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Environmental Assessment

Blowout Thin Project

**Detroit Ranger District
Willamette National Forest
Lane County, Oregon**

Legal Location: T10S, R5E; T10S, R6E; T11S, T5E; & T11S, R6E; W.M.

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Summary

The Willamette National Forest proposes to commercially thin about 926 acres of plantations and regenerated stands and regenerate about 59 acres of fire regenerated stands in the Blowout Creek drainage on the Detroit Ranger District, about three miles south of Detroit, OR. The Blowout Thin Planning Area is in the southwest portion of the Detroit Ranger District, in Linn County, within the Upper Blowout Creek subwatershed and the Lower Blowout Creek subwatershed (both are sixth fields). Primary drainages include Blowout, Divide, Beard, K, Cliff, Ivy, Hawkins, and Lost Creeks. The legal description of the planning area is: T10S, R5E, Sections 21-28, 34-36; T10S, R6E, Sections 19, 28-33; T11S, R5E, Sections 1-3, 10-15, 22-25; T11S, R6E, Sections 2-11, 14-23, 27-34; and T12S, R6E, Sections 4-5.

The stands being considered for treatment include overstocked managed stands over 40 years old and overstocked fire regenerated stands about 100 years old. The Blowout Thin Project will be implemented in two timber sales sold over a period of about 2 to 3 years starting in 2007 and producing a total of about 11 million board feet of raw materials for timber products. The project also includes the following associated activities: construction of temporary roads to access units; maintenance and reconstruction of existing Forest Service roads; closure of roads after the timber sales to reduce open road density; fuels reduction treatments to reduce the short-term hazards and cumulative effects of fine fuels created during the harvesting operations; snag creation and coarse woody debris creation for wildlife enhancement; tree planting in skyline corridors in riparian thinning areas; and subsoiling of some temporary spurs, skid roads, and landings.

The project may also provide funding for forage seeding, erosion control seeding, slope stabilization, soil restoration, timber stand improvement treatments in adjacent young plantations, noxious weed surveys and treatments, gate replacements, cleanup of slash piles and landing debris along heavily traveled roads to improve visual quality above fuel reduction needs, rehabilitation of popular dispersed camping sites, and stream restoration.

This action is needed to maintain the growth and health of these stands. Based on existing conditions, these stands meet the standards to begin or continue commercial thinning, or in some cases, to regenerate new stands.

Commercial thinning on about 926 acres would improve the growth and maintain the health of the residual trees, diversify the species composition and stand structure, and provide for an intermediate harvest of merchantable size trees for commercial timber products. Thinning treatments are also proposed in the upslope portions of the Riparian Reserves to accelerate the development of late-successional forest characteristics.

Some fire regenerated stands (about 59 acres) have culminated in mean annual increment and are stagnated. These stands exhibit very high tree per acre densities, small diameters, and high suppression mortality. Current diameter growth is poor and live crown ratios are low (<33%), which would prevent most trees from responding to increased tree spacing. These stands could

also have increased susceptibility to windthrow if thinned. Regeneration harvest and planting of the 59 acres of stagnated fire regenerated stands would result in replacing these stands with healthier, faster growing stands. It would also provide for restoration of both western white pine and sugar pine abundance, which has been greatly reduced due to white pine blister rust.

Some stands include pockets (less than one acre) of Phellinus weirii root rot, which is spreading and reducing the health and vigor of the stands and predisposing stands to damage from insects and fire. There is a need to treat these root rot pockets by harvesting infected trees and regenerating with root rot resistant tree species.

The need for fuel reduction treatments is based on the potential for fine fuel levels created from the commercial thinning and regeneration harvest that exceed the Standards and Guidelines (S&Gs) established in the Forest Plan.

The Proposed Action for the project was scoped in June 2004. Two comment letters (one from the Oregon Natural Resources Council, the other from Freres Lumber Company) were received. These letters and internal review of the project identified the following significant issue: stand health, growth and vigor; water quality, and economic viability. Other (nonsignificant) issues included: riparian reserves, impacts to the local economy, fuels, and biodiversity.

The Forest Service evaluated five alternatives. Alternative 3 represents the original proposed action, Alternative 1 represents the No Action baseline, Alternative 2 is similar to Alternative 3 but with no road construction, Alternative 4 is similar to Alternative 2 but with no regeneration harvest, and Alternative 5 is similar to Alternative 3 but with less temporary road construction.

Alternative 3 (Proposed Action) was designed with an emphasis towards low cost ground-based yarding systems and less helicopter yarding. This alternative would commercial thin about 926 acres and regenerate about 59 acres with approximately 40 percent of the acreage yarded with a ground-based system, 58 percent yarded with a cable skyline system, and 2 percent yarded with a helicopter. The alternative would produce an estimated 10.9 MMBF. The alternative requires the construction of about 4.1 miles of temporary roads and the re-opening of about 1.2 miles of temporary road. Alternative 3 mitigates fuel loading by yarding tops attached, grapple piling, hand piling, and broadcast burning on 288 acres.

Alternative 2 was designed without relying on temporary road construction for access to timber stands. This alternative would commercial thin about 926 acres and regenerate about 59 acres with approximately 29 percent of the acreage yarded with a ground-based system, 33 percent yarded with a cable skyline system, and 38 percent yarded with a helicopter. The alternative would produce an estimated 10.9 MMBF. The alternative does not construct or re-open any roads. Alternative 2 mitigates fuel loading by yarding tops attached, grapple piling, hand piling, and broadcast burning on 288 acres.

Alternative 4 was designed to avoid regeneration harvest and to commercially thin without relying on temporary road construction for access. This alternative would commercially thin about 926 acres with approximately 30 percent of the acreage yarded with a ground-based system, 32 percent yarded with a cable skyline system, and 38 percent yarded with a helicopter.

The alternative would produce an estimated 9.2 MMBF. The alternative does not construct or re-open any roads. Alternative 4 mitigates fuel loading by yarding tops attached, grapple piling, hand piling, and broadcast burning on 213 acres.

Alternative 5 was designed with an emphasis towards reducing the acreage that would be helicopter yarded, while tempering the amount of temporary road construction needed. This alternative would commercial thin about 926 acres and regenerate about 59 acres with approximately 29 percent of the acreage yarded with a ground-based system, 56 percent yarded with a cable skyline system, and 15 percent yarded with a helicopter. The alternative would produce an estimated 10.9 MMBF. The alternative requires the construction of about 3.1 miles of temporary roads. Alternative 5 mitigates fuel loading by yarding tops attached, grapple piling, hand piling, and broadcast burning on 2272 acres.

All action alternatives would close about 1.25 miles of currently existing road to passenger vehicles.

Alternative 1 is the No Action alternative where the proposed project does not take place. No further activities would take place to manage the stands by thinning or regeneration harvest. The No Action alternative provides a baseline, or a point of reference for describing the environmental effects of the Proposed Action and other alternatives.

Based upon the effects of the alternatives, the responsible official will decide which alternative approach best meets the projects purpose and need, resolves significant issues, and addresses public comments.

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Chapter 1. Purpose of and Need for Action

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

Introduction: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Environmental Consequences: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.

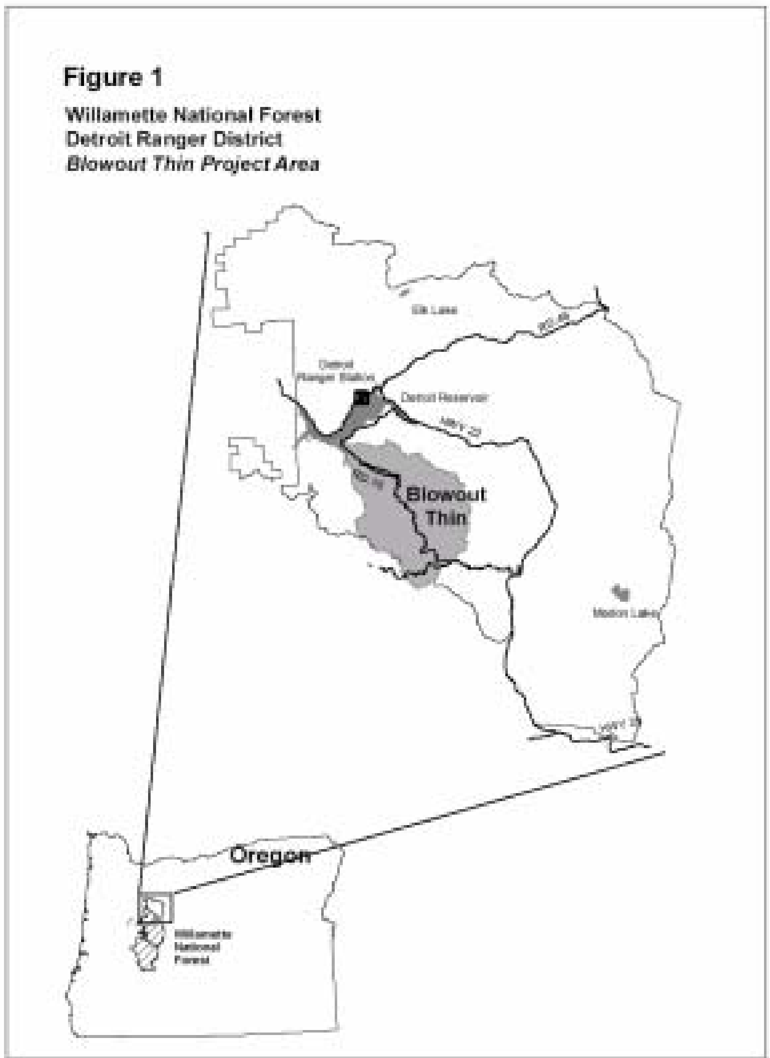
Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment. Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Detroit Ranger District Office in Detroit, Oregon.

Project Location

The 27,320-acre Blowout Thin Planning Area is in the southwest portion of the Detroit Ranger District, in Linn County (see Figure 1), within the Upper Blowout Creek subwatershed (HUC 170900050301) and the Lower Blowout Creek subwatershed (HUC 170900050302). These two subwatersheds (along with two other subwatersheds) lie within the Detroit Reservoir/Blowout Divide Creek watershed (HUC 170900503, see Figure 2). Proposed actions presented in this analysis would occur in the Upper Blowout Creek subwatershed and in the portion of the Lower Blowout Creek subwatershed that is north of Blowout Creek.

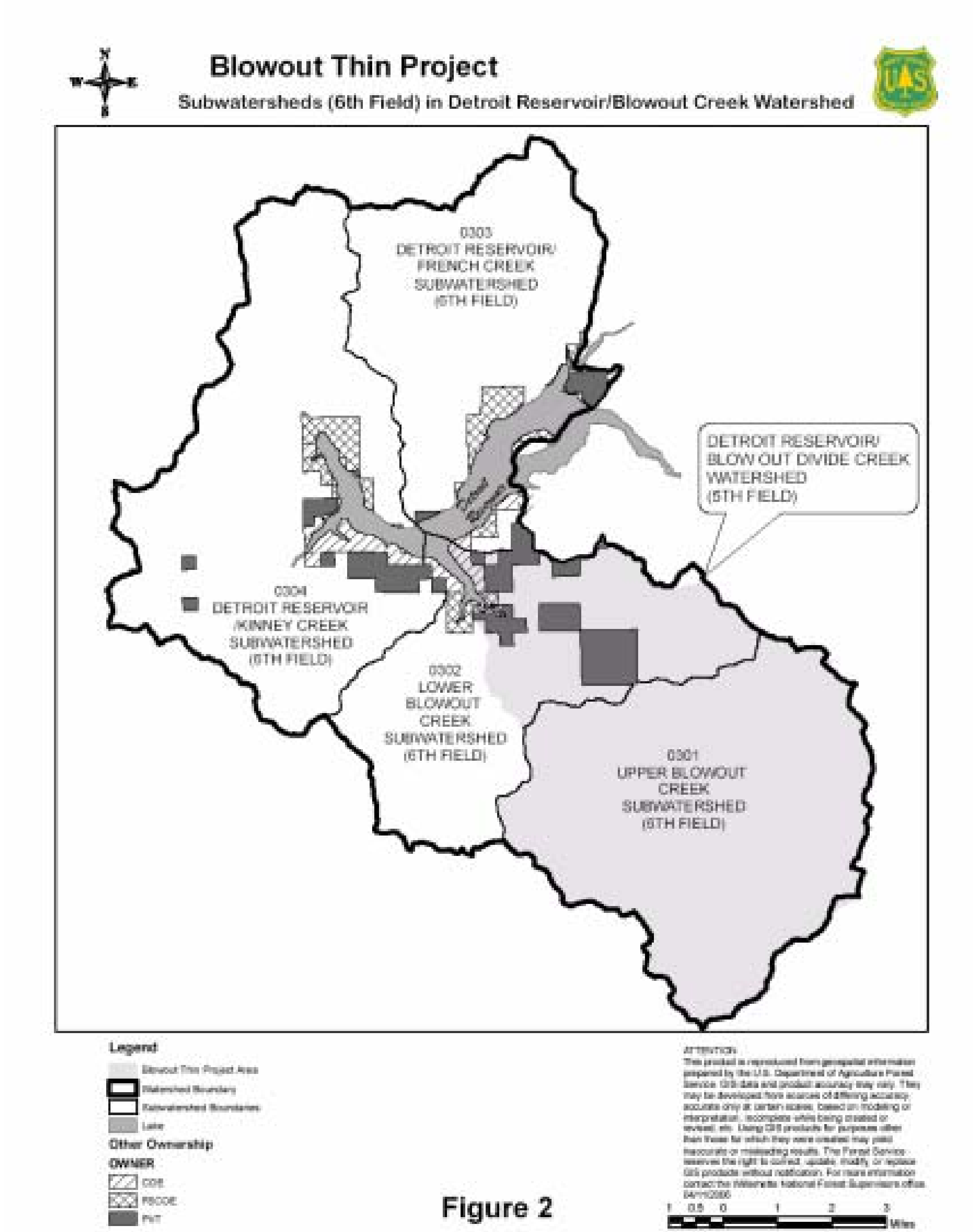
Figure 1. Project Location Map



The planning area is southeast of Detroit Lake, southwest of Cooper's Ridge, west of Coffin Mountain, north of Scar Mountain, and east of Lucky Butte. Primary drainages include Blowout, Divide, Beard, K, Cliff, Ivy, Hawkins, and Lost Creeks. Elevations within the planning area range from approximately 1,500 feet at Detroit Lake to over 5,700 feet at Coffin Mountain. Oregon State Highway 22, heading east of the Detroit Ranger Station provides access to the forest arterials and roads that lead to the Blowout Thin Planning Area.

The legal description of the planning area is: T10S, R5E, Sections 21-28, 34-36; T10S, R6E, Sections 19, 28-33; T11S, R5E, Sections 1-3, 10-15, 22-25; T11S, R6E, Sections 2-11, 14-23, 27-34; and T12S, R6E, Sections 4-5.

Figure 2. Blowout Thin Project Map



Background

Stand conditions on National Forest System (NFS) lands in the Blowout Thin Planning Area are characterized by young forests that were either planted after regeneration timber harvesting, or regenerated naturally after fires. Stands that were planted following regeneration harvesting (the primary harvest method applied to the Willamette National Forest for the last half century) were planted from the 1950s through 1980s. The Blowout Watershed Analysis (USDA Forest Service, 2000) identified about 4200 acres of such stands that are greater than 40 years old in the Blowout Watershed. Clearcutting and subsequent planting of primarily Douglas-fir were implemented to comply with sustainable yield timber management objectives of the time. Minor amounts of salvage, selection harvest, and commercial thinning also occurred in the project area (See Table 1-1). The Blowout Watershed Analysis also identified approximately 6,000 acres of 100-year fire regenerated stands with trees ranging in size from 9 inches to 21 inches in diameter.

Timber sales occurred in Forest Plan land allocations that were then designated for programmed timber management. Current Forest Plan management areas include Late Successional Reserves (LSRs), Matrix, and Riparian Reserves as designated in the 1994 Northwest Forest Plan (See Relationship to the Willamette Forest Plan later in this Chapter). In most cases, young managed stands on this landscape were planted at a density that typically requires pre-commercial and commercial thinning to control density and keep the stands healthy and productive. See Table SH-1 in Ch. 3 for stand origins, ages, and conditions. The long-term view was to schedule final regeneration harvest when the stands reached certain ages or stand density levels, usually at 80 years. It is important to note that regeneration harvest has occurred, and continues to occur, on privately owned lands within the Blowout Thin Planning Area, mostly in areas downstream from the actions proposed in the Blowout Thin Project.

The Blowout Thin Project includes proposed harvest units that were included in the Blowout Environmental Assessment of 1995. These units were associated with the Pin, Nasty, and Skyhawk Timber Sales. These sales were not implemented because the average tree diameter was not marketable at the time. One sale from that environmental assessment, Echo Timber Sale, was sold and a portion of the sale is being logged at this time.

Table 1-1. Historic Stand Management on NFS Lands within the Blowout Thin Planning Area

Decade	Acres of Managed Stands*	Acres of Regeneration Harvest Only
1940-1949	801	801
1950-1959	1,139	1,139
1960-1969	2,794	2,794
1970-1979	3,752	3,507
1980-1989	3,061	2,178
1990-Present	951	224
Totals	12,498	10,643
*Acres of Managed Stands includes salvage, commercial thinning, partial cutting, and regeneration harvest.		

The following table displays the overall age distribution of stands in the Blowout Thin Planning Area. Approximately 10,522 acres or 39% of timber stands in the project area are less are than 50 years old, with many of these stands in need of commercial thinning to reduce stand density and maintain overall stand growth for meeting various resource objectives.

Table 1-2. Age of Timber Stands within the Blowout Thin Planning Area

Stand Age in Years	Acres
0 - 25	3,654
26 - 50	6,868
51 – 100	3,310
101 – 150	3,219
151 and Older	9,643
Total Forested	26,694
Total Non-forested	626
Total Planning Area	27,320

Purpose and Need for Action

The underlying purpose of the proposed action is to implement the Land and Resource Management Plan (USDA Forest Service, 1990) of the Willamette National Forest as amended by the Record of Decision for 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 (USDA, USDI, 1994).

Because of the current conditions of stand density and age, future growth projections, and expectations of increased tree-competition induced mortality, several management objectives discussed in the Blowout Watershed Assessment (WA) (2000) are not being met. For example, the Blowout WA identifies vegetation management action objectives of minimizing the spread of insects and diseases, designing timber harvest units to minimize blowdown, and improving stand vigor (Blowout WA, Management Implications, pp. 9-10). Current conditions and management in the project area are not supporting these objectives.

Other purposes of this project are to improve forest health, increase vegetative diversity, reduce long term fire risk and provide for various resource outputs, including an ecologically sustainable yield of timber for commercial products and timber commodities from matrix lands.

There is a need for this project to:

1. **Reduce current stocking levels to enhance growth and vigor of the remaining trees and to reduce future losses from fire, insects, disease, and from snow breakage.**

The majority of the planning area (21,335 acres of the total 27,320 acres) is designated as Management Area 14A - General Forest and Matrix in the Forest Plan. The stands being considered for treatment include overstocked managed stands over 40 years old and overstocked fire regenerated stands about 100 years old. The objective for the timber stands located within this land allocation is to produce a sustainable and commercial yield of wood within site capability and management requirements of all resources. The desired future condition is to maintain the growth and health of these stands, which provides prevention and protection against insects, diseases, and wildfires.

The existing conditions, as determined from timber stand examinations, reflect the need to commercially thin stands based on stocking levels, average stand diameters, and economic feasibility (Forest Plan Standard and Guideline MA-14A-13).

Relative Density (RD) is often used to measure competition for growing space. The occupied density is compared to a theoretical maximum density to obtain RD. RD measures the number of trees per acre independent of site qualities such as light, water, and nutrients. According to Drew and Flewelling (1979), the zone of imminent competition mortality occurs at RDs of .55 and above. Generally, stands where thinning is possible should not be allowed to exceed RD 50 (Drew and Flewelling, 1979). The average RD weighted by acres for the Blowout Thin sale area is .51.

Stands being considered with this proposal have RD values that range from .35 to 1.00. Recommended post-thinning density for managing Douglas-fir between the ages of 40-100 years to maximize gross production is within the range of .37 to .44 relative density (Drew and Flewelling, 1979). The District would forgo potential stand growth and timber yield by leaving high stand densities on these General Forest – Matrix lands for extended periods. Stands with RD values are also at greater risk of fire, insect or disease infestations, increased competition-induced mortality, and volume losses (Keen, 1936; Westveld, 1954; and Waring and Pittman, 1980).

Commercial thinning of existing plantations and the fire regenerated stands would enhance the growth, health, and vigor of the remaining trees, diversify the species composition and stand structure, provide for an intermediate harvest of merchantable size trees for commercial timber products, enhance growth and vigor of the remaining trees, and reduce future losses from fire, insects, disease, and snow breakage.

2. **Regenerate stagnated overstocked second growth stands that will no longer respond to thinning in order to enhance growth and yield on matrix lands as per Forest Plan direction.**

Some fire regenerated stands have culminated in a stagnated mean annual increment. These stands exhibit very high tree per acre densities, small diameters, and high suppression mortality. Current diameter growth is poor and low live crown ratios (<33%) would prevent most trees from responding to increased tree spacing. (Smith 1962; Oliver and Larsen 1996; Emmingham and Elwood 2002; Homberg, Aulds and Jaross 2006). Due to poor height-to-diameter ratios (H/D) in these stands, the opening up of these stands in a thinning would greatly increase their susceptibility to windthrow. H/D ratios for these stands range from 95 to 127. H/D ratios exceeding 90 to 100 indicate an unstable condition when considering thinning (Emmingham 2000; Oliver and Larsen 1996; Wonn 2001; Homberg, Aulds and Jaross 2006). Regeneration harvest of these stagnated fire regenerated stands with healthier, faster growing stands would provide for restoration of both western white pine and sugar pine abundance which has been greatly reduced due to white pine blister rust. The need to regenerate these stands is also based on the Desired Future Condition for MA-14a (Forest Plan), which states that the landscape will be a patchwork of age classes and species of trees, with a balance of acres in each age group up to approximately 80 years.

3. **Regenerate root rot pockets within the stands to be commercially thinned in order to limit the spread of Phellinus weirii and other root rot species.**

Some stands include pockets (less than one acre) of Phellinus weirii root rot, which is spreading and reducing the health and vigor of the stands and predisposing stands to damage from insects and fire. There is a need to treat these root rot pockets by harvesting infected trees and regenerating with root rot resistant tree species (Blowout Watershed Analysis, 2000).

4. **Accelerate the attainment of late-successional stand characteristics in the riparian reserves to provide water quality and provide wildlife habitat benefits**

The Blowout Watershed Analysis (USDA Forest Service, 2000), Section V, Management Implications, page 8, places a high priority on recommendations for thinning within Riparian Reserves with emphasis on growing large trees and logs and other late-successional characteristics. Implementing this objective needs to be tempered with the hydrology, stream channel, water quality, aquatic, and wildlife objectives for these areas to allow the attainment of the Aquatic Conservation Strategy objectives at the fifth field watershed scale.

Headwater channels in the Blowout drainage have low sediment storage capacity due to the lack of channel structure such as logs and boulders. Many of the streams in the drainage have been artificially narrowed with rip-rap to protect and maintain road access, which has reduced the sediment storage capacity of the stream in these sections. As a result, there is a need to accelerate the attainment of stands with large tree diameters in the Riparian Reserves to provide future recruitment of large down wood into stream channels. There is also a need to reduce stream energies by enhancing channel complexity with long-term input of material through time (adding structure into channels and riparian areas), as stated in the Blowout Watershed Analysis (USDA 2000).

Blowout Creek is listed under 303(d) classification with the State of Oregon because it exceeded the temperature criterion for salmonid migration and rearing. The "Water Quality Management Plan for the Water Quality Limited Streams in the North Santiam Watershed, Specifically Blowout Creek and its Tributaries" (USDA Forest Service, 2001), states that shade cover for surveyed reaches of Blowout Creek averaged 24 percent in the riparian areas, which perpetuates the high water temperatures within the basin. Due to these water temperatures, there is a need to increase the shade cover on streams in the Blowout Creek watershed. Thinning within Riparian Reserves promotes multi-canopy stands with increased average diameters and canopy sizes in the long term, which would improve shade conditions near the streams.

5. **Bring open roads in the project area to Forest Plan standards.**

There is a need for road maintenance and reconstruction in the planning area to repair ditches, remove ruts, and repair cut slope failures along roads which may be contributing sediment into streams. There is also a need to replace culverts which are no longer functional or are migration barriers for aquatic species.

Proposed Action

The proposed action is summarized below and was the initial proposed action that was scoped in June 2004. This alternative is Alternative 3 in the range of alternatives discussed in Chapter 2 which contains a full description of all the alternatives.

The Proposed Action would harvest timber in overstocked, managed stands over 40 years old and overstocked, 100-year old fire regenerated stands on about 985 acres (see Table 2-2 in Chapter 2). The proposed action includes:

- commercial thinning on 926 acres and regeneration harvest on 59 acres. Total volume of commercial timber harvested is expected to be 10.9 million board feet (MMBF).
- 59 acres of regeneration harvest units to be planted with varying mixes of Douglas-fir, western white pine, noble fir, western redcedar, and sugar pine.
- 926 acres of commercial thinning to be thinned to an average basal area of 120 to 160 square feet per acre. Diameter limits would be prescribed for white pine, cedars, and noble fir in some of the units in order to retain sufficient numbers of these species. Small (one acre or less) Phellinus weirii root rot pockets occurring in some of the proposed units would be treated.

