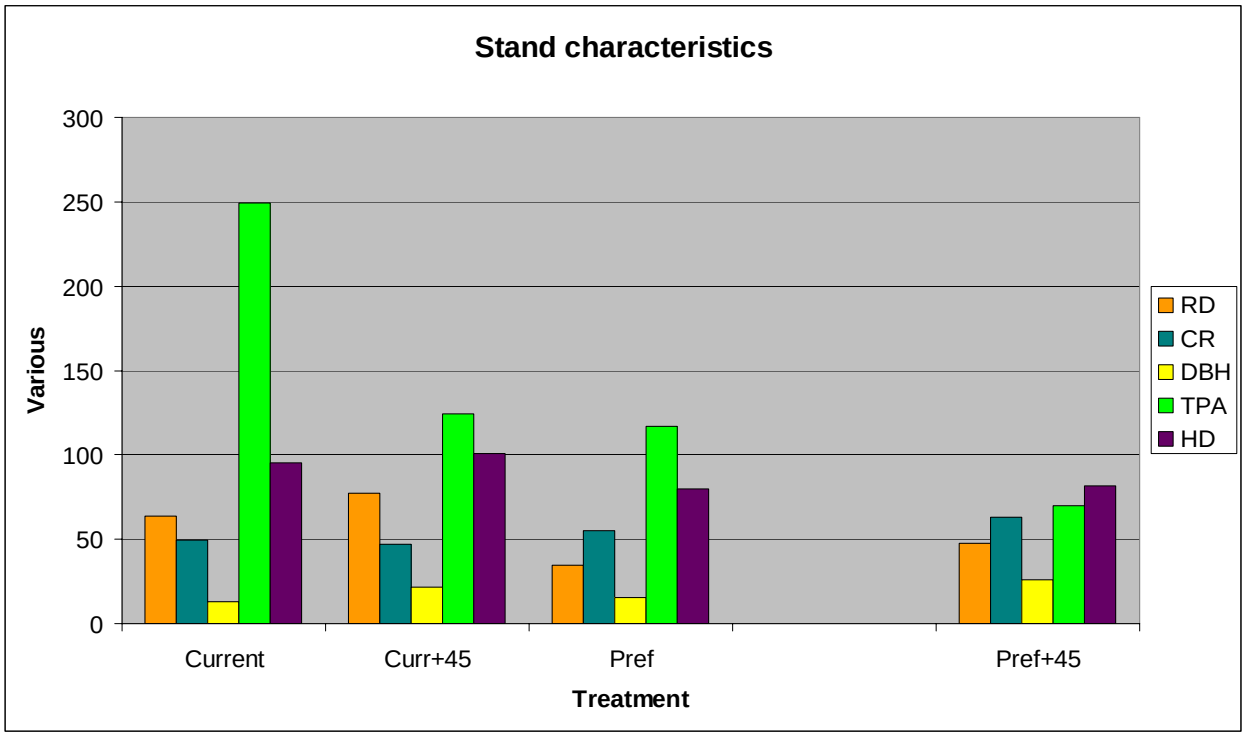


Figure 4-1 Stand characteristics for 5 representative conifer-dominated stands proposed for treatment within the analysis area, modeled using SPS (Arney 1991). Mean relative density (RD), crown ratios (CR), diameters at breast height (DBH), tree/acre (TPA), and height/diameter (HD) ratios are presented for 5 representative units, for 4 scenarios: 1) current conditions ; 2) conditions (with no action) in 45 years; 3) conditions in these units under Alternative 2; 4) conditions 45 years after institution of Alternative 2. Limited data and limited modeling tools are available for hardwood-dominated stands and stands currently > 50 years old, so these stands are not modeled. Differences in TPA are attributable solely to competition mortality; recruitment was not modeled.

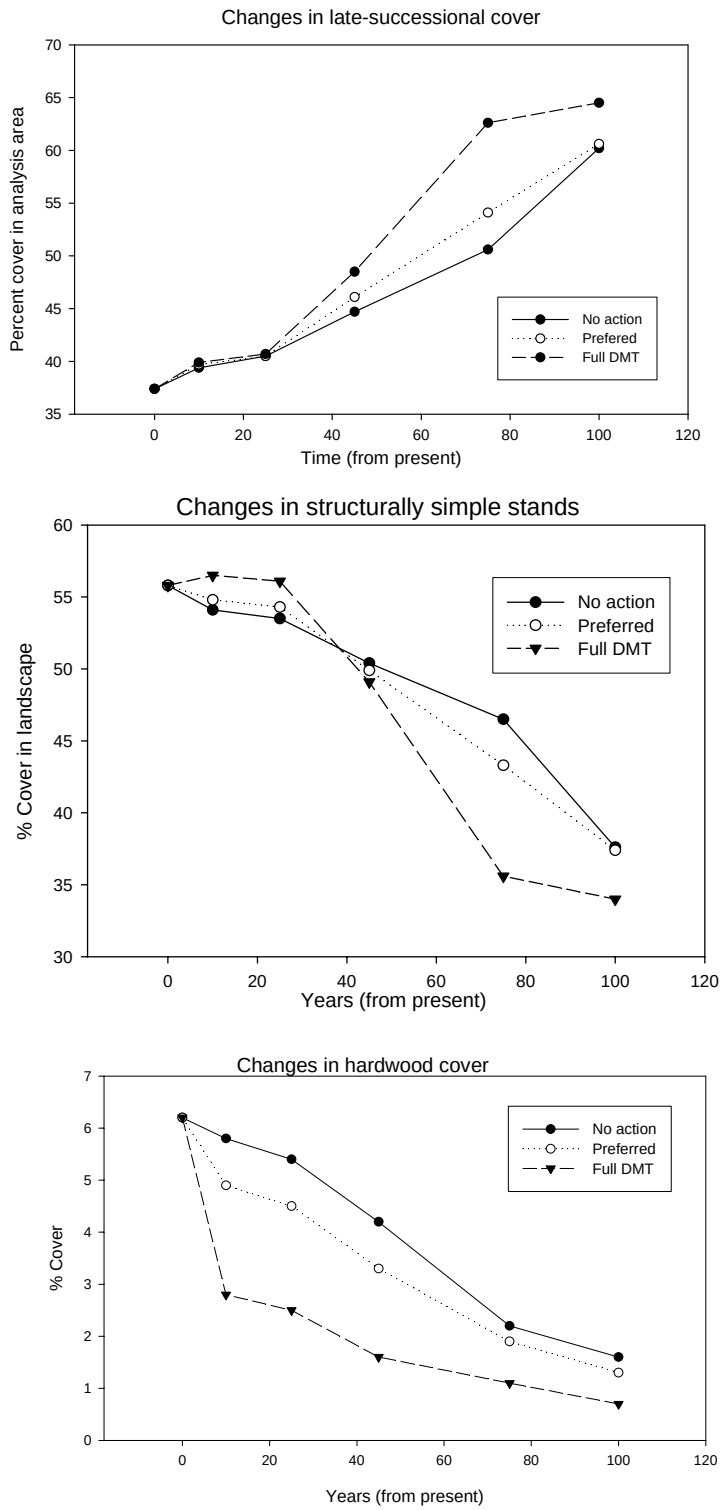


Figure 4-2 Predicted changes in cover in the analysis area by: a) late-successional forest; b) structurally simple stands; and c) hardwood forest, assuming: No Action (Alternative 1), the Preferred Alternative (Alternative 2), or density management thinning (DMT) on all possible federal lands. Private lands are assumed to be managed on short rotations, and large disturbances are not modeled. Results are for all ownerships, produced using a TELSA model (Analysis File section 1.17).

The No Action alternative would also have long-term implications for LSR 261. The No Action alternative would fail to meet several goals suggested by the LSRA (USDA and USDI 1998), including: 1) enlarging existing interior late-successional habitat blocks; and 2) creating additional blocks of late-successional habitat where absent.

Cumulative Effects

The environmental baseline for the analysis area includes > 60% cover by young stands (< 80 years old). Young stands have histories including regeneration harvest (by tractor, skyline or other methods), subsequent dense replanting of Douglas-fir and, in some cases, site dominance by red alder. Alternative 1 (No action), representing the environmental baseline, would maintain natural stand developmental trajectories, including very slow succession in hardwood-dominated areas and areas of high tree density and competitive exclusion.

No other major federal projects have been proposed for the analysis area (Brummit Creek subwatershed) for the remainder of the decade. Several projects have been implemented or are proposed in federal lands in the watershed containing the analysis area, as well as for watersheds directly adjacent to the analysis area (Table 4-1). The preferred alternative of the East Fork Coquille project would harvest approximately 467 acres of forest in matrix allocations in the East Fork Coquille watershed, including up to 328 acres in late-successional stages (< 1.5% of watershed) and up to 139 acres in less-developed structural stages. This stand conversion and subsequent maintenance would preclude future development of late-successional habitat in these matrix areas, and would further fragment remaining late-successional habitats in the analysis area. Approximately 2,400 acres would be commercially thinned under the East Fork and Lower East Fork Coquille EAs. This thinning would have many of the same effects on the landscape as density management thinning in the Brummit proposed action, including reduction in within-stand tree competition. Under the current RMP, these matrix stands would be available for regeneration harvest prior to development of late-successional characteristics. Approximately 365 acres of density management is proposed or currently ongoing in the watersheds immediately north of the Brummit subwatershed. These thinnings include a range in retained densities and under plantings, and would generally facilitate development of some late-successional structures (while decreasing the amount of suppression-related small diameter snags). An additional 697 acres of density management thinning in the East Fork Coquille 5th field watershed is planned or recently completed in the Camas subwatershed. The majority of private holdings in the 5th field watershed will probably be maintained on short rotations, and will remain below 50 years of age.

The cumulative effects of no federal action and short rotations on private lands on forest structural types in the analysis area have been modeled (Analysis File 1.17). This scenario, roughly comparable to Alternative 1, predicted modest changes in forest structure over the next 45 years include: a) a reduction (from 6%-4%) in hardwood-dominated stands; b) an increase (through succession) in late-successional stands (from 37-45%); c) a decrease in young stands (from 56%-50%). Assuming no disturbances (an unrealistic assumption), hardwood stands would be functionally eliminated outside thin riparian corridors and the majority of federal lands would be in late-successional forest stages after 100 years.

4.3.2 Alternative 2 (Proposed action)

Direct Effects (within-stand)

Direct effects of Alternative 2 on treated conifer stands in the analysis area would include increases in individual tree growth and health, average tree size, increased horizontal variability (gaps), increased blowdown (initially) and damage to individual trees. Tree densities in treated units would be greatly reduced (Figure 4-1); the most intense thinning would reduce some units to approximately 45 trees/acre; these units would still maintain > 50% canopy cover post treatment, increasing to around 80% after 5-8 years (Chan and Cole 2002a, Chan et al. 1996, Chan 2004). The majority of cut trees would be in suppressed, intermediate, or codominant positions. Resultant units would have an immediate increase in mean crown ratio and DBH and a decrease in mean height/diameter ratios, since smaller, weaker trees would be removed. Densities of brooms, double tops and other suppression/release structures would be reduced (e.g., from 15% to 5-12%, Curtis and Marshall 2004) due to retention of best-formed individual trees. However, such structures in older stands frequently are associated with tolerant species (e.g., western hemlock) and are not currently present in young, dense stands. Horizontal variability within unit areas outside of gaps would change dramatically in some individual units. Trial marking in a sample of ten units suggested changes in the coefficient of variation (CV) of trees/acre with a range of +53% to -70% (average change for all ten units was a decrease in CV of 2%). Gap areas would greatly increase horizontal variability in tree density, light/microclimatic environment, and shrub/ground layer characteristics in 10 units at the unit-level.

Stand thinning associated with Alternative 2 would lead to damage to residual trees, and increased chances of blowdown. Based on prescriptions, 10-30% of individual trees could receive some damage during harvest (Curtis and Marshall 1986, Hann and Kellog 2000). Some of these damaged trees would develop deformities currently lacking in young, dense stands; a subset of these damaged trees would die and enter snag/down wood pools over time. Blowdown would also contribute to down wood pools. Blowdown would increase initially following thinning, and blowdown trees (down wood) could reach 0.25-2.0 trees/acre (Curtis and Marshall 2004, Hann and Kellog 2000) or higher. As trees in formerly dense units became dominant and developed larger root systems, blowdown would probably decrease. Prescribed creation of snags would immediately increase snag densities by from 1-10 snags/acre in treated units (Table 8-4); simultaneously, some snags would be downed by thinning, entering down wood pools. Down wood densities would increase by approximately 1 tree/acre in most units, not including snags felled during thinning operations.

The effects of the proposed action would be different in riparian communities and in hardwood conversion areas than in conifer DMT areas. Thinning in first-order riparian communities would immediately shift these communities away from dominance by red alder and would facilitate development of large-boled conifers; this would also change shrub and herb communities in these ecotones. Hardwood conversion areas would be shifted from red alder-dominated communities (often with sword fern or salmonberry understories) in canopy closure or mature stages to ecosystem initiation stages, with mixed conifer seedlings and > 2 snags and pieces of down wood/acre provided by red alder from the converted unit.

Indirect Effects (temporally or spatially-disjunct)

Under Alternative 2, changes would occur in treated units in the reasonably foreseeable future, facilitating development of late-successional conditions in slightly more of the federal portions of the analysis area in coming decades (Figure 4-2). Treated conifer units could develop mean DBHs 5 inches greater than with no action (Alternative 1) by 2049 (Figure 4-1). Height/diameter ratios would be

reduced following thinning, but these ratios could still be as high as 80 in treated units by 2049. Development of large limb structures low in the canopy would probably not be facilitated by treatment of units > 30 years old, which have already undergone self-pruning; however, non-commercial LSR thinning associated with the proposed action (see Analysis File section 1.10) would lead to wide spacing, which could facilitate development of these structures in young units over time. Canopies would close in created gap areas with time; trees at periphery of gaps could increase epicormic branching and develop larger limbs facing gap areas. Gap areas planted with tolerant seedlings could contribute to development of multiple canopy layers over time. Alternative 2 would include modification of young, dense conifer stands and lightly-managed older stands within the analysis area, and hardwood communities. Cover by dense conifer stands < 80 years old would be reduced by almost 2,000 acres, from 27% to approximately 10% of the analysis area. Dense, young stand types were probably a component of pre-European landscapes in the analysis area; 1930s cover maps include 9,655 acres (34%) of seedling/sapling and small second-growth cover. Regeneration densities in natural Cohort Establishment-stage stands like these vary widely ((Franklin et al. 2002), and probably included low-stocking stands influenced by multiple fires, as well as stands without seeding or other limitations with high to very high stocking densities. Dense young stands support distinct communities and favor some species (e.g., Pacific slope flycatcher (Muir et al. 2002)). Dense stands may also buffer old stands from effects of certain edge species, by providing low nutrient habitat outside these older stands (Marzluff et al. 2000). Dense stand types currently present in the landscape lack some components of historic young dense stands, including high variability in tree densities and species, and legacy structures. Although dense young conifer units in the analysis area would be reduced to levels which might be slightly below historic means, these levels are probably not outside the historic range of natural variability for the analysis area; young dense stands in the remainder of the watershed would remain at the high end of the historic range of natural variability. Effects to lightly-managed older stands are discussed in Section 4.1.

Red alder has ecological benefits including production of horizontal and vertical structural diversity in mixed stands, increasing species diversity, and providing biotic (food) function (Duncan 2004). Hardwood stands support numerous species and guilds including some neotropical migrant birds (Weikel et al. 2003). Alternative 2 would convert approximately 513 acres of young hardwood communities into (predominantly) seedling conifer stands, reducing cover by hardwood communities in the analysis area from 6.6% to 4.9%. An additional 477 acres of mixed hardwood units (conifer-dominated but with significant hardwood cover) would have hardwoods removed and conifers thinned. Hardwood snags and down wood would be left in these converted units at densities of 2/acre (each); conifer snags and down wood would be left at densities from 0-10/acre (Table 8-4). The densities of created legacies would be lower than reference stand legacy densities (USDA and USDI 1998), but are appropriate for existing stand structural stages; additional legacy structures would develop during stand development. Hardwood trees (specifically red alder) would not be entirely eliminated from hardwood conversion areas for several reasons: a) proposed treatment unit sizes are smaller than actual hardwood/mixed stands; b) treatment units would not include stream and terrace areas; c) maintenance in conversion areas is often incomplete, allowing hardwoods to occupy treated areas; d) fluvial and hillslope disturbances within treated units create moist, disturbed soils favorable to red alder invasion. However, although individual hardwood trees would remain even in converted stands, hardwood communities (including contiguous, interacting hardwood canopies and shrub/herb layers) in the analysis area would be reduced by approximately 25% by Alternative 2.

Alternative 2 would result in creation of roughly 9.4 acres (5 miles) of road ecotone in the form of uninventoried roads (Gucinski et al. 2000). This ecotone would be in the form of thin, linear patches of

canopy gap and compacted soils. This ecotone would be created in young, dense, disturbed conifer stands often along old, existing harvest roads. In some older units (units 89n, 89s, 89ne, 52), new road ecotones would be created. Road ecotones support specialized biota (e.g., edge species), exchange energy with adjacent systems (e.g., microclimatic effects) and influence adjacent systems in ways different than interior canopy gaps, and the width of this influence is far larger than road width (Gucinski et al. 2000). Alternative 2 would entail decommissioning > 90% of these uninventoried temporary roads, as well as actively and passively decommissioning an additional approximately 50 miles of existing uninventoried roads. Road ecotones and the effects of these ecotones on microclimate, soils, hydrology and community structure can last for considerable time, even with fully decommissioned roads.

Although Alternative 2 would result in minimal changes in total cover by late-successional stands in the analysis area, this alternative would facilitate meeting several LSRA goals (USDA and USDI 1998) developed to meet RMP objectives of creating late-successional forest conditions (USDI 1995). Specifically, Alternative 2 could enlarge existing interior late-successional habitat blocks (e.g., units 32, 39, 58, 59, 60, 61, 64, 68, 83, 89n, 89s, 89ne), improve connectivity within LSRs (e.g., units 38, 55, 76, 77, 80), and create additional blocks of late-successional habitat where absent (e.g., units 48, 75n, 86). Other LSRA goals would not be met in all units, including: maintaining interior habitat conditions in adjacent old-growth stands (e.g., units 58e, 59, 84, 89s, others), and avoiding construction of new roads or upgrading of naturally closed roads through large contiguous stands unless there are no feasible alternatives (e.g., units 26, 42, 52, 74, 89n, 89s, 89ne).

Cumulative effects

The proposed action would entail the only major federal activity planned in the Brummit Creek subwatershed. The proposed action would encompass density management thinning, hardwood conversion, and non-commercial (restorative) thinning in some of these stands, as well as riparian restoration. Outside the subwatershed, approximately 2,880 acres of density management and commercial thinning are planned in the surrounding East Fork Coquille 5th field watershed, as well as approximately 470 acres of regeneration harvest (see Table 4-1). The effects of past activities on forest resources have been incorporated into the discussion of baseline conditions in section 3.3. Almost one half of the 5th field watershed is privately owned, and would be managed on relatively short rotations favoring Douglas-fir (described above and modeled in Analysis File section 1.17). Approximately 1,500 acres of thinning are proposed in areas roughly adjacent to (and north of) the analysis area. The approximate 2,500 acres of thinning and conversion proposed in Alternative 2 represent almost 9% of the analysis area, approximately 3% of the 5th field watershed and < 4% of LSR 261. Thus, Alternative 2 would result in large structural changes at unit scales (e.g., creation of gaps, larger trees), moderate changes at the subwatershed scale (e.g., decrease in cover by hardwoods, more late-successional cover over time), and minimal change in conditions at the LSR or province levels (e.g., slightly shorter time to achieve > 50% late-successional cover). Since 1995, approximately 31% of the dense, young conifer stands on BLM-administered land in LSR 261 have been thinned or are proposed for thinning, including the Brummit Creek EA. These cumulative BLM planning efforts have considered the full extent of the LSR, and therefore, there would probably be few additional thinning projects proposed in LSR 261 in the next decade.

The cumulative effects of federal and private activities associated with Alternative 2 would include > 25% reduction in hardwood communities in the analysis area, to levels < 5%; mixed conifer hardwood stands would retain cover > 25%. Historic conditions (prior to logging) in the Oregon Coast Range may have included approximately 11% cover by hardwood communities and an additional 38% cover by

mixed conifer/red alder stands (Ripple et al. 2000). Cover maps from the 1930s (Harrington 2003) depict no hardwood cover in the analysis area; however, the coarseness of this mapping effort probably underestimated cover by hardwood communities. Air photos from the 1950s for the analysis area show conifer cover in most areas, with hardwoods predominantly in thin riparian areas and debris torrent paths. The analysis area includes more upper slope areas, and less valley margin, terrace, and lower slope habitat than other portions of the watershed; upper slope landscape positions probably supported less hardwood cover than lower positions, prior to creation of extensive moist, disturbed soils by logging (after 1950). Alternative 2 would reduce cover by red alder communities in the analysis area to roughly ½ of the mean historic cover for hardwood stands in the Oregon Coast Range (Ripple et al. 2000); however, this cover is probably within the historic range of natural variability for hardwood cover in upper watershed positions. Conversion/loss of hardwood communities in the analysis area could impact species dependent on these communities within the subwatershed (e.g., neotropical migrants (Weikel et al. 2003), emergent insects, others). However, hardwood communities are not limited in the remainder of the 5th field watershed or Coast Range in general.

Modeling suggests that through time Alternative 2 would result in moderately large changes in forest structure at stand scales (Figure 4-1), but only small changes at the subwatershed scale (Figure 4-2). By the year 2049, 46% of the analysis area would be late-successional (in a Maturation stage or more advanced) verses 44.6% with Alternative 1. Without disturbance, Alternative 2 would lead to higher cover by young, structurally simple stands initially (due primarily to hardwood conversion), lower cover by young stands at 2080, and the same cover by young stands in 2100 once all federal stands became older.