Best management practices would be utilized. Alternative 3 was designed to reduce the risk to water quality through numerous measures (unit design, stream course protection landing locations, erosion control, stream crossing design, prescribed fire, cumulative effects, slope limitations for tractor operations and soil moisture limitation for tractor operations). Full disclosure of BMP’s considered can be found in the General Water Quality Best Management Practices, November 1988 handbook.

Approximately 195 of the 297 acres of riparian reserve adjacent to and within proposed thinning units would be thinned. The riparian reserve strategy also provides for the retention of existing shade vegetation and adequate levels of large wood in Riparian Reserves associated with regeneration harvest units.

Fuels treatments include one or more of the following: yarding of trees with the top attached to the last log; limbing to be done at the landing; broadcast burning of slash fuel and the creation and burning of landing, hand, and machine piles. Please refer to the Alternative 3 Harvest Units, Table 2-2, for acres of fuel treatment by unit and Table 2-7 for acres of fuel treatment by treatment type.

The Proposed Action would close 1.25 miles of road, construct approximately 4.1 miles of temporary roads, reopen about 1.2 miles of temporary roads to allow access to harvest and would prescribe road maintenance activities on approximately 56.57 miles of existing forest roads needed for timber haul (see Figure 9). Approximately 29.75 miles of existing forest roads would have reconstruction performed, to allow better access to harvest areas and to reduce adverse impacts to resources (see Figure 9).

Three existing rock pits would be used to produce crushed aggregate, pit run aggregate, and riprap for the road maintenance needs. The rock pits are Hawkins, McCoy and Cub Point (see Figure 9).

Right-of-way permission would be needed to perform maintenance and haul logs on about 0.60 miles of road on Freres Lumber Co. land in order to access unit 1 for skyline yarding.

The Proposed Action would leave live green trees of suitable size and downed wood as well as create green tree retention areas in regenerated units.

To improve visual quality along roads that are used for recreation traffic, slash, slash piles and landing debris created through operations along mainline roads and dispersed sites would be cleaned.

Decision Framework

The Responsible Official for this proposal is the Detroit District Ranger. The Responsible Official shall review the proposed action and the other alternative actions and consider whether or not they meet the purpose and need to manage for an output of timber products at the optimum level to meet the long-term sustained yield capacity as prescribed in the Willamette Forest Plan, and to manage the area consistent with the Northwest Forest Plan goal of helping to maintain the stability of local and regional economies, now and in the future. The Responsible Official may then decide to:

- select the proposed action, or
- select another action alternative that has been considered in detail, or
- select the no-action alternative.

The Responsible Official would also determine if all actions within the selected alternative are consistent with the Willamette Forest Plan or if the Forest Plan should be amended in this decision.

Forest Plan Direction

Relationship to the Forest Plan and the Northwest Forest Plan

This environmental assessment is tiered to and relies upon the analysis in the 1990 Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Willamette National Forest Land and Resource Management Plan (hereafter referred to the Forest Plan) (USDA, 1990) and all subsequent NEPA analyses for plan amendments including the Final Supplemental Environmental Impact Statement on the Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (USDA, USDI, 1994). The Willamette Forest Plan, as amended, provides a Forest-level strategy for managing land and resources, and the Northwest Forest Plan provides a regional strategy for management of old-growth and late-successional forest ecosystems on federal lands. The plans provide direction, land allocations (management areas), and standards and guidelines for the management of National Forest lands within the project area, as summarized in this chapter.

This EA also tiers to a recent broader scale analysis for invasive plants, the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision, hereby referred to as the R6 2005 ROD that amended the Willamette National Forest Plan by adding management direction relative to invasive plants (USDA Forest Service, 2005a). This project is intended to comply with the new management direction.

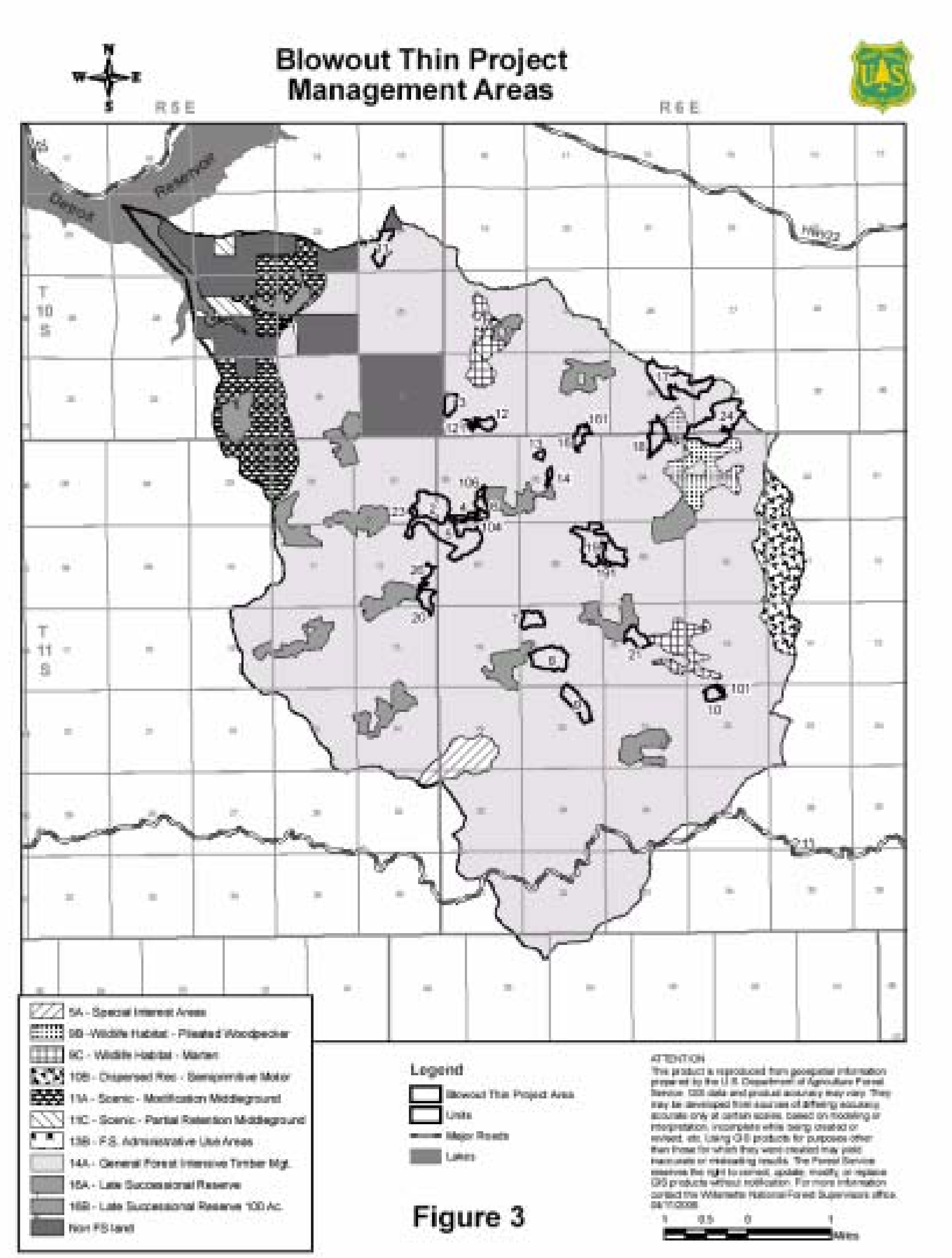
Management Areas

Table 1-3 displays Management Area acres within the Blowout Thin project area, as designated in the amended Willamette Forest Plan. For a map of the Management Areas, see Figure 3. The table also includes the overlying land allocations from the 1994 Northwest Forest Plan. Four of the Northwest Forest Plan allocations are present and consist of Administratively Withdrawn, Late-Successional Reserves, Matrix, and Riparian Reserves. Since Riparian Reserves overlap with other land allocations, they are shown in a footnote under Table 1-3. The intent is to accurately display Willamette Forest Plan Management Area acres. Riparian Reserves within harvest units are displayed in Chapter 3 – Water Quality.

Table 1-3. Willamette Forest Plan Management Areas in the Blowout Thin Planning Area

Willamette Forest Plan Management Areas	Northwest Forest Plan Land Allocations*	Acres
5a – Special Interest Areas	Administratively Withdrawn	211
9b – Wildlife Habitat-Pileated Woodpecker	Administratively Withdrawn	315
9c – Wildlife Habitat-Marten	Administratively Withdrawn	327
10b – Dispersed Recreation, Semiprimitive Motorized	Matrix	531
11a – Scenic-Modification Middleground	Matrix	1,021
11c – Scenic-Partial Retention Middleground	Matrix	143
14a – General Forest	Matrix	21,335
16a – Late Successional Reserves	Late Successional Reserves	7
16b – 100-acre Late Successional Reserves	Late Successional Reserves	1,507
8000 – Other Than National Forest Ownership		1,754
WA – Major Water Bodies	Administratively Withdrawn	164
Total Acres		27,320
*There are about 12,091 acres of Riparian Reserve, covering about 44 % of the planning area. The following briefly discusses the goals of Forest Plan Management Areas where harvest units or other management is proposed in the action alternatives.		

Figure 3. Blowout Thin Project Management Areas



MA-11a, Scenic, Modification Middleground

The goals for this visually sensitive management area is to create and maintain desired visual characteristics of the forest landscape through time and space. Timber harvest in MA-11c is scheduled to occur at a rate of 12% for the first 10 years. Maximum size for even-aged regeneration harvest units should be 30 acres (15-30 preferred).

In the Blowout Thin Planning Area, this allocation is located along the Blowout Creek arm of Detroit Lake. In general, it consists of the middleground viewshed along Forest Road 1000 and above Detroit Lake.

Approximately 4 acres of regeneration harvest unit 1 are located within MA-11a.

MA-11c, Scenic, Partial Retention Middleground

The goal of this management area is the same as that of MA-11a. Timber harvest in MA-11c is scheduled to occur at a rate of 10% for the first 10 years.

In the Blowout Thin Planning Area, this allocation is located along the Blowout Creek arm of Detroit Lake. In general, it consists of the middleground viewshed along Forest Road 1000 and above Detroit Lake, but generally farther away from Rd. 1000 and Detroit Lake than the MA-11a allocations.

Approximately 2 acres of thinning unit 11 are located within MA-11c.

MA-14a, General Forest

The primary goal of this management area is to produce an optimum and sustainable yield of timber based on the growth potential of the land that is compatible with multiple use objectives and meets environmental requirements for soil, water, and wildlife habitat quality.

This allocation is widely distributed over the Blowout Thin Planning Area. Proposed harvest units 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 23, 24, 26, 101, 104, 106, 121, 161, 191, and portions of units 1 and 11 are located in MA-14a.

All construction and reopening of temporary roads would be in MA-14a.

MA-15, Riparian Reserves

Riparian Reserves are one of the six designated management areas identified in the Northwest Forest Plan ROD (USDA Forest Service, 1994). Riparian Reserves are areas along all streams, wetlands, ponds, lakes, and unstable or potentially unstable areas where the consideration of aquatic and riparian dependent terrestrial resources receives primary emphasis. According to the Northwest Forest Plan ROD, p.7, the main purpose of the reserve is to protect the health of the aquatic system and its dependent species.

Riparian reserve widths are based on some multiple of a site-potential tree, or a prescribed slope distance, whichever is greater. Reserve widths may be adjusted based on watershed analysis to meet Aquatic Conservation Strategy (ACS) objectives from the Northwest Forest Plan. The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands by maintaining and restoring ecosystem health at watershed and landscape scales.

Management activities such as commercial thinning and fuel treatments may occur within Riparian Reserves in this project only if they maintain or enhance the riparian dependent species and their requirements.

Units 2, 3, 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 23, 24, and 26, would include some thinning in MA-15 in all the action alternatives.

Maintenance and reconstruction of existing timber haul roads could occur in MA-15. The existing transportation system travels through MA-15 areas and their reserves.

Other Ownership

All of the private land in the planning area is owned by Freres Lumber Co. Permission to perform maintenance and right-of-way for timber hauling on a road on Freres Lumber Co. land would be needed in order to access unit 1 for skyline yarding and timber haul.

Other ownerships in the planning area are Army Corps of Engineers land that is administered by the Forest Service, National Forest land that is withdrawn for Army Corps of Engineers purposes, and State land. There are no proposed actions in the Blowout Thin Project on any of these lands.

Relationship to the Watershed Analysis

The Aquatic Conservation Strategy in the Northwest Forest Plan included a requirement to prepare comprehensive watershed analyses for all fifth field watersheds.

The Blowout WA, completed in October, 2000, documented the ecological conditions and processes in the Blowout watershed, and is incorporated by reference. The Blowout watershed (not a fifth field watershed) is comprised of two subwatersheds, Upper Blowout and Lower Blowout (sixth field watersheds). The Blowout Thin Planning Area lies within these two subwatersheds. For clarification purposes, it is noted that Upper Blowout and Lower Blowout subwatersheds plus two other subwatersheds (Detroit Reservoir/Kinney Creek and Detroit Reservoir/French Creek) comprise the fifth field Detroit Reservoir/Blowout Divide Creek watershed. The watershed and fisheries analyses in this E.A. are both focused on the Blowout watershed.

Relationship to the Water Quality Restoration Plan

Under the 1986 Clean Water Act, waters of the State are to be protected. In 1998, Blowout Creek was listed as a Water Quality Limited stream in the State of Oregon for water temperature. The forest-wide goals in the Water Quality Management Plan for the Water Quality Limited Streams in the North Santiam Watershed are to: “Maintain the role and function of rivers, streams, wetlands and lakes in the landscape ecology.”

This is to be accomplished through:

- Protection and rehabilitation of the aquatic and terrestrial riparian habitat.
- Maintenance and improvement of water quality while minimizing risks of downstream flooding.
- Restoration and maintenance of the ecological health of watersheds and aquatic ecosystems contained within them on public lands.

Public Involvement

The areas proposed for harvest in the Blowout Thin Project were initially included in the Blowout Environmental Assessment, completed in 1995. The sales originally included these units were not implemented because the average tree diameter was too small to be marketable. One sale from that environmental assessment, Echo Timber Sale, was sold and a portion of that sale has been logged. The harvest units from the 1995 Blowout Environmental Assessment that did not sell were later grouped into the Blowout Thin Project.

The Blowout Thin Project was initiated in 2004, and was first listed in the Winter (February) 2004 edition of the Forest Focus – the quarterly schedule of proposed actions (SOPA) for the Willamette National Forest. The project has since appeared in the Forest Focus through fall 2006.

The scoping letter for Blowout Thin was mailed to the Confederated Tribes of Siletz, Confederated Tribes of Grand Rhonde, and the Confederated Tribes of Warm Springs on June 22, 2004. No comments were received from the tribes.

Scoping comments were received in response to this scoping letter from Oregon Natural Resources Council (ONRC) and Freres Lumber Co. Additional clarification of ONRC’s comments was made by Chandra La Gue of ONRC during a telephone conversation March 23, 2005.

Using the comments from the public and other agencies, the interdisciplinary team developed a list of issues to address.

Issues

Issues are points of concern about environmental effects that may occur as a result of implementing the proposed action. They are generated by the public, other agencies, organizations, and Forest Service resource specialists and are in response to the proposed action.

Significant issues describe a dispute or present an unresolved conflict associated with potential environmental effects of the proposed action. Significant issues are used to formulate alternatives, prescribe mitigation measures, and focus the analysis of environmental effects. Significant issues are also determined based on the potential extent of their geographic distribution, duration of their effects, or intensity of interest or resource conflict, if not mitigated or otherwise addressed. The significant issues for this project were identified by the ID Team and approved by the Responsible Official.

Significant issues are tracked through issue identification (Chapter 1), alternative development and description (Chapter 2), and Environmental Consequences (Chapter 3). Measurement criteria have been identified for the significant issues and are used to compare alternatives (Tables 2-7 and 2-8 in Chapter 2).

In addition to the significant issues, other issues or nonsignificant issues were raised by the public or Forest Service resource specialists. These issues were determined to be nonsignificant because they were; 1) outside the scope of the proposed action, 2) already decided by law or regulation, Forest Plan, or other higher level decision, 3) irrelevant to the decision to be made, or

4) conjectural and not supported by scientific or factual evidence. These issues are less focused on the elements of the Purpose and Need and did not influence the formulation of alternatives. Several of the non significant issues are also included in the environmental effects analysis (Chapter 3) because of regulatory or policy direction.

Significant Issues

Significant issues are normally considered the basis for alternative development. However, there are a variety of ways to address significant issues within any specific alternative. Significant issues may be addressed by simply avoiding environmental consequences by elimination of an action that would impact a given resource. For example, if impacts to a specific stream segment are a significant issue, the project alternatives that avoid all potential impacts to the stream segment address this issue. Mitigation attached to specific alternatives may also address significant issues.

The Forest Service identified three significant issues raised during scoping either by the public or by the IDT. These issues include:

1. Stand Health, Growth, and Vigor

The IDT has a concern that certain overstocked, fire-created stands within the planning area would not respond to thinning. These stands, if regenerated, would be less susceptible to blowdown, insect and disease infestations, and resource damaging fires. Overstocked managed stands, if not thinned, may become stagnant and more susceptible to blowdown, insect and disease infestations, and resource damaging fires. This issue is discussed in the Forest Vegetation section of Chapter 3.

Measurements:

- Projected growth (inches dbh/decade) resulting from thinning of fire stands (50 years)
- Projected growth (inches dbh/decade) resulting from thinning of managed stands (50 years)
- Projected growth (inches dbh/decade) resulting from regeneration of fire stands (50 years)

2. Water Quality

Oregon Natural Resources Council (ONRC) identified an issue with temporary road construction and maintenance and reconstruction of existing roads stating that these activities may affect slope stability, amount of sediment introduced into streams, and therefore water quality. ONRC has also identified an issue with regeneration harvest and its potential to increase soil erosion. The IDT identified water quality as a significant issue early in the analysis process due to the listing of Blowout Creek as a 303(d) listed stream (see Figure 16). Any activity in this drainage poses a risk to water quality. The IDT also has a concern that the type of logging system used to yard proposed harvest units may affect the amount of ground disturbance and compaction in areas with gentle slopes, which could result in increased water runoff and increased sedimentation to streams. This issue is discussed in the Water Quality section and the Soil Productivity and Slope Stability section of Chapter 3.

Measurement:

- Miles of road maintenance, reconstruction, temporary road construction, and reopening of old temporary roads.
- Number of stream crossings associated with temporary road work.
- Aggregate Recovery Percentage (ARP) for the affected 6th field watersheds.
- Risk to hydrology, stream channels and water quality.

3. Economic Viability

A comment was received from Freres Lumber Company concerning an issue with the costs and scheduling conflicts associated with helicopter yarding. They requested that ground based logging be used whenever possible to allow more local loggers to work on the project, reduce harvesting costs, return more money to the U.S. Treasury, and reduce conflicts with helicopter scheduling during fire season and summer tourist season. The methods of harvest, amount of road work proposed, fuels treatment costs, and total volume harvested could affect the economic viability of the proposed timber sale.

Measurements:

- Gross Value
- Associated Costs
- Net Appraised Value
- Cost/Benefit Ratio

Nonsignificant Issues:

The Forest Service identified four non significant issues raised during scoping either by the public or the IDT. These issues include:

1. Riparian Reserves

The ONRC scoping letter included comments related to thinning in riparian reserves. Although a portion of a letter advocates that an alternative be pursued that allows no commercial activities in riparian reserves, another portion of the letter states that "[i]n young stands in riparian reserves, we support thinning activities that enhance the development of trees to shade streams and become sources of coarse woody debris, as long as these activities do not result in yarding corridors, roads, or other yarding activities impacting water quality and aquatic habitat."

This issue was deemed nonsignificant as the concerns are mitigated by the design measures that are applied to riparian reserves for all alternatives. Design measures include a no harvest zone adjacent to the stream, which depending on the size of the stream, varies in width.

It is unclear whether the scoping comment was pursuing a specific alternative that included no riparian reserve harvest. Although this issue does not meet the purpose and need for the project, (specifically, need #4 "Accelerate the attainment of late-successional stand characteristics in the riparian reserves to provide water quality and provide wildlife habitat benefits”), it is analyzed in the No Action Alternative.

The environmental effects associated with the proposed riparian reserve thinnings are disclosed in the Water Quality section in Chapter 3.

Measurements:

- Acres of riparian reserve thinned.
- Percentage of Riparian Reserves thinned in the two affected 6th field watersheds.

2. Impacts to the Local Economy

Freres Lumber Co. expressed a concern about the low level of timber sale volume offered on the Detroit Ranger District over the past 15 years and the harm caused to the public timber dependent communities in the North Santiam Canyon. The IDT recognizes that timber sales are important to local communities. The social and economic well-being of residents and local governments is dependent on employment and revenues generated in the local community. Timber sales, fuel treatment, and associated resource work generate employment and stimulate the local economy. This concern was categorized as a non significant issue as the comment is not specific to the proposed project but rather is a general statement related to timber harvests on the Detroit Ranger District. This concern is also outside the scope of this particular project as the 15-year trend described in the comment cannot be altered buy one sale, Although not considered a significant issue, this concern is discussed in the Economics/Social section of Chapter 3.

Measurement:

- Jobs provided in the logging sector and in sawmills.

3. Fuels

The ONRC letter asks that certain principles be considered when considering fuels reductions. These principles include ensuring meaningful public participation, prioritizing treatments in high risk areas starting in the community zone, ensuring fuel reduction treatments are effective, and including environmental safeguards. This concern was addressed in the Fuels section in Chapter 3 and is considered non-significant because fuel treatments are included in the project proposal.

Measurement:

- Acres of post-harvest fuel treatments

4. Biodiversity

Due to past management activity, some stands proposed for thinning have developed into stands composed predominantly of Douglas-fir, with minor components of other species. ONRC identified an issue with the standard type of thinning used by the Forest Service in both Matrix and Riparian Reserves (but especially Riparian Reserves), because stands may not develop into more complex and resilient forests. ONRC prefers that variable density thinning be used. See also issue #5, above, regarding thinning in Riparian Reserves. The IDT came to the conclusion that biodiversity is not a significant issue because the thinning treatments in the Proposed Action and alternatives would result in intra- and inter-stand structural and species diversity. This issue is addressed in Chapter 2 in Alternatives Considered but Eliminated from Detailed Study, and in Chapter 3 in Stand Growth, Health and Vigor, under Conclusions and Rationale.

Chapter 2. Alternatives, Including the Proposed Action

Introduction

This chapter describes and compares the alternatives considered for the Blowout Thin project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., helicopter logging versus the use of skid trails) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of erosion or cost of helicopter logging versus skidding).

Alternatives Considered in Detail

Based on the issues identified through public comment on the proposed action, the Forest Service developed three alternative proposals that achieve the purpose and need differently than the proposed action.   In addition, the Forest Service is required to analyze a No Action alternative. The proposed action, alternatives and no action alternative are described in detail below.

Alternative 1

No Action

Under the No Action Alternative, current management plans would continue to guide management of the project area and none of the proposed projects would be implemented in the Blowout Thin Project area at this time. The "No Action" alternative serves as a baseline to compare the differences and the effects among taking no action and implementing action alternatives in order to accomplish project goals.

Only those management activities considered part of normal maintenance requirements, or those allowed under previous decision documents, would continue on this landscape if Alternative 1 were selected. No new activities would take place as a result of this project.

Normal road maintenance such as brushing, culvert cleaning and surface blading would continue. Roads would be maintained in accordance with annual maintenance plans.

Projects designed to meet other goals in the Willamette Forest Plan, such as maintaining high quality water resources, maintaining or enhancing aquatic habitat for fish, maintaining or enhancing terrestrial habitat diversity for wildlife and plants, maintaining scenic quality, and improving young timber stands may occur but there would be fewer funding opportunities to pay for these projects without a timber sale.

Alternative 2

Stand Health, Growth, and Vigor

Alternative 2 would harvest densely stocked, natural and previously managed stands on 985 acres (see Table 2-1, and Figures 4 and 5). This alternative would include commercial thinning on 926 acres and regeneration harvest on 59 acres. Stand conditions for the units in this alternative can be found in table SH-1 in Chapter 3. See the silvicultural prescription in the analysis file for complete stand treatment prescriptions. Rationale for regenerating some of the stands, as opposed to thinning, is presented in Ch.1 Purpose and Need, Ch. 1 Issues, and Ch. 3 Stand Health, Growth, and Vigor. Total volume of commercial timber harvested is expected to be 10.9 million board feet (MMBF).

The 926 acres of commercial thinning would be thinned to an average basal area of 120 to 160 square feet per acre, depending on the unit. Diameter limits would be prescribed for white pine, cedars, and noble fir in some of the units in order to retain sufficient numbers of these species. Small (less than one acre) Phellinus weirii root rot pockets occurring in some of the proposed units would be treated by removing all Douglas-fir and western hemlock from the root rot pocket plus any of these species within 50 feet of the last confirmed tree. The opening would then be planted with root rot resistant tree species.

The 59 acres of regeneration harvest units would be planted with varying mixes of Douglas-fir, western white pine, noble fir, western redcedar, and sugar pine. Reforestation would provide for future timber harvest and for a diverse habitat for various plant and wildlife species.

Construction, reconstruction, or modification of landings for helicopters, skylines, and ground-based yarding systems would occur.

Water Quality

Best management practices are utilized when treating 985 acres. These practices are spatial and temporal in relation to activities that could possibly impact water quality. Examples of considerations include but are not limited to; timber management activities, road systems, fuels management, vegetative manipulation, and watershed management. Within these, each specific area was evaluated and designed to reduce the risk to water quality through numerous measures (unit design, stream course protection landing locations, erosion control, stream crossing design, prescribed fire, cumulative effects, slope limitations for tractor operations, and soil moisture limitations for tractor operations). Full disclosure of BMP's considered can be found in the General Water Quality Best Management Practices, November 1988 handbook.

Riparian Reserves

Approximately 195 of the 297 acres of riparian reserve adjacent to and within proposed thinning units would be thinned. The riparian reserve strategy also provides for the retention of existing stream shading vegetation and adequate levels of large wood in Riparian Reserves associated with regeneration harvest units.

Economic Viability

Yarding methods would include 287 acres of ground based systems, 322 acres of skyline yarding, and 376 acres of helicopter yarding. About 14 ½ to 1 acre helicopter landings would be needed, some of which may need minor additional clearing. There would be no costs for construction or reopening of temporary roads, but there would be more helicopter yarding.

Fuels

All units in Alternative 2 would receive fuel treatments to reduce logging slash which may include one or more of the following: yarding of trees with the top attached to the last log (YTA); limbing (L) to be done at the landing; broadcast burning (BCB) of slash fuel and the creation and burning of landing, hand, and machine piles. Refer to the Table 2-1: Alternative 2 Harvest Units, for acres of fuel treatment by unit and Table 2-6 for acres of fuel treatment by activity type.

All units with harvest activities would have landing piles burned following harvest. Hand piling treatments would be focused along the roadsides 66 ft. into the unit. On units adjacent to private land boundaries hand piling would be 100 ft into the unit. These treatments would be more effective as fuel breaks for wildfire suppression. Alternative biomass utilization would occur if a market exists for wood fiber or firewood.

Prescribed fire would take place during the spring or fall season. Grapple pile and hand pile burning generally takes place in the fall and broadcast burning generally takes place in the spring, but can be implemented in the fall if weather and fuels conditions warrant. Favorable conditions are:

- Fuel moisture 3” and greater in diameter (1000 hour fuels) fuels.
- Damp soil and duff moisture to limit duff consumption to less than 15% across the unit.
- Conditions should support low overstory mortality rates.

Roads and Access

This alternative, like Alternative 4, does not propose any new temporary road construction nor any reopening of old temporary roads. Consequently three roads are needed in this alternative to access helicopter landings that are not necessary in Alternatives 3 or 5. These Roads are 1000-068, 1000-070, and 1013-180. The 1013-180 Road would receive maintenance only, while the 1000-070 and 1000-068 Roads would be reconstructed and maintained.

Alternative 2 would prescribe road maintenance activities on 50.55 miles of existing forest roads needed for timber haul. Road maintenance activities would include cutting hardwood trees along roads, felling hazard trees for the life of the road, clearing and grubbing, surface blading, replacing drainage structures, reshaping ditches, and placement of aggregate surfacing. To allow better access to harvest areas and to reduce adverse impacts to resources, 26.16 miles of existing forest roads would be reconstructed. Reconstruction activities would include sections of asphalt patching, subgrade repair, culvert replacement, erosion repair, new culvert installation, brushing, slump repair, clearing and grubbing, road widening, and crushed rock placement. Reconstruction activities would occur within the identified 26.16 miles as needed. Approximately 525 hazard trees (danger trees) associated with the reconstruction would be felled. Hazard tree felling would continue for the life of the reconstructed roads. A bridge surface would need to be replaced on Rd. 1000-068 at Cliff Creek. See Figure 6 for location of proposed road-related activities.

Three existing rock pits would be used to produce crushed aggregate, pit run aggregate, and riprap for the road maintenance needs. The rock pits are Hawkins, McCoy and Cub Point (see Figure 6). Some minor clearing and disturbance may be associated with this use, such as removal of soil overburden, felling hazard trees, clearing small trees, drilling and blasting, reducing existing oversize material, and eventual rehabilitation of the site.

No road right-of-way permission would be needed from private landowners to access any of the units.

The following roads would be closed and closure devices installed: Boulders would be used to close Rd. 1000-112. Gates would be installed on Rd. 1003-448 north of proposed unit 24, Rd. 1011-557 in proposed unit 17, Rd. 1003-456 in proposed unit 17, and Rd. 1003-354 on the west edge of proposed unit 17. Tributary roads closed by default because they are behind the above closures would include Rd. 1000-101, Rd. 1003-450, and Rd. 1011-558. The total length of road behind these closures is about 1.25 miles. Currently, 1.14 miles of the roads behind the gates are drivable with a four wheel drive vehicle.

Wildlife Habitat

Alternative 2 would include leaving live green trees, of suitable sizes, within some of the proposed regeneration harvest units for future snag and down wood creation. The treatment would occur 4 to 5 years after harvest. In the proposed regeneration units, mortality of some of the remaining trees is expected to occur following broadcast burning. Follow-up snag and down wood creation would occur to meet prescribed post harvest levels for snags and down wood.

Snags: In thinning units 6, 8, 9, 10 and 12, 1.5 trees per acre of the largest available would be left and topped. For unit 6 this equates to 15 trees, unit 8 – 17, unit 9 – 14, unit 10 – 14 and unit 12 – 15. In regeneration harvest units 13 and 14 –8.2 trees per acre of the largest diameter available would be left and 3.8 trees per acre would be topped after harvest and slash treatment in each unit. For units 13 and 14, this equates to leaving 50 trees of the largest diameter available and topping 23 after slash treatment is complete. Units 1 and 161 would be evaluated to determine whether trees of adequate diameter are available for snags. If they are available, 57 trees would be left and 21 trees would be topped in unit 1 and 8 trees would be left and 4 trees topped in unit 161.

Down Wood: In thinning units, existing and harvest produced material (such as tops and snags felled to reduce hazards) would be left as down wood to the extent that fuel loading standards can still be met. One tree per acre of the largest available diameter, excluding retained old growth trees, would be felled after slash treatment. In regeneration harvest units, 2 trees per acre of the largest available diameter excluding retained old growth trees would be left, to be felled after slash treatment.

Green Tree Retention Areas: Green Tree Retention (GTR) areas would be located within the regeneration units. GTRs are scattered, no-harvest patches of various size that provide diversity and future snags and large down wood. For units 1, 13, 14, 101, 104, 106, 121, 161 and

191, 15% of the proposed harvest units would be left or portions of adjacent stands containing old-growth clumps would be included in the unit boundary and designated as GTRs.

Riparian Reserves: Some trees would need to be cut in skyline corridors within the no-harvest buffers in some thinning units in order to facilitate yarding. These trees would be left on the ground as down coarse wood and not yarded to landings.

Recreation/Visuals

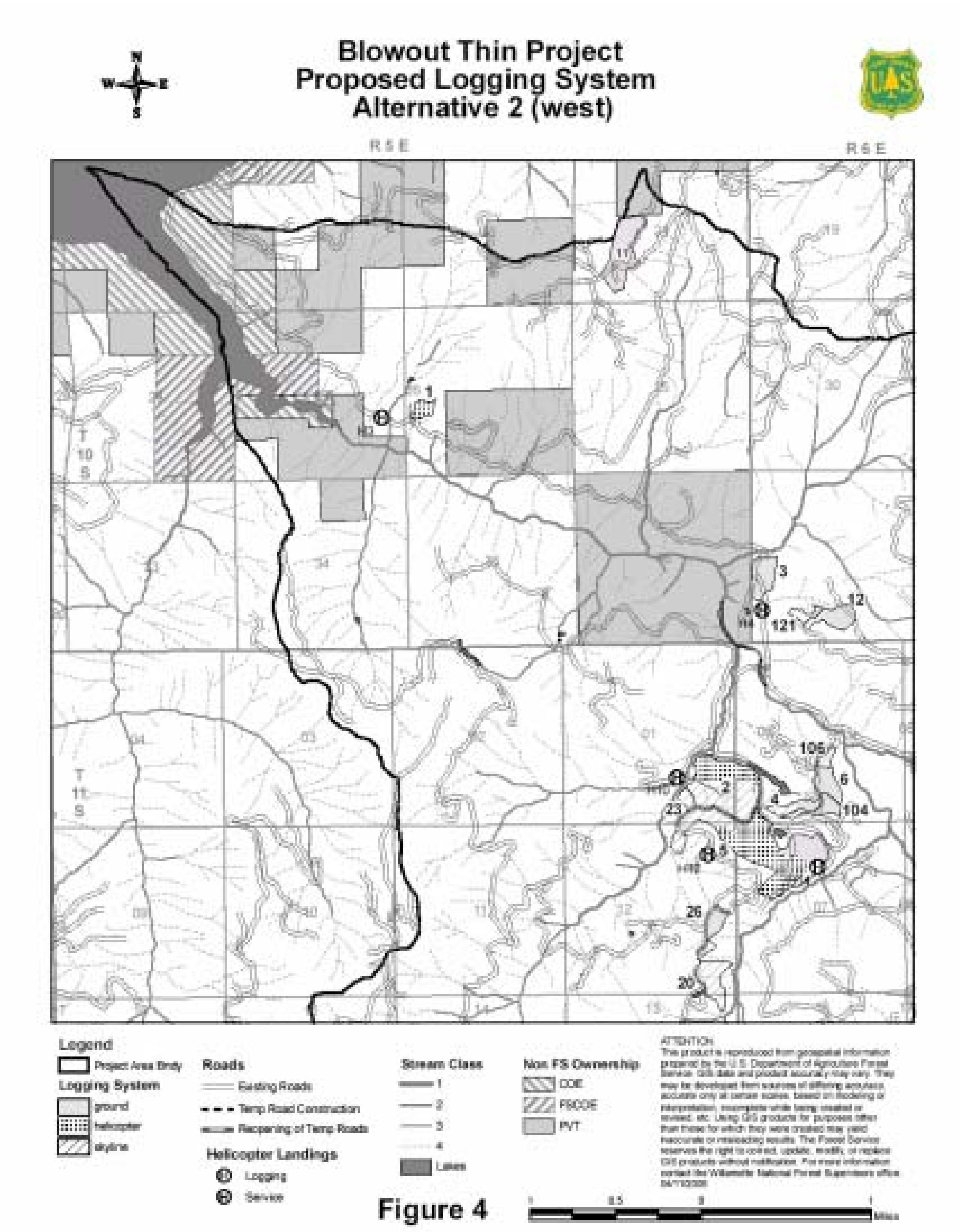
Slash, slash piles and landing debris created through operations along mainline roads and dispersed sites would be cleaned up to improve visual quality along roads that are used for recreation traffic if funding is available.

Table 2-1 Alternative 2 Harvest Units

Unit	Acres	Harvest Prescription	Logging Systems	Temp. Road Constr. (mi.)	Temp. Road Reopen (mi.)	Fuels Treatment	Estimated Timber Volume	
							MBF	CCF
1	7	Regeneration	Helicopter	0	0	BCB 7 ac	98	188
2	75	Thinning	Skyline/Helicopter	0	0	HP 5 ac	750	1442
3	20	Thinning	Ground	0	0	HP 1 ac	160	308
4	10	Thinning	Ground/Skyline	0	0	GP 5 ac	150	288
5	123	Thinning	Ground/ Skyline	0	0	HP 4 ac	984	1892
6	14	Thinning	Ground	0	0	GP 14 ac	140	269
7	28	Thinning	Skyline	0	0	HP 2 ac	252	485
8	66	Thinning	Skyline/Helicopter	0	0	HP 1 ac	726	1396
9	46	Thinning	Ground/Skyline	0	0	GP 37 ac	414	796
10	17	Thinning	Helicopter	0	0	YTA 17 ac	153	294
11	36	Thinning	Ground	0	0	GP 36 ac	396	762
12	16	Thinning	Ground/Skyline	0	0	GP 14 ac	160	308
13	6	Regeneration	Skyline	0	0	BCB 6 ac	180	346
14	6	Regeneration	Helicopter	0	0	BCB 6 ac	210	404
16	20	Thinning	Ground/Helicopter	0	0	GP 17 ac YTA 3 ac	240	462
17	104	Thinning	Ground/Skyline/ Helicopter	0	0	HP 4 ac	936	1800
18	40	Thinning	Ground/ Skyline/Helicopter	0	0	HP 3 ac	360	692
19	109	Thinning	Ground/ Skyline/Helicopter	0	0	GP 44 ac	1417	2725
20	22	Thinning	Skyline	0	0	HP 1.5 ac	242	465
21	28	Thinning	Ground/Skyline	0	0	HP 1 ac	252	485
23	5	Thinning	Skyline	0	0	HP 1 ac	45	87
24	134	Thinning	Helicopter	0	0	HP 1.5 ac	1340	2577
26	13	Thinning	Ground/Skyline	0	0	HP 1 ac	117	225
101	6	Regeneration	Helicopter	0	0	BCB 6 ac	180	346
104	11	Regeneration	Ground/Skyline	0	0	BCB 11 ac	330	635
106	5	Regeneration	Skyline	0	0	BCB 5 ac	115	221
121	5	Regeneration	Skyline	0	0	BCB 5 ac	150	288
161	1	Regeneration	Helicopter	0	0	BCB 1 ac	25	48
191	12	Regeneration	Skyline/Helicopter	0	0	BCB 12 ac	360	692
Total	985			0	0		10,882	20,927

HP - Hand Pile (and burn); MBF - Thousand Board Feet; YTA - Yard Tops Attached; CCF - Hundred Cubic Feet; GP - Grapple Pile; BCB - Broadcast burn

Figures 4-6. Alternative 2 Maps



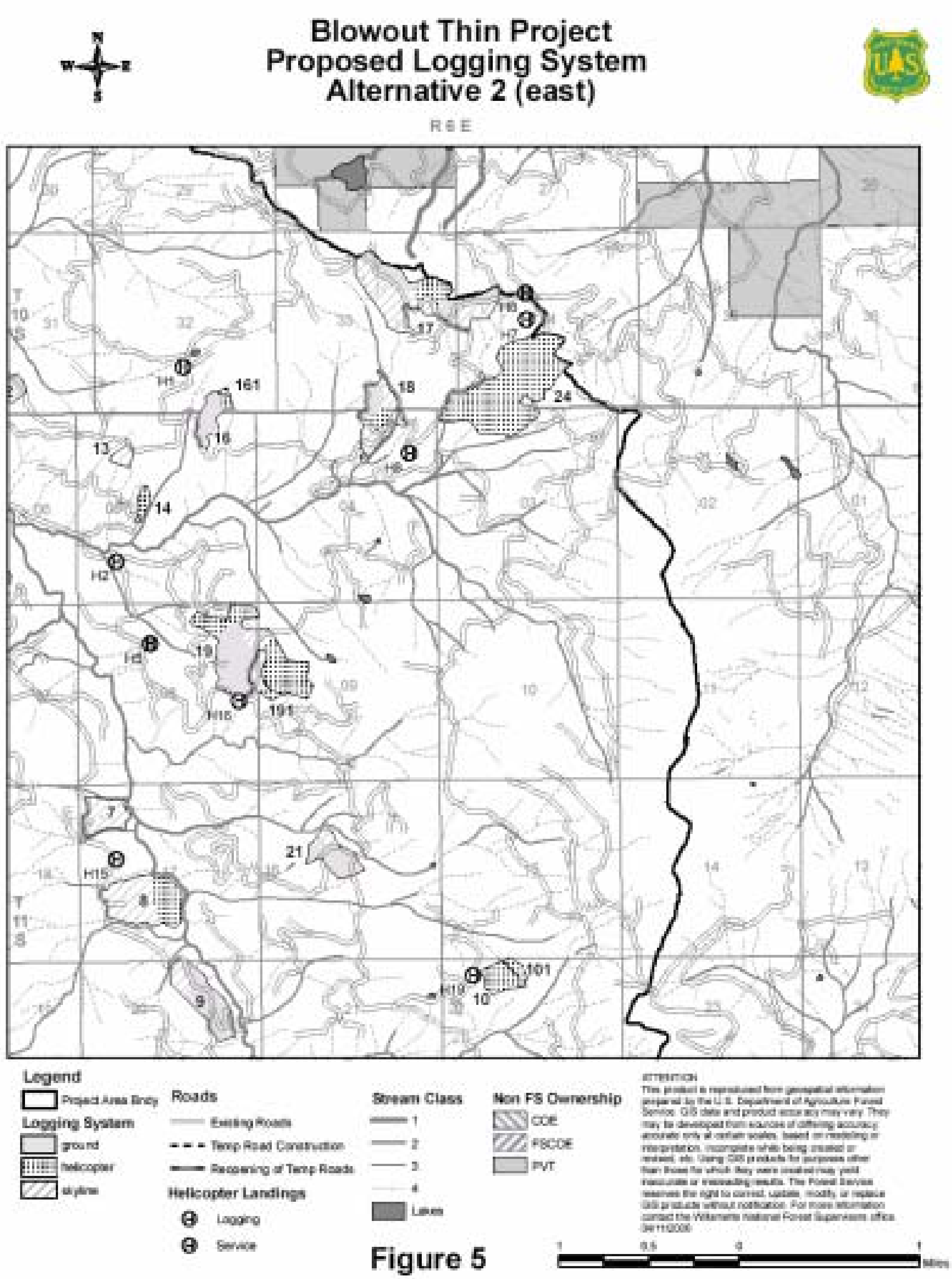

Blowout Thin Project
Proposed Logging System
Alternative 2 (east)
N
S
W
E
R 6 E
T 10 S
T 11 S
H1
161
16
13
14
H2
H5
19
H16
191
17
H6
H7
18
24
H8
7
H15
8
21
9
H19
10
101
Legend
Project Area Bndy
Logging System
ground
helicopter
skyline
Roads
Existing Roads
Temp Road Construction
Reopening of Temp Roads
Helicopter Landings
Logging
Service
Stream Class
1
2
3
4
Lakes
Non FS Ownership
COE
FSCOE
PVT
ATTENTION
Miles

Figure 5

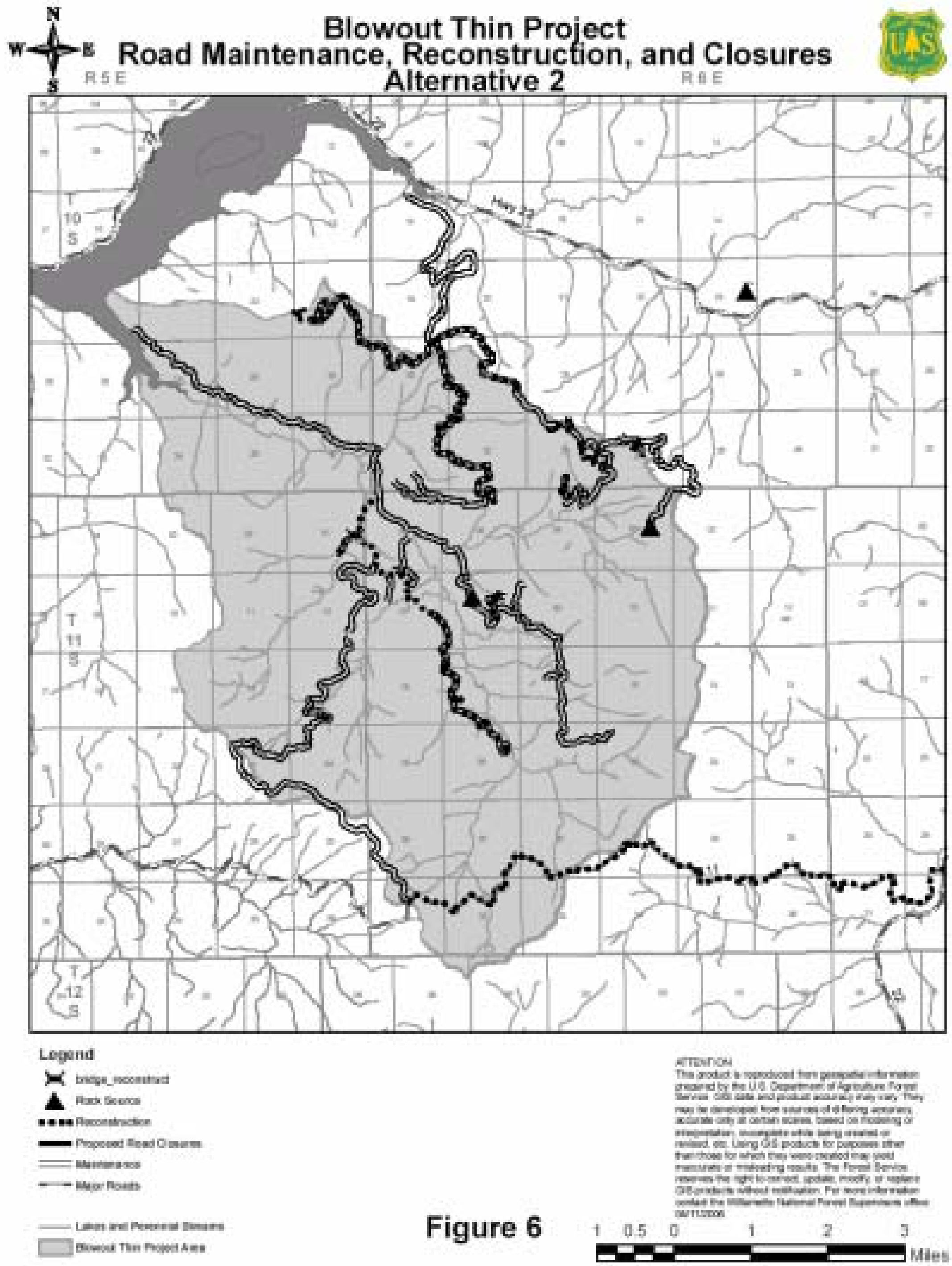

Blowout Thin Project
Road Maintenance, Reconstruction, and Closures
Alternative 2
N
W
E
S
R 5 E
R 6 E
T 10 S
T 11 S
T 12 S
Legend
Rock Source
Reconstruction
Proposed Road Closures
Maintenance
Major Roads
Lakes and Perennial Streams
Blowout Thin Project Area
1 0.5 0 1 2 3
Miles

Figure 6

Alternative 3 – Proposed Action[1]

Stand Health, Growth, and Vigor

Same as Alternative 2, except see Table 2-2 and Figures 7 and 8

Water Quality

Same as Alternative 2

Riparian Reserves

Same as Alternative 2

Economic Viability

Yarding methods would include 394 acres of ground based systems on approximately, 570 acres of skyline yarding, and 21 acres of helicopter yarding. About three ½ to 1.0 acre helicopter landings would be needed and may require minor additional clearing. There would be costs associated with construction and reopening of temporary roads, but there would be less helicopter yarding in this alternative.

Fuels

Same as for Alternative 2, except refer to Table 2-2: Alternative 3 Harvest Units, for fuels treatment by unit.

Roads and Access

Three road segments would be used in this alternative, which are not utilized in Alternatives 2 and 4. These roads are 2236-000 (Milepost 5.73-8.09), the private road into Unit 1, and the last 4.12 miles of Road 1000-000. Maintenance only would be implemented on the first two road segments. The last 4.12 miles of Road 1000-000 would need both reconstruction and maintenance.

Alternative 3 would construct approximately 4.1 miles of temporary roads and reopen about 1.2 miles of temporary roads to allow access to harvest. Upon completion of sale activities, the new temporary roads and the reopened temporary roads would be decommissioned by scarification, seeding, and maintenance of natural drainage patterns.

The 1.2 miles of temporary road reopening would all be within proposed Unit 24 and would involve six stream crossings with fills and culvert replacements as follows:

Reopening of decommissioned road 1011650:

- First stream crossing: 12 to 15 foot fill, 48 inch culvert.
- Second stream crossing: 4 to 5 ft. fill, 24 inch culvert.
- Third stream crossing: 24 inch culvert
- Fourth stream crossing: 36 inch culvert with 24 inch culvert for a spring

Reopening of lower spur:

- First stream crossing: 48 inch, 30 ft. long culvert with 5 ft. fill.

[1] This is the original Proposed Action that was scoped in June 2004.

- Second stream crossing: 15 ft. fill with 60 inch culvert and dip in road grade enough to provide fill for this crossing and the other crossing on this road.

Alternative 3 would prescribe road maintenance activities on 56.57 miles of existing forest roads needed for timber haul (see Figure 9). Road maintenance would include the same types of activities as in Alternative 2. 29.75 miles of existing forest roads would be reconstructed. Road maintenance would include the same types of activities as in Alternative 2. Approximately 600 hazard trees (danger trees) associated with the reconstruction would be felled. Rock pit activities would be the same as in Alternative 2. Proposed road closures would be the same as in Alternative 2. See Figure 9 for location of proposed road related activities.

Right-of-way permission would be needed to haul and maintain 0.60 miles of road on Freres Lumber Co. land in order to access unit 1 for skyline yarding.