4.4 Effects on botanical resources (including special status species)

4.4.1 Alternative 1 (No action)

Direct/Indirect Effects

Density Management

Vascular Plants

Young 23 to 79 year old stands in the stem exclusion stage (Oliver 1981) would remain densely stocked with very little light reaching the forest floor. As a result, there would be less shrub cover in the understory than if the stand were thinned (Bailey and Tappeiner 2002, Bailey and Tappeiner 1998).

Non-vascular Plants

Young conifer stands in the stem exclusion stage (Oliver 1981) would remain densely stocked with very little light reaching the forest floor. Hotspots for macrolichen diversity in young plantations in the Oregon Coast Range include old remnant trees, large wolf trees, old shrubs, hardwood trees, and rocky outcrops (Muir et al. 2002). No additional gaps would be created in the stands and overall macrolichen diversity would remain low with the greatest diversity occurring in areas with these hotspot characteristics.

In the Coast Range of Oregon, there is no apparent difference in bryophyte species richness between unthinned and thinned stands less than 50 to 80 years old (Rosso 2002). However, bryophyte abundance on older shrubs may actually be greater in unthinned stands because they would not be adversely affected by damage due to logging (Rosso 2002). Thus, bryophyte diversity would likely remain unchanged or even be greater than if the units were thinned.

There is limited data available on the effects of forest management as related to fungi richness and abundance. Mycorrhizal fungi are most active in the upper soil and humus layers. They are sensitive to increases in soil temperature, soil compaction, and the erosion that can accompany forest harvest (Molina et al. 1993). As plant species composition changes during forest succession, the fungus communities undergo change (Molina et al. 1993). Since plant-species composition would not be altered, and the present fungal community would not be disturbed, the current species association would remain unchanged.

Hardwood Conversions

Vascular Plants

Red alder is the dominate overstory tree species in the hardwood conversion units. Red alder is a relatively short-lived species, maturing at about 60 to 70 years, with a maximum age usually around 100 years (Worthington et al. 1962). These units typically have gaps in the overstory canopy created by the break up of the red alder and by natural blow down. These conditions have resulted in much more sunlight reaching the forest floor than in the density management units and explains why the understory shrub and herb cover is normally quite dense. If no management action were undertaken, these stands would continue to have understories dominated by shrubs that have increased with the breakup of the alder overstory (Hibbs et al. 1994).

Non-Vascular Plants

Canopy gaps, large remnant trees, wolf trees, and hardwoods are primary areas of macrolichen diversity in forested stands (Neitlich and McCune 1997). These units are dominated by a hardwood species, red alder, and typically have frequent canopy gaps, two conditions important for macrolichen diversity. If no management action were undertaken, conditions would remain favorable for macrolichen diversity.

Bryophyte abundance is lower in dense stands and positively correlated with canopy gaps, percentage of hardwoods, and incident solar radiation (Rambo and Muir 1998). Research also shows that certain bryophytes benefit from litter and through-fall (water that falls through the canopy) of deciduous trees. This addition of deciduous litter increase nutrients and pH level which in turn enhances habitat conditions that promotes sporophyte production (Wiklund 2003). These units are dominated by a hardwood species, red alder, and typically have frequent gaps, two conditions important for bryophyte abundance. If no management action were undertaken, conditions would remain favorable for bryophyte abundance.

There are limited data available on the effects of forest management as related to fungi richness and abundance. Mycorrhizal fungi are most active in the upper soil and humus layers. They are sensitive to increases in soil temperature, soil compaction, and the erosion that can accompany forest harvest (Molina et al. 1993). As plant-species composition changes during forest succession, the fungal communities undergo change (Molina et al. 1993). Since plant-species composition would not be altered, and the present fungal community would not be disturbed, the current species association would remain unchanged.

Cumulative Effects

Several other BLM timber harvest projects have been implemented or planned for the East Fork Coquille 5th field watershed (see Table 4-1). These combined projects include 3,211 acres of commercial thinning and density management thinning. There are approximately 17,000 acres of timber stands 30 to 80 years of age on BLM-administered land in the East Fork Coquille 5th field watershed. Thus, 19% of the total watershed has already been thinned or is proposed for thinning. Many of the

unthinned stands are in the stem exclusion stage of forest development where a dense canopy cover limits the amount of light reaching the forest floor which also limits the understory plant diversity. Treating these stands would accelerate development of old-growth characteristics associated with greater vascular and nonvascular plant diversity (Tappeiner et al. 1997). Therefore, not treating these conifer stands would slow down the time it would take these stands to achieve old-growth stand development characteristics associated with greater vascular and nonvascular plant diversity.

4.4.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

Density Management

Vascular Plants

The density management units have dense canopy cover with little light reaching the forest floor. Canopy cover has a strong influence on the cover of shrubs (Klinka et al. 1996). Thinning these young Douglas-fir stands would hasten the development of multistory stands by recruitment of conifer regeneration in the understory as well as by enabling the survival of small overstory trees and growth of advanced understory regeneration (Bailey and Tappeiner 1998). Richness, frequency, and cover of some herbaceous species and most species groups, including exotics, are also greater in thinned stands than in unthinned stands (Bailey et al. 1998). Although thinned stands have a greater number of exotic plants than do unthinned or old-growth stands, exotic plant cover is normally low (Bailey and Tappeiner 2002).

Non-vascular Plants

Thinned stands support a slightly higher abundance of forage lichens than do unthinned stands less than 50 to 80 years old (Peterson 2002). However, traditional commercial thinning appears to have little effect on the overall epiphytic macrolichen communities in young stands (Peterson and McCune 1998). This is because traditional commercial thinning often reduces the number of tree species present in a stand, removes remnant old trees or small diameter trees, and evens spacing between trees (Peterson and McCune 1998). Gaps, hardwoods, wolf trees, and old-growth remnant trees promote the majority of epiphytic macrolichens in young conifer stands (Neitlich and McCune 1997). Leaving within-stand hotspots such as old remnant trees, large wolf trees, old shrubs, and hardwood trees would help maintain or increase lichen diversity in thinned stands (Peterson 2002). Thus, lichen diversity would be expected to increase in areas where gaps were created, were hardwood trees were concentrated and left uncut, and on and near uncut wolf trees and remnant old-growth trees. Thinning prescriptions proposed in Alterative 2 protect remnant trees, maintain current tree species composition including minor conifer and hardwood species, and create gaps, all of which serve to maintain or enhance lichen diversity.

In the Coast Range of Oregon, there is no apparent difference in bryophyte species richness between unthinned and thinned stands less than 50 to 80 years old (Rosso 2002). However, bryophyte abundance on older shrubs may actually be greater in unthinned stands because they would not be adversely affected by damage due to logging (Rosso 2002). Retention of hardwoods species during thinning would contribute to more diverse bryophyte community abundance (Rambo and Muir 1998). In addition, retention of course woody debris in managed stands provides a variety of decay classes for some bryophyte species, and the retention of remnant mature overstory conifers would ensure a continuing supply of coarse woody debris to the forest floor (Rambo and Muir 1998). Thinning prescriptions proposed in Alternative 2 protect and maintain coarse woody debris on the forest floor which would help maintain bryophyte diversity.

There is limited data available on the effects of forest management as related to fungi richness and abundance. One common species of ectomycorrhizal fungi, chanterelle (*Cantharellus formosus*), was

found to fruit in significantly lower numbers following thinning (Pilz et al. 2002). The declines were greatest in the most heavily thinned stands. It is possible that as the trees resume vigorous growth and the forest canopy closes, this species would begin to fruit at the same levels it did prior to the thinning. Further studies are required to verify this (Pilz et al. 2002). The units, then, with the heaviest thinning prescriptions would be expected to have the greatest impact on the existing ectomycorrhizal fungal community.

Hardwood Conversions

Vascular Plants

Despite dramatic loss of plant cover in response to clear-cut logging and slash burning of experimental watersheds (Halpern 1989, Halpern and Franklin 1990), loss of diversity is a short-lived phenomenon. Within two years after burning, species richness exceeded old-growth levels. Most additional taxa are native, ruderal herbs (Halpern and Spies 1995). Thus, dramatic changes could be expected in plant cover, but these changes would be short-lived.

Non-vascular Plants

Lichen and bryophyte species abundance would drop dramatically and pioneer species such as green algal-foliose lichens and early successional bryophytes would slowly recolonize the new conifer plantation. These impacts have been mitigated to a certain extent by retaining and maximizing the number and dispersion of remnant trees, particularly any larger conifer trees that may be present, as well as some hardwoods. The single most important action promoting the accumulation of old-growth associated epiphytic lichens is the retention of propagule sources in and near cutting units. These propagules are provided by older, remnant trees (Sillett et al. 2000). Hardwood conversion prescriptions would retain most large conifer trees, including any remnant trees. In addition, richness of forest floor bryophytes is enhanced when a full range of coarse woody debris decay classes is present (Rambo and Muir 1998). Thus, leaving down wood, particularly any conifer trees that may be present as well as leaving some hardwood trees would be helpful in developing bryophyte species richness in the ensuing young conifer plantation.

Mycorrhizal fungi are most active in the upper soil and humus layers. They are sensitive to increases in soil temperature, soil compaction, and the erosion that can accompany forest harvest (Molina et al. 1993). As plant species composition changes during forest succession, the fungal communities undergo change (Molina et al. 1993). Thus, a significant change in species composition would likely occur in the stands and early seral fungi species would predominate. The exact effects of these changes are unknown though, as there is limited data available on the effects of forest management as related to fungi richness and abundance.

Special Status Species

There are no Threatened or Endangered species known or suspected to occur in the project area. Of the 94 Bureau sensitive and Bureau assessment plant species known or suspected of occurring on Coos Bay BLM, 16 are suspected of occurring in the Brummit Analysis Area (Table 4-2, also see Analysis File section 1.5). This determination was based on the proposed project overlapping the known or suspected range of a species as well as the likelihood that potential habitat is present. Potential habitat was determined from aerial photo interpretation, review of habitat requirement information for each species, and proximity of known site locations.

Pre-project surveys are recommended if Bureau sensitive or Bureau assessment species are known or suspected to occur in a proposed unit. Of the 16 Bureau sensitive and Bureau assessment species known

or documented on the analysis area, only nine are considered practical to survey for. Surveys are not recommended for species that are considered impractical to survey for (USDA and USDI 2004b). Surveys are deemed practical only if they meet all the criteria established in the "Ability to Reasonably and Consistently Conduct Pre-Disturbance Surveys" section of the Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDA and USDI 2004b).

Recommended pre-project surveys are ongoing and are expected to be completed by the end of 2006. To date, no special status botanical species have been found.

Table 4-2 Special status botanical species suspected in the analysis area.

Species	Suspected (S) or Documented (D)	Key habitat features, presence information	Practical to Survey for this Species
Bureau Sensitive (BS)			
Cimicifuga elata (tall bugbane)	S	Perennial forb or herb, coniferous forest, north of Umpqua River, and east side of district. Present in the western hemlock forest association on Eugene and Roseburg BLM lands directly adjacent to Coos Bay BLM land.	Yes
Romanzoffia thompsonii (Thompson's mist maiden)	S	Annual forb or herb, Mossy covered rock outcrops, 750 to 6,000 ft; Slater Ridge at T30S, R9W, Sec 33. The habitat this species prefers is scarce in the proposed project area	Yes
Phaeocollybia californica (California Phaeocollybia)	D	Endemic to the Pacific NW. Form ectomycorrhizal associations with Douglas-fir, western hemlock, and Sitka spruce. There are four known sites of this species on Coos Bay BLM in late-seral or old-growth forests. This species could occur in units with remnant old-growth trees.	No
Phaeocollybia olivacea (olive Phaeocollybia)	D	Mixed woods and under conifers in southern OR and N. Cal. Form ectomycorrhizal associations with Douglas-fir, western hemlock, and Sitka spruce. This species has primarily been found in older stands on the Coos Bay district but has also occurred in 40 yr. old plantations. There are 16 known sites on district.	No
Phaeocollybia oregonensis (Oregon Phaeocollybia)	D	Previously only known from the Oregon Cascades. Form ectomycorrhizal associations with TSHE, PSME, and PISI. There are two sites of this species on district and both are located in old-growth forests. This species could occur in units with remnant old-growth trees.	No
Rhizopogon exiguous (false truffle)	S	Hypogenous species that occurs in coniferous forest. A known site exists adjacent to district in a coniferous forest near Mapleton on the Siuslaw NF.	No
Bureau assessment (BA)			
Carex gynodynama (hairy sedge)	S	Perennial, moist meadows and open forests, <600 m. The habitat this species prefers is scarce in the proposed project area.	Yes
Iliamna latibracteata (California globe mallow)	S	Perennial forb or herb, moist ground and stream banks, openings in the forest, recent burns, roadsides, etc. The only known site of this species on district is along the Big Creek mainline	Yes
Pellaea andromedifolia (coffee fern)	S	Perennial forb or herb, fern, rocky outcrops up to 5900 ft. This species is rare on district but could potentially show up almost anywhere in the analysis area.	Yes
Polystichum californicum (California sword fern)	S	Perennial forb or herb, fern, woods, stream banks, shaded rocky outcrops. This species is rare on district but could potentially show up almost anywhere in the analysis area.	Yes
Bryoria subcana (horsehair lichen)	S	Coastal forest and high precipitation summit. The only known site of this on district is from Big Creek in a late-seral forest stand.	No
Calicium adspersum (pin lichen)	S	Growing on bark on boles of old-growth conifer trees. Habitat is present only where large snags were left in a few units but pin lichens are small and easy to overlook while surveying.	Yes

Diplophyllum plicatum (liverwort)	S	Tree boles of western hemlock and red cedar. There are several sites on district in late-seral and old-growth stands.	No
Heterodermia leucomelos (lichen)	S	Sitka spruce and shore pine branches on forested headlands in the coastal fog zones. Might also be found inland in riparian areas, moist valleys and fog-intercept ridges (USDA 2003). Has been found in both coastal and inland forests on Coos Bay BLM.	No
Lobaria linita (lettuce lichen)	S	Mature to old-growth forests, oak forests with rock outcrops, riparian areas, late-mature tanoak and madrone forests, 1,800 to 6,700 ft, Habitat is present on Coos Bay BLM lands but it has not been located after several years of pre-project timber sale surveys on district.	Yes
Tetraphis geniculata (moss)	S	Found on down logs in late-seral conifer forests in W. OR and WA. Habitat is present on Coos Bay BLM lands but it has not been located after several years of pre-project timber sale surveys on district.	Yes

Cumulative Effects

Several BLM timber harvest projects are planned for the East Fork Coquille 5th field watershed (see Table 4-1). These combined projects include 3,211 acres of density management and commercial thinning. There are approximately 17,000 acres of timber stands 30-80 years of age on BLM-administered land in the East Fork Coquille 5th field watershed. Thus, together with the 1,996 of thinning proposed in Alternative 2, 31% of the 30-80 year old stands in the watershed would be thinned. Many of the remaining 69% which would not be thinned are in the stem exclusion stage of forest development where a dense canopy cover limits the amount of light reaching the forest floor which also limits the understory plant diversity. Thinning dense stands would accelerate the forest development process and would likely shorten the period that these stands would need to attain old-growth attributes associated with greater vascular and nonvascular plant diversity (Tappeiner et al. 1997). Modeling for the Brummit area which accounted for current conditions and assumed continuation of current management practices on BLM and private land suggested that the proposed action in Brummit Creek could increase the amount of potential late-successional forest habitat in the analysis area by 2-6% after 45-75 years compared to the no action alternative (Analysis File section 1.17). Overall, the cumulative effects of Alternative 2 would result in a reasonable mix of thinned and unthinned stands which should maintain short-term botanical diversity and special status species in the analysis area and surrounding 5th field watershed by maintaining a range of thinned and unthinned stand conditions. In the long-term, Alternative 2 promotes the development of key late-successional forest characteristics and should improve habitat conditions for special status and other key botanical species.

Nearly 40% of the analysis area is covered by hardwood or mixed hardwood/conifer stand types, 77% of which is on private land (see Table 3-2). No commercial hardwood treatments have occurred on BLM-administered land in the analysis area within the last decade or so, nor are any others planned. Alternative 2 would reduce the amount of hardwood stands by < 5%. Private forest management practices often include use of herbicide which may reduce diversity of botanical species on private land; however, even ignoring hardwood stands on private lands, approximately 7% of the analysis area (12% of the BLM land) would retain significant hardwood cover after implementation of Alternative 2. Modeling for the Brummit area which accounted for current conditions and assumed continuation of current management practices on BLM and private land suggested that the proposed action in Brummit Creek could decrease the amount of alder-dominated habitat in the analysis area by 20-25% over the next 100 years compared to the no action alternative. Even with the cumulative effects of hardwood treatments, hardwoods, and presumably their botanical associates, would remain well represented in stands in the analysis area.

4.5 Effects on wildlife (including special status species)

4.5.1 Alternative 1 (No action)

Direct/Indirect Effects

Habitat for special status wildlife species, deer, and elk would remain unchanged in the short term. Many of the special status species are associated with late-successional forests. Stands targeted for treatments in this EA would remain unsuitable habitat for special status species associated with late-successional forests and would continue to develop on trajectories destined to develop key habitat characteristics such as large trees, snags, and down wood; deformed trees; multiple canopy layers; diversity in spacing; and large limbs only very slowly. As fuels build up and live crown ratios decrease, the risk of extensive windthrow would increase which could threaten the development desired LSR stand characteristics. Habitat for special status species associated with cliffs and rocky outcrops would remain unchanged. Foraging habitat for deer and elk would remain unchanged. Key habitat features such as remnant trees and snags would remain at current levels.

Cumulative Effects

Special status species associated with late-successional forest currently find little habitat available on private lands within the analysis area; although the private lands may provide sufficient cover to allow some of these species to move between old-growth stands on BLM-administered land. Several other BLM timber harvest projects have been implemented or are planned for the East Fork Coquille 5th field watershed which would result in 3,211 acres of commercial thinning or density management thinning in the 5th field watershed (see Table 4-1); therefore, about 20% of the young stands (30-80 years of age) would be thinned and 80% would remain unthinned. Without thinning, many of these overstocked young conifer stands would progress towards late-successional forest conditions very slowly, if at all (see section 3.3). Impacts of other past harvest actions have established the current habitat baselines for wildlife and are considered in section 3 of the EA. Private harvest units would continue to provide foraging habitat for deer and elk.

4.5.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

<u>Special status species</u>

Table 4-3 lists the special status wildlife species that were assessed. Impacts to the following special status species are addressed below: American peregrine falcon, bald eagle, marbled murrelet, northern goshawk, northern spotted owls, fisher, fringed myotis, Townsend's big-eared bat, and tailed frog. Other special status species are unlikely to be affected because they do not occur in the area, are very unlikely to occur, or the proposed units do not contain suitable habitat. Section 1.11 of the Analysis File contains more detailed analysis.

Bald eagles, marbled murrelets, northern goshawks, northern spotted owls, fisher, and tailed frogs all associate to some degree with large trees (bald eagles) or late-seral forests (rest of the species). There are no known active sites or nests for any of these species within any of the proposed units. Although some spotted owl dispersal habitat would be removed (513 acres) or modified (1,996 acres) by Alternative 2, no suitable habitat would be removed for any of these special status species. The loss or modification of dispersal habitat is not expected to restrict movements of these species between habitat patches since >50% canopy cover would be maintained in most of the density management thinning units and patches of conifers would be retained in hardwood conversion stands where they exist. Chan et al. (1996) and Chan and Cole (2002b) found that stands similar to those in the project area which were thinned to 60 trees per acre had a canopy closure of 49% post treatment. The same stands had a canopy

closure of 75% after 5 years and 82% after 8 years. No adverse impacts to water quality are expected (see Section 4.7), so tailed frog habitat should remain unaffected. Alternative 2 is designed to accelerate development of large trees and late-successional forest characteristics, which should eventually improve habitat conditions for these species. None of the stands proposed for treatment are currently late-successional forest habitat, so the special status species associated with late-successional forests probably use the proposed treatment units rarely, if at all. The potential for use is greatest in the lightly-managed subset of units which do contain some widely scattered remnant characteristics of late-successional forests (trees, snags, and down logs; see section 4.1). Even in these lightly-managed stands, however, use by special status wildlife species associated with late-successional forest is probably negligible because, a) the density of late-successional forest characteristics is very low, b) treatment units target areas where these remnant structures are relatively rare, and c) these stands are not late-successional forest habitat.

There were two possible fisher sightings in 1991 north of the analysis area but within 15 miles. The reliability of these sightings is difficult to evaluate. There are no other known sightings within 50 miles. More recent surveys in the Umpqua and Coquille river drainages failed to locate any fisher, although the surveys were rather limited in extent and intensity. The scarcity of sightings together with work by Slauson and Zielinski (2001) suggest a very low probability that fishers are present in the analysis area. Fishers are most closely tied to late-successional coniferous forests and conditions typically associated with late-successional forests such as numerous tree deformities and large trees, snags, and down logs (USFWS 2004). Since no existing late-successional forests would be removed or degraded by Alternative 2; since large trees, snags, and logs are scarce in proposed treatment units, and since the probability of fisher presence is very low, the proposed action would have virtually no short-term impact on fishers. All prescriptions are designed to promote the development of late-successional forest characteristics and could therefore potentially improve habitat conditions in the future.

Peregrine falcons, fringed myotis, and Townsend's big-eared bats are associated with cliffs or rocky outcrops. No cliffs are present in any of the harvest units, and the only known rocky outcrops within a unit which contain potentially suitable crevices for roosting and hibernating bats are in a density management thinning unit where a light thinning is proposed (unit 31). The resultant canopy cover (estimated > 80%) should be high enough to minimize microclimatic changes.

The Design Features would restrict operating seasons near known or potential nest sites of spotted owls, marbled murrelets, and peregrine falcons to reduce or avoid disruptions to any nesting activities. Shorter peregrine falcon seasonal restrictions are proposed in the China Creek vicinity to balance the relatively higher and more certain impacts of sedimentation on water quality and aquatic species should hauling be pushed to the wet season. The cliff in China Creek has not been surveyed for peregrine falcons, so their presence is uncertain. Seasonal restrictions in China Creek would still eliminate disturbance during the nest initiation phase when, presumably, falcons are more sensitive to disturbance. They are likely less sensitive once they have committed to nesting. Alternative 2 is not expected to have any appreciable affect on habitat since vegetation in the immediate vicinity of the cliff would not be affected, and since, except for their dependence on cliffs for nesting structure, peregrine falcons are habitat generalists (O'Neil et al. 2001).