Wildlife Habitat

Same as Alternative 2

Recreation/Visuals

Same as Alternative 2

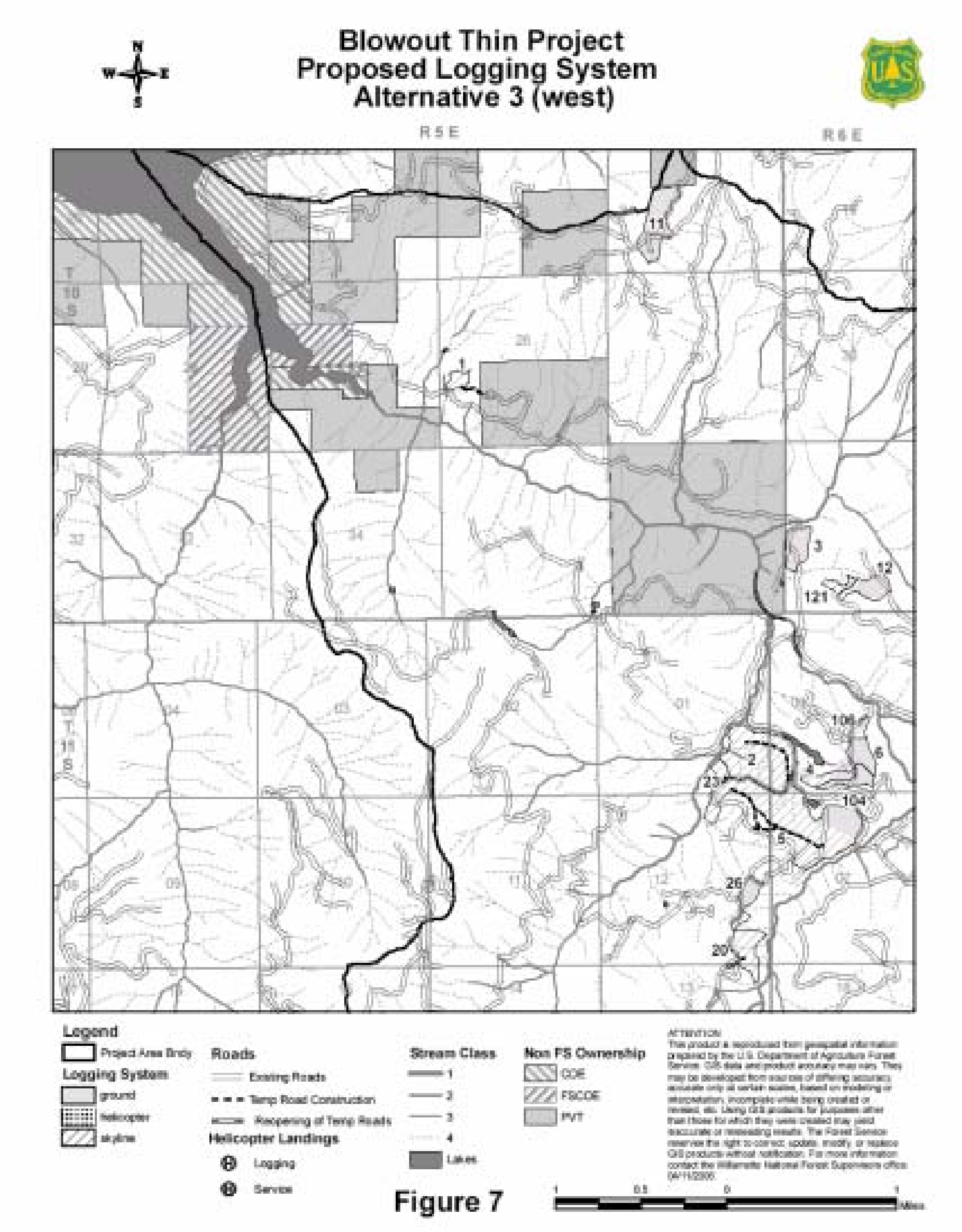
Table 2-2. Alternative 3 Harvest Units

Unit	Acres	Harvest Prescription	Logging Systems	Temp. Road Constr. (mi.)	Temp. Road Re-opening (mi.)	Fuels Treatment	Estimated Timber Volume	
							MBF	CCF
1	7	Regeneration	Skyline	0.16	0	BCB 7 ac	98	188
2	75	Thinning	Skyline	0.42	0	HP 5 ac	750	1442
3	20	Thinning	Ground	0.10	0	HP 1 ac	160	308
4	10	Thinning	Ground/ Skyline	0	0	GP 5 ac	150	288
5	123	Thinning	Ground/ Skyline	0.93	0	HP 4 ac	984	1892
6	14	Thinning	Ground	0	0	GP 14 ac	140	269
7	28	Thinning	Skyline	0	0	HP 2 ac	252	485
8	66	Thinning	Skyline	0.18	0	HP 1 ac	726	1396
9	46	Thinning	Ground/ Skyline	0	0	GP 37 ac	414	796
10	17	Thinning	Skyline	0.71*	0	YTA 17 ac	153	294
11	36	Thinning	Ground	0	0	GP 36 ac	396	762
12	16	Thinning	Ground/ Skyline	0	0	GP 14ac	160	308
13	6	Regeneration	Skyline	0	0	BCB 6 ac	180	346
14	6	Regeneration	Helicopter	0	0	BCB 6 ac	210	404
16	20	Thinning	Ground/ Helicopter	0	0	GP 17 ac YTA 3 ac	240	462
17	104	Thinning	Ground/ Skyline	0.15	0	HP 4 ac	936	1800
18	40	Thinning	Ground/ Skyline	0.12	0	HP 3 ac	360	692
19	109	Thinning	Ground/ Skyline/ Helicopter	0.90**	0	GP 60 ac	1417	2725
20	22	Thinning	Skyline	0.04	0	HP 1.5 ac	242	465
21	28	Thinning	Ground/ Skyline	0	0	HP 1 ac	252	485

Unit	Acres	Harvest Prescription	Logging Systems	Temp. Road Constr. (mi.)	Temp. Road Re-opening (mi.)	Fuels Treatment	Estimated Timber Volume	
							MBF	CCF
23	5	Thinning	Skyline	0.02	0	HP 1 ac	45	87
24	134	Thinning	Ground/ Skyline	0.46	1.19	HP 1.5 ac	1340	2577
26	13	Thinning	Ground/ Skyline	0	0	HP 1 ac	117	225
101	6	Regeneration	Skyline	0*	0	BCB 6 ac	180	346
104	11	Regeneration	Ground/ Skyline/	0	0	BCB 11 ac	330	635
106	5	Regeneration	Skyline	0	0	BCB 5 ac	115	221
121	5	Regeneration	Skyline	0	0	BCB 5 ac	150	288
161	1	Regeneration	Helicopter	0	0	BCB 1 ac	25	48
191	12	Regeneration	Skyline	0**	0	BCB 12 ac	360	692
Total	985			4.19	1.19		10,882	20,927

*Portion of temp road construction for unit 10 would also be used for unit 101
**Portion of temp road construction for unit 19 would also be used for unit 191.
HP - Hand Pile (and burn); MBF - Thousand Board Feet; YTA - Yard Tops AttachedCCF - Hundred Cubic Feet; GP - Grapple Pile; BCB - Broadcast burn

Figures 7-9. Alternative 3 Maps



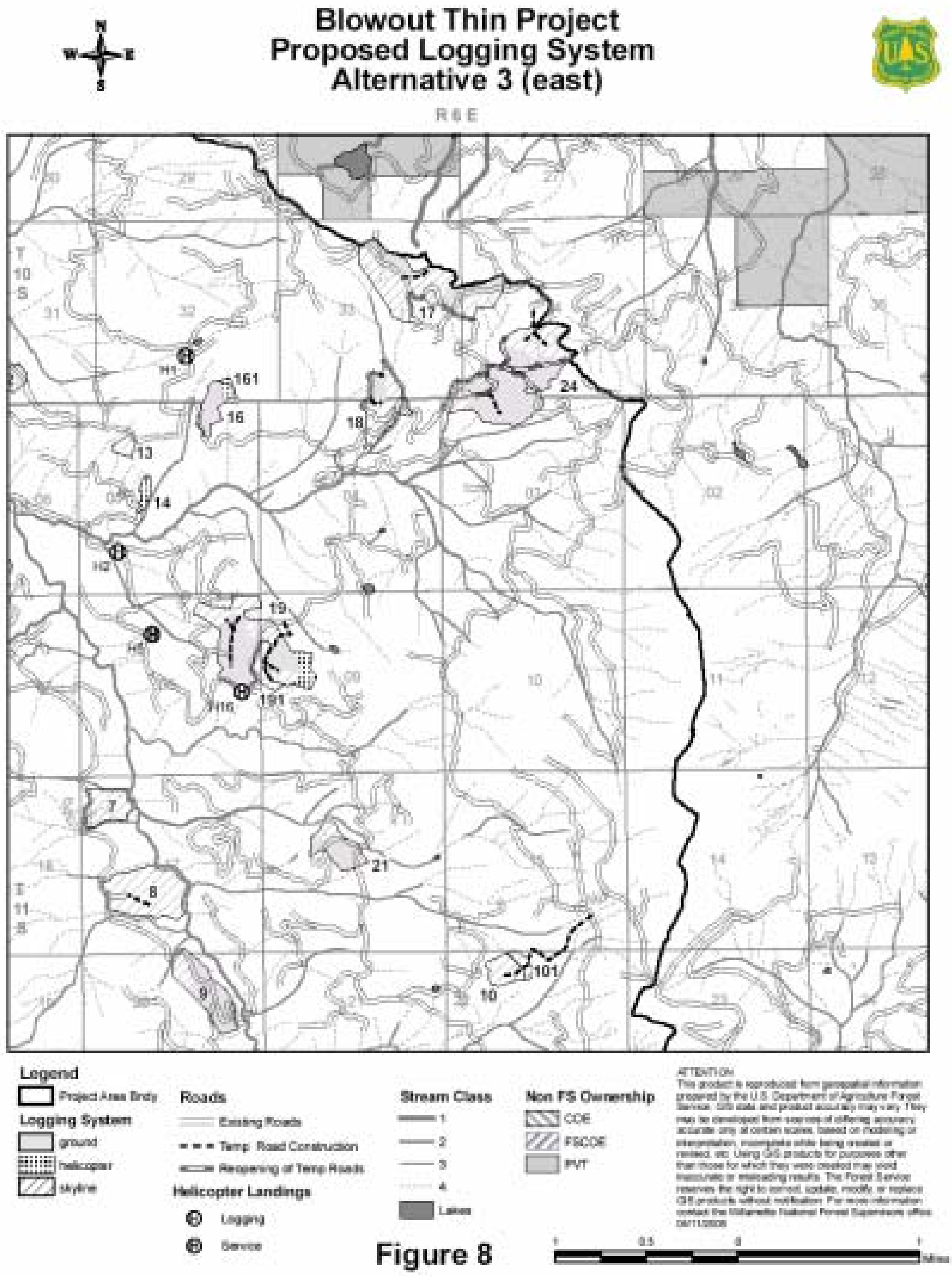
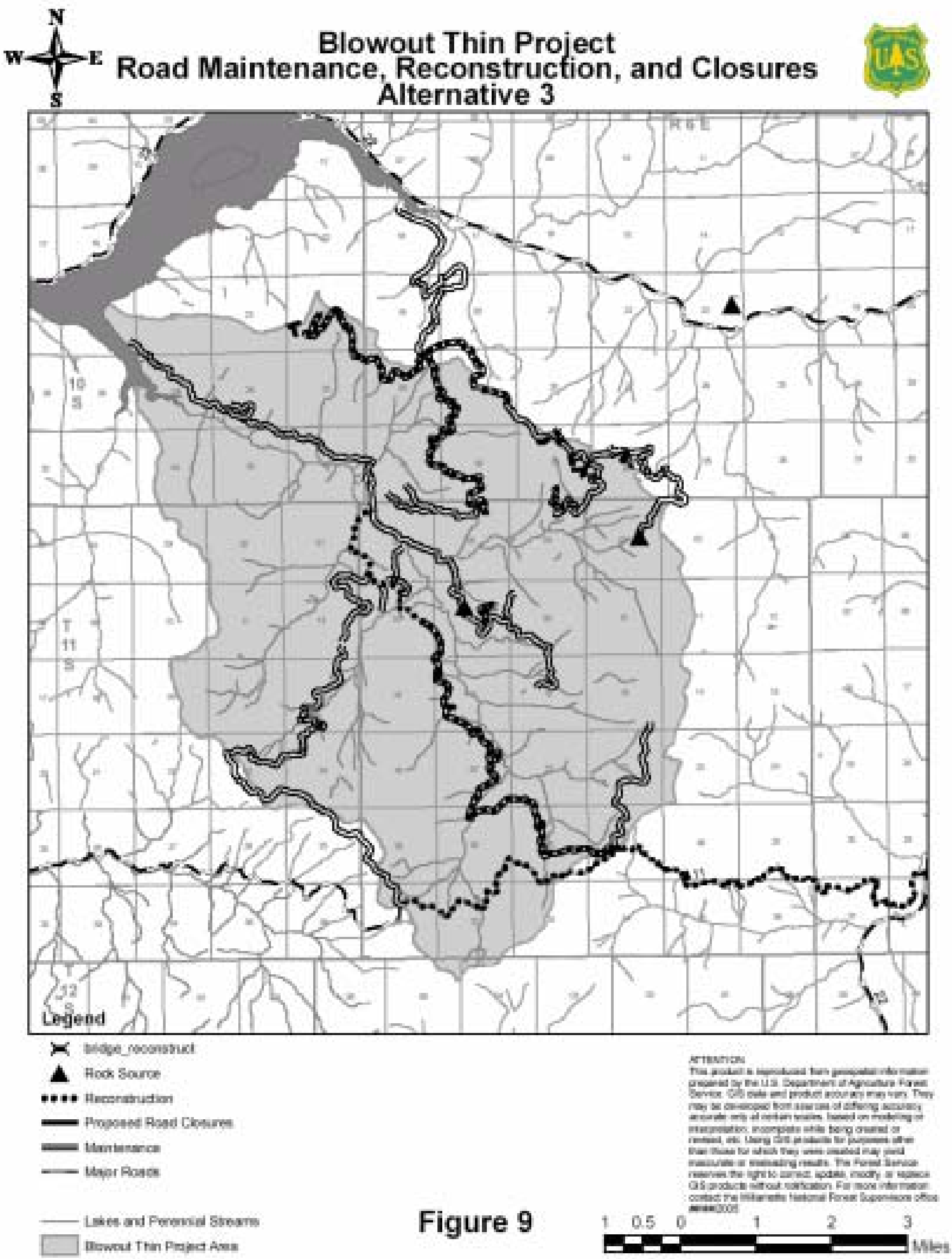

Blowout Thin Project
Proposed Logging System
Alternative 3 (east)
R 6 E
T 10 S
T 11 S
Legend
Project Area Bndy
Logging System
ground
helicopter
skyline
Roads
Existing Roads
Temp. Road Construction
Reopening of Temp Roads
Helicopter Landings
Logging
Service
Stream Class
1
2
3
4
Lakes
Non FS Ownership
CDE
FSCDE
PVT
ATTENTION
Miles

Figure 8



Blowout Thin Project
Road Maintenance, Reconstruction, and Closures
Alternative 3
N
W
E
S
Legend
bridge_reconstruct
Rock Source
Reconstruction
Proposed Road Closures
Maintenance
Major Roads
Lakes and Perennial Streams
Blowout Thin Project Area
1 0.5 0 1 2 3
Miles

Figure 9

Alternative 4

Stand Health, Growth, and Vigor

Same as Alternative 2 except no regeneration harvest is proposed (see Table 2-3 and Figures 10 and 11).

Water Quality

Same as Alternative 2 except no regeneration harvest is proposed.

Riparian Reserves

Same as Alternative 2 except no regeneration harvest is proposed.

Economic Viability

Yarding methods would include 278 acres of ground based system, 295 acres of skyline yarding, and 353 acres of helicopter yarding. About 12 ½ to 1 acre helicopter landings would be needed which may require minor additional clearing. There would be no costs for construction or reopening of temporary roads, but there would be more helicopter yarding.

Fuels

Same as Alternative 2 except refer to Table 2-3: Alternative 4 Harvest Units, for fuels treatment by unit.

Roads and Access

This alternative, like Alternative 2, does not propose any new temporary road construction, nor any reopening of old temporary roads. Consequently three roads are needed in this alternative to access helicopter landings that are not necessary in Alternatives 3 or 5. These Roads are 1000-068, 1000-070, and 1013-180. The 1013-180 Road would be maintained and not reconstructed. The 1000-070 and 1000-068 Roads would be reconstructed and maintained.

Alternative 4 would prescribe road maintenance activities on approximately 50.55 miles of existing forest roads needed for timber haul. Road maintenance would include the same types of activities as in Alternative 2. 26.16 miles of existing forest roads would be reconstructed. Road reconstruction would include the same types of activities as in Alternative 2. Approximately 525 hazard trees (danger trees) associated with the reconstruction would be felled. A bridge surface would need to be replaced on Rd. 1000-068 at Cliff Creek. Rock pits used and activities associated with them would be the same as in Alternative 2. Proposed road closures would be the same as in Alternative 2. See Figure 12 for location of proposed road-related activities.

No road right-of-way permission would be needed from private landowners to access any of the units.

Wildlife Habitat

Treatment is the same as Alternative 2 except no regeneration harvest will occur and no protection measures will be needed for these units. Also, green tree retention areas will not be needed.

Recreation/Visuals

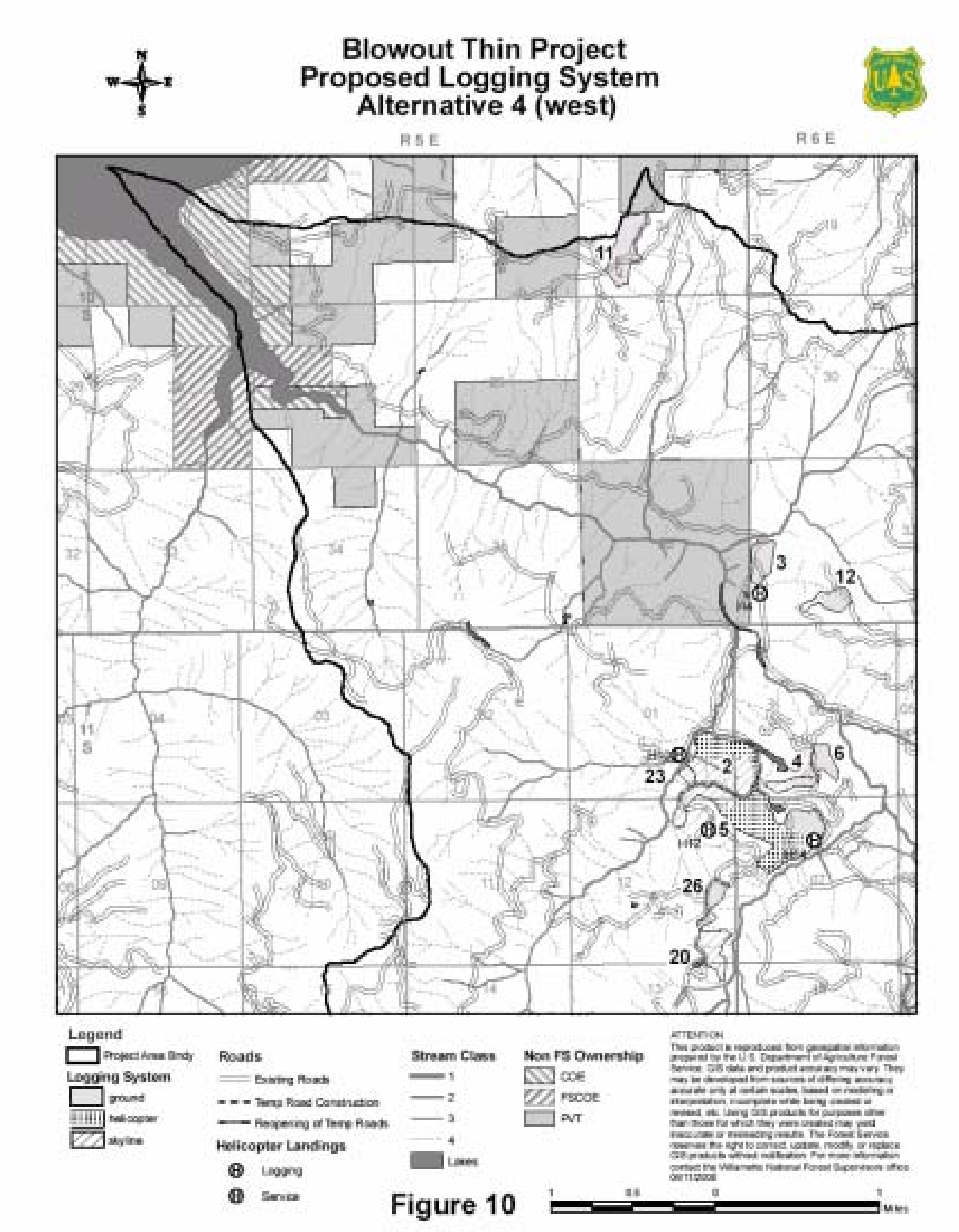
Same as Alternative 2.

Table 2-3. Alternative 4 Harvest Units

Unit	Acres	Harvest Prescription	Logging Systems	Temp. Road Constr. (mi.)	Temp. Road Reopen (mi.)	Fuels Treatment	Estimated Timber Volume	
							MBF	CCF
2	75	Thinning	Skyline/ Helicopter	0	0	HP 5 ac	750	1442
3	20	Thinning	Ground	0	0	HP 1 ac	160	308
4	10	Thinning	Ground/ Skyline/	0	0	GP 5 ac	150	288
5	123	Thinning	Ground/ Skyline/	0	0	HP 4 ac	984	1892
6	14	Thinning	Ground	0	0	GP 14 ac	140	269
7	28	Thinning	Skyline	0	0	HP 2 ac	252	485
8	66	Thinning	Skyline/ Helicopter	0	0	HP 1 ac	726	1396
9	46	Thinning	Ground/ Skyline/	0	0	HP 37 ac	414	796
10	17	Thinning	Helicopter	0	0	YTA 17 ac	153	294
11	36	Thinning	Ground	0	0	GP 36 ac	396	762
12	16	Thinning	Ground/ Skyline/	0	0	GP 14 ac	160	308
16	20	Thinning	Ground/ Helicopter	0	0	GP 17 ac YTA 3 ac	240	462
17	104	Thinning	Ground/ Skyline/ Helicopter	0	0	HP 4 ac	936	1800
18	40	Thinning	Ground/ Skyline/ Helicopter	0	0	HP 3 ac	360	692
19	109	Thinning	Ground/ Skyline/ Helicopter	0	0	GP 44 ac	1417	2725
20	22	Thinning	Skyline	0	0	HP 1.5 ac	242	465
21	28	Thinning	Ground/ Skyline	0	0	HP 1 ac	252	485
23	5	Thinning	Skyline	0	0	HP 1 ac	45	87
24	134	Thinning	Helicopter	0	0	HP 1.5 ac	1340	2577
26	13	Thinning	Ground/ Skyline	0	0	HP 1 ac	117	225
Total	926			0	0		9,234	17,758

HP - Hand Pile (and burn); MBF - Thousand Board Feet; YTA - Yard Tops Attached; CCF - Hundred Cubic Feet; GP - Grapple Pile; BCB - Broadcast burn

Figure 10-12. Alternative 4 Maps



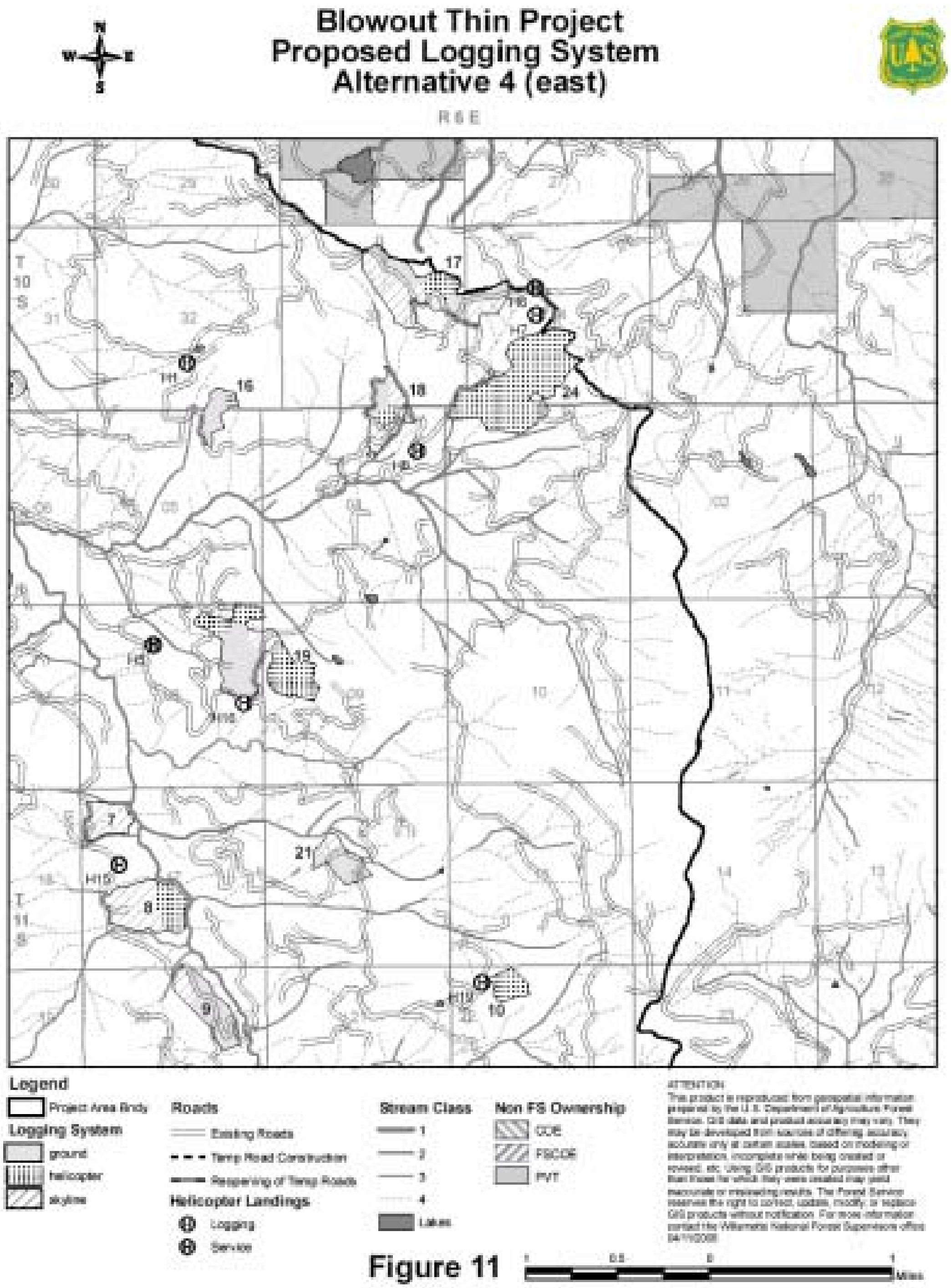

Blowout Thin Project
Proposed Logging System
Alternative 4 (east)
N
S
W
E
R 6 E
T 10 S
T 11 S
17
16
18
24
19
7
21
8
9
10
H1
H7
H8
H15
Legend
Project Area Bndy
Logging System
ground
helicopter
skyline
Roads
Existing Roads
Temp Road Construction
Reopening of Temp Roads
Helicopter Landings
Logging
Service
Stream Class
1
2
3
4
Lakes
Non FS Ownership
COE
FSCOE
PVT
0.5
0
1
Miles

Figure 11

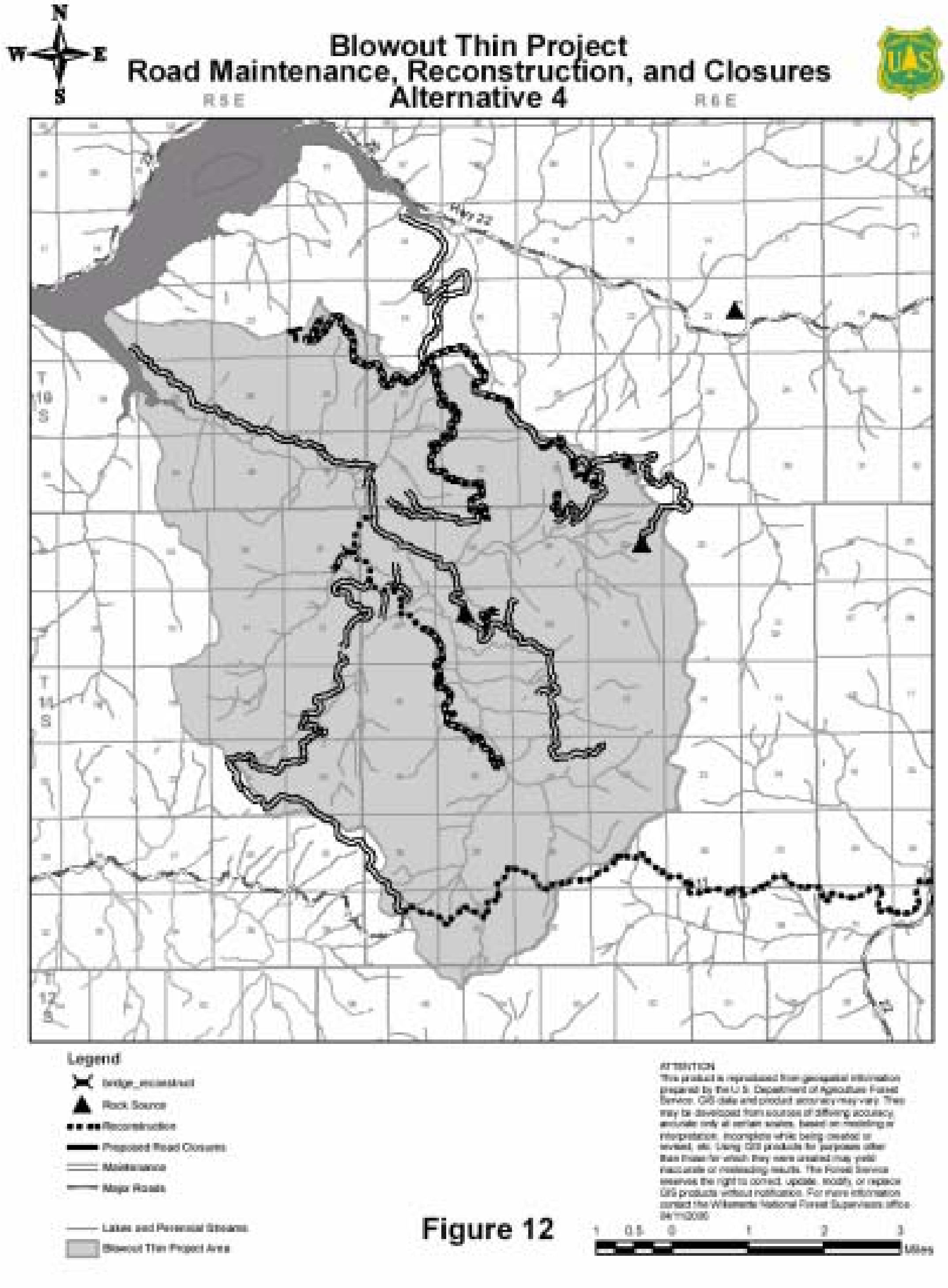

N
W
E
S
Blowout Thin Project
Road Maintenance, Reconstruction, and Closures
Alternative 4
R 5 E
R 6 E
Hwy 22
Legend
Rock Source
Reconstruction
Proposed Road Closures
Maintenance
Major Roads
Lakes and Perennial Streams
Blowout Thin Project Area
ATTENTION
Miles

Figure 12

Alternative 5

This alternative was developed after it was determined that Alternative 3 would require construction and reopening of temporary roads in areas that could require extensive switchbacks, steep grades, large culverts, or deep fills. The intent was to develop an alternative that would reduce the amount of temporary road construction and reopening compared to Alternative 3, but with less helicopter yarding than Alternatives 2 and 4.

Stand Health, Growth, and Vigor

Same as Alternative 2 except see Table 2-4 and Figures 13 and 14

Water Quality

Same as Alternative 2

Riparian Reserves

Same as Alternative 2

Economic Viability

Yarding methods would include 287 acres of ground based systems, 549 acres of skyline yarding, and 149 acres of helicopter yarding. About 7 ½ to 1 acre helicopter landings would be needed, some of which may require minor additional clearing. There would be costs associated with construction and reopening of temporary roads, but there would be less helicopter yarding in this alternative. .

Fuels

Same as for Alternative 2, except refer to Table 2-4, Alternative 5 Harvest Units, for fuels treatment by unit.

Roads and Access

Alternative 5 is similar to Alternative 3 except most of the temporary road work in unit 24 (reopening 1.19 of existing spurs and 0.14 miles of temporary road construction) and all of the temporary road construction in unit 19 would be deleted, leaving 3.05 miles of temporary road to be built. Upon completion of sale activities, the new temporary roads and the reopened temporary roads would be decommissioned by scarification, seeding, and maintenance of natural drainage patterns.

Alternative 5 would prescribe road maintenance activities on 56.57 miles of existing forest roads needed for timber haul. Road maintenance would include the same types of activities as in Alternative 2. Approximately 29.75 miles of existing forest roads would be reconstructed. Road reconstruction would include the same types of activities as in Alternative 2. Approximately 600 hazard trees (danger trees) associated with the reconstruction would be felled. Rock pit activities associated with them would be the same as in Alternative 2. Proposed road closures would be the same as in Alternative 2. See Figure 15 for location of proposed road-related activities.

Right-of-way permission would be needed to haul on and maintain 0.60 miles of road on Freres Lumber Co. land in order to access unit 1 for skyline yarding.

Wildlife Habitat

Same as for Alternative 2.

Recreation/Visuals

Same as for Alternative 2.

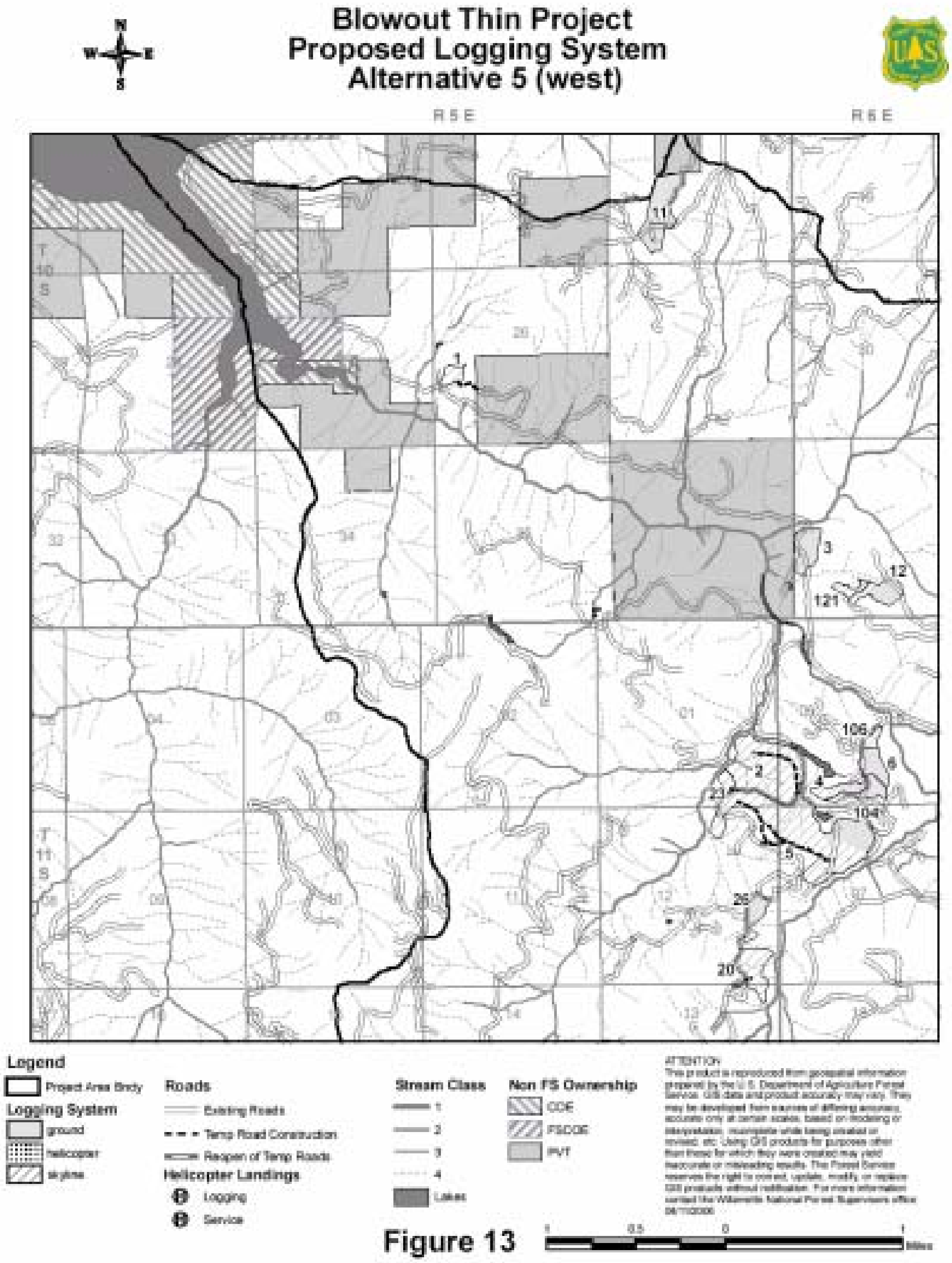
Table 2-4: Alternative 5 Harvest Units

Unit	Acres	Harvest Prescription	Logging Systems	Temp. Road Constr. (mi.)	Temp. Road Re-opening (mi.)	Fuels Treatment	Estimated Timber Volume	
							MBF	CCF
1	7	Regeneration	Skyline	0.16	0	BCB 7 ac	98	188
2	75	Thinning	Skyline	0.42	0	HP 5 ac	750	1442
3	20	Thinning	Ground	0.10	0	HP 1 ac	160	308
4	10	Thinning	Ground/ Skyline	0	0	GP 5 ac	150	288
5	123	Thinning	Ground/ Skyline	0.93	0	HP 4 ac	984	1892
6	14	Thinning	Ground	0	0	GP 14 ac	140	269
7	28	Thinning	Skyline	0	0	HP 2 ac	252	485
8	66	Thinning	Skyline	0.18	0	HP 1 ac	726	1396
9	46	Thinning	Ground/ Skyline	0	0	GP 37 ac	414	796
10	17	Thinning	Skyline	0.71*	0	YTA 17 ac	153	294
11	36	Thinning	Ground	0	0	GP 36 ac	396	762
12	16	Thinning	Ground/ Skyline	0	0	GP 14 ac	160	308
13	6	Regeneration	Skyline	0	0	BCB 6 ac	180	346
14	6	Regeneration	Helicopter	0	0	BCB 6 ac	210	404
16	20	Thinning	Ground/ Helicopter	0	0	GP 17 ac YTA 3 ac	240	462
17	104	Thinning	Ground/ Skyline	0.15	0	HP 4 ac	936	1800
18	40	Thinning	Ground/ Skyline	0.12	0	HP 3 ac	360	692
19	109	Thinning	Ground/ Helicopter /Skyline	0	0	GP 44 ac	1417	2725
20	22	Thinning	Skyline	0.04	0	HP 1.5 ac	242	465
21	28	Thinning	Ground/ Skyline	0	0	HP 1 ac	252	485
23	5	Thinning	Skyline	0.02	0	HP 1 ac	45	87
24	134	Thinning	Skyline/ Helicopter	0.32	0	HP 1.5 ac	1340	2577
26	13	Thinning	Ground/ Skyline	0	0	HP 1 ac	117	225
101	6	Regeneration	Skyline	0*	0	BCB 6 ac	180	346
104	11	Regeneration	Ground/ Skyline	0	0	BCB 11 ac	330	635
106	5	Regeneration	Skyline	0	0	BCB 5 ac	115	221
121	5	Regeneration	Skyline	0	0	BCB 5 ac	150	288
161	1	Regeneration	Helicopter	0	0	BCB 1 ac	25	48

Unit	Acres	Harvest Prescription	Logging Systems	Temp. Road Constr. (mi.)	Temp. Road Re-opening (mi.)	Fuels Treatment	Estimated Timber Volume	
							MBF	CCF
191	12	Regeneration	Skyline/ Helicopter	0	0	BCB 12 ac	360	692
Total	985			3.05	0		10,882	20,927

*Portion of temp road construction for unit 10 would also be used for unit 101
HP - Hand Pile (and burn); MBF - Thousand Board Feet; YTA - Yard Tops Attached; CCF - Hundred Cubic Feet; GP - Grapple Pile; BCB - Broadcast burn

Figures 13-15. Alternative 5 Maps



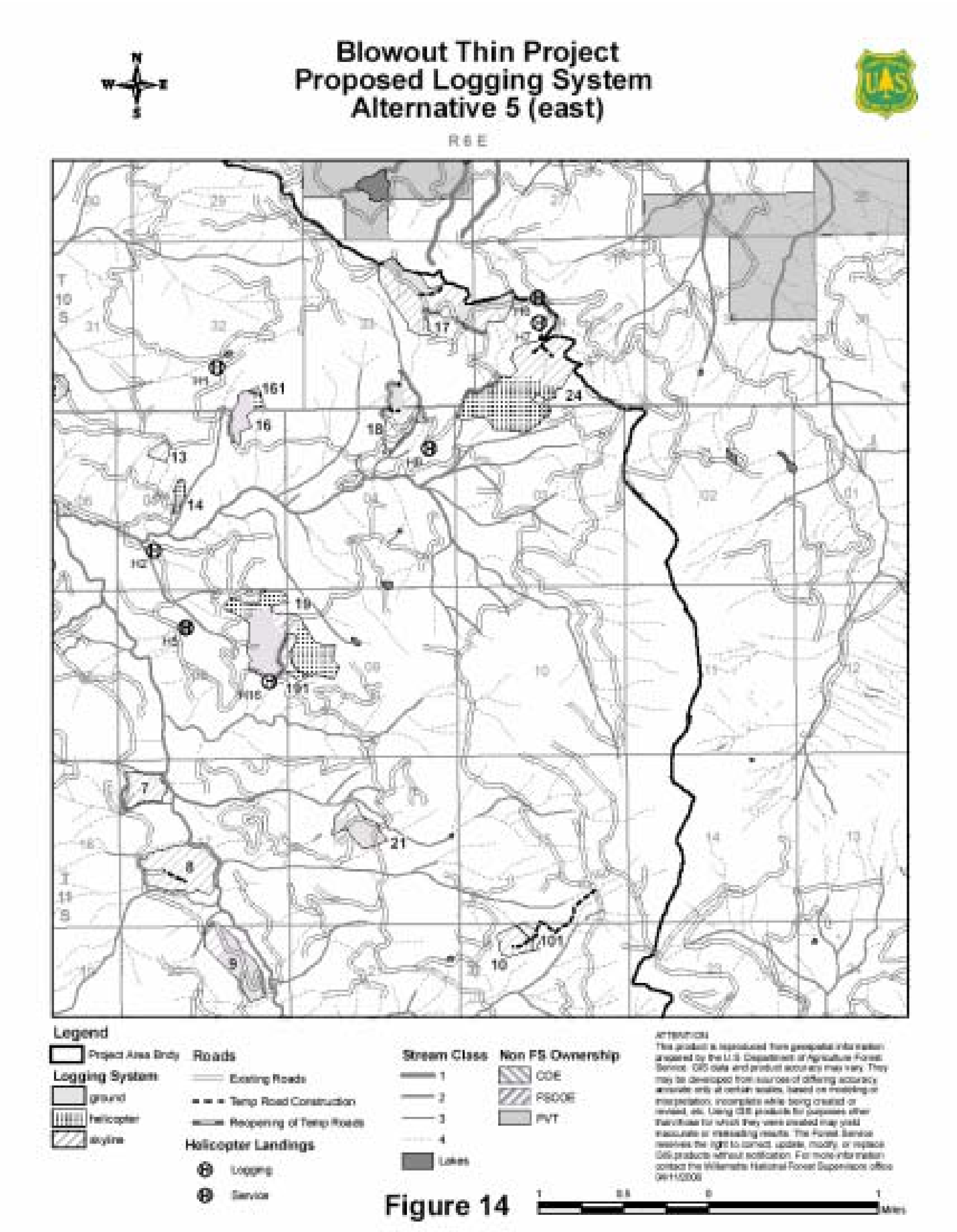

Blowout Thin Project
Proposed Logging System
Alternative 5 (east)
N
W
E
S
R 6 E
T 10 S
T 11 S
17
161
16
13
14
18
24
19
191
7
8
9
21
101
10
Legend
Project Area Bndy
Logging System
ground
helicopter
skyline
Roads
Existing Roads
Temp Road Construction
Reopening of Temp Roads
Helicopter Landings
Logging
Service
Stream Class
1
2
3
4
Lakes
Non FS Ownership
COE
FSCOE
PVT
1
0.5
0
1
Miles

Figure 14

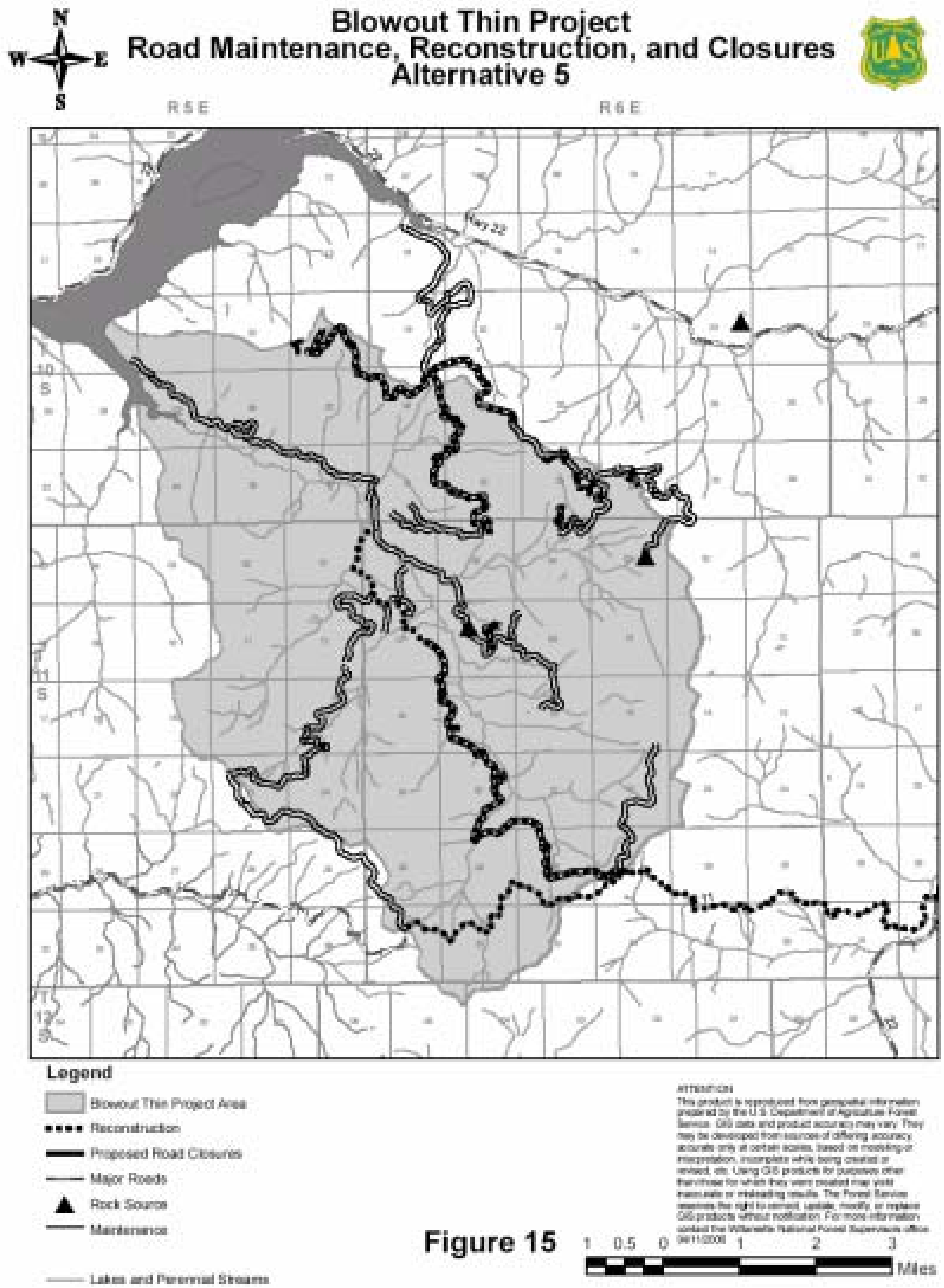

Blowout Thin Project
Road Maintenance, Reconstruction, and Closures
Alternative 5
N
S
W
E
R5E
R6E
Hwy 22
10 S
11 S
12 S
Legend
Blowout Thin Project Area
Reconstruction
Proposed Road Closures
Major Roads
Rock Source
Maintenance
Lakes and Perennial Streams
1 0.5 0 1 2 3
Miles

Figure 15

Mitigation and Design Measures Common to All Action Alternatives

The Forest Service also developed the following design criteria to be used for all action alternatives.

Unless otherwise noted, the following mitigation and design measures are common to Alternatives 2, 3, 4, and 5.

Mitigation Measures

The Council of Environment Quality (CEQ) Regulations (§ 1508.20) defines Mitigation as:

1. Avoiding the impact altogether by not taking a certain action or certain parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impacts by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

Stand Health, Growth, and Vigor

Logging systems will be designed to minimize damage to residual trees and soil. Some of the major considerations are:

- Ground based logging – Restrict skidding equipment to pre-designated skid roads.
- Skyline systems – Require parallel corridors whenever possible, fall trees to the lead, downhill yarding will be kept to a minimum.
- Helicopter yarding – Helicopter yarding must protect the residual stand.
- Western redcedar will be planted in skyline corridors in riparian thinning areas to provide for multi-story stand conditions and species diversity in the future.

Fishery Resource

Any project activity such as culvert replacement that must occur within fishbearing and other perennial streams would comply with Oregon Department of Fish and Wildlife (ODFW) seasonal restrictions on in-stream work activities. In the Blowout Creek watershed, in-stream work must occur between June 1 and September 30. Best Management Practices (BMPs), including placement of sediment barriers, provision of flow bypass, and other applicable measures, would be included in project design as necessary to control off-site movement of sediment.

Haul will be prohibited on native-surfaced roads during the winter rainy season between November 1 and May 31. The objectives are to maintain water quality and fish habitat.

Wildlife Habitat

Big Game

Restrict all project activities and close the gate on Forest Road 10 to reduce disturbance to big game in winter range from January 1 – April 15. Restrict helicopter yarding operations during opening weekend (dates vary each year) of buck deer and Cascade elk rifle season on Friday, Saturday and Sunday to reduce potential conflicts with the hunting public.

Peregrine Falcon

Alternatives 2 and 3

Restrict all operations in units 1, 13, 14, 16, 161, 17, 18, 24 from January 15 – July 31. Restrict air operations only in units 2, 3, 4, 5, 6, 7, 8, 11, 12, 19, 21, 23, 26, 104, 106, 121 and 191 from January 15 – July 31. Restrict rock source blasting at Hawkins and Cub point pits from January 15 – July 31. Rock crushing, hauling, etc is not restricted. Regeneration harvest units 1, 161, 13 and 14 are in the secondary peregrine falcon management zone and the recommendation is to provide snags at the 100% level for potential population of cavity excavator species.