The Design Features also provide for the retention and creation of snags and down logs which are important habitat features for some of these special status species, including spotted owls and fishers. Since the action alternative is designed to promote development of late-successional forest characteristics, these species should benefit overall from the implementation of the action alternative.

Impacts to spotted owls, marbled murrelets, and bald eagles and critical habitat have been addressed in consultation with the U.S. Fish and Wildlife Service. All project design criteria from the consultation have been incorporated into the proposed action and would be implemented in accordance with the Endangered Species Act. Key project design criteria from the consultation include seasonal restrictions to reduce disturbance impacts and prescription constraints to maintain spotted owl dispersal conditions and protect potential murrelet nesting habitat in scattered remnant old-growth trees.

Deer and elk

Deer and elk foraging habitat would improve slightly due to roadside seedings and the shrub growth response in hardwood conversions (513 acres) and thinned stands, especially the heavy thinnings and gap creation prescriptions. The effects of roads are considered in Section 4.2.

Key habitat features

See Section 4.1 for impacts to snags, down logs, and remnant trees and Analysis File section 1.14 for impacts relative to the Aquatic Conservation Strategy objectives and riparian habitats. See above for impacts to cliffs and rocky outcrops. Other key habitat features such as meadows would not be affected.

Cumulative Effects

Alternative 2 does not contribute towards any short-term cumulative effects to species associated with late-successional forests since no late-successional habitats would be affected. Several other BLM timber harvest projects are planned for the East Fork Coquille 5th field watershed which would result in 3,211 acres of commercial and density management thinning in the 5th field watershed (see Table 4-1). Together with Alternative 2, approximately 5,207 acres would be thinned to promote tree growth or development of late-successional forest characteristics. There are approximately 17,000 acres of stands 30-80 years of age on BLM-administered land in the East Fork Coquille 5th field watershed, so the cumulative fraction being thinned is around 30% which leaves 70% unthinned. Private landowners seldom commercially thin their stands. No special status species are associated exclusively with young conifer or alder stands, so no cumulative adverse effects are anticipated. Alternative 2 would thin nearly 2,000 acres more than the no-action alternative resulting in more of the analysis area developing on a trajectory towards late-successional forest. The thinned stands also offer a wider variety of structural conditions as habitat for wildlife. Modeling for the Brummit area which accounted for current conditions and assumed continuation of current management practices on BLM and private land suggested that the proposed action in Brummit Creek could increase the amount of potential late-successional forest habitat in the analysis area by 2-6% after 45-75 years compared to the no action alternative. Therefore, Alternative 2 would be beneficial to wildlife associated with late-successional forests in the long-term.

Alternative 2 does not contribute towards any cumulative adverse effects to special status species associated with cliffs and rocky outcrops since the alternative has minimal impact to these habitats. Private harvest units would continue to provide foraging habitat for deer and elk; the acreage of deer and elk foraging habitat contributed by Alternative 2 is minimal compared to actions on private land.

Table 4-3 Wildlife special status species in the Coos Bay District. Marine and strict coastal species are not included. Includes updates reflecting changes due to the 2004 S&M SEIS.

Scientific Name	Common Name	Status	Presence in Brummit Cr	Key habitat features, presence and range information	Impacts
Birds					
Branta canadensis leucopareia	Aleutian Canada Goose	BS	not present	In Coos Bay District, only occurs near coast	None, not present
Falco peregrinus anatum	American Peregrine Falcon	BS	present	Cliffs, one documented nest and several other potential nest cliffs in analysis area	**See text**
Falco peregrinus tundrius	Arctic Peregrine Falcon	BS	potential migrant	Generalist, potentially present as winter migrant	None, habitat generalist that is only an occasional winter migrant
Haliaeetus leucocephalus	Bald Eagle	T	present	Late-seral forest, known nest site in analysis area	**See text**
Dolichonyx oryzivorus	Bobolink	BA	unlikely	Grassland, < 5 records in Coos Co, presence unlikely	None, presence very unlikely, habitat not affected
Speotyto cunicularia hypugaea	Burrowing Owl	BS	not present	Occasional winter migrant along coast	None, not present
Branta canadensis occidentalis	Dusky Canada Goose	BS	potential	Open grasslands or wet meadows	None, habitat not affected
Otus flammeolus	Flammulated Owl	BS	not present	Oak & pine woodlands, esp. Ponderosa pine. No records in Coos Co.	None, not present
Melanerpes lewis	Lewis' Woodpecker	BS	unlikely	Recently burned forest, oak/pine habitats, presence very unlikely	None, habitat not present, presence very unlikely
Brachyramphus marmoratus	Marbled Murrelet	T	present	Late-seral forest, known occupied sites	**See text**
Accipiter gentilis	Northern Goshawk	BS	potential	Late-seral forest, rare but potentially present	**See text**
Strix occidentalis caurina	Northern Spotted Owl	T	present	Late-seral forest, known nest sites	**See text**
Pooecetes gramineus affinis	Oregon Vesper Sparrow	BS	potential	Grassland, presence unlikely except in lower valley	None, habitat not affected
Progne subis	Purple Martin	BS	potential	Snags in early-seral habitats, potentially present	Snag creation may benefit
Eremophila alpestris strigata	Streaked Horned Lark	FC	unlikely	Coastal dunes, open ground with short grass or scattered bushes	None, habitat not affected
Bartramia longicauda	Upland Sandpiper	BS	not present	Rare migrant	None, not present
Elanus leucurus	White-tailed kite	BA	present	Pastures, open grasslands; documented in Brewster Valley	None, habitat not affected
Mammals					
Martes pennanti	Fisher	FC	potential	Late-seral forest, potentially present	**See text**
Myotis thysanodes	Fringed myotis	BA	present	Rock crevices, caves, bridges, buildings. Documented at a helipond.	**See text**
Thomomys mazama helleri	Gold Beach Pocket Gopher	BA	not present	Curry County	None, not present

Antrozous pallidus pacificus	Pacific Pallid Bat	BA	not present	Xeric, possibly in Siskiyous & SE edge of district	None, not present
Thomomys bottae detumidus	Pistol River Pocket Gopher	BA	not present	Curry County	None, not present
Arborimus longicaudus longicaudus	Oregon Red Tree Vole	BT	present	Coniferous forest, especially late-seral.	**See text**
Corynorhinus townsendii	Townsend's Big-Eared Bat	BS	present	Caves, rock crevices, buildings, bridges. Documented on a bridge.	**See text**
Amphibians					
Aneides flavipunctatus	Black salamander	BA	not present	Outside of range	None, not present
Batrachoseps attenuatus	California slender salamander	BA	not present	Late-seral forest, large down logs; outside of range	None, not present
Rana boylii	Foothill yellow-legged frog	BA	present	Rocky rivers, documented in E.Fk. Coquille River	None, habitat not affected
Reptiles					
Clemmys marmorata	Western Pond Turtle	BS	potential	Ponds and slow moving rivers and creeks, potentially present	None, habitat not affected
Invertebrates					
Gliabates oregonius	Salamander slug	BS	unlikely	Probably outside range. Known range is Clackamas, Hood, Lane, Linn Co.	None, presence unlikely
Helminthoglypta hertleini	Oregon shoulderband snail	BS	unlikely	Rocky and talus substrates, nearest sites are in S. Douglas Co, many surveys but no records in District	None, presence very unlikely, rocky/talus habitats not affected
Hesperarion mariae	Tillamook westernslug	BS	unlikely	Probably outside range. Known range is Douglas, Lane, Tillamook Co.	None, presence unlikely
Hochbergellus hirsutus	Sisters Hesperian	BS	unknown	Type locality is at Sisters Rock, Curry Co suggesting they likely are not present	None, presence unlikely
Incisalia polia maritima	Hoary Elfin Butterfly	BS	not present	Curry County	None, not present
Monadenia fidelis beryllica	Green sideband snail	BS	unknown	Probably outside range. Known range is Curry Co.	None, presence unlikely
Plebejus saepiolus insulanus	Insular blue butterfly	BS	unlikely	Open areas, clover	None, presence unlikely
Polites mardon	Mardon skipper butterfly	FC	unlikely	Open grasslands with fescue grasses, nearest populations Jackson/Klamath counties and near Mt. Shasta	None, habitat not affected, presence unlikely
Prophysaon sp. nov.	Klamath tail-dropper	BS	unlikely	Probably outside range. Known range is Douglas, Jackson, Josephine, Klamath Co.	None, presence unlikely
Prophasoan vanattae pardalis	Spotted tail-dropper	BS	unknown	Documented in Coquille River drainage	**See text**
Vespericola sp. nov	Bald Hesperian	BS	not present	Probably outside range. Known range is Lower Willamette Valley	None, not present

T = Threatened
FC = Federal Candidate
BS = Bureau Sensitive
BA = Bureau Assessment

4.6 Effects on soils

4.6.1 Alternative 1 (No action)

Direct/Indirect Effects

Under this alternative, no treatment of any kind would be undertaken. Ground cover would not be removed since no units would be cut or yarded, nor would there be any road or roadside disturbance. There would be no change or risk to the soil resources by accepting this action

Cumulative Effects

Across the 5th field watershed, other activities such as cutting and yarding of trees would occur both on private and BLM managed lands. Exposure of the soil could produce sediment depending on storm intensity and timing, compact the surface soils and be followed up with prescribed burning and planting. Some reduction of sediment delivery is expected over the long term as roads presently contributing sediment are treated with culvert replacements, improvements to surface erosion conditions, and re-growth of vegetation under the actions proposed in the East Fork Coquille EA action alternatives.

Compaction within the 5th field watershed should remain at current levels. Increases due to road building will be negligible as most of the lands are accessible from existing transportation systems and only short spur roads are expected to be built. New road construction on federally managed lands is most often decommissioned after use. The use of ground-based equipment over a layer of slash or the suspension of timber during yarding inhaul has become common practice for most land owners. The yarding of small-diameter logs most commonly harvested today results in less soil compaction than the yarding of much larger old-growth timber. Best Management Practices on federally managed lands minimizes the level of compaction from all types of harvest removal.

Site preparation burning still occurs on private lands within the watershed but at a much reduced scale compared to a few decades ago. The younger, smaller trees being harvested on private lands today result in less slash (compared to harvesting of old-growth trees) that is manageable for tree planting without broadcast burning. Many of the acres harvested on private lands in the last two years were not burned with the exception of the landing piles.

4.6.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

The harvest of trees from 1,996 acres of density management thinning and 513 acres of hardwood conversion should not impact the soil resources if all design criteria are adhered to as they have in the past. Sediment filters and soil infiltration rates exist to sufficiently trap runoff prior to delivery to a stream under all actions. The increase in compaction from building new roads is temporary or negligible as most new or renovated roads are planned to be decommissioned after use. Alternative 2 proposes a net reduction of road mileage. Thus the overall level of compaction due to roads would decrease.

Compaction from the yarding of approximately 101 acres using a tractor type ground based yarding system would not appreciably increase the level of compaction in the units. Designated skid trails to be pre-approved by the contract inspector would keep the skid trail density within the allowed amount (under 12% of harvest unit). Following use, skid trails not needed for future entries would be decompacted using approved equipment and the land returned to timber production as described in the RMP (USDI 1995). Disturbance and compaction from cable yarding is not expected to appreciably increase the level of compaction within the thinning units. Requirements of one-end suspension during

inhaul and the small size of materials to be removed would keep the compaction in these thinning units well below acceptable limits. This has been demonstrated many times over in the last ten years by the District timber sale program. Minor compaction of selected units within the Karl Creek drainage is expected to occur under the yarding corridors near the landings due to limited suspension available and a small landing area.

Harvest units are concentrated on lower slope gradients and avoid steeper slopes (i.e. > 60% slope) and soil map units prone to high or moderate landslide rates (see Analysis File section 1.8). Pile burning for site preparation would be conducted in the spring or winter months so no adverse impacts are expected from this activity. The distribution of piles across the units and ignition timing would spread the effects of burning out over a series of days, rather than concentrate it with a one-day broadcast burn. Pile burning would expose only a small area of soil and an unburned filter would exist around the pile to filter out any eroding soil

Cumulative Effects
The harvest level proposed in Alternative 2, together with other harvest planned in the 5th field watershed (see Table 4-1), would not adversely affect the soil resources. The planned removal is largely a thinning type removal which takes the boles of trees and leaves the nutrient rich stems, twigs and needles. The length between harvest removals is also of sufficient time which allows for soil building processes to overcome slight removal of nutrients from the soil by any means. Road density and sediment delivery from deteriorating roads and culverts can be expected to decrease across the watershed. Private and federal land managers are improving road conditions or decommissioning roads not necessary for management activities as a means of reducing operation costs. Site preparation burning would continue to be of low acreage as in Alternative 1.

4.7 Effects on water and stream channels

4.7.1 Alternative 1 (No action)

Direct/Indirect Effects
No treatments would be applied. The forestland within the drainages is performing similarly to undisturbed forests with respect to annual yield and low flows. Peak flows for smaller storms (below bank full two year recurrence interval flow) may still be slightly elevated, due in part to the density and pattern of existing roads and previous harvest in the drainages. If these differences do exist, they are not apparent as changes in stream channel bed or bank form.

Many stream channel culvert crossings and ditch relief culverts in the planning area were built in the 1970s with galvanized corrugated metal pipe, and are moving toward the end of their design life. Culverts with rusted out bottoms (from prolonged sediment abrasion below the normal waterline that removed the galvanization and then subsequent rusting) and reduced inlet area affecting flow capacity, are common. If these are not scheduled for replacement or repair, then the risk of road washouts in the future is more certain. This in turn would reduce water quality in the vicinity, but probably only during high flows when stream turbidities are higher. Water quality for normal flows should remain excellent, within the range of natural variability.

The China and Brummit Creek Stream channels would remain simplified and in need of structural habitat components (e.g. large wood). Alluvial materials that shape stream channels and create habitat for aquatic organisms would continue to be transported to downstream areas at an accelerated rate because of lack of channel roughness. Floodplains would remain underdeveloped or disconnected

because of a lack of stream channel structure. The flow buffering benefits of large wood would continue to be reduced in the China Creek and Brummit Creek stream channels.

Cumulative Effects

OWEB (1999) classified risk of peak flow enhancement due to rain-on-snow events based on the percentage of area within the transient snow zone and the percentage of area with < 30% crown cover; areas with low percentages in both categories have a low risk of peak flow enhancement (see Figure 4-3). Approximately 40% of the East Fork Coquille 5th field watershed is in the transient snow zone, 10.7% of which are open acres with < 30% crown closure, so according to Figure 4-3, the risk of increased peak flows is quite low.

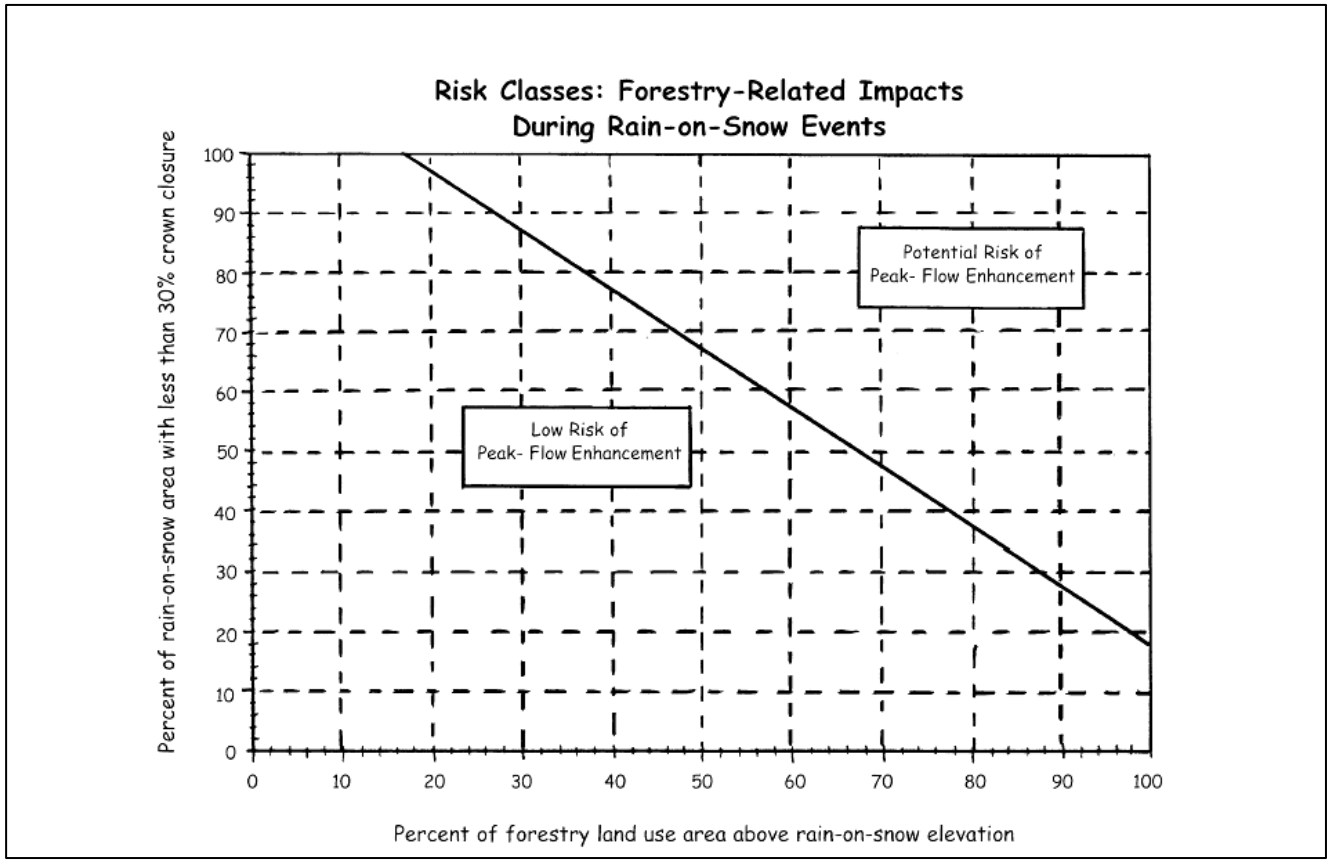


Figure 4-3 Peak flow enhancement risk during rain-on-snow events (from OWEB 1999). Data are based on approximate values from GIS using CFER data for private lands (Analysis File section 1.17). Stands < 15 years of age were used as a conservative surrogate of < 30% crown closure even though stands approaching 15 years of age typically have canopy cover much greater than 30%.

4.7.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

Annual Yield

No change in annual yield is expected with this alternative. Studies have found no significant change in water yield in four Oregon Coast Range watersheds that were shelterwood cut (30% of the area) and patchcut (25% of the area) (Harr 1976). These kinds of treatments had a much higher resultant removal of basal area and wider spacing than the proposed prescriptions.

Low Flows

Low flows are not expected to change with this alternative. Soil moisture depletion by evapotranspiration in a thinned and un-thinned stand is reported to be similar. Hicks et al. (1991) indicate that frequent regeneration harvest of 25% or more of the watershed would be required to maintain elevated base flow. In addition, in the Brummit LSR project there are untreated intervening Riparian Reserves. These forests should maintain normal soil water depletion during the dry season.

Peak and Extreme Flows

The density management alternative involves thinning treatments of forest stands. Much of the forest and vegetation is retained on site such that evapotranspiration and rainfall interception remain practically unchanged. Peak flow data studies (including small peaks that are not floods and larger peaks) in similar environments have shown that there is no statistical difference between undisturbed stands and partial cut units when 59-69% of the stand volume was selectively removed by ground-based methods (Ziemer 1998). Furthermore, the proposed density management prescriptions would remove substantially less forest stand volume (35-40%) than the aforementioned study.

There are 513 acres of hardwood conversion in this alternative with 335 acres in the precipitation dominated lower areas, and 178 acres in the transient snow zone (TSZ) discussed in the following paragraph. With respect to peak flows, hardwood conversion units in the rainfall areas of the watershed respond similarly to a patch-cut unit. Researchers have found that patch-cutting practices where up to 25% of small watersheds (250-300 acres) were logged in low elevation watersheds, showed only minor increases in peak flows (Rothacher 1973).

The project area is partly within the TSZ. This zone encompasses the lands above the 1,800 foot contour elevation and comprises 38% of the planning area, mostly in upper Brummit Creek. Some public comments have expressed concern about altered snow accumulation and melt processes from forest practices. However, there are several reasons that changes in snowpack and melt processes should be insignificant with this alternative The density management prescriptions include residual tree spacings in the range of 16 to 30 feet. These small openings are not large enough to affect transient snow accumulation and melt rates. (Golding and Swanson 1978) indicate that the windward side of logged units must be at least one tree height to significantly affect snow openings on accumulation. Units 33s, 33s2, 42, 43, 68s, 88 and 89s are planned to have some gaps that are potentially larger than the existing trees in the stand. However, these openings are few in any particular unit (typically 1-3/unit), are circular or patchy openings, and are well distributed. Therefore these prescriptions should not result in appreciable snow accumulation that could change stream flow runoff. Large openings can also increase wind speed over the snowpack which is reported to increase melt rates (Berris and Harr 1987). Because much of the forest stand structure is retained, no sufficient openings would be created with the Brummit thinnings that could significantly modify canopy snow interception, accumulation on the ground in openings, or faster snowmelt.

There are 178 acres of hardwood conversion in the transient snow zone in this alternative. There would be greater snow accumulation and melt rates in these units, than in the surrounding forest. However, the units are well distributed in different drainages, and accumulation or melt may be tempered by slope and aspect position from windward storms, reducing snow accumulation or melt There are intervening Riparian Reserves of forest vegetation between the units and streams; except for ephemeral/intermittent streams. This may dampen down slope movement of water due to some uptake. The streams variable runoff combination of quickflow, with delayed flow from the sequencing of flow paths in a drainage may cause flows to slightly increase, decrease or remain unchanged. Furthermore, the total area is small

(0.6% of the analysis area) and is scheduled to be sold in a four year period with treatment within another 3 year normal contract time period.