Alternative 4

Same as Alternatives 2 and 3, except no regeneration harvest is proposed.

Alternative 5

Restrict all operations in units 1, 13, 16, 161, 17 (south of road 1003) and 18 from January 15 – July 31. Restrict air operations in units 4, 6, 7, 11, 12, 14, 17 (north of road 1003) 19, 21, 23, 24, and 26 from January 15 – July 31. Units 104, 106, 121 and 191 do not have helicopter yarding proposed. If these units are changed to helicopter yarding systems they should be restricted from January 15 to July 31. Restrict rock source blasting at Hawkins and Cub point pits from January 15 – July 31. Rock crushing and hauling is not restricted. For regeneration harvest units 1, 161, 13 and 14are in the secondary peregrine falcon management zone and the recommendation is to provide snags at the 100% level for potential population of cavity excavator species.

Harlequin Duck

Restrict project activities in units 7 and 8 from March 15 – July 15 to avoid potential disturbance. Surveys may be conducted to determine if harlequin duck activity is occurring adjacent to or within the sale units. If harlequin ducks are determined, by protocol surveys, to be absent in the sale area, this restriction may be lifted for the year surveys are conducted.

Northern Spotted Owl

Project related activities within the project area and all project units that fall within 1/4 mile of occupied or suitable unsurveyed habitat and have the potential to disturb spotted owls are restricted from March 1 to June 15. Helicopter activities within 1/2 mile of occupied or suitable unsurveyed habitat, having the potential to disturb spotted owls, are restricted from March 1 to June 15. Portions of units 2, 4, 5, 17, 24 and 104 are more than 1/4 mile from unsurveyed suitable spotted owl habitat and are not restricted except for blasting and helicopter use.

Blasting is prohibited within 1.0 mile of occupied or unsurveyed suitable spotted owl habitat in any land use allocation between March 1 and July 15. Blasting may occur between July 16 and September 30 only in the Matrix land use allocation. Blasting is prohibited within ¼ mile of any occupied or unsurveyed suitable spotted owl habitat in Critical Habitat Units from July 16 to September 30. Blasting is prohibited within 1 mile of any occupied or unsurveyed suitable spotted owl habitat in Late Successional Reserves from July 16 to September 30.

Restrict rock source blasting and rock crushing at Hawkins and Cub Point pits from March 1 to July 15. Rock loading and hauling is not restricted. McCoy pit is inside a late successional reserve; therefore blasting and rock crushing are restricted from March 1 to September 30. The suitable habitat at McCoy pit is surveyed yearly which may result in restrictions being lifted earlier than September 30. The habitat adjacent to McCoy pit is occupied by a pair of spotted owls that nested in 2004 and not in 2005. These recommendations comply with the terms and conditions from the Biological Opinions from USFWS for this project.

Unit 16 and 161 are restricted for helicopter operations from March 1 to September 30. Currently only unit 161 is proposed to be helicopter yarded. At the Decision Maker's request, combine operational restrictions for unit 161 with unit 16 so both have a helicopter restriction from March 1 to September 30. If such cause arises to change units 13, 104, 106, and 121 to helicopter systems, these units will be restricted for helicopter operations from March 1 to September 30.

In units 13, 104, 106, 121, and 161 all project activities with the potential to disturb nesting spotted owls within 65 yards of occupied or suitable unsurveyed habitat are prohibited from March 1 to July 15.

Sensitive Botanical Species

In order to protect the existing sensitive lichen sites, no thinning should take place within 100 feet of these occurrences, and no regeneration harvest within 340 feet. Refer to the integrated prescriptions in the project file for those units with lichen protection measures.

Noxious weeds

The spread of noxious weeds and other invasive non-native plants will be minimized through preventative measures taken prior to and during harvest operations. These mitigation measures constitute a prevention plan, as directed in the Mediated Agreement (1989), and are consistent with the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision, hereby referred to as R6 2005 ROD that amended the Willamette National Forest Plan by adding management direction relative to invasive plants (USDA Forest Service, 2005a). This project is also consistent with the Willamette National Forest Noxious Weed Prevention Guidelines (USDA Forest Service, 2005b).

- Minimize new road construction and minimize areas of disturbance during road construction and reconstruction.
- Re-vegetate landings and temporary road disturbance at the first appropriate opportunity following project work with competitive seeding and plantings.
- Use weed-free rock sources for any additional gravel needed for road construction and reconstruction.
- Berm or gate any new roads to reduce disturbance and incoming weed seed due to vehicular traffic.
- Use only certified weed-free seed and straw for erosion and forage seeding.

- All road construction and logging equipment will be pressure washed prior to working in the area in accordance with appropriate Timber Sale contract provisions for equipment cleaning
- Monitoring and controlling noxious weeds will take place on all harvest units and associated roads in the planning area.
- Rock sources will be inspected for noxious weeds, infestations will be treated, and the rock source will be deemed to be weed-free by a District or Forest weed specialist, before rock sources are used.
- Where practical, retain all hardwoods.

Special habitats

Neither mitigation nor monitoring is required for special habitats as a result of project implementation.

Recreation and Visual Quality

To mitigate log hauling and recreation traffic conflicts during the peak recreation use season, hauling is restricted on weekends (6 PM Friday through midnight Sunday) and holidays on the Blowout Road (Rd.10 and 11) and Straight Creek Road (Rd. 11, also known as Quartzville Back Country Byway) between the beginning of Memorial Day weekend and the end of Labor Day weekend. Hauling off helicopter yarded units is restricted on the three holiday weekends (Memorial Day, 4th of July, and Labor Day) and between the hours of 5 PM and 8 AM.

Heritage Resources

Mitigation measures for heritage resources are based on the results of the field inventory and information gleaned from the District's cultural resource files. Information specific to heritage resource location and content is exempt from disclosure under the Freedom of Information Act (FSM 6271.2). In order to facilitate the decision-maker's choice, the information will be made available to him.

- All National Historic Preservation Act eligible sites and potentially eligible sites must be avoided during all project activities.
- Changes to the current unit configurations and/or the addition of any new units, will require consultation with the District Archaeologist in order to protect known and unknown heritage resources.
- Project activities planned outside of the area defined in the heritage resource inventory schema must be coordinated with the district archaeologist prior to initiation. This includes the establishment of harvest landings, helicopter landings, guy-line equipment anchors, slash burning, silvicultural treatments, and subsoiling in high probability areas.
- After harvest and prior to cultivating skid roads, a re-entry survey must be conducted in those areas deemed high probability for the occurrence of heritage resources. Coordination with the district archaeologist is essential to ensure the protection of heritage resources.

- In order to extend protection to heritage resources which have not yet been discovered, but which may be uncovered during the course of project activities, the appropriate timber sale provisions must be included in all project prospectus and contracts. The contract clause outlines the procedures to follow in the event heritage resources are inadvertently discovered or disturbed during project activities. Basically, if material is inadvertently discovered, suspend operations and consult the District Archaeologist.

Roads and Access

Alternatives 2, 3, 4, and 5: Temporary roads constructed or reopened for thinning units would be decommissioned after use through hydrological stabilization with water bars, pulling of culverts, and forage seeding.

Alternatives 3 and 5 only: Temporary roads constructed for regeneration harvest units would be decommissioned after use by subsoiling and planting with trees.

Soil Productivity and Slope Stability

All skyline units shall have at least partial suspension yarding to avoid excessive soil displacement.

Subsoiling is proposed in some ground-based units in order to reduce compaction at heavily used haul roads (dirt spurs), skid roads, and landings. Subsoiling would not occur on all the skid roads, reused and new, because of the potential for problems with root pruning and excessive soil disturbance.

The following table was developed from direction in the Willamette Forest Plan Standards and Guides (primarily FW-079, FW-090 and FW-179) to maintain or enhance soil productivity and stability, field reconnaissance, and experience gained from extensive monitoring of similar projects.

The logging system suspension listed in the following table is the minimum required for soil protection. Additional suspension may be needed for other resource protection.

Table 2-5. Soil Resource Inventory Landtypes, Suspension, and Duff Depth Retention

Unit	SRI Landtype	Suspension*	Duff Depth Retention(%)
1	201, 212	Partial	50-70
2	55, 212, 236, 201	Partial, Ground	50-70
3	16	Ground (ctl)	10-30
4	231, 55-162-236	Partial, Ground	40-60
5	13, 55-162-236, 212, 201-214, 234-443, 441	Partial, some Ground at landings and benches	40-60
104	231-441	Partial, Ground	40-60
6	231-441	Partial, some Ground	40-60
106	201	Partial	60-80
7	13, 13-16,162, 236, 201-214.	Partial, some ground	50-70
8	13, 201	Partial, Ground	30-50
9	132, 201-212	Ground, some Partial	30-50
10	55, 135-644	Ground, some Partial	40-60
101	55, 135-644	Gound	30-50
11	233	Ground (ctl)	20-40
12	13-132, 212, 135	Partial, Ground	30-50

Unit	SRI Landtype	Suspension*	Duff Depth Retention(%)
121	213-214	Partial	50-70
13	132-553, 13-212-214	Ground (ctl)	20-40
14	234	Ground (ctl)	20-40
16	212, 231-443, 55-132	Partial, Ground	40-60
161	212	Partial	40-60
17	55-233, 212-214, 212-234	Partial, some Ground	40-60
18	132, 201-212, 201, 233	Partial, Ground	40-60
24	231-233, 212	Partial, Ground	40-60
19	233-553, 13, 553, 214, 251, 252	Partial, Ground	20-40
191	13	Partial, Ground	30-50
20	134, 135, 441	Partial, Ground	30-50
26	55, 134, 441	Partial, Ground	30-50
21	134, 441, 13	Partial, Ground	30-50
23	212-441	Partial	50-70

*Partial means skyline logging with one end suspension and full suspension over draws and drainage courses. The area at tail trees and landings is excluded. Ground means a ground based system such as tractor or cut-to-length (ctl). Some units may be helicopter yarded to avoid an expansion of the transportation system. This provides additional protection to the soil resource, but is not required as a minimum soil protection measure.

Design Measures

Design Measures are standard operating procedures to follow so that activities remain consistent with Willamette Forest Plan Standards and Guidelines.

The following measures would be implemented through project design and layout, contract specifications, contract administration, and with monitoring performed by Forest Service officers.

Water Quality

The width of the riparian reserve for perennial fish-bearing streams (Class I and II) is 344 feet on each side of the stream. The riparian reserve width for perennial non-fishbearing streams (Class III) and intermittent or ephemeral streams (Class IV) is 172 feet.

Commercial thinning is planned within Riparian Reserves but outside of prescribed no-harvest buffers. Vegetation thinning will not occur within primary shade zones. Canopy closures within the secondary shade zone will not be reduced below 50 percent canopy closure post harvest. Average canopy closure will be at least 70 percent for the riparian reserve.

Thinning unit no-harvest buffers:

- 172 feet for perennial fish-bearing streams (Class I, II)
- 50 to 150 feet for perennial non-fishbearing streams (Class III)
- 50 feet for intermittent or ephemeral streams (Class IV)
- 50 to 150 feet for unstable headwalls and wetlands

Regeneration harvest will not take place within Riparian Reserves. All streams within the project will be protected utilizing various widths of no-harvest buffers. The no-harvest buffers vary by site and are displayed for each stream on the individual integrated prescription maps. The buffer for streams is generally measured from the edge of the water or channel, but in some cases from the edge of the vegetation change (these exceptions are noted in the Riparian Treatment sections of the integrated prescriptions). The buffer for wet areas and wetlands is generally measured from the edge of the vegetation change.

Regeneration unit no-harvest buffers:

- 344 feet for perennial fish-bearing streams (Class I, II)
- 172 feet for class III and IV (non-fishbearing) in regeneration harvest units
- 172 feet for wetlands

Design units to insure channel bank stability, and provide adequate buffers to reduce sediment inputs and minimize peak flow effects (BMP T-2; T-7; T-8; T-12). Boundaries are placed in such a manner to avoid compromising stability of the channel banks. No trees are to be cut which attribute to bank stability. Directionally fall trees away from streams and stream buffers. If felled trees fall into the Riparian Reserve, they will be bucked off at the Riparian Reserve boundary and the portion within the Riparian Reserve will be left in place.

Best Management Practices (BMP's) are utilized in the development of mitigation and compliance with the Aquatic Conservation Strategy Objectives in the Northwest Forest Plan. These BMP's can be found in "General Water Quality Best Management Practices" Pacific Northwest Region, November, 1988. Utilizing BMP's for this project specifically addresses direction and guidance in the protection of water quality. Blowout Thin project BMP's for water quality are:

- Designate riparian management units and specific prescriptions for each individual unit adjacent to stream courses requiring protection to maintain or improve the quality of water for domestic and fisheries users (BMP; T-7).
- Locate appropriate riparian management units and establish fire lines to ensure maintenance of established buffers and filter strips to maintain natural filtration of surface, overland flow, through post sale activities (BMP T-7; T-8; F-2; F-3).
- Designate riparian management units to preserve and improve shade canopies over stream channels and existing temperature regimes along perennial streams. (BMP T-2; T-7; T-8).
- Establish riparian management units that include channel bank areas and or establish marking prescriptions that prevent any tree contributing to channel bank stability from being marked for removal, in order to maintain or improve channel bank stability (BMP T-2; T-6; T-7; T-8).
- Utilize appropriate Timber Sale contract provisions to ensure adequate surface rock on winter haul routes and erosion control techniques, such as mulching of bare soils associated with the road system occur.
- No activities will occur on or within flood plains due to the maintenance of Riparian Reserves and buffer restrictions. Wet areas will be dealt with on an individual basis under the stand specific recommendations. Wetland areas less than 1/4 acre will be treated as special habitat areas (FW-211).

Fuel Treatment:

Handlines for slash burning will not be constructed along no-harvest riparian buffer areas. Fire will only be allowed to back into the riparian area.

All burning operations will comply with the Oregon State Implementation Plan (SIP).

Wildlife Habitat

Snags or trees to be topped for snag creation will not be left within 172' of roads to avoid designation as a road hazard tree.

Residual old growth trees are to be left intact and shall not count toward snag creation requirements.

No coarse woody debris is to be left within 50 feet of any road to avoid the development of unwarranted firewood cutting areas.

Recreation

Allow parking and dispersed camping space in front of gates where practical. Wheel chair accessible gates should be installed on roads that are relatively flat (less than 10%), particularly within popular hunting areas.

Soil Productivity and Slope Stability

All ground based yarding will require LTSR (Located Tractor Skid Road), and/or line pulling and directional falling, as appropriate.

All areas of ground based yarding must be well away from active drainages.

Skid roads will cross ephemeral swales only during dry periods and at right angles.

Ground-based yarding systems may be employed where slopes are gentle (generally 30% or less).

Tractor yarding skid roads will be pre-designated and approved prior to use by the Timber Sale Officer and will generally be 150 to 200 feet apart. On units with processor / forwarder yarding, forwarder roads would generally be about 50 to 60 feet apart, and forwarder trips will generally be limited to 3 or less on any given road.

With appropriate contract language and enforcement, excessive compaction from unrestricted tractor yarding will not occur.

Objectives for duff depth retention are specified for each unit in the Soils Report and in the integrated prescriptions.

Burn piles in the fall or spring, when duff and soil moistures are higher.

Concentrations of larger down logs that were produced with the initial harvest should be left undisturbed as much as possible.

Standard contract language should provide for sufficient erosion control measures to be implemented by the purchaser during timber sale operations (BMP T-13). Revegetation of areas disturbed by harvest activities (such as landings, temporary roads, and equipment storage areas) is required with an appropriate seed mix (BMP T-14, T-15, and T-16).

The proposed harvest areas have been located on productive soils and designed to avoid localized potentially unstable areas and unsuited areas of rocks and cliffs. Units have been designed to avoid unstable soils as follows:

- Unit 5 below the slope break at the southeast boundary.
- Unit 8 along the north boundary, and also a small slump (0.1 acre) located in the southwest corner in the in the no-harvest riparian zone.

- Unit 18 has two small unstable areas (0.1 acre) on the east and west boundaries Both unstable areas are excluded with no – harvest riparian zones.
- Unit 18A had an unstable area along the west boundary. This unit has been dropped from all the alternatives.
- Unit 26 beyond the north and northeast boundary.

Monitoring Plan

Stand Health, Growth, and Vigor

Monitor tree marking to ensure it follows prescribed treatment (Silviculturist). Monitor compliance with Designation-By-Description in units where trees are designated by the timber sale contract for removal (Timber Sale Administrator). Monitor logging operation in order to minimize logging damage (Timber Sale Administrator). Conduct stand exams on completed thinning to support silvicultural treatments, measure post treatment results and revise stand information. Conduct reforestation survival exams on areas designated for planting.

Water Quality

USGS has a real-time gauge on Blowout Creek. This will continue to collect information to determine if management affects are occurring. In addition, a network of temperature recording devices will be placed throughout the watershed. This information will be utilized as part of the Water Quality Management Plan.

Wildlife Habitat

Coarse woody debris (CWD) retention will be monitored in units where CWD habitat enhancement work has occurred. Wildlife tree use and retention will be monitored in units where wildlife trees were created post harvest. CWD and wildlife tree monitoring will occur approximately 5 years after harvest activities are complete.

Noxious Weeds

Noxious weed invasions in the harvest units and along associated roads will be monitored.

Soil Productivity and Slope Stability

The proposed project will be monitored to evaluate the efficiency and adequacy of soil protection measures. Sale area rehabilitation needs or protection measures will be updated as necessary. Primary implementation monitoring will be conducted at the contract administration phase of the project by the Timber Sale Officer. The purchaser will be required to maintain adequate log suspension during the harvest process. In addition, numerous other contract requirements dealing with such items as erosion control, hazardous material use, and fire restrictions will be enforced. Duff retention will be monitored as part of any post sale activity that may affect the soil resource, such as handpile or grapple pile burning.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of the need for the proposal, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below:

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The following four alternatives were considered, but eliminated from detailed consideration for the reasons stated.

1) Variable Density Thinning

An alternative that would propose variable density thinning (¼ to ½ acre gaps; dense patches; lightly thinned, moderately thinned, and heavily thinned patches in every stand) in Matrix lands and Riparian Reserves was considered in response to scoping comments from ONRC. However, variable density thinning is more appropriate in areas where late successional characteristics are a primary objective, such as in Late-successional Reserves (LSRs), and the most urgent need for thinning in this planning area is in the Matrix.

Late-successional characteristics are not a primary objective in Matrix lands. The direction for the MA14a land allocations within Matrix is to manage lands to full growth potential while maintaining Forest Plan Standards and Guides. The openings and single large tree release component of the variable density prescriptions result in understocked sites within the stand, while the unthinned patches maintained at higher than desirable densities continue to result in reduced diameter increment, intra-stand competition, and growth reduction. These results are not a concern in the LSR where the young stand silviculture objective is to “jump-start” late successional stand structure. But in land allocations where timber production is one of the management objectives, underutilizing site potential to accelerate late successional conditions would not meet multiple use objectives.

It should be recognized that many commercial thinning prescriptions for Matrix land allocations inherently result in varying degrees of increased intra stand variability. Spacing adjustments for logging systems, mitigations for special habitats, survey and manage sites, treatment of root disease areas, measures to protect hardwoods and minor conifer species, and post harvest planting of minor species in created openings are examples of Matrix thinning prescription components that increase intra stand variability. The thinning prescriptions will develop late successional conditions, albeit on a different timeline than the LSR stands.

Within Riparian Reserves, one objective is to maintain sufficient shade to moderate stream temperatures. The gaps and heavy thinning techniques associated with variable density thinning would not meet this objective. Many commercial thinning prescriptions for Riparian Reserves inherently result in varying degrees of increased intra stand variability. Examples of Riparian Reserve thinning prescription components that increase intra- stand variability include leaving unthinned portions as no-harvest buffers adjacent to streams, wider spacing within skyline corridors, mitigation buffers for special habitats, survey and manage sites, measures to protect hardwoods and minor conifer species, and post harvest planting of western redcedar seedlings in skyline corridors.

Inter-stand variability at a watershed or landscape level is a key for resilient and healthy forests. The Forest Plan highlights the importance of the landscape variability by providing different types of late successional stand conditions. At the landscape level, the differences between young stand treatments in LSR and young stand treatments in Matrix become less noticeable. Features such as edge, patch size, and habitat contiguity are less affected by intra stand vegetation manipulations and more by overall size, shape, and spacing of areas treated.

Within Riparian Reserves, skyline corridors will be planted with western redcedar seedlings to improve long-term structural and species diversity.

2) Thin Riparian Reserves and Leave Felled Trees on the Ground

ONRC requested an alternative that thins trees in Riparian Reserves and leaves them on the ground. This alternative was not given detailed consideration because of the fuel loading concerns associated with leaving whole trees on the ground after a thinning operation.

3) Avoid Timber Harvest within CHU

An alternative was considered that would avoid any timber harvesting within a Critical Habitat Unit (CHU) for spotted owls. This alternative was eliminated because there is no direction to avoid thinning in CHU at this time, and because thinning improves habitat conditions for spotted owls in the long term.

Comparison of Alternatives

This table provides a brief summary of the alternatives and their environmental impacts in comparative format.

Table 2-6. Comparison of Alternatives by Activity

	Unit of Measure	Alt.1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Timber Harvest						
Thinning	Acres	0	926	926	926	926
Regeneration Harvest	Acres	0	59	59	0	59
Total Harvest Area	Acres	0	985	985	926	985
Estimated Timber Volume	MBF	0	10,882	10,882	9,234	10,882
	CCF	0	20,927	20,927	17,758	20,927
Logging Systems						
Ground	Acres	0	287	394	278	287
Skyline	Acres	0	322	570	295	549
Helicopter	Acres	0	376	21	353	149
Roads and Access						
Haul Road Maintenance	Miles	0	50.55	56.57	50.55	56.57
Reconstruction	Miles	0	26.16	29.75	26.16	29.75
Road Closures	Miles	0	1.25	1.25	1.25	1.25
Temp. Road Construction	Miles	0	0	4.1	0	3.1
Temp. Road Reopening	Miles	0	0	1.2	0	0
Landings						
Helicopter Landings	Number of	0	14	4	12	7
All landings (Heli+Skyline+Ground)	Acres of	0	21	23	17	19
Fuels Treatments						
Hand Pile and Burn	Acres	0	26	26	26	26
Grapple Pile and Burn	Acres	0	167	183	167	167
Yard Tops Attached	Acres	0	20	20	20	20
Broadcast Burn	Acres	0	59	59	0	59
Total	Acres	0	272	288	213	272

Table 2-7. Comparison of Alternatives by Significant Issue and Measurement

	Unit of Measure	Alt.1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Stand Growth, Health, and Vigor (projected average DBH growth per decade over the next 50 years)						
Thinning of Fire Stands	in./decade	0.86	1.46	1.46	1.46	1.46
Thinning of Managed Stands	in./decade	1.04	1.62	1.62	1.62	1.62
Regeneration of Fire Stands	in./decade	0.96	2.88	2.88	0.96	2.88
Water Quality						
Road work – See Table 2-8	Miles	0	Table 2-8	Table 2-8	Table 2-8	Table 2-8
Stream crossings associated with temporary road work (does not include skid trail crossings)	Number	0	0	6	0	0
Aggregate Recovery Percentage (ARP) for 6th Field Watersheds [Midpoint ARP Threshold is 70%]	Lower Blowout Cr.	83%	82%	82%	82%	82%
	Upper Blowout Cr.	82%	78%	78%	79%	78%
Risk to hydrology, stream channels and water quality	Risk rating	N/A	Low	Moderate	Low	Low
Economics						

	Unit of Measure	Alt.1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Gross Value	Thousand Dollars	0	$7,345	$7,439	$6,283	$7,392
Associated Costs	Thousand Dollars	0	$4,696	$4,157	$4,095	$4,392
Net Appraised Value	Thousand Dollars	0	$2,382	$2,949	$1,967	$2,697
Cost/Benefit Ratio	Thousand Dollars	N/A	1.48	1.66	1.46	1.57

Table 2-8. Comparison of Alternatives by Other Issues and Measurement

	Unit of Measure	Alt.1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Riparian Reserves						
Riparian Reserves thinned	Acres	0	195	195	195	195
Percentage of Riparian Reserves thinned in Upper and Lower Blowout Subwatersheds combined	Percent	0	1.3%	1.3%	1.3%	1.3%
Impacts to the Local Economy						
Jobs provided in logging (3.5 jobs per MMBF)	Number of	0	38	32	38	38
Jobs provided in sawmills (4.0 jobs per MMBF)	Number of	0	44	37	44	44
Wildlife Habitat						
Open Road Density Beard BGEA	Miles per square mile	2.72	2.69	2.69	2.69	2.69
Open Road Density Cliff BGEA	Miles per square mile	2.67	2.67	2.67	2.67	2.67
Open Road Density Divide BGEA	Miles per square mile	3.10	3.03	3.03	3.03	3.03
Open Road Density Upper Blowout	Miles per square mile	3.93	3.93	3.93	3.93	3.93
Threatened, Endangered, and Sensitive Species						
Spotted owl suitable habitat thinned within/outside CHU	Acres	0/0	2/0	2/0	2/0	2/0
Spotted owl dispersal habitat thinned within/outside CHU	Acres	0/0	268/538	268/538	268/538	268/538
Spotted owl suitable habitat removed within/outside CHU	Acres	0/0	0/0	0/0	0/0	0/0
Spotted owl dispersal habitat removed within/outside CHU	Acres	0/0	24/17	24/17	0/0	24/17
Spotted owl effects for thinning outside CHU	Determin-ation**	NA	NA	NA	NA	NA
Spotted owl effects for regen-eration harvest outside CHU and thinning in CHU	Determin-ation**	NA	NLAA	NLAA	NA	NLAA
Spotted owl effects for regen-eration harvest within CHU	Determin-ation**	NA	LAA	LAA	NA	LAA
Measurable negative effects realized to occupied ESA fish habitat	Probability	very low	very low	low	very low	very low
	Magnitude	very low	very low	low	very low	very low
Noxious Weeds - Risk of Introduction and Establishment from Management Activities						
Regeneration Harvest	Risk rating*	0	2	2	0	2
Ground based yarding	Risk rating*	0	0	2	0	1
Construction of temporary roads	Risk rating*	0	0	1	0	.5
Helicopter Landings	Risk rating*	0	1	0	1	.5
No opportunity for KV funding for noxious weed control	Risk rating*	2	0	0	0	0
Total of risk ratings	Risk rating*	2	3	5	1	4
Biodiversity						

	Unit of Measure	Alt.1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Total area thinned	Acres	0	926	926	926	926
Area thinned to wider spacing (skyline corridors)	Acres	0	5	11	5	10
Untreated areas in Riparian Reserves (no-harvest buffers)	Acres	297	102	102	102	102
Area of underplanting in skyline corridors within Riparian Reserves	Acres	0	4	4	4	4
Area in openings (landings)	Acres	0	21	23	17	19
Recreation						
Helicopter use between units and landings that are near dispersed recreation sites.	Days	0	66	14	53	25
Dispersed campsites potentially affected by helicopter noise in Divide Creek	Number of	0	1	1	0	1
Dispersed campsites potentially affected by helicopter noise in Blowout Creek	Number of	0	13	2	10	2
Scenic Quality						
Regeneration harvest in visual management allocations	Acres	0	4	4	0	4
Soil Productivity						
Cumulative detrimental soil condition before harvest	Percent	8-10	8-10	8-10	8-10	8-10
Cumulative detrimental soil condition after harvest and subsoiling	Percent	8-10	9-12	9-12	9-12	9-12

*Risk rating of 0 = no risk;. 1 = small risk; 2 = moderate risk; 3 = large risk
**NA = No affect; NLAA = May affect, not likely to adversely affect; LAA = May affect, likely to adversely affect
ESA = Endangered Species Act

Chapter 3. Affected Environment and Environmental Consequences

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the Chapter 2.