Effect on Water Quality and Channels

Construction of 4.8 miles of new road, of which 1.1 miles is within Riparian Reserves (4.7 miles would be subsequently decommissioned) and renovation/improvement of 74.5 miles of road is planned.

There would be a positive effect to water quality from replacing rusted and failing culverts and improving road drainage and erosion problems along renovated/improved roads. There may be some slight short-term elevation in sediment delivery to channels during culvert replacement (normally completed during summer low flow conditions) and the first several fall storms. However, this can be substantially prevented with Design Features and Best Management Practices. The recent Aquatic Conservation Strategy SEIS acknowledged that "some short-term degradation may permissibly occur as a result of activities in aquatic ecosystems…" (USDA and USDI 2004c, ROD pg 11).

A beneficial effect to water quality would be realized by road renovation where spot rock or a new lift of rock is applied to graveled roads. Also included is road improvement where the standard of the road is changed; normally by adding a gravel surface to a previously dirt road that had surface rilling or gullying occurring. Graveled roads are much more resistant to erosion and would result in much less sediment delivery. In one study, placement of a 6 inch lift of 1.5-inch minus rock decreased erosion by 70% from the unsurfaced condition (Swift 1984).

The 1.1 miles of new roads constructed within Riparian Reserves would generally have a maximum road surface width of 12 feet and maximum clearing width of 30 feet. Therefore the canopy openings would be minimal and resemble a linear thinning. Much of the road within the Riparian Reserves (73%) is greater than 110 feet from a channel and only 8% is within 55 feet. Large woody debris recruitment should not significantly change, because these roads are outside a tree-to-stream recruitment distance, are planned over existing old roads or in areas that involve minimal tree removal. Sediment delivery from this new construction is not expected to reach a channel. This is because sediment plumes below newly constructed roads moving towards drainage features in the Oregon Coast Range have found to have an average dropout distance of 30 feet, which is further from a channel than any of the new road segments (Brake et al. 1997). All road built within Riparian Reserves would be decommissioned and essentially would return to a natural forest stand condition.

A positive beneficial effect to water quality would be realized by preventing sources of sediment delivery by storm proofing and closing 27.1 miles of existing road (i.e. roads that would not be constructed, renovated, or improved to facilitate the thinning or hardwood conversion treatments. The drainages would have culverts pulled and bed and banks configured to a hydrologically stable, self-maintaining condition. These roads would be closed by active decommissioning (17.6 miles), ripping (1.5 miles), self closing (2.5 miles), or temporary closure (5.5 miles).

A positive beneficial effect to water quality would be realized by storm proofing and closing a total 50.7 miles of road (decommissioning) under this alternative.

No effects on water quality are anticipated from the density management thinning prescriptions. This is because planning design has included no treatment buffers of 30-50 feet along perennial stream channels. These reserve widths are sufficient to maintain a no-disturbance zone, adequate shade, bank stability, and favorable microclimate. Forest thinning would occur along approximately 12 miles of

intermittent/ephemeral Northwest Forest Plan channels, but no ground disturbance is anticipated because the yarding systems provide at least partial suspension over streams. Hardwood conversion units would include portions of Riparian Reserves along intermittent/ephemeral streams. No downstream thermal heating is expected in the summer, because these streams are dry. No sediment delivery is expected to intermittent/ephemeral channels because stream bank trees would be reserved, slash would remain on site, and no broadcast burning would be completed. These factors would ensure that no disturbance would occur to the forest duff and soils.

The placement of large wood into stream channels would help re-establish more "natural" instream and riparian conditions within China, Brummit, and Karl Creeks. These conditions include diverse, and inherently stable (not static), stream channel habitat that is closely connected to its floodplain and off-channel areas. The placement of large wood is also expected to result in beneficial impact to water quality by increasing pool areas which in turn lower water temperatures. Furthermore, large wood in channels generally increases stream bank stability by creating small falls, runs, and hydraulic jumps, and other zones of concentrated turbulence where energy is dissipated. Large wood, both instream and in the riparian zone, also plays a critical role in modifying channel morphology, trapping eroding sediment, providing fish cover, and regulating water temperature.

The distribution of wood within the channel is expected to have beneficial influences on stream channel morphology. Large jams are expected to help form pools, trap organic matter and cause deposition of sediments immediately upstream.

A stream improvement project consisting of 1,700 feet of BLM road no. 28-10-5.1 along China Creek would be realigned and moved away from the immediate stream channel. This would involve removing streamside red alder and pulling back about 1,900 yds^3 of soil material away from the stream and incorporating it on site. Trees removed would be left on site for aquatic habitat, unless there is debris jam potential in which case they would be relocated or removed. There may be some short term turbidity to China Creek from the project. Preventative BMPs, outlined in section 2.3.2, and would be put in place during restoration. There would be a positive long term benefit because the source area of soil material that may collapse into the steam during high flows would be removed. The narrow stream width would be restored to normal stream width and damaging velocities (due to stream current confinement) that may erode banks would be lessened.

There may be some slight direct effects of sediment delivery and turbidity to channels from winter haul, as some contractors choose to operate in the wet season, and many times there is no practical alternative. A set of BMPs have been designed to address winter haul with the objective of maintaining water quality.

<u>Channel Response to Flow</u>
Channel response to flow is not expected to measurably change. The watersheds are primarily rain dominated and the mechanisms that influence infrequent rain-on snow and melt by vegetative manipulation are not significantly affected. Additionally, the forestry harvest practices would not increase compaction to a greater runoff threshold.

Cumulative Effects
There should not be any measurable cumulative effects on water at the 5th field East Fork Coquille watershed or 6th field subwatershed scales. This is because density management thinning using cable systems with applicable Design Features do not have measurable effects on water flow or water quality.

The 101 acres of tractor yarding with the applicable Design Features would have no effect on water flow or quality at the 5th field scale. The road renovation may have a slight positive effect on long-term water quality. No effects to water flow or water quality from culvert replacements, China Creek road fill pullback and road renovation are anticipated at the fifth field watershed scale. This is because the actions are localized and well distributed, small in extent, completed during dry periods, and utilize appropriated BMPs to ensure water quality protection.

There are 178 acres of hardwood conversion proposed in the transient snow accumulation zone and another 73 acres planned in Camas Creek. There are also 467 acres of regeneration harvest planned in the East Fork Coquille. This amounts to 0.84% of the 5th field watershed. Approximately 40% of the East Fork Coquille watershed is in the TSZ, and these new open acres move the rain-on-snow area with less than 30% crown closure from 10.7% to 12.8%. Figure 4-3 shows that the risk of peak flow enhancement in the TSZ from these additional acres, added to the baseline vegetative condition, would yield a low risk rating.

4.8 Effects on aquatic species (including special status species)

4.8.1 Alternative 1 (No action)

Direct Effects
There are no direct effects anticipated to aquatic species as a result of no action.

Indirect Effects
An indirect effect of this alternative would be that a large number of young riparian conifer stands would continue to develop under conditions of high competition and growth suppression. This would result in stands that are more susceptible to disturbance and that have an overall smaller tree size. As a result, contributions of woody material to the aquatic environment would be likely to occur, but the wood would be of smaller size and would decompose relatively quickly.

As a result, the adjacent aquatic streams habitat conditions would remain simplified until trees in riparian stands grow to larger sizes, and start to enter the stream channel. Larger wood pieces are necessary to form the complex stream channels that have been shown to contribute to healthy aquatic habitat conditions.

An additional indirect effect of this alternative would be that stream channel conditions in China and Brummit Creeks would remain degraded because instream and road related restoration would not occur. Stream channel connectivity in China Creek would also remain disconnected, at least in terms of upstream movements, as a result of impassable culverts remaining in place.

As a result, the health and distribution of aquatic species populations within the analysis area may remain below the levels that could exist if restorative actions were taken.

Cumulative Effects
Cumulative effects of past land management practices in the basin have contributed to degraded habitat conditions within the East Fork of the Coquille River. Under the no action alternative, no restorative actions would be undertaken. Aquatic habitat quality would likely improve slowly over time on federally managed lands. The no action alternative would not contribute to the cumulative effects that have led to degraded habitat conditions within the analysis area. Similarly, this alternative would not be expected to improve habitat conditions for aquatic species.

4.8.2 Alternative 2 (Proposed action)

Direct Effects

A direct effect of the alternatives on aquatic species may be the disturbance or even death of individual organisms as a result of restorative activities that occur in-stream. The activities include wood placement into streams and road related restoration activities, such as fill pull back and culvert replacements. While individual organisms may be harmed or killed, the number of individuals affected is not expected to have a significant effect on overall population levels. This is because of the ability of some species to avoid injury by leaving the effect area, and because of the relatively small portion of the stream network being affected.

Indirect Effects

An indirect effect of the alternative would be a slight short-term reduction in the amount of small diameter trees available to enter the stream channel. This short term reduction is likely to have a negligible effect on aquatic habitat, and therefore aquatic species. This is due to the small scale of the reduction and the small percentage of aquatic habitat it could potentially influence. In addition, all fish-bearing streams within or adjacent to proposed harvest units have no-treatment zones. These areas would serve to maintain stream bank stability, shade, and provide a concentrated, short-term source of smaller woody material available to enter stream channels.

The indirect effect of instream wood placement and road related restoration is the improvement of habitat conditions for aquatic organisms. The increase in stream channel complexity associated with instream wood placement in China and Brummit Creeks and road fill removal from floodplain areas in China Creek is expected to improve spawning and rearing habitat for fish, as well are provide improved habitat conditions for other aquatic organisms. These improve conditions may allow for a localized increase in the population levels of aquatic organisms or may lead to improved health of the individual organisms residing in the restored portion of stream.

Populations of aquatic organisms may also be indirectly benefited by the restoration of channel connectivity associated with culvert replacements in China Creek. Restoration of connectivity would provide some species, such as steelhead, access to additional spawning habitat. This may in turn increase spawning success and benefit the population as a whole, although at a very limited scale.

Cumulative Effects

Cumulative effects of past land management practices in the basin have contributed to degraded habitat conditions within the East Fork of the Coquille River. On BLM lands, road and harvest Design Features and best management practices associated with the alternative is expected to have a beneficial affect upon aquatic species in terms of improving riparian conditions over the long term. This, coupled with instream and road related restoration, is expected to contribute to improved stream channel conditions and therefore benefits to aquatic organisms within the East Fork Coquille River Watershed, although at a limited scale.

<u>Special Status Aquatic Species</u>

The following discussion identifies potential effects to aquatic Special Status Species that may be present or whose habitat is present within the analysis area. These species and habitats are identified in Table 4-4.

Oregon Coast coho salmon and Oregon Coast steelhead

Portions of the proposed project occur within and adjacent to streams that provide habitat for the Oregon

Coast coho salmon and Oregon Coast steelhead. These activities include road maintenance, timber harvest, timber haul, stream restoration activities, and silvicultural treatments. The actions that may have the greatest potential to adversely affect coho salmon and steelhead, in the short term, are the stream channel restoration activities. Removal of road fill from floodplain areas and wood placement in China Creek may have short term impacts in terms of sediment delivery and mobilization as the channel re-establishes a restored form. In the long term, the restored channel is expected to benefit spawning and rearing coho salmon and steelhead. These short term impacts and long term benefits are not expected to contribute to a trend toward Federal listing because of the short duration and relatively small scope of the effects.

The other activities, including those that occur in riparian areas, are not expected to adversely affect coho salmon or steelhead. This is because adequate stream buffers and shading along coho salmon and steelhead bearing streams would be maintained and dry season haul restrictions on rocked roads along coho and steelhead bearing streams would all but eliminate sediment delivery to streams.

Endangered Species Act Consultation

All actions associated with the Brummit Creek Density Management and Restoration Project, located outside of the China Creek watershed, have been determined to have "No Effect" upon Oregon Coast (OC) coho salmon, which are currently proposed for listing under the Endangered Species Act (ESA). These actions are all located above a natural barrier (Brewster Gorge) and/or are at least a river mile or more away from OC coho salmon habitat. Therefore, there is a very low probability that any potential effects, such as sediment delivery to streams, would be detectable that far downstream.

Silvicultural activities within China Creek are also determined to have "No Effect" on OC coho salmon. This is because timber harvest and yarding activities would occur away from fish bearing streams. Unit 4 is the only unit that may have any harvest (hardwood conversion) and yarding activities within riparian reserves for fish bearing stream. A no-harvest buffer of at least 100 feet would be maintained along this stream, and would be established to follow the top of the canyon slope break. This is expected to result in much of the buffer being greater that the minimum of 100 feet.

Non-commercial silvicultural activities identified in unit 2, instream wood placement, within China Creek, culvert removal / bridge placement, and road fill pullback along China Creek road are all activities that would be "Likely to Adversely Affect" OC coho salmon and that are covered by the Programmatic Biological and Conference Opinion (PBCO) issued by NMFS (now NOAA Fisheries) on August 8, 2001. Section 1.2.2 of the PBCO considers "Aquatic and Riparian Habitat Projects" which includes the placement of large wood and riparian silviculture activities. This section also addresses the replacement of barrier culverts with passable culverts or bridges. Section 1.2.5 of the PBCO considers "Non-commercial Vegetation Treatments" including pre-commercial thinning and snag creation. Section 1.2.8 of the PBCO considers "Road Decommissioning, Obliteration, Storm Proofing, and Inactivation" including culvert removal, fill removal, side cast pullback, and placement of large woody material. The Reasonable and Prudent Measures identified in section 2.2 and the Terms and Condition identified within section 2.3, that apply to the aforementioned activities, would be adhered to as identified within the PBCO.

As a result of the information presented above, ESA consultation for the Brummit Creek Density Management and Restoration Project is considered to be completed for OC coho salmon.

Table 4-4 The 5-step Biological Evaluation process for Aquatic Special Status Species which may occur on the Coos Bay District. *

Common Name	Scientific Name	Status	Species Information	Step #1	Step #2	Step #3	Step #4	Step #5
				Species Present on District lands?	***Habitat Present/ Accessible in Action Area?***	***Species Present in Action Area?***	***Will the proposed project affect this species?***	***Will the project contribute to the need to list the species under ESA or provisions of BLM Manual?***
Fish								
Chum salmon	*Onchorhynchus keta*	BS	anadromous, spawn in fresh water just above tidal influence, juveniles migrate immediately upon emergence	Yes	No	N/A	N/A	N/A
Coho salmon (OC)	*Onchorhynchus kisutch*	FP	anadromous, spawn and rear (1.5 yr) in smaller freshwater streams before migrating to ocean	Yes	Yes	Yes	Yes	No
Coho salmon (SO/NC)	*Onchorhynchus kisutch*	FT	anadromous, spawn and rear (1.5 yr) in smaller freshwater streams before migrating to ocean	Yes	No	N/A	N/A	N/A
Fall Chinook salmon (SO/NC)	*Onchorhynchus tshawytscha*	BS	anadromous, spawn and rear in larger freshwater streams/estuaries (0.5 yr) before migrating to ocean	Yes	No	N/A	N/A	N/A
Spring Chinook salmon (SO coast/CA coast)	*Onchorhynchus tshawytscha*	BA	anadromous, spawn and rear in medium freshwater streams(0.5 yr+) before migrating to ocean	Yes	No	N/A	N/A	N/A
Steelhead – (KMP) SUMMER RUN	*Onchorhynchus mykiss sp.*	BA	Mainstem Rogue River - Rearing and Migration	Yes	No	N/A	N/A	N/A
Steelhead – (KMP)- WINTER RUN	*Onchorhynchus mykiss sp.*	BA	anadromous, spawn and rear in medium freshwater streams(0.5 yr+) before migrating to ocean	Yes	No	N/A	N/A	N/A
Steelhead – (OC) – SUMMER RUN	*Onchorhynchus mykiss sp.*	FC	Mainstem Umpqua River –Rearing and Migration	Yes	No	N/A	N/A	N/A

Common Name	Scientific Name	Status	Species Information	Step #1	Step #2	Step #3	Step #4	Step #5
				Species Present on District lands?	***Habitat Present/ Accessible in Action Area?***	***Species Present in Action Area?***	***Will the proposed project affect this species?***	***Will the project contribute to the need to list the species under ESA or provisions of BLM Manual?***
Steelhead – (OC) - WINTER RUN	*Onchorhynchus mykiss sp.*	FC	anadromous, spawn and rear in medium freshwater streams(0.5 yr+) before migrating to ocean	Yes	Yes	Yes	Yes	No
Millicoma dace	*Rhinichthys cataractae sp.*	BS	Coos River Basin, rubble areas in swifter waters	Yes	No	N/A	N/A	N/A
Snails								
Rotund Lanx (snail)	*Lanx subrotundata*	BS	Freshwater snails found in large, turbulent water of large rivers. Confined to mainstem Rogue and Umpqua Rivers	Suspected	No	N/A	N/A	N/A
Robust walker	*Pomatiopsis binneyi*	BS	Perennial seeps, shallow mud banks and marsh seeps leading into shallow streams. Documented only in Chetco River drainage.	Suspected	No	N/A	N/A	N/A
Pacific walker	*Pomatiopsis californica*	BS	Wet leaf litter and vegetation near flowing or standing water in shaded areas, high humidity. Documented in the Lower Millicoma River sub-basin.	Suspected	No	N/A	N/A	N/A

* Other aquatic Special Status Species were considered, but since their presence has not been documented on the BLM Coos Bay District they were not addressed in the table above or in the subsequent narrative.

Essential Fish Habitat Assessment

Species Considered - coho salmon and chinook salmon.

Mandatory contents of EFH Assessment

1) A description of activities associated with the Brummit Creek Density Management and Restoration Project can be found within this Environmental Assessment.

2) Activities associated with the Brummit Creek Density Management and Restoration Project located within the East Fork Coquille River watersheds, except China Creek, are expected to have no effect upon EFH, the species considered, and their major freshwater prey species. This is because EFH for coho salmon and chinook salmon is located approximately 2 miles (or more) below where most activities identified in the Brummit Creek Density Management and Restoration Project are proposed. Potential effects on aquatic and riparian habitats, both adverse and beneficial, are outlined within the Environmental Assessment.

   Sediment delivery and channel morphology changes produced as a result of instream and road related restoration activities in China Creek may have a short term effect upon EFH, the species considered, and their major freshwater prey species. However, the potential adverse effects are expected to be relatively small and temporary in nature. In the long term, changes associated with these actions should help restore channel morphology, sediment, and wood routing, as well as water quality.

3) There may be a short-term adverse effect upon EFH in China Creek as a result of the activities associated with the Brummit Creek Density Management and Restoration Project.

4) Best management practices and mitigation measures to further reduce impacts to aquatic and riparian habitats and the species of concern are outlined in Section 2.3 of the Environmental Assessment.

Magnuson-Stevens Act Essential Fish Habitat Consultation with NOAA Fisheries (formerly NMFS) has been completed. The Programatic Biological and Confernece Opinion issued by NMFS on August 8, 2001 addresses the activities identified in China Creek that may have an effect on EFH and associated species. The instream and road related restoration projects in China Creek will comply with the appropriate Reasonable and Prudent Measures and Terms and Conditions sections outlined in sections 2.2 and 2.3 of the aforemention Programatic Biological and Confernece Opinion respectively.

4.9 Effects on fire hazards and air quality

4.9.1 Alternative 1 (No action)

Direct/Indirect Effects

No changes to the fuels, fuel loadings or air quality would occur.

Cumulative Effects

Burning and smoke emissions for site preparation and fuel load reduction done on private forests would be managed by the Oregon Smoke Management Plan (2001). Site preparation and prescribed burning consumes approximately 208,000 tons of fuel per year in Coos County (CFPA 2002). Slash loads on the

Camas and Lower East Fork projects would be monitored for risk within the Wildland Urban Interface (NIFC 2002).

4.9.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

Fuel hazard reduction and site preparations treatments are described in section 2.2.7 and in section 1.15 of the Analysis File. Up to 513 acres would be site prepped by machine or hand piling and subsequent burning. Fuel loads are expected to range from 2 to 15 tons per acre and average 7 tons per acre. The Southwest Oregon Fire Management Plan (BLM et al. 2004) addresses Wildland Urban Interface (WUI) criteria. Units meeting the WUI criteria would be further evaluated to determine appropriate mitigating measures to protect private property and adjacent public land and provide for public health and safety. Hazardous fuels reduction and site preparation treatment would not deviate from the management direction provided in the RMP (USDI 1995 pages 74-75). Specific examples of protection treatments to public and private land boundaries could include pullback or removal of ladder and surface fuels, pruning, waterhole restoration, shaded fuel break, and roadside hazardous fuel reduction.

In addition, seasonal restrictions reduce the likelihood of ignition of a large-scale wildfire and subsequent smoke emissions. Smoke from prescribed fire activities would have little contribution to particulate emissions into the surrounding air shed.

Cumulative Effects

Burning and smoke emissions for site preparation and fuel load reduction done on private forests and hardwood conversions in the Brummit Density Management project would be managed by the Oregon Smoke Management Plan (2001). Slash loads on the Camas, Brummit, and Lower East Fork projects would be monitored for risk within the Wildland Urban Interface (NIFC 2002). The Oregon Smoke Management Plan (2001) manages the cumulative effects on air quality in the analysis area. A short term increase in dead fuel loads is expected in the thinning projects and would remain for approximately 2 to 3 years, but would decline as green up and decomposition occurs. Road decommissioning may prevent immediate access to some locations during initial attack fire suppression activities; however, roads would be easily reopened in emergency situations with standard fire suppression equipment (dozer).

4.10 Effects on access/transportation network

4.10.1 Alternative 1 (No action)

Direct/Indirect Effects

No change to present access or road conditions would occur under this alternative. Roads would remain open and in need of maintenance. Road failures on unmaintained roads would require the redirection of limited road maintenance funds. Access for land management purposes and public safety may be adversely affected as road conditions continue to deteriorate.

Cumulative Effects

Other planned federal actions (listed in Table 4-1) would improve and construct some new roads within the 5th field watershed. Even under Alternative 1, there would be a net reduction in road density on BLM-administered land in the 5th field watershed due to implementation of road decommissioning proposed in the other federal actions listed in Table 4-1. The lack of road maintenance and the eventual failure of the aging culverts could limit access to some road systems. Road failures on main roads are typically repaired fairly quickly. Road failures on other roads often go without repair for months or

even years. Private land owners are expected to open some old roads and remove their timber through either thinning or harvest regeneration methods. The roads necessary for such operations may or may not remain open at the end of the operations.