Past, Present and Reasonably Foreseeable Actions

The cumulative effects discussed in this section include an analysis and a concise description of the identifiable present effects of past actions to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the proposed action and its alternatives may have a continuing, additive and significant relationship to those effects. The cumulative effects of the proposed action and the alternatives in this analysis are primarily based on the aggregate effects of the past, present, and reasonably foreseeable future actions. Individual effects of past actions have not been listed or analyzed and are not necessary to describe the cumulative effects of this proposal or the alternatives. (CEQ Memorandum, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005).

Past Actions

There are currently about 170.7 miles of system Forest Roads in the planning area. About 52.4 miles of road are currently closed with gates, berms, or other structures. All of the spur roads on privately owned land (Freres Lumber Company) are closed with gates or barriers.

- Maintenance of roads, closure devices, and culverts in the planning area. Open roads are maintained every 2-4 years as a rule of thumb, unless they are a high use passenger car aggregate road, which may get annual maintenance. Closed roads are checked to ensure that they are stable every few years.
- Approximately 7.4 miles of road in the planning area have been decommissioned, with culverts removed. About 1.0 mile of road has had asphalt and culverts removed (Rd. 1000-130). About 4.0 miles of road have been obliterated, with both culverts and fills removed.
- Timber harvest on National Forest land in the planning area: Since 1940, approximately 12,498 acres have been managed for timber harvest. Of those, about 10,643 acres were regeneration harvests, including clearcuts and shelterwoods. The other 1,855 acres were managed with commercial thinning, partial cutting, and salvage logging.
- Salvage logging and routine hazard tree felling along roads.
- Prescribed burning and fuels treatment. Most of the acres managed for timber since the 1960's have had some sort of fuel treatment.

- Forage seeding of regeneration harvest units and disturbed areas after slash treatment has occurred for the purpose of increasing forage valued for big game.
- Timber Stand Improvement: Pre-commercial thinning has been a major part of past forest management. The thinning treatments usually reduced stand densities to about 300 trees per acre. In the past five years, approximately 824 acres were pre-commercially thinned.
- Noxious weed manual control, various locations in the planning area. Chemical sprays have been applied to a small area of spotted knapweed off Rd. 1013 during the last two years.
- Mushroom picking, huckleberry picking, beargrass picking, bough cutting, and firewood cutting.
- Recreational activities, including dispersed camping; hunting; ATV use on roads; recreational driving on Quartzville Backcountry Byway (Rd. 11); boating and day use in the Blowout Creek arm of Detroit Lake; and hiking on Trail # 3426, which crosses a suspension bridge on the Blowout Creek arm of Detroit Lake.
- Detroit Dam construction was finished in 1953, inundating a historical fish barrier on Blowout Creek. This allows Chinook salmon, rainbow trout, and non-game fish to move up the drainage that could not do so before the dam.
- Stocking of hatchery Chinook salmon starting in the early 1990’s by the Oregon Department of Fish and Wildlife.
- Stocking of kokanee salmon in Detroit Lake.

Present Actions

- Echo Timber Sale is a sold sale that has been delayed primarily due to the road failure on Rd. 1012. The sale consists of 40 acres of regeneration harvest.
- Roadway Thin Timber Sale consists of felling and removal of small diameter trees (less than 16”) on about 70 acres along Roads 10, 1011, 1012, and 1013 to increase visibility, reduce hazards, and improve stand health. Harvest, haul, and road maintenance activities associated with this sale will cause minor traffic delays on Road 11, as well as on Roads 10, 1011, 1012, and 1013. The sale is expected to be completed by April 2007.
- Log hauling activities associated with the Shore ‘Nuf, Echo, and Roadway Thin Timber Sales may contribute to adverse haul road conditions between periods of maintenance activities, specifically on Roads 10 and 1012. The Echo Timber Sale is expected to be completed by April 2007 while the Shore ‘Nuf Timber sale is expected to be completed by April 2009.

Reasonably Foreseeable Future Actions:

- Road 11 will receive some reconstruction involving asphalt patch placements under the Road 11 Reconstruction Project. This work is expected to be completed in the Summer or Fall of 2006.

- Maintenance of roads, closure devices, and culverts in the planning area. Open roads are maintained every 2-4 years as a rule of thumb, unless they are a high use passenger car aggregate road, which may get annual maintenance. Closed roads are checked to ensure that they are stable every few years.
- Hazard trees will be felled routinely along open roads as part of normal road maintenance for the life of the roads.
- Hawkins Rock Pit expansion and rock crushing contract (Decision Memo has been issued). Traffic associated with the Hawkins Quarry Crushing contract will primarily impact Road 1013. This will only be a two month contract and the completion date for this work is anticipated to be December 2006.
- Approximately 12 gate replacements are foreseeable, if funding becomes available (see Ch. 3, Wildlife Habitat, Big Game, Cumulative Effects). The total miles of road behind the gate replacements are 12.88 miles. This project (Blowout Thin) may provide funding for the replacement gates. New gates will replace previously approved closure devices and pipe barriers that have been damaged.
- Parking and dispersed camping space in front of gates to be replaced will be allowed where practical, especially where gate replacement will block road access to existing dispersed sites. Consideration will be given to install gates so they are wheel chair accessible on roads that are relatively flat (less than 10%).
- Routine hazard tree felling along open roads.
- Continued logging and road construction by Ferris Lumber on their land in next five years. Within the project area, this includes approximately 270 acres pf clear cutting and 220 acres of thinning in the next 0-5 years. Little (less than 50 feet) of additional road construction is expected to support these activities.
- Timber Stand Improvement Projects: Aerial fertilization of 926 acres of commercial thinning units proposed for harvest in the Blowout Thin Timber Sale; pre-commercial thinning of about 558 acres, including pruning of white pine; and stands in site class IV and V needing pre-commercial thinning will be reviewed for growth response after pre-commercial thinning to determine the need for aerial fertilization (estimated at approximately 200 acres).
- Noxious weed manual and chemical control, various locations in the planning area.
- Mushroom picking, huckleberry picking, beargrass picking, bough cutting, and firewood cutting.
- Recreational activities, including dispersed camping, hunting, ATV use on roads, recreational driving on Quartzville Backcountry Byway (Rd. 11), boating and day use in the Blowout Creek arm of Detroit Lake, and hiking on Trail # 3426, which crosses a suspension bridge on the Blowout Creek arm of Detroit Lake.
- Dispersed site rehabilitation of the more popular sites along Blowout and Divide Creeks.
- Reconstruction of Trail # 3426 in 2006 (which crosses the Blowout Creek arm of Detroit Lake on a suspension bridge).

- A feasibility study has been completed in cooperation with the North Santiam Economic Development Corporation, showing that it would be feasible to construct a trail around the south side of Detroit Lake, which would pass through the northwest portion of the planning area and connect with trail 3426.
- Stream restoration projects: large wood placement with boulder material used for anchoring - approximately 2.0 miles (0.9 miles in Cliff Cr. and 1.1 miles in Divide Cr.); structure maintenance - approximately 4.8 miles (4.2 miles in Blowout Cr. and 0.6 miles in Ivy Cr.); floodplain restoration – approximately 0.15 miles in Blowout Creek near the confluence with Cliff Cr., in the NW ¼, NW ¼, Section 6, T11S, R6E.; and a cooperative Payments to Counties (PAYCO) stream restoration project on Freres Lumber Co. land in 2006 (large wood and boulder structures will be added to Blowout Creek between Beard Cr. and Cliff Cr. in 2006).
- Placing of Rd. 1013-220 into hydrological storage (Maintenance Level 1) and replacement of gate. This road would be made accessible to equipment by bucking out the old growth logs across the road. The road would then be brushed and shallow cut slope failures would be cleared or ramped over. When vehicle access is no longer needed, the road would be put in storage by creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. This work would only be performed from the junction with the 1013 road to the bridge on Hawkins Cr., because this bridge is not useable. The gate at the beginning of the road will be replaced.
- Riparian hardwood and conifer planting and minor shaping and drainage work on a wet area (about 5 acres) associated with an earthflow across a decommissioned road (former road number 1013-140) east of proposed unit19.
- Erosion control seeding – seeding and fertilizing of cutbanks as needed within the sale area, especially in or near the following units: along Rd. 10 south of unit 1, along Rd. 1011 in unit 3, unit 9, and the earthflow between units 17 and 7.
- There is an opportunity to increase big game forage value by seeding 59 acres in the regeneration harvest units and disturbed slash treatment areas.
- Forage seeding in the 59 acres of Blowout Thin regeneration harvest units and disturbed areas after slash treatment has occurred for the purpose of increasing big game forage value.

Stand Growth, Health, and Vigor

Regulatory Framework

The Willamette National Forest Land and Resource Management Plan (Forest Plan) as amended by the Record of Decision and Standards and Guidelines for Management of Habitat for Late Successional Species and Old Growth Dependent Species Within the Range of the Northern Spotted Owl (NWFP 1994) provides direction based on Management Area allocations.

The units proposed for treatment are located within Management Areas (MA) 11A, and14A. Project activities have been designed to be consistent with the goals, objectives, direction, and desired future conditions contained for these Management Areas in the plan. Approximately four acres are located in MA 11A with the remainder of the proposed acres in MA 14A.

The goal for MA 11A is to create and maintain desired visual characteristics for a modest level of scenic quality. Even-aged timber harvest should not exceed 12% of the suitable and available land within this management area. Maximum unit size is 30 acres.

Management area 14A is programmed for timber harvest with the primary goal to produce an optimum and sustainable yield of timber based on the growth potential of the land.

Analysis Methods

Units selected for treatment within the project area were primarily selected from stands identified for treatment in the Blowout Environmental Assessment (1995). These stands were not subsequently treated because of low economic viability associated with low stand volumes, low product value and high logging costs. An additional 10+ years of growth since the original proposal has increased the economic viability of most stands. In addition to these original stands, adjacent plantations that appeared in need of thinning were also evaluated for inclusion in the project. Existing silvicultural prescriptions within the project area were reviewed for information on past reconnaissance and findings. Completed silvicultural exam data was also reviewed. A transect of all stands was made and data collected regarding tree species, diameters, trees per acre, insects, diseases, and other damaging agents, as well as the composition of non-tree vegetation, and a determination of plant association was made. Plant association classification is used to evaluate the environmental conditions likely to be found on a given site and to help predict the outcome of proposed vegetation management. Notes on the economic viability of timber management, past management or disturbance history, soils, suitability for reforestation, and microclimate or other environmental factors may be recorded.

Based on gathered field data, district GIS data and mapping, Forest Plan direction, Regional guidelines, various silvicultural management guides or models, discussions with IDT members, and direction from the District Ranger, silvicultural prescriptions were prepared for each stand examined. These prescriptions describe existing vegetation and site characteristics, stand history, recommendations for treatment, including harvest prescriptions, post harvest treatments, and projections for future treatment.

Another source of information comes from approximately 1,300 acres of completed commercial thinning units that exist within or adjacent to the project area. Many of these units have had post-thinning stand examinations which are useful in validating such factors predicted versus actual densities, growth rates, crown closure, or understory vegetation response.

The age, size, density, and condition of stands are factors used to determine the need for thinning and the density desired following treatment. Stand parameters are compared with appropriate growth models for similar stands to determine the level of thinning needed. The primary method used to determine desired density levels was Relative Density Index (Drew and Flewelling, 1979). Relative density is a proportion of maximum possible density for a particular species and is expressed as 1.0. For Douglas-fir a relative density of .55 and above has been determined to be the point where imminent competition mortality is likely to occur (Drew and Flewelling, 1979). Recommended optimum density for managing Douglas-fir to maximize gross production is within the range of .4 to .55 relative density (Drew and Flewelling, 1979). Densities lower than .4 may be selected as a goal when greater diameter growth is desired for increased product value or to meet other resource objectives. Several stands proposed for treatment had lower average relative densities, 3.5 to 4.0, due the highly variable and clumped nature of the stands. Significant portions of these stands exceed recommended densities and will benefit from thinning. The cost of harvest reentries also is a factor in determining the density selected and the frequency of treatments. Managed yield scenarios for Douglas-fir modeled for the current Willamette National Forest Plan generally results in a post-thinning relative density ranging from .3 to .35.

Regeneration treatments were prescribed based on the age, density, and condition of the individual stands. The percent of live crowns in these stands was considered a predictor of future growth potential and of windthrow hazard. Existing snow breakage and suppression mortality was another existing condition considered in prescribing this treatment. Current stand examination data was used along with projections of future growth to determine that these stands had culminated mean annual increment.

Another stand condition encountered within the project area is Phellinus rot. This disease occurs in small pockets, generally ¼ to one acre in size, although larger areas may rarely occur. The extent of diseased pockets is determined through identifying the pathogen in infected roots of windthrown trees. It is assumed that tree species susceptible to this disease that are within fifty feet of an infected stump are also infected since the primary means of disease spread is through root grafting. Because infection pockets are generally small, some sites are not located during initial field reconnaissance and may be found later during sale layout or logging operations.

Projections of future growth and yield to determine the effects of treatments were modeled using either the Forest Vegetation Simulator (FVS) or the Douglas-fir Simulator (DFSIM).

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect were included in the cumulative effects analysis.

Existing Condition - Stand Health, Growth and Vigor

Stands evaluated for silvicultural treatment are in two primary age class groupings, (1) managed plantations, 40 to 55 years old, and (2) fire regenerated stands approximately 100 years old. These stands are shown in the table below. See also Photos 1-3 for a visual comparison of managed and fire regenerated stands. The Blowout Watershed Analysis, 2000, identified approximately 4200 acres of managed stands greater than 40 years old and about 6000 acres of fire regenerated stands approximately 100 years old. These stands are primarily in a tree size class that ranges from 9 to 21 inches in diameter.

The following table displays characteristics for stands proposed for treatment in this project:

Table SH-1. – Stand Characteristics

Unit#	Stand#	Acres	Stand Origin	Stand Age	Trees per acre	Basal Area (sq ft/acre)	Avg. Tree Diameter of trees > 7”	Relative Density
1	15584	7	FIRE	87	440	280	12	0.93
2	15543	75	MANAGED	53	201	231	14.5	0.48
3	8453	20	MANAGED	52	222	214	13.2	0.45
104	9228	11	MANAGED	47	337	256	11.6	0.63
4	9228	10	MANAGED	47	337	256	11.6	0.63
5	9228	123	MANAGED	47	254	238	12.6	0.54
106	9228	5	MANAGED	47	274	200	11.4	0.48
6	9228	14	MANAGED	47	274	200	11.4	0.48
7	10228	28	MANAGED	50	164	190	14.5	0.38
8	10655	66	MANAGED	49	174	200	14.5	0.43
9	10968	46	MANAGED	50	220	202	12.8	0.46
101	10985	6	FIRE	107	312	253	12	0.73
10	10985	17	FIRE	107	312	253	12	0.73
11	7007	36	MANAGED	54	258	233	12.6	0.52
121	8612	5	FIRE	105	294	234	11.8	0.67
12	8612	16	FIRE	105	294	234	11.8	0.67
13	8894	6	FIRE	95	317	256	11.8	0.67
14	9048	6	FIRE	107	550	255	12	1.00
161	8630	1	FIRE	92	415	253	10.4	0.67
16	8630	20	FIRE	92	376	277	11.5	0.79
17	8243	104	MANAGED	50	235	206	12.5	0.43
18*	8621	40	MANAGED	54	176	175	13.4	0.35
191	9518	12	FIRE	104	329	255	11.8	0.69
19*	9518	109	FIRE	102	329	255	11.8	0.69
20	9746	22	MANAGED	42	265	238	12.7	0.48
21	10504	28	MANAGED	41	250	197	11.9	0.45
23	15543	5	MANAGED	43	289	200	11.2	0.51
24*	8684,8665,8527	134	MANAGED	55	182	200	14	0.38
26	9746	13	MANAGED	45	229	204	12.7	0.42
		985						

*Units with an asterisk by the unit number are thinning units with known root rot pockets of less than one acre.

A comparison of the managed plantations and the fire regenerated stands in the table below points out significant differences in stand characteristics. The fire regenerated stands have not been previously entered and are characterized by very high relative densities, with one stand reaching the theoretical maximum density possible. Basal area per acre is greater in the fire regenerated stands due to the higher number of trees per acre, but tree diameters are smaller than the younger managed stands. The live crown ratios in the fire regenerated stands are low, generally less than 30%, and the incidence of suppression related mortality is much higher than in the managed stands. Due to favorable soils and precipitation, it is characteristic of stands in the lower Blowout watershed to regenerate at high stocking levels and with a substantial component of western redcedar and western hemlock in addition to the Douglas-fir. These species are shade tolerate and once established can survive at high densities for many years. Due to these prolonged, high-density conditions some of these stands are experiencing high suppression mortality. Stand exams were conducted in 1993 and in again in 2004 on most of the stands proposed for treatment. On average, the fire regenerated stands lost about 5% of their basal area in the 11 yrs between exams, while the managed stands increased approximately 25%. See photo 2.

Table SH-2. Stand Characteristics by Stand Origin

	Stand Origin	
	Fire Regenerated	**Managed**
Relative Density	0.76	0.47
Acres	205	780
Trees/Acre	361	241
Basal Area/Acre	255	213
DBH	11.7	12.7
Age	100	49

It appears, from field exams, that all of the managed stands were originally planted with Douglas-fir only which was common for the time period in which they were harvested. Subsequently, significant numbers of other tree species have naturally regenerated within the units. Western hemlock and redcedar are the most common species following Douglas-fir with lesser amounts of western white pine, and Pacific silver fir in some units. Most of these stands were precommercially thinned, and some have been pruned and fertilized. See photo 1.

Both the fire regenerated and managed stands are classified as being in the Stem Exclusion structural stage. They are characterized by having closed canopies, low light levels, and generally sparse understory vegetation. The proposed units are located in both western hemlock and Pacific silver fir plant associations. Ground vegetation species do not vary greatly throughout the project area and is predominated by salal, Oregon grape, with lesser amounts of vine maple, Alaska huckleberry, and Pacific rhododendron. Large down wood and snags are not abundant in any stands. In some of the fire regenerated stands there are very scattered, large old growth remnants. These stands also may include many small diameter snags that have resulted from suppression mortality. Recent snow damage has created varying amounts of snags and downed wood in both fire regenerated and managed stands.

Forest health conditions are variable throughout the stands. In fire regenerated stands the greatest mortality factor is from suppression due to high densities. Dwarf mistletoe in western hemlock is prevalent in some stands, especially in the fire regenerated stands with a large hemlock component. It is primarily responsible for reduced growth and occasional mortality. Phellinus root rot has been found in units 18, 19, and 24. Known infected areas are generally one acre in size or less. Additional areas could be discovered during sale layout or contract administration. Treatment to limit the spread of this disease is normally achieved by removing susceptible species, primarily Douglas-fir and hemlock, and replanting with less susceptible species such as redcedar, white pine, or red alder.

Most of the units proposed for treatment in Blowout Thin were previously marked with blue paint as part of previous timber sales that were a product of the 1994 Blowout Environmental Assessment. After field review (which included collection of new updated stand data) it is apparent that this marking was not properly monitored and did not meet the intent of the silvicultural prescriptions written for the 1994 Environmental Assessment. This marking is also unacceptable in meeting silvicultural treatments prescribed in the current Blowout Thin Environmental Analysis. Trees prescribed for removal in this proposal must either be identified using the designation-by-description method, or stands will require remarking with another color of paint.

Photo 1. Managed Stand. Unthinned Managed plantation (45 years old) – proposed for commercial thinning

Photo 2. Unit 10 – Fire regenerated stand approximately 107 years old, proposed for commercial thinning.

Photo 3. Unit101 – Fire regenerated stand approximately 107 years old, proposed for regeneration harvest.

Environmental Consequences – Stand Health, Growth, and Vigor

Direct and Indirect Effects

Alternative 1 – No Action

The primary forest health issue occurring on this project is the high tree density found in all stands. The No-Action alternative would perpetuate this condition. Trees in these stands would continue to exhibit low or declining diameter growth and a reduction in live crown ratios. Projected average diameter growth over the next 50 years in stands proposed for thinning in Alternatives 2, 3, 4 and 5, as determined from data in Table SH-3, would be about 0.86 inches per decade in fire regenerated stands and about 1.04 inches per decade in previously managed stands. Projected average diameter growth over the next 50 years in stands proposed for regeneration harvest in alternatives 2, 3, and 5, as determined from data in Table SH-4, would be about 0.96 inches per decade. See Table SH-5.

Suppression related mortality would increase without treatment. Due to the height-to-diameter ratio of many trees in these stands, susceptibility from snow breakage can be expected to continue. Identified root rot pockets would remain untreated. The older, fire regenerated stands with high suppression mortality and fuel loading would remain vulnerable to wildfire. Low light levels in unthinned stands would suppress development of shade tolerant trees and limit understory vegetation. The diameter and product value of trees harvested in the future would be reduced without treatment.

Alternatives 2, 3, 4, and 5

All action alternatives include the same units prescribed for commercial thinning. While the amount of road construction and logging system may vary by unit for each alternative, these differences would not effect the implementation of silvicultural treatments. An exception to this would be if a particular alternative proves to be uneconomical and resulted in some areas not being treated.

Alternative 4 does not include any regeneration treatments and would have the same effects on the units designated for that treatment as described in the No-Action Alternative and further described below under regeneration harvests.

Thinning treatments would increase growing space for trees which would respond with increased diameter growth and maintain or increase live crowns. Projected average diameter growth over the next 50 years in stands proposed for thinning in Alternatives 2, 3, 4, and 5, as determined from data in Table SH-3, would be about 1.46 inches per decade in fire regenerated stands and about 1.62 inches per decade in previously managed stands. Projected average diameter growth over the next 50 years in stands proposed for regeneration harvest in Alternatives 2, 3 and 5, as determined from data in Table SH-4, would be about 2.88 inches per decade. For alternative 4, projected average diameter growth over the next 50 years in stands proposed for regeneration harvest in the other action alternatives, as determined from data in Table SH-4, would be about 0.96 inches per decade, same as for Alternative 1. See Table SH-5.

Suppression related mortality and snow breakage would be reduced. Development of a second canopy layer would be accelerated following thinning and understory vegetation should increase due to more sunlight reaching the forest floor. A small percentage of trees may be damaged during logging. Following thinning, some trees may blow down as a result of increased exposure to the wind.

Phellinus root rot pockets identified within thinning units 18, 19, and 24 (each less than one acre) would be regenerated to reduce the infection spread to other areas of stands affected. If other root rot pockets of one acre size or less are identified during project layout, they would also be regenerated. Non-susceptible or resistant tree species such as redcedar or white pine or hardwoods, would be left. Root rot pockets would be replanted with non susceptible species. Mortality from root rot should decline within the area currently infected.

Both young, managed stands and older, fire regenerated stands would be thinned in these alternatives. The effects of thinning and no-thinning treatments were projected for a 50-year period using the Forest Vegetation Simulator (FVS). A representative stand from both managed and fire regenerated stands was modeled to compare the effects of treatments and are shown in the table below. Both stand groupings, managed and fire regenerated, had very similar ages within the group, so stands closest to the mid-range of diameter at breast height (dbh) were selected as representative stands.