4.10.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

This alternative would reduce public vehicular access on 50.7 miles of road. Approximately 74.5 miles of road would be renovated or improved. Road renovation and improvements could include adding rock, grading the surface, installing or replacing stream and ditch relief culverts or other structures to improve drainage and protect the road surface from erosion. The loss of vehicular access, due to 50.7 miles of road decommissioning, would then be partially offset by improving access and doing preventative maintenance on 74.5 miles. Decommissioned roads would still remain available for non-motorized public access. Roads were identified for decommissioning in an interdisciplinary setting to ensure that need for future administrative access was considered. Any road decommissioning proposal that might affect access to private land would be coordinated with the private landowner to ensure private access needs are maintained.

Cumulative Effects

Alternative 2 would result in improved road maintenance on about 75 mile of road. Together with road activities from other planned federal actions (listed in Table 4-1), the transportation network on both BLM and private lands would receive maintenance which would safeguard access along main roads. Cumulatively, the BLM actions would reduce open road density by closing numerous side roads leaving them in a fairly maintenance-free condition. Overall, Alternative 2 and the cumulative effects protect access along main roads and other roads necessary for management activities in the next 10 years or so, while reducing access along BLM side roads. Except for some improved maintenance on private roads used in conjunction with the BLM activities, access along private roads would remain largely unchanged by the BLM actions.

4.11 Effects on recreation

4.11.1 Alternative 1 (No action)

Direct/Indirect Effects

The analysis area would continue to be used for motorized recreation, with almost no opportunities for non-motorized recreation. Roadside vegetation would become denser over time, further limiting hunting and other recreational opportunities.

Cumulative Effects

Recreational use would continue to decline from historically higher levels in the 1990s.

4.11.2 Alternative 2 (Proposed action)

Direct/Indirect Effects

Timber stands would become more open and suited for a variety of recreational pursuits. Temporary roads created during thinning operations and some existing roads would be closed and decommissioned, but would still be able to be used for non-motorized recreational activities. Burnt Mountain Campground would most likely see an increase in use as the public discovers opportunities for hiking, biking, horseback riding, and hunting on foot.

Cumulative Effects
Recreational use would most likely return to historic levels or increase further because of this action. Maintaining the option of using closed temporary and permanent roads as trails retains opportunities for potential future trail developments and also demonstrates a positive relationship between forestry and recreation.

4.12 Effects on other resources

4.12.1 Critical elements not pertinent to the analysis area

All analyses have shown no effects to the following elements of the human environment:

1. Farm lands, prime or unique
2. Flood plains
3. Wild and scenic rivers
4. Wilderness values

4.12.2 Areas of critical environmental concern

The analysis area includes the China Wall Area of Critical Environmental Concern (ACEC). The ACEC was identified to protect cultural, archaeological, botanical, and old-growth forest resources. No management plan has been developed for the ACEC. The preliminary ACEC boundary is drawn along the existing old-growth stand and ownership boundaries. Several proposed density management thinning units adjoin the preliminary ACEC boundary, but no management actions are proposed for within the ACEC. Guyline anchors would be needed in the ACEC for the action alternative. Design Features require that no trees be cut in the ACEC and that protective straps or plates be used when anchoring to trees in the ACEC to prevent damage to the trees; therefore, the ACEC would not be affected by any of the alternatives. A more detailed review is contained in section 1.16 of the Analysis File.

4.12.3 Cultural resources

Neither a records check nor a reconnaissance-level field visit has suggested the presence of prehistoric or historic resources in any of the proposed units. Therefore, it is not expected that the action alternative would have any effect on cultural resource values. In addition, Design Features require operators to stop work and notify the BLM should any cultural resources be discovered during implementation.

4.12.4 Native American religious concerns and/or Indian trust resources

This project is in the traditional territory of the Coquille Indian Tribe, a federally recognized Indian Tribe. We do not anticipate Native American religious concerns in the vicinity of any proposed project units. Indian trust resources are not present in any of the proposed units. The Coquille Indian Tribe has been notified about this project via the method of their choice, paper copy, and we expect a response if this project is of possible concern. The lack of response from the Coquille Indian Tribe and internal review by BLM staff suggest there would be no effects of the action alternative to the Coquille Indian Tribe.

4.12.5 Solid or hazardous waste

All Action Alternatives are subject to Federal and State regulatory guidelines for petroleum product use and storage. Spill Prevention, Control and Countermeasure Plans are required under the Oregon Forest Practices Act (Rule OAR 629-57-3600) and by Department of Environmental Quality (Rule OAR 340-108, Oil and Hazardous Materials Spills and Releases), which specifies the reporting requirements,

cleanup standards and liability that attaches to a spill or release or threatened spill or release involving oil or hazardous substances. In addition, the Coos Bay District Hazardous Materials Contingency Plan and Spill Plan for Riparian Operations apply when applicable to operations where a release threatens to reach surface waters or is in excess of reportable quantities.

4.12.6 Wetlands and riparian zones

Alternative 1 riparian areas would continue to be comprised of small diameter tree stands with little down wood being present. Riparian tree growth would continue to be suppressed and the benefits of thinning trees, in terms of accelerating tree growth, would not be realized. Falling and leaving trees within the riparian areas would not occur.

Other than a very small (< 100 ft^2) wet area that would be thinned through in unit 47, no wetland areas would be involved by the action alternative. Alternative 2 would have minimal impact to hydric soils and hydrology that could lead to a short-term change in wetland plant composition. The wet area in unit 47 is distant from any proposed landing so yarding would not disturb the area. Canopy cover would remain > 50% and would increase rapidly within 5-10 years so microclimate effects would be short-term. Riparian Reserves would be treated as described in Sections 2.2.6. Impacts to riparian/aquatic habitats and species are addressed in sections 4.8 and Analysis File section 1.14. The proposed treatments are designed to enhance the long-term function of the Riparian Reserve network by providing important components characteristic of late-successional forest areas. The Proposed Action is small in scope and would not retard or prevent attainment of the Aquatic Conservation Strategy objectives at the fifth-field watershed scale.

4.12.7 Noxious weed spread

Direct/Indirect Effects

The project area has been heavily inventoried, treated and monitored for weeds in the past. Continued treatment is planned in 2005 on those areas known to have weeds. Because some populations exist in the area, surface disturbance activities or activities that would transport noxious weed seed may provide a means to introduce new populations of noxious weeds. Habitat may be affected by being replaced by noxious weeds indirectly displacing other native vegetation and animals. Design Features and monitoring requirements are intended to minimize the incidence of new infections and their spread.

Cumulative Effects

Any surface disturbance activities would increase the risk of spreading noxious weeds. This should be mitigated through the use of noxious weed prevention Design Features and a normal weed eradication program. Prompt revegetation of exposed soils would provide competition that reduces the likelihood of weed infestations.

4.12.8 Port-Orford-cedar

The analysis area is near the edge of the range of Port-Orford-cedar, so Port-Orford-cedar trees are relatively rare. According to procedures described in USDA and USDI (2004a), no additional site-specific management measures for Port-Orford-cedar are required for the Brummit Creek Density Management and Restoration project to limit the spread of the root pathogen, *Phytophthora lateralis*. The Risk Key analysis demonstrated that there is no risk to Port-Orford-cedar as a result of implementing the Brummit Creek Density Management and Restoration project. A detailed assessment is included in Analysis File section 1.6. Under the proposed action, Port-Orford-cedar would be retained in units where it currently exists and would be planted in hardwood conversion units where appropriate. As an additional precaution, Design Features for the proposed action require vehicle washing and some

limited roadside sanitation to further guard against the spread of *Phytophthora lateralis.*

4.12.9 Environmental justice

The proposed areas of activity are not known to be used by, or disproportionately used by, Native Americans and minority or low-income populations for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed areas. Also, BLM concludes that no disproportionately high or adverse human health or environmental effects will occur to Native Americans, and minority or low-income populations as a result of the proposed actions.

4.12.10 Energy production, transmission, or conservation

The project is located within and near potential systems and prospects as well as hydroelectric power withdrawals. The proposed closures of roads, specifically the complete roadbed removal for access are examples of actions that could have an adverse energy impact to the exploration, development, and/or transmission of energy. Up to 8.5 miles of road would be fully decommissioned in the action alternative; all of it would occur on spur roads in areas where other roads would remain open, so some level of road access would remain.

Alternative 1 (No action)

Direct/Indirect Effects

No thinning next to the powerline would occur and Bonneville Power Administration (BPA) would continue to assess adjacent stands for hazard and danger trees and remove them according to the provisions within their right-of-way agreement.

Cumulative Effects

Future removal of danger trees and snags along the power corridor by other planned actions would improve the reliability of the BPA transmission line and reduce the need to remove hazard trees.

Alternative 2 (Proposed action)

Direct/Indirect Effects

Thinning next to the powerline in units 12, 13, and 15 would benefit long term line reliability by promoting growth of vigorous trees with healthy crown rations and reduce the need for BPA to take hazard trees down adjacent to the power corridor in this area.

Cumulative Effects

Similar to Alternative 1.

4.12.11 Unresolved conflicts concerning alternative uses of available resources

Some irreversible and irretrievable commitment of resources would result from the proposed actions. Crushed rock from quarries would be committed to reconstruction and construction of the road system. Energy used to grow, manage, and harvest trees is generally irretrievable. Irreversible and irretrievable commitments as stated above are discussed in the Coos Bay District RMP.

5 Abbreviations

AC = acres
ACEC = Area of Critical Environmental Concern
ACS = Aquatic Conservation Strategy
BA = basal area or Bureau Assessment
BLM = Bureau of Land Management, Coos Bay District Office
BMP = best management practice
BPA = Bonneville Power Administration
BS = Bureau Sensitive
CFR = Code of Federal Regulations
CT = commercial thinning
DBH = diameter at breast height
DF = Douglas fir
DM = density management
DMT = density management thinning (of conifer stands)
DTR = dominant tree retention thinning prescription
EA = Environmental Assessment
EFH = essential fish habitat
ESA = Endangered Species Act
FC = Federal Candidate
FY = fiscal year
GIS = geographic information systems
HW = hardwood
HWD = hardwood
LSR = Late-Successional Reserve
LSRA = Late-Successional Reserve Assessment (USDA and USDI 1998)
MDL = maximum diameter limit thinning prescription
MI = miles
OC = Oregon Coast
ODEQ = Oregon Department of Environmental Quality
ODFW = Oregon Department of Fish and Wildlife
MSA = Magnuson-Stevens Fishery Conservation and Management Act
NEPA = National Environmental Policy Act
NFP = Northwest Forest Plan
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
NRCS = USDA Natural Resources Conservation Service
NTU = nephelometric turbidity unit
NTZ = no treatment zone
PAG = plant association group
PBCO = programmatic biological and conference opinion
POC = Port-Orford-cedar
RD = relative density
Regen = regeneration timber harvest
REO = Regional Ecosystem Office
RMP = Resource Management Plan for the Coos Bay District BLM (USDI 1995)
ROD = Record of Decision
RR = Riparian Reserve

SPCC = Spill prevention, control and countermeasures plan
T = Threatened
T&E = Threatened or Endangered species
TPA = trees per acre
TSZ = transient snow zone
USDA = U.S. Department of Agriculture
USDI = U.S. Department of Interior
USFWS = U.S. Fish and Wildlife Service
WA = watershed analysis (generally a reference to (USDI 2000)
WH = western hemlock
WUI = wildland urban interface
YO = years old

6 List of Preparers

The following is a list of the Brummit Creek Density Management and Restoration EA interdisciplinary team members:

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Bob Raper	Noxious Weeds
Tim Rodenkirk	Botany
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Barry Brook	Engineering
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8 Appendices

8.1 Maps (attached)

Map 1.0 General vicinity
Maps 2.1 Alternative 2 treatments, transportation management, and stream buffers
Maps 2.2 Alternative 2 operating seasons and road decommissioning
Maps 4.0 Other projects proposed in both Alternatives 2 and 3

8.2 Other alternatives considered

Table 8-1 Summary of other units considered but eventually dropped from consideration (hwd = hardwood conversion, dmt = density management thinning).

Unit	Type	Acres	Reason for dropping
1	Hwd	47	Requires 0.75 mi of road renovation of a road that is currently healed; marginal need to treat. Stability issue if conversion cut and burned.
3	Hwd	34	Unit needs hardwood conversion and regular follow-up maintenance but associated road requires bridge construction across China Creek. Bridge is not economical. Concerns about constructing a new stream crossing on a fish-bearing stream.
6	Hwd	13	No need to treat to meet Late-Successional Reserve objectives.
8	Hwd	12	No need to treat to meet Late-Successional Reserve objectives.
12e	Hwd	6	Large remnant Port-Orford-cedar trees may inadvertently be damaged by treatment.
14	DMT	19	Some trees already exhibiting dominance; not a strong need to treat.
24s	DMT	3	Modifications for murrelets render unit inoperable.
25	DMT	11	Downhill logging would damage residual trees and suspension requirements would not be met.
27	Hwd	12	No need to treat.
28	Hwd	18	Most of unit encompasses a wet area in the Brummit Creek flood plain. Remainder of unit (above road) is so small, it is not worth treating.
33a	DMT	8	Requires downhill yarding and would not get full suspension when yarding across stream.
33b (part)	DMT	18	Contains numerous scattered remnant old-growth trees and suitable marbled murrelet habitat. No need to treat to meet Late-Successional Reserve objectives.
42 south	DMT	11	Contains numerous scattered remnant old-growth trees and suitable marbled murrelet habitat. No need to treat to meet Late-Successional Reserve objectives.
44s	DMT	14	No need to treat to meet Late-Successional Reserve objectives.
46	DMT	12	Low priority because it is a lightly-managed young stand and the associated new road construction would weave between old-growth trees before it enters the unit. Relatively high amount of new road construction compared to potential treatment acres.
52	DMT	37	Drop portion of unit with lot of remnant snags, logs, and scattered remnant live trees.
56	DMT	31	Too steep and potentially unstable.
58n	DMT	5	No need to treat to meet Late-Successional Reserve objectives.
79	DMT	23	High storm damage rendered treatment unnecessary. Steep and unstable hillslopes.
89sw	DMT	6	Blind lead.
91w	Hwd	14	Trees too small to be commercial. No hurry to treat.
	TOTAL	281	

8.3 Road Decommissionings

Table 8-2 Road decommissioning details

Road Number	*Recommended TMO Type of Closure*	*Method of Closure*	*Possible Miles*	*Involves Private lands*
27-10-21.0	Full	Till surface to promote infiltration, Remove stream 3 crossings Place woody debris on tilled areas.	.52	NO
27-10-29.1	Full	Till surface for infiltration evaluate stream crossing before removal	.28	NO
27-10-32.0	Full	Till surface no stream crossings	.07	NO
28-09-08.0 Seg C-3	Full	Till surface, evaluate 4-5 potential stream crossings, place woody debris on roads	1.08	YES
Misc. unnumbered spurs and new construction	Full	Generally till all new roads and place woody debris as available. Evaluate all potential stream crossing pull pipes as necessary	6.99	POSSIBLE
27-09-20.0	Decommission	Block w/berm at 17.0 rd, waterbar	.92	NO
27-09-28.1	Decommission	Block w/Berm, waterbar	.15	NO
27-09-28.2	Decommission	Block w/Berm at 28.0 rd, waterbar	.39	NO
27-09-29.0	Decommission	Block w/Berm at 21.0 rd, waterbar	.66	YES
27-09-29.1	Decommission	Block w/Berm at 21.0 rd, waterbar	.26	NO
27-09-30.0	Decommission	Block w/Berm at 17.0 rd, waterbar	.76	NO
27-10-14.0	Decommission	Block w/Berm at paved road, waterbar	.43	NO
27-10-14.2	Decommission	Block w/14.0 rd, waterbar	.36	NO
27-10-14.3	Decommission	Block w/berm @ paved road, waterbar	.24	NO
27-10-16.0	Decommission	Block w/berm at paved road, waterbar	.44	NO
27-10-20.0	Decommission	Block w/berm at Sec 32 Property line, waterbar	.46	YES
27-10-22.0	Decommission	Block w/berm, waterbar	1.75	POSSIBLE
27-10-23.0	Decommission	Block w/berm, waterbar	2.40	NO
27-10-23.1	Decommission	Block w/berm, restore water routing/ infiltration	.34	NO
27-10-24.0	Already Closed	Reblock and waterbar as needed	.57	NO
27-10-26.2	Decommission	Block w/berm at 13.0 rd, waterbar	1.01	NO
27-10-26.3	Decommission	Block w/berm at 13.0 rd, waterbar	.73	NO
27-10-28.1	Decommission	Block w/berm, waterbar	.18	NO
27-10-29.1	Decommission	Block w/berm, waterbar	.25	NO
27-10-29.2	Decommission	Block w/berm, waterbar	.27	NO
27-10-29.5	Decommission	Block w/berm, waterbar	.38	NO
27-10-35.2	Decommission	Block w/berm, waterbar	.14	YES
28-09-05.3	Decommission	Block w/Berm, waterbar to top of hill	.65	YES
28-09-08.3	Decommission	Block w/Berm, waterbar	.30	YES
28-10-01.0	Decommission	Block w/Berm from 5.2 rd, waterbar	1.45	YES
28-10-01.1	Decommission	Block w/Berm, waterbar	.35	YES
28-10-01.2	Decommission	Block w/Berm, waterbar	.68	YES
28-10-01.3	Decommission	Block w/Berm, waterbar	.60	YES
28-10-01.5	Decommission	Block w/Berm, waterbar	.05	NO
28-10-05.0	Decommission	Block w/Berm, waterbar	1.28	YES
28-10-07.0	Decommission	Block w/Berm, waterbar	.37	NO
28-10-07.1	Decommission	Block w/Berm, waterbar	.38	NO
28-10-09.3	Decommission	Block w/Berm, waterbar	.09	NO

28-10-10.0	Decommission	Block w/Berm, waterbar	2.05	YES
28-11-03.0	Decommission	Block w/berm, waterbar	.01	NO
74 Misc spurs and new const.	Decommission	Block w/Berm, waterbar	8.87	POSSIBLE
27-09-17.0	Temp	Construct Gate at Junction of 27-11-12.0 Road	2.96	YES
27-09-19.0	Temp	Construct Gate at Junction of 27-11-12.0 Road	1.17	YES
27-09-20.1	Temp	Construct Gate at Junction of 27-11-12.0 Road	1.3	NO
27-09-31.0	Temp	Construct Gate at Junction of 27-11-12.0 Road	.53	YES
27-09-31.1	Temp	Construct Gate at Junction of 27-11-12.0 Road	.26	YES
27-10-15.0	Temp	Construct Gate at Junction of 27-11-12.0 Road	1.47	NO
27-10-20.5	Temp	Construct Gate at Junction of 27-10-20.0 Road	3.8	NO
27-10-27.0	Temp	Construct Gate at Junction of 28-10-10.2 Road	.73	NO
27-10-24.1	Self	Allow to grow in by brush and tree species. Most are closed now	.29	YES
27-10-29.4	Self	Allow to grow in by brush and tree species. Most are closed now	.32	YES
27-10-32.1	Self	Allow to grow in by brush and tree species. Most are closed now	.29	NO
27-10-32.2	Self	Allow to grow in by brush and tree species. Most are closed now	.11	NO
27-10-33.0	Self	Allow to grow in by brush and tree species. Most are closed now	.21	YES
28-10-05.3	Self	Allow to grow in by brush and tree species. Most are closed now	.77	NO
Misc spurs	Self	Allow to grow in by brush and tree species. Most are closed now	5.13	POSSIBLE
		Total GIS Data * Road Length Closed	**58.5**	
*** Data includes road miles presently closed that will be reopened then closed by this action.**				

To adequately describe the different treatments for roads within the analysis area under this action the following descriptions for each type of road are provided.

Existing roads – These fall into several categories of use and current standard of maintenance or construction. Mainline roads used for timber management activities are well maintained paved or gravel surface roads. Other spurs or landings are either gravel of dirt surfaces. Some old roads are a combination of large rock where roads needed maintenance during hauling or dirt and grass covered rock surfaces. Road improvement activities generally are confined to grading, brushing and ditchline cleaning. At times a lift of rock will be placed on the dirt surfaces to make them all weather roads or reduce sediment delivery potential during rainy weather.

Decommissioned roads – The East Fork Coquille River Watershed Analysis identified roads to be decommissioned as opportunities and funding allow. The roads identified in this action used the initial TMO recommendations in WA but considered past closures and new management actions by private and federal land managers. Thus a road to be decommissioned would either be closed on a short or

long-term basis (5-20 years) and may be used again in the future, or is not needed in the future and will be closed with the intent of not opening them again.

Decommissioning includes closure by gates, allowing vegetation to grow in (self) or building a structure to block the beginning of the road. Closure generally consists of blocking the road to vehicular traffic, installing water bars to route water from ditches and road surfaces and leaving the gravel road portion in a condition to self maintain. This allows for reduced, low-risk maintenance and easy renovation or improvement in the years to come.

Full decommissioning involves the removal of stream-crossing culverts. The banks and bed of the channel will be returned to original grade unless the past installation has changed the local environment in a drastic manner. At which time a step down channel or gulley plug may be designed into the stream crossing removal implementation. Full decommissioning involves the most complete removal of the road grade and all associated pipes, fills or overburdened materials likely to cause sediment delivery to a stream.

For this action, roads that are within the older aged stands of timber, and no longer are expected to be necessary to manage the stands, would have the road grade tilled in some manner to increase the infiltration rates to near forest-like conditions. Past projects on various BLM Districts has shown it is not necessary to use a sub-soiler to accomplish this goal. Old rock roads with sandstone surfaces can be turned over with an excavator or ripper to restore infiltration rates. Scraping off the surface rock in order to recover the investment may not be feasible and does not ensure plant establishment. Once the sub-grade is reworked, placement of slash, plants and some amount of organic matter from the neighboring slope should be worked into the surface layer. This addition of nutrients and more importantly, fungi and micro-organisms, would allow the process of colonization to occur. Once established, these organisms would process materials both on and in the soil much like that under the forest canopy. Without the aid of the micro organisms, the timeframe to establish them becomes very long, sometimes decades. Some refer to this as "jump-starting" the system.

Newly constructed roads – New road construction on BLM lands within the analysis area is limited to roads analyzed through the NEPA process to facilitate BLM timber sales and by private timber companies constructing new roads across BLM lands under existing reciprocal right of way agreements. All new roads are constructed according to the Best Management Practices in the RMP that reduce impacts during construction and provide stability over a long time period. Severe erosion or instability, cultural or botanical reasons would prevent private road construction across BLM lands. Most new road construction has demonstrated that roads can be built and not be as large of an impact as in the past. Under this action new roads would be dirt surfaced and would be fully decommissioned after use.

Except for 0.1 mile of new road construction on private land, all new constructed dirt spurs would be decommissioned after use. The intent of the action is to return soil infiltration rates, organic matter, and nutrient cycling functions to the temporary road surfaces. The objectives would be accomplished through the use of heavy equipment (excavators or dozers) that is capable of reworking the surface with an implement that reduces the compact layer. Presently there are several attachments that can de-compact these surfaces; they range from a sub-soiler unit to a simple bucket on the excavator. The return of the soil infiltration rate can be accomplished on dirt surfaced roads rather easily. It is once these surfaces become covered with rock that they become more problematic to restore the infiltration rates. Operationally they become more expensive to close and the success of doing so is less.

Transportation Management Objectives TMO - Categories as defined within the GIS data base

Open = The road segment is to remain open at all times for all uses (minimum maintenance level 2).

Self = The road segment is needed for management only in the near term (5+ years). Road density, ACS, or other issues do not require closure of the road. The road will be assigned a maintenance level 1, which, over generally a 10-year period, will result in the encroaching vegetation closing the road. Roads recommended to be self closing would not be classified as "closed" until encroaching vegetation physically prohibited vehicular access.

Temp (temporary) = the road segment is to be temporarily closed with a gate, tank trap, or similar barrier. The road would be closed to general public, but opened for administrative uses (i.e., surveys, silvicultural contracts, restoration contracts, road maintenance, etc.). The road could also be used by private land owners or timber companies to access their lands. During BLM/Permittee commercial activities, the road could be open to the general public. Drainage structures would be left in place and a maintenance level 2 assigned.

Seas (seasonal) = The road segment is to be seasonally closed with a gate or similar barrier. The road would be closed to general public, BLM/Permittee timber harvest, and BLM administrative uses during an established time period. Drainage structures would be left in place and a maintenance level 2 assigned.

Dcom (decommission) = The road segment is to be closed to vehicles on a long-term basis with a permanent barrier (i.e. tank trap, boulders, etc.) and would not require future maintenance. The road will be left in an "erosion-resistant" condition by establishing cross drains, removing fills in stream channels, and excavating potentially unstable fill areas. These roads would not have vehicle activity until the next commercial harvest opportunity along that road system, generally, for a 10 to 20-year time frame. The road segment would still be tracked in the road inventory with a maintenance level 1 assigned. Some decommissioned road may be closed with a guard rail type barrier. These road segments would have vehicle activity sometime within the next 3-5 years to conduct silvicultural treatments. The road would be opened to traffic for up to 2-3 weeks and then closed until the next commercial harvest opportunity along that road system, generally, for a 10-20 year time frame.

Full (full decommission/hydrologic obliteration) = The road segment is to be closed with a permanent barrier (i.e. tank trap, boulders, etc.) and would not require future maintenance. Cross drains, fills in stream channels, and potentially unstable fill areas will be removed to restore natural hydrologic flow. The roadbed would be subsoiled (or tilled), seeded, mulched, and planted to reestablish vegetation. Roads receiving this treatment would have no future need or at least no have vehicle activity until the next timber rotation, generally, for the next 30-40 years. The road segment would be removed from all inventories.

Obl (obliteration, full site restoration) = The road segment is to be completely obliterated, reclaiming the right-of-way. This would involve removing all culverts and fill material. Fill material would be placed on the subgrade in an attempt to reestablish the original ground line (recontoured). Exposed soil will be revegetated with trees or other native species. This is generally the recommended treatment for roads in sensitive or unstable areas where potential for damage to the watershed is high. Roads receiving this level of treatment will not be used at any time in the future and will be removed from all inventories.

8.4 Other issues identified but not used to develop the action alternative

Port-Orford-cedar plant associations

Port-Orford-cedar is uncommon in the analysis area; however, plant associations driven by the presence of Port-Orford-cedar exist in limited areas within the southern portion of the analysis area. Density management treatments in these Port-Orford-cedar stands could reduce the number of trees through the introduction or spread of fungal disease. This reduction will threaten the dominance of this cedar species within the stand and prevent the attainment of the plant association.

> Resolution: Some Port-Orford-cedar dominated units were dropped from consideration for a variety of reasons. Thinning prescriptions and Design Features would favor and protect Port-Orford-cedar in the remaining units which contain substantial numbers of cedar (units 57e and 57w).

Water quality for domestic water source

A known domestic water source is located along lower Bills Creek, just west of China Creek. Units 38 and 39 are located 1.0-1.5 miles upstream.

> Resolution: The prescriptions are for medium variable density management thinning of 25 year old stands. Unit boundaries have been adjusted to exclude riparian areas. These units are well outside a hardwood dominated riparian reserve. There should be no effects to water quality from management within these units.

Visual impacts along the Coos Bay Wagon Road west of China Creek

Public scoping revealed a concern about the visual impacts of unit 1 which may have been visible from private land west of China Creek along the Coos Bay Wagon Road.

> Resolution: Unit 1 was subsequently dropped from consideration for a variety of reasons and would not be treated under any alternative.

Consider multiple entries

Public scoping identified a concern that thinning prescriptions would preclude rethinning in the future.

> Resolution: Prescriptions have been designed anticipating a range from single silvicultural entry to multiple entries. Several units (approximately 18) are > 50 years old, and would probably begin to develop late-successional characteristics prior to second entries; in these units, only a single entry is planned. Single entry is proposed for several units where roads would be fully decommissioned and stands approach 60 years of age at time of treatment for which road closure is proposed (e.g., 23w, 52, 59, 69e, 74, 83, 84, 85s, 89ne, 89s) or units with difficult access (e.g., 66e, 72n). Second entries are proposed for the majority (> 50) of the units. Multiple entries may be required for hardwood conversion units (e.g., 64w, 41). Suggestions for second entries will become part of project files.

Minimize helicopter yarding because of high cost and seasonal availability

Public scoping identified a concern about the high cost and availability of helicopters for yarding.

> Resolution: Although helicopter yarding was considered, no helicopter yarding of units is proposed. A helicopter may be used to transport and place instream wood with future restoration projects. See section 1.9 for a short discussion on why helicopter yarding is not proposed in

either action alternative.

Minimize seasonal restrictions to avoid making sales impractical

Seasonal operating seasons are often prescribed to reduce impacts to leave trees, water quality and soils, Port-Orford-cedar disease, nesting Threatened wildlife species, and to reduce fire risk. Sometimes the combined seasonal restrictions limit operations to an impractically narrow window.

Resolution: Operating seasons were assessed for each set of units that would likely be packaged into a timber sale contract to ensure that the suite of units offered realistic opportunity to implement a timber sale. In some cases, surveys are being conducted or planned for marbled murrelets to identify areas where murrelet seasonal restrictions would not be necessary. Disturbance threshold distances for marbled murrelets and spotted owls have been recently reassessed by the U.S. Fish and Wildlife Service and were substantially reduced; the reduced disturbance distances are incorporated into the action alternative resulting in less acreage subject to wildlife seasonal restrictions. Rocking is proposed for some road systems to reduce impacts to soils and water quality and allow harvesting during winter. The action alternative incorporates reduced bark slip seasonal restrictions in acknowledgement of greater acceptability of tree damage during yarding in density management thinning for Late-Successional Reserve and Riparian Reserve objectives.

Seasonal haul restrictions for water quality and the protection of fisheries are only being proposed on the China Creek road system. Wet weather haul and sediment containment structures would restrict transport of logs on this road in order to minimize the delivery of fine sediment to anadromous fish bearing waters during the spawning and incubation period.

Transportation/access (administrative and public)

Many of the roads that cross the analysis area are controlled by either the BLM or private landowners. Public and internal scoping revealed a concern that road decommissioning would unreasonably restrict access to private and BLM lands and would interfere with necessary management actions in the future.

Resolution: When closing roads that access private lands, a cooperative arrangement is made with the landowner(s) in order to meet their management needs both in the short and long range. Some land owners are willing to close roads where others place a high priority on access for fire suppression needs. Hence, road density on private lands generally is higher than on BLM managed lands. This action concentrates closure efforts on roads where BLM has control of the road and maintains access to private lands.

Road management recommendations were developed in an interdisciplinary setting, both during the original Transportation Management Objective development [during the East Fork Coquille watershed analysis (USDI 2000)] and in this EA, to ensure that future management needs were addressed. Public access would be maintained on the prominent roads throughout the analysis area. Those roads are considered the arterial or haul roads and will be kept open. For administration purposes, local roads or spur roads would be closed via a gate if future management needs are expected in the next 3 to 7 years or with a berm or trench if greater than 7 to 10 years. Generally, roads expected to be used again would have water bars or dips installed to route water out of ditches and make the roads less prone to erosion processes. Where longer periods of closure are expected, stream crossings may be removed, primarily when risk of failure is high. At all times, the roads would be open to non-motorized traffic and could be used for

hiking or hunting activities. Where full decommissioning of roads takes place, the surface of the road would be reconditioned to encourage growth of native plants from seed and in most cases, the prism of the road would still be visible however, it would be difficult to walk. No re-contouring of the hillsides to obliterate the existence of the road would ensue.

Doerner Fir Recreation Site

Public scoping revealed two concerns related to the Doerner Fir Recreation Site. The present trail configuration encourages people to congregate at the base of the tree, which could have some long term impacts to its health. Secondly, several small cutoff trails have developed over time as the public has attempted to find shortcuts around switchbacks. In addition, visitor comments often complain of difficulty in finding the trail head.

Resolution: Access to the base of the tree and potential damage will be addressed in a separate EA (anticipated in fiscal year 2005) where the possibility of a loop trail passing away from the tree will be explored. Cutoff trails will be blocked with woody debris removed from the trail during regular maintenance. Road signs are also being installed to improve the public's ability to find the Doerner Fir in the maze of surrounding roads. These latter two actions are covered by Categorical Exclusions and will occur independent of this EA.

Cutting trees > 20 inches dbh, treatment of stands approaching 80 years old

The LSRA (USDA and USDI 1998) suggests that: "In general, trees greater than 20 inches in DBH would not be cut." (p. 89). The Brummit Creek Density Management Project adheres to this guideline in at least 90% of the units. In up to seven of the older units (< 250 acre; < 12 % of treated conifer areas) 56-78 years old, codominant trees > 20 inches DBH would be removed to reduce competition on dominant trees, allowing development of larger individual tree structures and increasing horizontal variability and canopy layers.

Resolution: The units in which this thinning is proposed are generally in the late stages of biomass accumulation/competitive exclusion. Retention of all trees > 20 inches DBH would result in retention of many codominant trees and continued suppression, and could lead to failure of dominant trees to develop massive boles and limbs. Units proposed for removal of some trees > 20" DBH are further addressed in as part of a Regional Ecosystem Office (REO) review (Analysis File section 1.3).

Creation of openings > ¼ acre in size; thinning stands to < 50 TPA

The LSRA discussion of commercial thinning suggests only 3-10% of treated areas within stands would be left at densities < 50 TPA (USDA and USDI 1998, page 82). The preferred alternative proposes applying low-TPA (< 50 TPA) prescriptions to 5 units (< 150 acre; < 5% of treated conifer units) in the analysis area. Low-TPA prescriptions would heavily thin up to 90% of individual stands, down to densities of 30-50 TPA.

Resolution: Modification of the post-treatment stand density criterion has been proposed because existing research and analysis of local data suggest that: a) pioneer tree densities in historic Oregon Coast Range stands may have frequently remained lower than current LSRA guidelines; b) historic stands supported a wide range in pioneer tree densities, including stands which stayed at very low densities for long periods of time (Poage and Tappeiner 2002); and c) low tree densities historically occurred across larger areas (i.e. > 10% of treated areas). Limited application of heavy thinning to areas in larger fractions of stands would allow management in

the analysis area to more closely approximate the historic range of tree densities found in natural landscapes and reduce the total number of entries into developing stands. This intensity of treatment would accelerate development of large trees with large structures, and increase horizontal diversity at spatial scales broader than the stand level, as well as accelerate the development of hardwood and shrub layers. This treatment could decrease horizontal structural diversity at the stand level (in treated stands), limit the number of trees available to provide for future large snags and down wood, and could increase the risk of blowdown in heavily-thinned stands. However, these high-intensity treatments are only proposed in a very limited portion of the landscape, in topographic/landscape positions where they would have had the highest probability of occurring historically (USDI 2000).

The LSRA also suggests that created gaps in treated stands be < 0.25 acre and cover < 10% of treated areas (USDA and USDI 1998, page 82). Alternative 2 proposes creating gaps up to 0.5 acre in nine units.

Resolution: Although these small gaps (< 0.25 acre) probably are adequate to support small mammal populations and are consistent with the fine-scale gaps in natural stands caused by single-tree mortality, they may not be consistent with the historic disturbance regimes which facilitated development of late-successional conditions in old-growth stands (e.g., variable and low densities) and would not allow existing managed stands to meet all structural characteristics of old-growth stands. Specifically, small gaps may not allow development of a range in pioneer species ages. Therefore, in addition to the fine-scale gaps within ranges suggested in the LSRA (Table 2-1), Alternative 2 proposes creating gaps 0.3 - 0.5 acre in size in nine units (< 250 acre; roughly 10% of treated conifer units) in the analysis area (see Table 8-4 for a list of the subset of these units included in Alternative 3). Proposed gap sizes were based on: a) analysis of canopy gap data from the analysis area and the surrounding watershed; b) reconstruction data from stands which achieved late-successional conditions; and c) minimum size gaps for establishment of Douglas-fir seedlings to promote a range in initiation of pioneer overstory trees. The goals for these gaps would be to: a) promote development of multiple cohorts of shade-intolerant (i.e. Douglas fir) tree species; b) accelerate development of late-successional tree structures; and c) allow conditions in young stands across the landscape to better reflect the historic range of natural conditions. These prescriptions would create 1-5 gaps up to 0.5 acre in size in targeted units, encompassing ≤ 15% of the total treated area in each unit and maintaining an average density of > 30 TPA in the unit. Failure to install such large gaps would probably not preclude development of late-successional characteristics in these young, developing conifer stands. However, characteristics such as large, open-grown trees and multiple canopy layers might not develop in these young stands without significant natural disturbance, which could take many decades to occur. Some stands in the analysis area with hardwood patches could also eventually develop large canopy gaps as hardwoods senesce. However, it is unclear whether these gaps would have composition comparable to gaps in more upland landscape positions (e.g., gaps leading to Douglas-fir with variable initiation dates, western hemlock understories), or even whether hardwoods would eventually be eliminated from such patches. These low density and large gap prescriptions were reviewed by the REO to ensure consistency with LSR objectives (see Analysis File section 1.3).

Impacts to adjacent old-growth stands

Thinning or hardwood conversion in young stands could potentially impact adjacent old-growth stands by triggering windthrow or altering microclimate and cover in the old-growth stand.

> Resolution: Thinning or hardwood conversion in young stands seldom causes windthrow in adjacent old-growth stands because the old-growth stand edges harden to wind effects as the adjacent young stand develops after the stand-replacement disturbance (usually timber harvest). Unit boundaries or prescriptions would be adjusted to reduce edge effects (e.g. leave an untreated or less-intensively treated buffer between units and old-growth stands) when treatments would reduce cover or substantially affect microclimate in the canopy of the adjacent old-growth stand (typically when an old-growth stand lies below a treatment unit and the canopies of the two stands interact). Unit boundaries or prescriptions would also be similarly adjusted as necessary to protect the microclimate around sensitive species sites in adjacent stands. Other edge effects are generally considered acceptable because of the long-term benefit that treatments offer for old-growth-associated species.

Thinning in Riparian Reserves

Thinning in Riparian Reserves may not facilitate meeting Aquatic Conservation Strategy objectives.

> Resolution: The selective thinning of riparian stands would alter existing stand conditions. Over time, these stand treatments are believed to be beneficial in terms of increasing species diversity, enhancing tree growth and vigor, and setting these stands on a trajectory towards healthy, late-successional conditions. The increase in tree growth rate is also expected to have a long term beneficial affect on the size and availability of down wood within the riparian area and adjacent stream channel. Thinning is expected to reduce the time it will take to develop large diameter trees within stream side areas. The falling and leaving of trees within fish-bearing stream buffers is expected to have an immediate beneficial effect upon near stream and instream down wood within the analysis area.

Noxious weeds

Any surface disturbance could potentially introduce noxious weeds, threatening the existing plant and animal diversity of the area.

> Resolution: Diligent application of noxious weed prevention Design Features and regular implementation of the eradication program would offset the potential for introducing noxious weeds into a relatively noxious-weed-free system. Follow-up monitoring for 3-5 years would ensure that new populations of noxious weeds would not have an opportunity to get a start in the area.

Douglas-fir beetle

Excessive creation of dead wood, either through snag creation or leaving large amounts of felled trees on the ground, could trigger or feed outbreaks of Douglas fir beetles (*Dendroctonus pseudotsugae*) which could, in turn, attack and kill large, weakened old-growth trees in nearby stands. Beetle populations can increase dramatically following large wind and snow events that cause widespread windthrow and stem breakage. The winter of 2003-2004 produced damage in over 50% of some proposed units in a few of the higher elevation stands. Broken out tree tops and downed trees in the unthinned stands were the result of heavy snow and ice that produced significant damage in pockets and on scattered individual trees. The introduction of this high pulse of dead and damaged trees could

contribute to higher bark beetle populations and produce higher mortality rates from the Douglas-fir beetle. This infusion of potential new bark beetle host material would not be removed in the next few years due to timing of the EA and timber sale process. Previous visits to the Coos Bay District by Dr. Don Goheen (SW Oregon Forest Insect and Disease Entomologist) have documented the possible bark beetle epidemic associated with downed wood accumulations that are greater than four down trees per acre with diameters greater than or equal to 10 inches.

Resolution: Most of the recent damage occurred in trees < 14 inches DBH. Douglas fir beetles prefer trees > 14 inches DBH (Mellen et al. 2003). In western Oregon, unless high levels of fresh down wood remains available, either through subsequent storms or management actions, bark beetle populations normally subside to baseline levels within 4 years (Mellen et al. 2003). Mellen et al. (2003) offer some general rules about beetle infestations following an event which creates abundant freshly downed trees:

1) for every 10 down trees that become infested with Douglas-fir beetles, 6 standing green trees are subsequently killed over the next two to three years;
2) when fresh down trees equal or exceed 3 trees/acre, roughly one tree is killed for every 2 down trees; the following year, one tree is killed for every 4 trees killed the previous year; and the next year, one tree is killed for every 25 trees killed the previous year.

Down log prescriptions call for the creation of no more than one down log/acre. Snag creation prescriptions would create 0-10 snags/acre, but monitoring data show that trees die at variable rates over a period of several years following snag creation project, so there would be no pulse of dead trees.

<u>Wildlife species associated with dense, young stands</u>
Widespread thinning of dense, young stands could adversely affect species which depend on this habitat type.

Resolution: O'Neil et al. (2001) list four species of vertebrates potentially present in the analysis area as being closely associated with small tree, single story, closed canopy habitats like the ones proposed for thinning in this EA. Two of these, sharp-shinned hawk and golden-crowned kinglet, were also listed as closely associated with other closed canopy habitats. The other two, northwestern salamander and ruffed grouse, were also listed as closely associated with other habitats as well, so none of the species are exclusively associated with dense, young stands. Hagar (1996) found Pacific-slope flycatchers to be more common in unthinned verses thinned stands; although O'Neil et al. (2001) list them as most closely associated with older stands. Therefore, no species are exclusively associated with dense, young stands; the wildlife species that frequent dense, young stands also utilize other habitat types as well, and these other habitat types would not be affected by the action alternative.

Across all ownerships in the analysis area, young, dense stands are fairly common, covering approximately 27% of the BLM land in the analysis area (see table below).

Table 8-3 Existing cover by young stands on BLM land in the analysis area.

Existing conditions (BLM)			
Hardwood < 80 years old	Young, dense conifer stands[1]	Young, open conifer stands[2]	Total BLM Acres in analysis area
1,058 ac. (5.9%)	4,841 ac. (27%)	129 ac. (0.7%)	17,664 ac.

[1] Conifer-dominated stands with ≥ 150 TPA, 21-80 years old
[2] Conifer-dominated stands with < 150 TPA, 21-80 years old

At least 57% of these would remain untreated in Alternative 2. In addition, density management prescriptions were assessed at the 7th field watershed level to ensure that dense young conifer stands remained available in each 7th field watershed. Therefore, the action alternative would not threaten the persistence of wildlife species associated with dense, young stands nor would it reduce the availability of this habitat type to levels below the range of natural variability in the analysis area.

Special status species
See sections 4.5 and 4.8 for descriptions of effects to special status species.

Deer/elk forage
Although Late-Successional Reserve management objectives do not explicitly include management for deer and elk habitat, opportunities may exist to provide deer and elk habitat.

Resolution: The action alternative includes seeding of forage and browse species for deer and elk along decommissioned roads and other openings (section 2.2.11). Road decommissioning is expected to improve habitat for deer and elk (see section 4.2).

Other aquatic species
Portions of the proposed project occur within and adjacent to streams that provide habitat for a variety of aquatic species. These activities include road maintenance, timber harvest, timber haul, stream restoration activities, and silvicultural treatments.

Resolution: The actions that may have the greatest potential to adversely affect stream dwelling organisms, in the short term, are the stream channel restoration activities. Removal of road fill from floodplain areas and wood placement in China, Brummit, and Karl Creeks may have short term impacts in terms of sediment delivery and mobilization as the channel re-establishes a restored form. In the long term the restored channels are expected to benefit aquatic organisms through the restoration of channel form and function.

Wood routing and recruitment
Riparian thinning and wood placement activities would alter the rate of wood recruitment and influence the routing of course woody debris within streams.

Resolution: The placement of wood within China, Brummit, and Karl Creek would move wood densities within those streams toward the large wood densities that are expected to have a beneficial affect on channel morphology and the hydrology of the stream system. Wood

complexes created during wood placement can be expected to trap large and small course particulate matter, helping to retain it with the stream system. This can have a beneficial affect on channel morphology and also help retain nutrients within the stream system. Fall and leave thinnings adjacent to fish-bearing streams would increase down wood densities on floodplains and other off channel areas helping to increase roughness within flood-prone areas. This would help create off-channel, calm-water areas where fish and other aquatic organisms may find refuge during flood events. Thinning would also help accelerate tree growth within the adjacent riparian stands. This is anticipated to increase the size of trees available for recruitment to the stream channel in the short and long term.

Arrangement and quantity of plant associations

The action alternative could modify the arrangement and quantity of plant associations in the analysis area.

Resolution: The majority of the analysis area (82%) has been assigned to the western hemlock (TSHE) plant association group (PAG)(Martinez and Atzet 2003). Most proposed treatment units are best described by this PAG, ranging from TSHE/RHMA3-BENE2-SWO in drier northeastern portions of the analysis area to TSHE/RUSP (Atzet et al. 1996) in moister, lower slope positions (often north-facing). This PAG is not limited in the analysis area, and would not be impacted by the proposed action. Highly-disturbed and lightly-disturbed Port-Orford-cedar (CHLA) associations are present in the southeastern portion of the analysis area, in and adjacent to units 57w, 57e. The proposed action has been modified to minimize effects of the action to units in this association, and may enhance conditions in Port-Orford-cedar stands.

Arrangement and quantity of forest successional stages and type (hwd vs. con)

The action alternative could modify the arrangement and quantity of forest successional stages and the type of stands (i.e. hardwood verses conifer).

Resolution: The potential effects of the proposed action on forest successional stages and forest cover types has been modeled and contrasted with a No Action alternative, over a 100 year time horizon (Analysis File section 1.17). Results of this modeling suggest a substantial decrease in hardwood community types under the proposed action, moving the analysis area closer to the lower limit of the historic range of natural variability in hardwood cover. The proposed action would initially increase cover by early successional types (due mostly to hardwood conversion), but would facilitate development of higher late-successional cover over time. The potential effects of the proposed action on successional stages and forest cover types are documented in section 4.3.

Forest structure (windthrow, etc.)

The action alternative would have immediate and long-term effects to forest structure. Immediate detrimental impacts to forest structure including increased windthrow (initially), degradation of some down wood (mostly advanced decay classes), conversion of some snags into down logs (including some decay class 1-3 and diameters > 16 inches). Near-term and long-term effects include snag and down wood creation (which would exceed loss and be of much lower decay classes), and some limiting of natural snag recruitment by removal of codominant trees.

Resolution: The potential effects of the proposed action on forest structure are documented in section 4.3.

Distinct habitat types (cliff, talus, maple flats, seeps, etc.)
Thinning and hardwood treatments could damage or modify distinct habitat types that are rare in the landscape.

> Resolution: All proposed units were reviewed on aerial photographs and in the field for the presence of special habitats such as cliffs, talus, remnant old-growth trees, large big-leaf maple trees, seeps, etc. The selection of units for the action alternative and the proposed unit boundaries and prescriptions all accounted for the existence of special habitats. For instance, several units were dropped from consideration because they included numerous large, cavity-ridden big leaf maple trees. Unit boundaries were adjusted to avoid small patches of remnant trees. In addition, Design Features (section 2.3) include provisions for protecting special habitats encountered during layout.

Soil stability
The East Fork Coquille Watershed analysis (USDI 2000) identified unstable areas based on soil type and percent slope within the analysis area. The Brummit Creek basin contains extensive bedrock exposures. Where the soil depth is less than 16 inches above this bedrock and the slopes are steep (greater than 65%) the stability of the hillslope is in question. When the weight of the soil, water and trees exceeds the force of retention of this mass, it can move downhill for either short or long distances (Swanston 1974). This is a normal delivery method for soil and large wood necessary for in-stream processes and aquatic species habitat needs. The headwalls of steep draws and canyons are likely places of failure in stands 80-200 years of age (depending on slope and soil depth), as are recent clearcuts 3-10 years after harvest when root strength is lost from harvested trees (Sidle 1985).

> Resolution: Steep headwall and bedrock outcrops were avoided during unit layout (i.e. unit boundaries were adjusted to avoid these areas) or the entire unit was dropped altogether from treatment consideration.

Soil productivity
Soil productivity is high across the analysis area based on soil type site index information. Past management practices such as sidecast road construction, downhill and spar tree yarding and hot broadcast burning may have reduced this productivity in some areas. These areas, which were conifer stands prior to harvest, often regenerated as alder which has a very high capacity to fix nitrogen into the soil and restore the nutrient base. The resulting alder-derived organic matter is different from conifer generated organic matter and supports a greater diversity of micro-organisms and soil fauna that further increase soil productivity. In combination, these processes allow soil structure and function damaged by past practices to recover at an accelerated rate.

> Resolution: Planting and establishing conifer on sites with lowered productivity has not been a problem in the past. However, it does require a greater investment in both time and resources in the first 5-7 years to achieve conifer establishment. Within the analysis area only a few units of the hardwood conversion type would be considered difficult to regenerate because of lowered site productivity.

Soil loss
Timber harvest, road construction or renovation activities could instigate erosion processes which result in soil loss levels which exceed the acceptable range for management activities.

Resolution: Forested environments normally loose less than 0.1 Mg/ha/yr [0.27 tons/ac/yr converted] of soil as a result of natural erosion processes (Neary 1994), well below any threshold of concern for the soil types in the analysis area. The most fragile soil types in the analysis area can withstand 1 ton/ac/year loss before it would be a concern from a productivity perspective (USDA-SCS 1989). Thinning stands of 30-50 year old timber would not expose the soil surface to the erosional processes where soil loss would be greater than normal background levels. Where conversion from hardwoods to conifer are planned, soil exposure would be greater than normal but erosion rates would still be within acceptable loss parameters established by the NRCS. Burning slash would be limited to pile and burn methods rather than broadcast burns. Some amount of slash and woody materials would remain providing entrapment of surface soil movement within the unit and prevent actual soil loss from the site. Best Management Practices from the RMP have been integrated into Design Features (see section 2.3) to be employed during road construction or renovation as well as during timber removal for any harvest method to prevent unacceptable loss of soil resources.

Reforestation

Slash left after logging and competition from existing shrubs could restrict opportunities to plant trees to the point where reforestation objectives would not be met. Once trees are planted, subsequent competition from salmonberry and other shrubs, invigorated by increased light levels, could limit establishment and growth of planted trees.

Resolution: Most of the stands are a western hemlock/sword fern plant association with some salmonberry, huckleberry, and vine maple in varying amounts throughout the units. Slashing of the existing vegetation to prepare the site after logging would be done with chainsaws to allow for accessibility to the planting spot and reduce competition for the newly planted seedlings. The slash produced after the logging operation would be treated either through piling and burning or through a lopping and scattering of slash. Access to acceptable planting spots would allow approximately 430 to 530 trees per acre to be planted the first winter after site prep is completed. Planting stock would generally be two year old stock, and in some cases, three or four year old seedlings would be planted where brush competition is expected to be more extreme.

The stands would be monitored regularly and manual maintenance performed in order to promote healthy growth, reduce competition, and expedite establishment of the newly planted trees. Some of these areas would need at least two brush cuttings in order to allow the conifer to exceed competitive brush height.

Road related sedimentation and turbidity

Several aquatic species require clear water and intersticial spaces in gravel for their habitat. Road building, renovation, and use can create sediment that can be delivered to streams degrading water quality and aquatic habitat. This sediment delivery can increase turbidity, alter channel morphology, and fill in intersticial gravel spaces. Restorative activities such as culvert replacement, and road fill pull back along streams can also deliver sediment to adjacent water courses. Road grade failures from unstable roads and chronic erosion from unmaintained roads are also sediment sources within the analysis area. Sedimentation and turbidity effects would be greatest where roads are immediately adjacent to streams or where ditch relief culverts empty directly into streams.

Resolution:

Affected Environment

A review of the 1950 and 1970 aerial photos was conducted to determine the extent of road construction and harvest prior to 1950 and by 1970. Road construction techniques during this period commonly included sidecasting excavated material and construction low standard roads. Both techniques often precipitated subsequent landslides. Prior to 1955, very few portions of the analysis area had roads or logging evident. Only a small part of China Creek, Brummit Creek and Deadhorse Creeks were roaded north of the main Coos Bay Wagon Road. Powerline construction activities to the south of the Wagon Road impacted a small portion of the analysis area.

All the mainline road systems were built by the 1970s. Sidecast construction techniques were used extensively in Brummit Creek, Karl Creek and the East Fork of Brummit Creek road systems, and much of the material was delivered to the stream systems below. Some portions of the Burnt Mountain Ridge road and West Fork Brummit Creek road were also side-casted but with less deleterious effects to the stream environment.

Roads within the analysis area today represent a wide spectrum of construction methods and standards and conditions. Paved roads, such as the Coos Bay Wagon road or the Burnt Mountain access road systems have minimal delivery of sediment to streams from cutbanks, slides or road surface even though they are heavily traveled. Most gravel surfaced roads on the ridges do not appreciably contribute to the overall sediment load unless a major stream crossing pipe fails or cut-bank slides fills the drainage ditch. Road use associated with timber removal or management activities rarely produces fine sediment from the surfaces due to age, gravel type and past use of these surfaces. Only when heavy rainfall events and timber haul occur on poorly maintained roads does sediment pump up from the road system and potentially deliver to the stream network. Many older roads that were not surfaced or surfaced lightly with sandstone type rock during use have been reclaimed by tree and brush species at this time. These roads are in some state of hydrological recovery at this time. Infiltration rates are in balance with precipitation and no sediment is being derived from these surfaces. Organic matter generally covers the old roadbed as well.

Some roads, such as the lower portion of China Creek, are showing signs of deterioration of the outside edge of the road. Such side-casted roads are being compromised by stream flows or simply failing due to the influence of gravity. Either method provides a mechanism that contributes more fine sediment than normal to the stream system. This system has also been noted to produce large quantity of fines during the winter under timber haul use. The proximity of the road adjacent to the creek does not allow vegetation to filter out the fines prior to delivery to the stream. BLM inventories of The West Fork Brummit Creek road indicate that the culverts are plugged, failing or improperly spaced causing ditchlines to carry more flow than expected, and downcutting of the ditch is occurring. This road was heavily side-cast when built and few culverts were originally installed. Those culverts that were placed in the larger streams have large amounts of fill on top of the failing culverts now and the potential for sediment delivery is high should failure become a reality. Having inadequately spaced cross drain culverts adds additional risk to the potential for failure.

Due to the underlying Tyee geology of the analysis area, the bulk of sediment derived during the weathering process is sand. This provides for low stream turbidity during disturbance or high

precipitation events. However, sand can fill interstitial spaces in stream gravel reducing spawning gravel quality and reducing habitat for aquatic macroinvertebrates. Recovery after storm events appears to be tied directly to the response curve of the watershed, most of which are considered flashy by nature. The western-most portion of the analysis area is on the Roseburg geologic formation and develops similar amounts and types of fine particles from disturbance or in-channel events

Effects

Alternative 1 (No action)

Direct/Indirect Effects

Alternative 1 would not construct, improve or decommission any roads in the analysis area. With the exception of road adjacent to China Creek and the Coos Bay Wagon Road, the transportation system within the analysis area is not contributing large amounts of fine sediment to the stream network. The restoration project to remove a part of the encroaching road bed and correct the delivery of sediment from both the road and stream channel in China Creek would not be implemented. Sediment delivery would continue into a known salmonid spawning and rearing portion of the watershed. The amount of fine sediment would be greater if timber haul is occurring in the winter months and could be considered chronic delivery at that time. The repair of road systems like West Fork Brummit Creek road would not occur. Thus there is a moderate risk of culvert failure and the delivery of the fill comprising the road into the stream drainage network.

Other restoration projects such as placing large wood within China Creek would not be conducted and the ability to stop and store sediment in channel would remain low. Pulling back encroaching roads or sidecast materials from road edges would not occur and failure of this type of material has traditionally reached stream channels during heavy rain events in the winter.

Unmaintained roads with the analysis area would continue to pose a risk of delivering sediment to streams as a result of deteriorating conditions. Most repairs could be expected to occur once environmental damage was done.

Cumulative Effects

Private timber companies would likely continue harvesting their lands in the analysis area on about a 40 year rotation. This is occurring in the Deadhorse and Knepper Creek areas at this time, and construction of new spurs is planned or complete west of Deadhorse Creek. Private timber hauling may occur in either the summer or winter time, and the maintenance of the roads is the responsibility of the operator or the private land owner. Control of timing of haul or condition of the road during haul belongs to the Department of Forestry of the State of Oregon and the enforcement of Best Management Practices is encouraged but not mandatory. Thus the road-related sediment and turbidity in this part of the analysis area can be expected to increase over the next several years and decrease there after.

There is no planned harvest on Coquille Forest lands within the East Fork Coquille watershed. The plan for 3,100 acres of thinning and regeneration harvest under the BLMs' Upper East Fork Coquille EA is not expected to deliver sediment through harvest, culvert or road improvement activities.

The condition of the Coos Bay Wagon Road would improve if the work on the natural gas

pipeline concludes this summer and restoration efforts are implemented. According to the EIS for the pipeline the gravel portion of this road is planned to be paved under this project which would greatly reduce the sediment delivery conditions along the East Fork Coquille River occurring at this time.

Alternative 2

Direct/Indirect Effects

Alternative 2 would treat problem roads discovered during field review of the proposed units. Specifically, China Creek road would undergo relocation away from the stream in select areas; the addition of large wood to the stream would store gravels routing out of the system, and the culverts would be replaced with bridges or stream simulation or baffled culverts and the stream channel widened to accommodate higher winter flows. The repair of West Fork Brummit Creek road would install properly-sized stream and ditch relief culverts on a spacing distance that can handle snow melt runoff events without down-cutting the ditchlines. Thus, the fine sediment delivery from most roads would subside, and road renovation would greatly reduce the risk of culvert failure and slumping of overburden along streams. Overall, there would be less delivery of fine sediment into China Creek and less risk of delivery of road fills from West Fork Brummit Creek road system in comparison to Alternative 1.

Short term increases in sediment delivery to water courses can be expected as a result of the road work and road related restoration in the vicinity of stream channels. However, these short term increases in sediment delivery would be minor due to the use of erosion control practices and techniques. Overall the impact would be localized, and recovery is expected after the flush of winter runoff.

Cumulative Effects

The harvest of private timber and the paving of the Coos Bay Wagon Road would also occur under this alternative and the related impacts, both negative and positive, would still occur. The reduction of the road-related sediment delivery from doing the associated road and stream channel work under this action would have little change on the overall sediment budget of the East Fork Coquille River in comparison to Alternative 1.

Alternative 3

Direct/Indirect Effects

The benefits of reducing fine sediment delivery into China and West Fork Brummit Creeks would still be realized under this alternative as described above in Alternative 2.

Cumulative Effects

The long term outcome under this alternative would be similar to Alternative 2.

8.5 List of individual treatment units and prescriptions

Table 8-4 Treatment units, prescriptions, and unit-specific Design Features (note key at bottom).

Unit	Acres	Type	Age	Prescription	RD	TPA	Snag/log creation (#/ac)	Additional Design Features
2	31.1	hwd	44	Non-comm	H	H	10/1 2/2 (hwd)	Enhancement of lower slope mixed hardwood, and release of tolerant trees(western red cedar, western hemlock)
4	36.4	hwd	36	HW Conversion	L	L	1/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
5	18.0	dmt	61	DTR (0.5/ac.) Light thin (120 tpa)	65	160	1/1	Entire bottom portion of unit would remain untreated (~ 5 ac)
7	20.2	hwd	36	HW conversion		109	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
9	32.2	dmt	34	MDL 12"/gaps	45	177	3/1	Gaps in north-facing portion of unit
9h	17.8	hwd	34	HW Conversion	L	L	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
10s	4.8	dmt	38	Spacing 22'	25	89	3/1	2 High-density areas will be created
10n	7.4	dmt	38	MDL 13"	30	92	1/1	Retain all minors
11	34.3	dmt	37	BA 160/DTR (1/ac.)	30	69	1/1	HW Conversion on 1 ac
12w	13.3	hwd	52	HW Conversion	L	L	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
13	13.88	dmt	48	HW Conversion/ Spacing 30'	L	L	1/1	RX designed to enhance bald eagle habitat
15	15.5	dmt	61	MDL 20"/DTR (0.5/ac.)	M	M	5/1	RX designed to enhance bald eagle habitat. Several NTZs
16	17.5	dmt	58	DTR (0.5/ac.)	H	H	10/1	Non-commercial treatment
17	40.9	hwd	35	HW conversion	L	70	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
18	39.3	hwd	35	HW conversion	L	L	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
19	23.5	hwd/dmt	32	HW conversion	L	70	3/1 1/1 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
20	28.2	dmt	38	Spacing 24'/MDL 16"	36	74	1/1	30m buff on OG stand to west
21	19.4	hwd/dmt	36	HW Conversion	L	70	3/1 1/1 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
21n	22.8	hwd/dmt	42	HW Conversion	L	70	3/1 1/1 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
22	7.9	dmt	63	Spacing 27'/High-density areas	31	59	1/1	
23e	8.9	dmt	64	Spacing 20'	47	99	1/1	> 50% of unit designated as NTZ
23w	7.7	dmt	64	Spacing 24'/High-density areas	39	75	1/1	2 (0.5 ac.) high-density patches (193 TPA) retained
24n	9.5	dmt	66	Spacing 26'/MDL 18"	21	63	1/1	Retain all HW. Additional marking to maintain deformed/wolf trees
24s	3.0	dmt	66	Spacing 24'/MDL 16"			1/1	Retain all POC, HW. Additional marking to maintain deformed/wolf trees and snags
25h	19.9	hwd	42	HW Conversion	L	L	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25'x 25'
26	64.4	dmt/hwd	40	MDL 14"/Var increase	41	103	3/1	

Unit	Acres	Type	Age	Prescription	RD	TPA	Snag/log creation (#/ac)	Additional Design Features
29	101.1	dmt/hwd	38	BA 120/ BA 160	30-33	60-87	1/1	BA strips developed for variability. Leave single alders
29r	67.4	hwd	39	HW Conversion/Retain all BLM >40”dbh	L	L	1/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25’x 25’
30	17.6	hwd	41	HW Conversion	L	L	1/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25’x 25’
31	12.3	dmt/hwd	41	HW Conversion	L	L	1/1	Cut all HW, thin conifer patches to 25’x 25’
32	33.4	dmt	36	BA 100/ High-density areas	25	69	1/1	
33s	8.2	dmt	78	BA 120/ MDL 16”/	H	H	1/1	
34m	8.2	hwd	37	HW Conversion	L	L	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25’x 25’
34n	4.1	hwd	37	NT	L	L	1/1 2/2 (hwd)	
34s1	10.6	hwd	37	HW Conversion	L	L	1/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25’x 25’
34s2	8.3	hwd	37	HW Conversion/ DTR conifers	L	L	1/1 2/2 (hwd)	Cut all HW, thin conifer patches to 25’x 25’
34s3	52.1	dmt/hwd	37	HW Conversion/ DTR conifers	L	L	1/1	Cut all HW, thin conifer patches to 25’x 25’
35	5.8	dmt	37	MDL DF-14”/ WH-12”	28	72	1/1	Retain all minor species
35m	10.4	dmt	37	MDL DF-14”/ WH-12”/High-density areas	H	H	3/1	Retain all minor species
35n	17.7	dmt/hwd	37	MDL DF-14”/ WH-12”/ High-density areas/gaps	M	M	1/1	Retain all minor species
36	29.2	dmt/hwd	37	DTR (east ½ only)	H	H	1/1	
37	31.5	dmt/hwd	34	BA 100	M	M	1/1	
38	35.4	dmt	26	BA 120/DTR	M	M	1/1	
39	30.3	dmt	25	BA 120/DTR	M	M	1/1	
40	24.0	dmt/hwd	30	BA 120	M	M	1/1	
41	18.3	hwd/dmt	40	HW Conversion/ Conifer spacing 25’	L	L	0/0	heavy existing storm damage
42	16.3	dmt	74	MDL 20”/DTR	34	118	1/1	
43	64.4	dmt/hwd	37	Spacing 23’/MDL 17”	28	80	1/1	
44n	14.8	dmt/hwd	26	Spacing 17’/MDL 14”/Gaps (0.5/ac.)	H	H	3/1	
45	28.1	hwd	32	HW Conversion	L	70	3/1 2/2 (hwd)	Cut all HW, thin conifer to 25’x 25’
47	16.3	dmt	32	Spacing 30’/MDL 15”	20	52	3/1	
48	22.5	dmt	29	Spacing 24’/MDL 16”	30	80	1/1	
49	12.0	dmt	36	Spacing 20’/MDL 18”	H	H	1/1	
49n	22.00	dmt	36	MDL 16”	22	65	1/1	
50	129.1	dmt	37	MDL 16”/DTR/Gaps	30	76	1/1	Retain WH>10”
51	23.5	dmt	34	MDL 15”	25	70	1/1	

Unit	Acres	Type	Age	Prescription	RD	TPA	Snag/log creation (#/ac)	Additional Design Features
52	21.2	dmt	78	Gaps/ variable thin	M	M	5/4	Dropped portion of unit containing lot of remnant structures
53	15.9	dmt	35	BA 120/gaps	24	54	1/1	3 large gaps (0.5 ac. each)
54	26.9	dmt	34	Spacing 31'/MDL 18"	19	45	1/1	
55	23.8	dmt/hwd	29	Spacing 20'/MDL 14"	25	98	1/1	
57e	28.3	dmt	54	Non-commercial	H	H	3/1	NTZ for POC-dominated areas; DTR in NW ¼ of unit
57w	11.1	dmt	54	MDL 16"-DF; MDL 12"-WH	M	M	3/1	
58	49.9	dmt	34	BA 120/140	27-29	55-61	1/1	
59	15.6	dmt	30	MDL 12"	43	169	1/1	
60	20.3	dmt	33	BA 80	20	54	1/1	Prescription designed to eliminate blackstain/root rot
61e	18	dmt	30	Spacing 20'/MDL	28	78	3/1	
61e	27	dmt	30	Spacing 20'/MDL	23	64	3/1	
62	8.3	hwd	36	HW Conversion	L	L	1/1 2/2 (hwd)	1 patch of conifers would be maintained
64w	311.5	hwd/dmt	36	30' spacing	L	L	1/1 1/1 (hwd)	Cut all HW, thin conifer patches to 30' x 30'
64e	5.1	hwd/dmt	36	30' spacing	L	L	3/1 1/1 (hwd)	Cut all HW, thin conifer patches to 30' x 30'
65	27.1	dmt	31	25' spacing	25	63	1/1	5 small gaps
66w	13.5	dmt	33	25' spacing	30	73	1/1	
66e	8.9	dmt	33	MDL 14"	30	80	1/1	DTR (7)
67n	12.0	dmt	39	25' spacing	M	M	0/0	heavy existing storm damage
67s	15.0	dmt	39	MDL 14"	17	50	1/1	
68n	15.66	dmt	38	20' spacing	38	109	0/0	heavy existing storm damage
68s	56.8	dmt	38	25' spacing	24	65	1/1	
69w	21.1	dmt	31	MDL 14"	35	112	3/1	
69e	9.7	dmt	31	MDL 12"/DTR	27	90	3/1	
70	28.6	dmt	30	BA 60/ High-density areas	16	44	0/0	heavy existing storm damage
72	79.0	dmt	46	MDL 15"/DTR	44-63	113-215	3/1	MDL in upper portion of the unit only; DTR in lower portion only
73	3.7	hwd	54	HW Conversion	L	L	3/1 2/2 (hwd)	Cut all HW, thin conifer patches to 30' x 30'
74	24.4	dmt	56	MDL 14"	28	59	5/1	Install several DTRs; snags/logs may exist from storm damage
75n	17.2	hwd	30	HW Conversion/ MDL 14"	L	20	1/1 2/2 (hwd)	Cut all HW, thin conifer patches to 30' x 30'
75s	4.8	dmt	30	25' spacing	M	70	1/1	
76	25.8	dmt	37	MDL 16"/DTR	30	67	3/1	
77w	455.3	dmt	37	24' spacing	30	74	0/0	heavy existing storm damage
77e	30.7	dmt	37	19' spacing	32	133	0/0	heavy existing storm damage
78w	41.8	dmt/hwd	38	20' spacing/DTR	M	M	0/0	heavy existing storm damage
78	12.5	dmt	37	MDL 18"/DTR	M	M	3/1	
80	36.3	dmt	30	MDL 15"/ High-density areas	25	66	3/1	
81	18.7	dmt	27	MDL 14"/ High-	32	95	3/1	

				density areas				
Unit	Acres	Type	Age	Prescription	RD	TPA	Snag/log creation (#/ac)	Additional Design Features
82	21.9	dmt	27	25' spacing	M	M	3/1	
83	6.4	dmt	30	BA80	19	47	1/1	
84	9.0	dmt	30	MDL 14"	33	91	3/1	
85n	10.4	dmt	30	19' spacing	38	134	3/1	DTR (10)
85s	9.44	dmt	30	MDL 14"	33	91	3/1	
86n	15.7	dmt	28	19' spacing	27	104	3/1	DTR (14)
86s	7.6	dmt	36	18' spacing	23	115	1/1	DTR (3)
87	31.9	dmt	26	MDL 12"	25	90	0/0	heavy existing storm damage
88	17.3	dmt	76	23' spacing	36	73	3/1	
89ne	20.6	dmt	74	MDL 20"	43	67	5/4	3 small gaps
89s	30.0	dmt	74	BA200	47	73	3/4	3 large gaps
89n	29.3	dmt	74	MDL 20"	43	67	5/4	16 small gaps, 4 HD patches
90	12.6	dmt	26	21' spacing	23	100	3/1	3 small gaps
91e	7.7	dmt	29	20' spacing	H	H	1/1	

Key to table abbreviations and definitions

BA = basal area

dmt/hwd or hwd/dmt = mixed density management thinning and hardwood conversion (predominant treatment listed first)

dmt = density management thinning

DTR = dominant tree retention (i.e. dominant tree surrounded by 50 foot-radius gap [0.2 acre])

HD patch = high-density patch, typically ~ 0.5 acre

HW = hardwood

hwd = hardwood conversion

Large gaps = 0.25 - 0.5 acre

MDL = maximum diameter limit (i.e. cut trees smaller than the limit, retain all trees ≥ the limit)

non comm = non-commercial treatment; limited yarding, if any

RD = relative density

Small gaps = 0.2 - 0.25 acre

TPA = trees/acre

TPA/ RD ranges:

- Low (TPA 50-75; RD 15-20)
- Med (TPA 76-100; RD 21-25)
- High (TPA >100; RD > 25)

Estimates of TPA and RD are preliminary, based on current information and modeling, and are subject to change. Generalized prescription types (e.g., "MDL" for maximum diameter limit) and TPA/ RD ranges are used for units in which prescriptions have not been modeled.

8.6 Yarding methods, suspension requirements, and seasonal restrictions

Table 8-5 Yarding methods, suspension requirements, seasonal restrictions, and the resultant operating seasons. See Maps 2.2 for the subunit boundaries. The operating season and seasonal restrictions are described at the bottom of the table. Operating seasons could change if new spotted owl or marbled murrelet sites are discovered.

Unit	Yarding	Alt 2	Alt 3	Suspension Requirements	Operating Season	Murrelets	Falcons	Fish	Soils	Bark	POC	ID
2	NA	y	y	NA		Y-1 (NW corner)		Y haul				197 198
4	Skyline	y	n	One-end	summer			Y				247
4	NA	n	y	Drop				Y				307
4	Skyline	y	y	One-end	summer			Y				308
5	Skyline	y	n	One-end	summer			Y		Y		204 348
7	Skyline	y	n	One-end	summer			Y				87
9	Skyline	y	y	One-end	summer					Y		263
9	Skyline	y	y	One-end	winter	Y				Y		264
9h	Skyline	y	y	One-end	winter	Y						266
10n	Skyline	y	y	One-end	winter	Y				Y		3
10s	Skyline	y	y	One-end	winter	Y				Y		4
11	Skyline	y	y	One-end	winter	Y				Y		5
12w	Skyline	y	y	One-end	summer							7
13	Skyline	y	y	One-end	summer					Y		8
15	Tractor	y	n	One-end	summer				Y	Y		209
15	Skyline	y	n	One-end	summer					Y		210
16	NA	y	y	NA	fall		Y-1			Y		11
17	Skyline	y	y	One-end	summer	Y-surv	Y-2	Y				12
18	Skyline	y	y	One-end	fall	Y						13
18	Tractor	y	y	One-end	fall	Y			Y			242
19	Skyline	y	y	One-end	winter	Y						14
20	Skyline	y	y	One-end	summer					Y		179
20	Skyline	y	y	One-end	winter	Y				Y		180
21	Skyline	y	y	One-end	winter	Y						17
21n	Skyline	y	y	One-end	winter	Y						18
22	Skyline	y	y	One-end	winter	Y				Y		19
23e	Skyline	y	n	One-end	winter	Y				Y		20
23w	Skyline	y	n	One-end	summer					Y		21
24n	Skyline	y	n	One-end	winter	Y				Y		22
25h	Skyline	y	y	One-end	winter	Y	Y					25
26	Skyline	y	y	One-end	winter					Y		327
26	Skyline	y	y	One-end	winter	Y-surv				Y		328
26	Skyline	y	y	One-end	winter	Y-surv				Y		330
26	Skyline	y	y	One-end	winter					Y		369
26	Skyline	y	y	One-end	summer							366
26s	Skyline	y	y	One-end	summer	Y-surv				Y		332

Unit	Yarding	Alt 2	Alt 3	Suspension Requirements	Operating Season	Murrelets	Falcons	Fish	Soils	Bark	POC	ID
26s	Skyline	y	y	One-end	winter					Y		365
26s	Skyline	y	y	One-end	summer					Y		367
29	Tractor	y	y	One-end	summer	Y-surv			Y	Y		234
29	Tractor	y	y	One-end	summer				Y	Y		238
29	Skyline	y	y	One-end	fall		Y			Y		269
29	Skyline	y	y	One-end	summer	Y-surv				Y		268 270 272 274
29	Skyline	y	y	One-end	summer					Y		267 273
29r	Skyline	y	y	One-end	winter		Y					355
29r	Skyline	y	y	One-end	summer							392
29r	Skyline	y	y	One-end	fall		Y					391
29r	Skyline	y	y	One-end	winter	Y						361
30	Skyline	y	y	One-end	summer							352
31	Skyline	y	y	One-end	winter		Y			Y		191
31	Skyline	y	y	One-end	summer					Y		192
32	Tractor	y	y	One-end	fall	Y			Y	Y		229
32	Skyline	y	y	One-end	winter	Y				Y		231
32	Tractor	y	y	One-end	summer				Y	Y		232
33a	NA	y	n		winter	Y-2				Y		35
33b	Skyline	y	y	One-end	winter	Y				Y		252 256
34m	Skyline	y	y	Full	winter							37
34n	Skyline	y	y	Full	summer							337
34n	Skyline	y	y	One end	summer							338
34s1	Skyline	y	y	One end	winter							339
34s1	Skyline	y	y	Full	winter							340
34s2	Skyline	y	y	Full	winter							289
34s3	Skyline	y	y	One-end	winter					Y		278 381
34s3	Skyline	y	y	Full	winter					Y		282 283
34s3	Skyline	y	y	Full	winter	Y-surv				Y		290
35	Skyline	y	y	One-end	winter					Y		40
35m	Skyline	y	n	One-end	fall	Y				Y		299
35m	Skyline	y	n	One-end	summer					Y		300
35n	Skyline	y	y	One-end	winter	Y				Y		293
35n	Skyline	y	y	One-end	winter					Y		294
36	Skyline	y	y	One-end	summer					Y		297
36	Skyline	y	y	One-end	fall	Y				Y		298
37	Skyline	y	n	One-end	fall	Y				Y		296
37	Skyline	y	n	One-end	summer					Y		285 295
38	Skyline	y	y	One-end	winter	Y				Y		193 194

Unit	Yarding	Alt 2	Alt 3	Suspension Requirements	Operating Season	Murrelets	Falcons	Fish	Soils	Bark	POC	ID
39	Skyline	y	y	One-end	winter	Y				Y		195 196
40	Skyline	y	y	One-end	winter	Y				Y		49
41	Skyline	y	y	One-end	fall	Y						384
41	Skyline	y	y	Full	fall	Y						382
41	Skyline	y	y	One-end	summer							383
41	Skyline	y	y	Full	summer							381
42	Skyline	y	n	One-end	summer	Y-surv				Y		258
43	Skyline	y	y	One-end	summer					Y		171
43	Skyline	y	y	One-end	summer	Y-surv				Y		172
44n	Skyline	y	y	One-end	summer					Y		260
45	Skyline	y	y	One-end	winter							333
45	Skyline	y	y	One-end	winter	Y						334
47	Skyline	y	y	One-end	winter	Y				Y		56
48	Skyline	y	y	One-end	winter	Y				Y		57
49	Tractor	y	y	One-end	summer	Y-surv			Y	Y		224 225
49	Skyline	y	y	One-end	summer	Y-surv				Y		222 223 226
50	Skyline	y	y	One-end	winter	Y				Y		154
50	Skyline	y	y	One-end	summer	Y-surv				Y		160 162
50	Skyline	y	y	One-end	summer					Y		156 395
50	Skyline	y	y	One-end	fall	Y				Y		393 309 396
50	Tractor	y	y	One-end	summer	Y-surv			Y	Y		227
51	Skyline	y	y	One-end	fall	Y				Y		377 380
51	Skyline	y	y	One-end	summer	Y				Y		379
52e	Tractor	y	n	One-end	summer				Y	Y		375
52e	Tractor	y	n	One-end	fall	Y			Y	Y		376
52w	Skyline	y	n	One-end	summer					Y		346
53	Tractor	y	y	One-end	summer				Y	Y		215
53	Skyline	y	y	One-end	summer					Y		216
54	Skyline	y	y	One-end	winter					Y		64
55	Skyline	y	y	One-end	winter	Y				Y		65
57e	Skyline	y	n	One-end	fall	Y				Y		387
57e	Skyline	y	n	One-end	summer					Y		388
57w	Skyline	y	y	One-end	fall	Y				Y		386
57w	Skyline	y	y	One-end	summer					Y		385
58	Skyline	y	y	One-end	winter	Y				Y		69
59	Skyline	y	y	One-end	winter	Y				Y		71
60	Skyline	y	y	One-end	fall	Y				Y		211
60	Tractor	y	y	One-end	fall	Y			Y	Y		212

Unit	Yarding	Alt 2	Alt 3	Suspension Requirements	Operating Season	Murrelets	Falcons	Fish	Soils	Bark	POC	ID
61	Skyline	y	y	One-end	winter	Y				Y		74
62	Skyline	y	y	One-end	fall	Y						75
64	Skyline	y	y	Full	winter	Y						404
64e	Skyline	y	y	Full	winter							403
64	Skyline	y	y	one end	winter							335 336
65	Skyline	y	y	One-end	summer					Y		373
66e	Skyline	y	y	One-end	fall	Y				Y		317
66e	Skyline	y	y	One-end	summer					Y		320
66w	Skyline	y	y	One-end	fall	Y				Y		317
66w	Skyline	y	y	One-end	summer					Y		318
67s	Skyline	y	y	One-end	winter	Y-1				Y		82
67n	Skyline	y	y	One-end	winter	Y-1				Y		81
68	Skyline	y	y	One-end	summer					Y		399 400
68	Tractor	y	y	One-end	fall	Y			Y	Y		402
68	Skyline	y	y	One-end	winter	Y				Y		401
68b	Skyline	y	y	One-end	summer					Y		142 141 315
68b	Skyline	y	y	One-end	fall	Y				Y		316
69e	Skyline	y	y	One-end	summer					Y		135 137
69e	Skyline	y	y	One-end	winter	Y				Y		138
69w	Skyline	y	y	One-end	summer					Y		133 134
69w	Skyline	y	y	One-end	winter	Y				Y		313
69w	Skyline	y	y	One-end	winter					Y		314
70	Tractor	y	y	One-end	summer				Y	Y		213
70	Skyline	y	y	One-end	winter					Y		397
70	Skyline	y	y	One-end	winter	Y				Y		323 326
70	Skyline	y	y	One-end	summer					Y		398
72e	Skyline	y	y	One-end	summer					Y		342
72w	Skyline	y	y	One-end	winter					Y		341
73	Skyline	y	y	One-end	fall	Y						90
74	Skyline	y	y	One-end	winter					Y		125 126
75n	Skyline	y	y	One-end	summer							303
75n	Skyline	y	y	Full	summer							304
75s	Skyline	y	y	One-end	summer					Y		94
76	Skyline	y	y	One-end	summer					Y		95
77e	Skyline	y	y	One-end	summer					Y		96
77w	Skyline	y	y	One-end	summer					Y		97
78	Skyline	y	y	One-end	summer					Y		177 178
78w	Skyline	y	y	One-end	winter					Y		173

Unit	Yarding	Alt 2	Alt 3	Suspension Requirements	Operating Season	Murrelets	Falcons	Fish	Soils	Bark	POC	ID
78w	Skyline	y	y	One-end	winter	Y-surv				Y		175
80	Skyline	y	y	One-end	winter	Y				Y		102
81	Skyline	y	y	One-end	winter					Y		103
82	Skyline	y	y	One-end	winter	Y				Y		104
83	Skyline	y	y	One-end	winter	Y				Y		105
84	Skyline	y	y	One-end	winter	Y				Y		106
85	Skyline	y	y	One-end	winter	Y				Y		107
86	Skyline	y	y	One-end	summer					Y		127 321
86	Skyline	y	y	One-end	fall	Y				Y		322
86s	Skyline	y	y	One-end	summer					Y		124
87	Skyline	y	y	One-end	winter	Y				Y		143 144
88	Skyline	y	n	One-end	winter	Y				Y		110
89n	Skyline	y	n	One-end	winter	Y				Y		146 147 148
89ne	Skyline	y	n	One-end	winter	Y				Y		112
89s	Skyline	y	n	One-end	winter	Y				Y		113
90	Skyline	y	y	One-end	summer					Y		129 130
91e	Skyline	y	y	One-end	fall	Y				Y		261

8.6.1 Summer/fall operating season

Summer Season – Harvest operations could occur during the summer dry season outside the bark slippage season; although falling and yarding could still occur during the bark slip season as long as damage is not excessive. Excessive damage is defined below (section 8.6.8) and also in the Design Features (section 2.3).

Fall Season - Harvest operations could occur during the dry fall period outside the seasonal restrictions for marbled murrelets and other wildlife.

8.6.2 Winter operating season

Winter Season – Harvest operations could occur during the winter and could extend into summer months as long as units meet wildlife and/or bark slippage restrictions.

8.6.3 Northern spotted owl seasonal restrictions

Table 8-6 Distances used for disturbance PDCs for various types of activities.

Spotted Owl		**Zone of Restricted Operation**
	Blast of more than 2 pounds of explosive	1 mile
	Blast of 2 pounds or less of explosive	120 yards
	Impact pile driver, jackhammer, or rock drill	60 yards
	Helicopter or single-engine airplane	120 yards
	Chainsaws (hazard trees, tree harvest, etc.)	65 yards

	Heavy equipment	35 yards
Marbled Murrelet		
	Blast of more than 2 pounds of explosive	1 mile
	Blast of 2 pounds or less of explosive	120 yards
	Impact pile driver, jackhammer, or rock drill	100 yards
	Helicopter or single-engine airplane	120 yards
	Chainsaws (hazard trees, tree harvest, etc.)	100 yards
	Heavy equipment	100 yards

Note that none of the units are within the above distances of currently known spotted owl nest sites. Seasonal restrictions would only become necessary if new owl nest sites are found closer to units.

Harvest activities (such as tree felling, yarding, etc.), snag creation, down wood creation, and instream projects will not take place within the distances listed in Table 8-6 of any nest site or activity center of all known pairs and resident singles between 1 March - 30 June at a minimum. This time span is considered the early nesting period; BLM biologists have the option to extend the restricted season during the year of harvest until 30 September, based on site specific knowledge (such as a late nesting attempt).

This PDC may be waived in a particular year if nesting or reproductive success surveys conducted according to the Service-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 sites/activity centers are assumed occupied unless surveys indicate otherwise.

(II) Blasting - Blasting will not occur 1 March - 30 September unless protocol surveys indicate owls are not present, that they are not nesting, or that young have dispersed. See Table 8-6 for the distances within which to apply the seasonal restrictions.

(III) The boundary of the disturbance distances may be modified by the biologist based on topographic breaks or other site-specific information.

(IV) No restrictions on hauling activities.

8.6.4 Marbled murrelet seasonal restrictions

Y-1 = Seasonal restrictions only necessary in a small part of the unit
Y-2 = Seasonal restrictions only necessary if working within 100 yards of suitable habitat (including) remnant trees
Y-surv = Seasonal restrictions apply but surveys are planned. Restrictions not needed if the habitat is surveyed, vacant.
Y = Seasonal restrictions apply

(I) Harvest activities (such as tree felling, yarding, etc.), snag creation, down wood creation, and instream projects within the distances listed in Table 8-6 of an occupied marbled murrelet site or unsurveyed suitable habitat, will not occur 1 April- 5 August . In addition, projects will be scheduled no earlier than 2 hours after sunrise and no later than 2 hours before sunset (Daily Operating Restrictions - DOR) from 6 August - 15 September.

(II) Blasting - Blasting will not occur near occupied sites 1 April - 15 September. Blasting would not occur near unsurveyed suitable habitat 1 April - 5 August; in addition, projects will be scheduled no earlier than 2 hours after sunrise and no later than 2 hours before sunset from 6 August - 15 September. See Table 8-6 for the distances within which to apply the seasonal restrictions.

(III) Maintain a ½ SPTH buffer around any group of 6 or more remnant conifer trees containing potential nesting structure if the trees occur within a 5 acre circle. Within this buffer, no trees would be removed for any reason associated with timber harvest, including the placement of roads, landings or yarding corridors.

(IV) The action agency biologist has the option to adjust the restricted season and zone based on site specific conditions, such as activity levels at the site, topography, or the type of impact.

(V) No restrictions on hauling activities.

8.6.5 Peregrine falcon seasonal restrictions

Y-1 = Seasonal restrictions only necessary if the unit is helicopter yarded.
Y-2 = Abbreviated seasonal restriction (no harvest-related operations 1 March – 31 May, unless surveys indicate peregrine falcons are not occupying the site or are not nesting in that particular year). If peregrine falcons are present, survey to monitor nest success.
Y = No harvest-related operations 1 March – 5 August unless surveys indicate peregrine falcons are not occupying the site or are not nesting in that particular year.

8.6.6 Fish

No hauling on gravel roads during the winter wet season.

8.6.7 Soils

Operate during dry season of the year when soil moisture content is less than 25% at a depth of 2 to 4 inches below the organic layer.

8.6.8 Bark slip

Conventional falling with chain saws and yarding during high sap flow, April 1 through June 30th, may be restricted to reduce bark damage. Damage to residual trees during logging shall affect less than 10% of the residual trees. Damage is defined as any tree having greater than twelve (12) square inches of the bark removed down to the cambium layer from the bole of the tree, any tree with top diameter broken at three (3) inches in diameter or greater, any visible bark removal on tree roots, or any tree being visually root-sprung due to falling or yarding operations.

8.6.9 Port-Orford-cedar

Port-Orford-cedar seasonal restrictions are coincidentally covered by seasonal restrictions for other resources.