Table SH-3. FVS Modeling Results for Representative Managed and Fire Stands

Stand #	Current Stand Age	Stand Origin	Treatment	Year	DBH	Trees per Acre	Basal Area per Acre
Fire Regenerated Stand – No Treatment Options							
9518	100	Fire	Existing Condition	2005	11.9	333	257
			No Treatment	2025	13.0	311	295
			No Treatment	2045	15.5	288	378

Stand #	Current Stand Age	Stand Origin	Treatment	Year	DBH	Trees per Acre	Basal Area per Acre
			Regenerate	2055	16.2	278	399
Fire Regenerated Stand – One Thinning							
9518	100	Fire	Existing Condition	2005	11.9	333	257
			Comm Thin	2005	15.2	111	140
			No Treatment	2025	18.8	107	205
			No Treatment	2045	21.4	102	255
			Regenerate	2055	22.5	100	277
Managed Stands – No Treatment Option							
9746	42	Managed	Existing Condition	2005	12.9	222	200
			No Treatment	2025	15.3	211	271
			No Treatment	2045	17.3	200	325
			Regenerate	2055	18.1	194	347
Managed Stand – Two Thinnings							
9746	42	Managed	Existing Condition	2005	12.9	222	200
			Comm Thin	2005	14.8	118	140
			No Treatment	2025	17.9	114	199
			Comm Thin	2025	18.9	82	160
			No Treatment	2045	21.7	81	182
			Regenerate	2055	22.9	78	224

The effects of thinning versus no treatment in both of these stands resulted in larger average stand diameters at the end of the 50-year simulation period. Thinning entries would result in timber receipts generated sooner within the rotation. Logging costs would be reduced when the stands are regenerated due to the timber volume being concentrated on fewer and larger diameter trees. Results of these simulations are consistent with the general trends found in the Managed Yield Tables developed for the Willamette National Forest Plan, 1990.

Regeneration harvests are proposed in 9 units for a total of 59 acres in Alternatives 2, 3, and 5. These stands exhibit very high tree per acre densities, small diameters, and high suppression mortality. Current diameter growth is poor and low live crown ratios (<33%) would prevent most trees from responding to increased tree spacing (Smith 1962; Oliver and Larsen 1996; Emmingham and Elwood 2002; Homberg, Aulds and Jaross 2006). Due to poor height-to-diameter ratios (H/D) in these stands, the opening up of these stands in a thinning would greatly increase their susceptibility to windthrow. H/D ratios for regeneration units ranged from 95 to 127. H/D ratios exceeding 90 to 100 indicate an unstable condition when considering thinning (Emmingham 2000; Oliver and Larsen 1996; Wonn 2001; Homberg, Aulds and Jaross 2006). Regeneration of these stands would allow existing fuels to be effectively reduced and remove potential mortality that is expected to occur. Green tree retention areas and individual trees to be left would include the largest diameter trees available on these sites. Sites would be replanted with a mixture of species found in the area. Creation of these openings would provide a favorable site for re-establishment of both sugar pine and western white pine. These treatments would provide opportunities for other early seral vegetation species to develop that do not thrive under either closed canopy or partially shaded conditions.

These stands have culminated mean annual increment. A sample of stand data for stands proposed for regeneration was projected for a 50-year period to compare the effects of treatment and no treatment.

Table SH-4. FVS Modeling Results for Proposed Regeneration Harvest (50 Years)

Stand #	Current Stand Age	Stand Origin	Treatment	Year	DBH	Trees per Acre	Basal Area per Acre	Mean Annual Increment
No Treatment								
15584, 8894, 9048	96	Fire	No Treatment	2005	12.0	436	342	130
				2015	13.0	371	343	116
				2025	14.0	324	346	110
				2035	15.0	288	352	105
				2045	15.9	260	358	100
				2055	16.8	237	364	96
Regenerate in 2005 and Apply Silvicultural Treatments								
15584, 8894, 9048	96	Fire	Regen-eration Harvest	2005	12	436	342	
			Plant	2006		550		
			Precom Thin	2018	1	300		
			Comm Thin	2050	12.5	234	200	139
			Post Thin	2050	13.1	146	140	
			No Treatment	2055	14.4	145	165	150

Table SH-5 Projected Average DBH Growth per Decade - Next 50 years

	Unit of Measure	Alt.1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Thinning of Fire Stands	in./decade	0.86	1.46	1.46	1.46	1.46
Thinning of Managed Stands	in./decade	1.04	1.62	1.62	1.62	1.62
Regeneration of Fire Stands	in./decade	0.96	2.88	2.88	0.96	2.88

Cumulative Effects

Alternative 1 – No Action

There are no cumulative effects associated with the No Action Alternative.

Alternatives 2, 3, 4, and 5

Cumulative effects related to stand health, growth and vigor and to past timber management activities are primarily limited to the specific sites being proposed for treatment. Silvicultural treatments in one stand generally have a limited effect on adjacent areas and are associated with the influence of “edge effects” relating to changes in light/shade conditions, root competition, seed dispersal, and wind patterns.

Insects and diseases affecting forest stands are capable of moving long distances and can be positively or negatively affected by timber management activities. No known outbreaks of insects or diseases related to these activities have been documented within the watershed and future outbreaks are not anticipated.

Past Effects - In the fire regenerated stands identified for treatment, with the exception of limited roadside salvage in some units, there has been no past management. During field reconnaissance for this project, there were no apparent effects on stand health or growth from adjacent timber management activities.

Within managed stands proposed for treatment under this project, past management has included timber harvest, site preparation, tree planting, precommercial thinning, pruning, and fertilization. The extent of these treatments varies by individual unit. The effect of these treatments has resulted in the current stand characteristics such as species composition, tree density, and growth. As with the fire regenerated stands, there were no apparent effects on stand health or growth from adjacent past timber management activities.

Present and Future Effects - The proposed thinning treatments are prescribed in order to promote improved stand health, growth and vigor. Commercial thinning has been implemented in similar stands on the Detroit Ranger District and post harvest analysis has verified this outcome.

In addition to timber harvest treatments, additional silvicultural activities, including fertilization, pruning, and precommercial thinning of nearby plantations, may be implemented within five years following harvest operations. Fertilization of the proposed harvest units may also be prescribed.

Alternatives 2, 3, and 5

Regeneration harvests are proposed in order to improve the productivity of sites now occupied by high density, poorly growing stands or to treat root rot infested sites. Replanting of these sites would improve long-term productivity for timber growth and reduce losses from root rot. These areas would be replanted, following site preparation, with native, local tree species and based on the results planting on similar sites, and no difficulties in tree survival and growth are anticipated.

Based on the results past similar, timber harvest treatments and other silvicultural treatments, no negative effects to the health of other stands within the Blowout Watershed is expected from the proposed or future treatments.

Conclusions and Rational For Conclusions

Alternative 1, no action, does not meet the purpose and need for silvicultural treatments.

Alternatives 2, 3, 4, and 5 all thin the same units. The differences in these units are related to logging systems and road construction and not to silvicultural treatments. Treatment objectives could be fully met under any of these alternatives although the harvest costs would vary by alternative and the availability of timber receipts to fund post sale silvicultural treatments could be affected.

Alternative 4 does not include regeneration harvests and, as previously described, the stands affected would continue to exhibit poor growth, high mortality, and prolonged susceptibility to fire.

The silvicultural treatments prescribed for the stands evaluated under this proposal have a high probability of success in improving the health vigor and growth of the areas described. The stands that were examined during project development are within the range of typical environmental, age classes and stand conditions normally encountered at mid-elevations (2500-3500 feet) in the northern Oregon Cascades. All stands were field classified as to plant association type and are located on soils determined to be suitable for successful reforestation.

The two harvest treatments prescribed, commercial thinning and regeneration harvest have both been implemented within the Blowout watershed, some in close proximity to the proposed units. All previously regenerated stands within the watershed have been reforested and meet Forest standards for minimum stocking. The managed stands proposed for treatment are themselves a product of past clearcutting, planting and other silvicultural treatments. The following table compares the average current stand conditions for managed stands in this proposal versus the projected stand conditions modeled in the Willamette National Forest Plan, Managed Yield Tables:

Table SH-6. Stand Conditions in Blowout Thin and Projected in Forest Plan

Stand Parameter	WNF Plan Managed Yield Table Projection	Blowout Thin Managed Stand Conditions (2004 Data)
Relative Density	0.51	0.47
Trees per Acre	250	241
Basal Area	210	213
DBH	12.4	12.7
Age	47	49

This comparison indicates that the assumptions and methodology used to model future stand growth and yield are good predictors of growth and stand conditions for the stands prescribed in Blowout Thin.

An issue was identified by Oregon Natural Resources Council (ONRC) in the scoping stage that the standard type of thinning used by the Forest Service may not result in stands developing into more complex and resilient forests. The suggestion was that variable density thinning would have better results. However, it should be recognized that many commercial thinning prescriptions for Matrix land allocations inherently result in stands with increased intra-stand variability. For example, intra-stand variability would exist in the stands after the proposed thinning occurs because most stands would have unthinned portions in the Riparian Reserves and unthinned portions where logging is not feasible. Underplanting of western redcedar in skyline corridors within Riparian Reserves would help create structural diversity as well as species diversity. There would also be variability simply because the procedures that are used for designating trees for removal allows for a certain amount of variance in spacing. Landings would provide small openings. Wider spacing would occur in skyline corridors. Mitigation buffers for special habitats and Survey & Manage sites, treatment of root disease areas, measures to protect hardwoods and minor conifer species, and post harvest planting of minor species in created openings are also examples of Matrix thinning prescription components that increase intra stand variability.

Intra-stand diversity would occur because there would be unthinnned stands mixed with thinned stands across the landscape. The different age classes that exist across the landscape as a result of past clearcut harvesting also contribute to between-stand diversity.

Unit specific Integrated Prescriptions (also known as the Implementation Plan) and unit specific Silvicultural Prescriptions are included in the Blowout Thin Project File.

Water Quality

Introduction

This section analyzes the proposed action and alternatives for their effects on water resources and their consistency with Forest Plan Objectives and Standards and Guidelines for water resources.

Regulatory Framework

The following direction and regulations were considered during the hydrological analysis of this project. A more thorough discussion of the regulatory framework, is contained in the Hydrology Specialist Report (Halemeier, 2006) in the analysis file.

1990 Willamette National Forest Land and Resource Management Plan (LRMP):

- Memorandum of Understanding, Oregon Department of Environmental Quality adopting "General Water Quality Best Management Practices" in November 1988.
- The 1993 the Forest Ecosystem Management Assessment Team Report (FEMAT) for the Pacific Northwest and Northern California identified the Aquatic Conservation Strategy (ACS) "aimed at maintaining and restoring the ecological health of aquatic ecosystems."
- The 1994 the Northwest Forest Plan (NWFP) included the Aquatic Conservation Strategy (ACS) as an integral component.
- In 2003, a Final Supplemental Environmental Impact Statement was released entitled: "Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan National Forest and Bureau of Land Management Districts Within the Range of the Northern Spotted Owl Proposal to Amend Wording about the Aquatic Conservation Strategy." Within this supplement clarification language was provided to consider actions effects upon the aquatic system.
- Federal Water Pollution Control Act Amendments of 1972 (Pl 92-500). This act revises and reenacts previous Federal Water Pollution Control Acts of 1970, 1965, 1956, and 1948 to restore and maintain the chemical, physical, and biological integrity of the nation's waters by eliminating pollutant discharges into the waters of the United States and providing surface waters suitable for uses. Section 208 of this law deals with non-point pollution, in which forestry type activities are included.
- Water Quality Restoration Plan. Under the 1972, 1977, and 1986 Clean Water Act, waters of the State are to be protected.
- In April of 2001, a Water Quality Management Plan for the Water Quality Limited Streams in the North Santiam Watershed, specifically Blowout Creek and its tributaries, was prepared (USDA Forest Service, 2001). In 2002, the plan was approved by Oregon Department of Environmental Quality (DEQ).

Analysis Methods

The main method of analysis utilized involved field review of the units proposed and surrounding area and streams. Stream conditions were evaluated under the Blowout Watershed Analysis (WA) and reviewed to determine if changes occurred since the drafting of the WA. Conditions appeared to be responding typically for Cascade environments and no discoveries were made to modify the WA determination. Analysis was also done utilizing the Sufficiency Analysis protocol (USDA, USDI, 2005). Aggregate recovery protocol and standard observations of past activities within the watershed to determine response to disturbance were utilized to determine hydrology, stream channel, and water quality responses. A monitoring network of thermographs has been in place since the early 1990s to monitor stream temperature of the watershed and a USGS real-time gauge is present directly downstream of the proposed project. This information was utilized to help determine existing condition and trends within the watershed.

Field review of the proposed harvest sites occurred during 2003, 2004, and 2005 field seasons. All proposed units were visited and evaluated for their hydrologic, stream channel, water quality, and riparian conditions. Recommendations, observations, determinations of risk, and management prescriptions are based on this field information.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on hydrologic characteristics, stream channels, or water quality were included in the cumulative effects analysis.

Temperature TMDL Implementation Strategies

In addition to requirements established in the Water Quality Management Plan, guidance established in the Northwest Forest Plan Temperature TMDL Implementation Strategies, September 9, 2005 was used in the establishment of primary shade zones and prescriptions developed to treat Riparian Reserves. The following steps were utilized in the evaluation.

1. Utilized silvicultural information to obtain tree density, (basal area), diameters, and heights. Utilized this information along with site visitation to establish existing canopy closure along all perennial streams.
2. Mapped out all perennial streams and establish their azimuth to be utilized in selecting correct shade nomograph.
3. Utilized appropriate shade nomograph to determine existing percent shade.
4. Establish response time and growth rates to determine effectiveness of thinning (personal communication with Dave Leach, District Silviculturist, 2005).
5. Utilized #4 to determine the percent of shade of the treated stand after a given time period. Average time for a canopy to close is between 5 and 10 years after thinning. A value of 10 years was used to determine the increased height. This height was then compared to an untreated height to determine the benefit of thinning in the riparian reserve. Results showed that effective shade could be produced in half the time if the area was thinned. (Growth rates were provided by Dave Leach, District Silviculturist, personal communication, 2005).

All prescriptions involving perennial streams endured this rigor to establish the benefits of thinning. Site visitation to validate the effectiveness of riparian thinning and evaluation of stream conditions was also considered in prescriptions. As a result, a complex range of full leave Riparian Reserves, were site specifically placed on all streams. It is therefore anticipated that the intent of the State and Federal government is being met in protecting water quality.

Utilization of the Sufficiency Analysis for Stream Temperature Process in Riparian Management

The following management measures were committed to under the Water Quality Management Plan for Blowout Creek. These measures were met in the design and prescriptions for all action alternatives discussed.

1. Where past management activities have resulted in reduced stream side shading vegetation, silvicultural and vegetative treatments should be designed and implemented to restore stream shade to natural potential levels.
2. For future management, the Willamette National Forest will continue to maintain Riparian Reserves of the dimensions listed in the ROD, 1994, on all streams in the watershed draining into the water quality limited segments of Blowout Creek until such time that 80 percent of the riparian reserve vegetation in each planning subdrainage, 7th field, is older than 60 years, or when 80 percent of the riparian reserve contains 70 percent canopy closure.
3. Under the Willamette National Forest Cumulative Watershed Effects assessment and Management Process, Forest Plan Appendix E 1990, areas will be evaluated for the potential of creating cumulative effects to the downstream beneficial users
4. In order to continually understand the current distribution of stream temperatures and the effects of management activities and natural processes, a comprehensive plan for collection of water temperature information should be created for the Upper and Lower Blowout Subwatersheds (6th fields).

Existing Condition – Hydrology

A description of the hydrology within the Blowout watershed can be found within the Physical Domain Chapter of the Blowout Watershed Analysis (Chapter II). The following discussion relates specifically to the planning area.

Dominant hydrologic characteristics for the Blowout are similar to other documented watersheds within the Western Cascades. Rainfall for the area averages 80-120 inches per year, with intensities reaching 9 inches in a 24 hour period. These intensities can be expected one percent of the time each year (National Weather Service 100 year, 24 hour rainfall intensity maps). Intense precipitation is episodic and often generates peak flows which are a major disturbance mechanism for stream channels and associated riparian areas.

The dominant hydrologic mechanism is rain, and rain on snow events. The entire Blowout watershed is within the rain on snow or transient snow zone. Surface precipitations drive the flow levels of tributary streams to Blowout Creek. Minor, less than 5 acres, sag ponds exist which meter some flows to tributary stream. These ponds are associated with large earthflows that are found within the Blowout Creek Watershed. Smaller wet areas associated with the broken earthflow topography punctuate the landscape and create vegetative diversity. Margins of the earthflows provide paths for water to work and create channel networks.

Minimum flows within the Blowout are regulated by water storage features which allow flow to persist during drought periods. Much of the summer flow comes from water stored in the broad alluvial floodplains along the main channel of Blowout Creek and the colluvial and glacial soils found throughout its tributaries. These valley areas provide opportunity for hyporheic interactions with the stream, which is the subsurface movement of water through depositional areas. Proposed units within the project area are adjacent to these types of features. Vegetation is the primary user of water with in the watershed with main use occurring between April and October. Diurnal fluctuations in stream flow are the result of vegetative transpiration rates associated with climatic conditions.

Environmental Consequences – Hydrology

Direct and Indirect Effects

Alternative 1 (No Action)

Implementation of Alternative 1, no action alternative, would create a consequence of stands that are not able to reach full growth potential within the near future (20 years). Existing conditions would change in that the current stands proposed for thinning would reduce growth and fuel loading would increase to above natural levels. Transpiration rates would decrease due to a reduction in growth rates of canopy and crown diameters. A potential for increases in summer flows could exist due to decline in the stands' ability to utilize available water. Higher likelihood of reduced tree health would occur and the ability of crowns to intercept and hold snow would decrease, resulting in greater risk for tree damage (breakage) through the accumulation of snow loads. Infiltration rates could be affected by the loss of canopy and the drip that occurs from snow interception. Warm rains would remove the snow and not allow for the water to infiltrate at the same rate that would occur within a healthy canopy. Reduced canopies are more exposed to latent heat transfer and rapid snow loss. This reduces the contact time the water stored in the snow has with the soil (Harr, 1981).

Stands that are not treated would have a higher risk of associated fire starts than the treated stands due to the amount of available fuel. This could result in detrimental soil damage from a hotter, more intense future fire, creating hydrophobic conditions in the soil and affecting the hydrology by not allowing infiltration to occur.

There would be no change in snow accumulation or solar radiation due to tree felling.

There would be no change in compaction levels or capture of runoff since there would be no ground skidding. There would be no effect on primary buffers from skyline yarding since there would be no yarding corridors placed in them.

There would be no reconstruction of system roads to improve the hydrology by maintaining the drainage network. There would be no chance of bringing ground water to the surface as a result of grubbing (digging of rootwads and vegetation). There would be no re-routing of historic drainage patterns as a result of temporary road construction.

There would be no subsoiling of old landings and previously compacted skid trails to reduce the cumulative effect from past ground based logging activity. Area of detrimental soil conditions would remain at present levels.

There would be no chance of compaction or re-routing of drainage patterns associated with grapple piling. There would be no effect from burning piles on water infiltration into the soil.

Common to Alternatives 2, 3, 4, and 5

Direct and indirect effects common to Alternative 2, 3, 4, and 5 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur:

Future Wildfires: Reducing the fuel loading through treatment reduces the risk of hotter, intense burns in the future, and subsequent creation of hydrophobic conditions.

Removal of Trees: Skyline yarding - Units or portions of units that would be skyline yarded would require corridors through primary buffers. These corridors are typically 10 to 15 feet wide. Hydrology is not anticipated to be affected due to the size and spatial orientation of these corridors. Helicopter yarding - This is the most protective way of removing trees from a site and it does not create an increased risk to hydrology.

Mitigation Subsoiling: A positive effect to hydrology would occur by increasing the permeability of compacted areas through mitigation subsoiling on selected heavily used landings, skid trails, and temporary roads (dirt spurs).

Slash Treatment: Hydrologic effects associated with piling are dependent on type. No effect occurs with hand piling while minor effects occur with machine piling. By having equipment on the site you increase the risk of intercepting ground water. Burning of hand piles would create small (15x15 foot) areas of soils that are at risk of hydrophobic conditions. This spatial distribution of these small sites does not create an impact to the hydrology of the area and is therefore not determined a risk. Machine piles tend to be larger (25 x 25 feet) and spaced at greater distance and are also not considered to pose a risk to the hydrology of the area. The greatest risk of these piles is in their placement associated with the natural flow patterns of the area. This risk could be reduced by avoiding placement of piles in natural flow areas.

Alternative 2

Implementation of Alternative 2 treats 985 acres and reconstructs about 26.16 miles of system roads. Reconstruction of the system roads would re-establish drainage and improve the condition of the road system while reducing the vegetation and interception associated with these roads. In addition, if connected to the natural drainage network, roads may lead to quicker delivery of runoff to stream networks. This could potentially lead to lower low flows (and higher peak flows) as a result of some water bypassing the normal routing (drainage) pathways (Pike and Scherer, 2003).

Road clearing associated with reconstructed roads reduces the canopy and allows for precipitation to fall directly to the surface. Minor effects would be attributed to the clearing associated with road reconstruction.

Landings associated with these reconstructed roads would add an additional 21 acres of openings. Stand treatment consist of 59 acres of regeneration cut, and 926 acres of thinning. Consequences to hydrology would be in the response to reduced competition for light, water, and nutrients, in the thinned stands, and increased snow accumulation on the regenerated acres, roads and landings. Short term (5-10 years) increases in discharge during the wet and the dry periods would occur from two mechanisms for the thinned stands. Increased snow accumulation (wet period) would create small increases in peak flows (Jones, and Grant; 2001), and reduced canopy (dry periods) would reduce transpiration rates which would account for small increases in summer flows. It is not anticipated that either of these changes would create detrimental effects, and they would probably not be measurable (Pike and Scherer, 2003). For the regeneration units a 35 year period would be expected to realize the changes in peak and low flows. This 35 year period is based on the time it would take to grow replacement trees to an 8 inch dbh and 70% canopy closure.

Capturing water and routing it down a different path could occur from the use of ground based yarding equipment, processor forwarder, tractor, or shovel. Units 3, 4, 5, 6, 9, 11, 12, 16, 17, 18, 19, 21, 26, and 104 all contain ground based systems (totaling 287 acres). The thinning of Riparian Reserves places the equipment within closer proximity to drainage networks and a greater risk of routing water out of its historic flow routes. To minimize the risk a buffer would be established along all streams and designated skid roads and crossing would be required. This has effectively worked in past thinning sales reduce the risk to an acceptable level.

Direct and indirect effects for Alternative 2 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Felling: Reduction of canopy is directly associated with the ability of the site to accumulate snow. Sparser canopy equals less interception. This short-term 3-5 year reduction would allow for additional snow to accumulate in the thinning stands. Total loss of canopy on the 59 acres of regeneration harvest would allow additional snow accumulation for 35 years. Increased solar radiation reaches the ground with a reduced canopy. Changes in microclimate and heat transfer would occur. This could change the duration snow stays on the site and the type of flora and fauna occupying the site and their water use.

Removal of Trees: Ground skidding - Capture of runoff (capturing water that would normally infiltrate and running it down skid roads and expanding the channel network) and compaction could occur within the 287 acres of ground based units. Capture, runoff, and compaction would not occur over the entire 287 acres, but rather on a portion of this acreage. Refer to the Soil Productivity and Slope Stability section of this EA for a more thorough discussion. Hydrology could be affected if rerouting of water occurs from the skidding pattern and method. Longer skids and increased number of turns per skid road are probable in the ground based units, since no temporary roads would be proposed in this alternative. There would be a moderate risk of capture due to intensity of turns on skid roads and riparian treatment.

Construction of Roads and Landings: Grubbing would be associated with the construction of landings. Approximately 15 of the 21 acres in landings would require some grubbing. There is a low risk of bringing ground water to the surface with digging. Since there would be no temporary road construction or reopening, there would be no additional risks associated with the capture and rerouting of water from its historic path.

Alternative 3

Implementation of Alternative 3 is similar to Alternative 2 in acres treated, with the addition of 10 acres for temporary road construction (4.1 miles) and 23 acres of landings and 3 acres of re-opened temporary road (1.2 miles) for a total of 36 acres. Reconstruction of about 29.75 miles of system road would improve the hydrology by maintaining the drainage network and the condition of the road system while reducing the vegetation and interception associated with these roads

This additional acreage, plus proposing unit 24 and more of unit 19 for ground based yarding, compared with the other action alternatives (for a total of 394 acres ground based), changes the hydrology by potential capture of surface water. This change occurs from utilization of ground based systems, increases in acreage of snow accumulation (95 acres total roads/landings/unit) and snow accumulation from reopening and constructing roads and landings. Additional risk occurs from intercepting shallow ground water due to the increased amount of road construction and rerouting flow away from its natural flow path.

Direct and indirect effects for Alternative 3 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Felling: Effects of canopy reduction on snow accumulation and solar radiation would be the same as Alternative 2, with the additional felling of trees to construct and re-open 5.3 miles of temporary roads. These roads would create an additional 13 acres of openings that could collect snow, affect hydrology, and expose the ground to solar radiation.

Removal of Trees: Ground skidding - Capture of runoff and compaction could occur within the 394 acres of ground based units. Capture, runoff, and compaction would not occur over the entire 394 acres, but rather on a portion of this acreage. Refer to the Soil Productivity and Slope Stability section of this EA for a more thorough discussion. Hydrology could be affected if rerouting of water occurs from the skidding pattern and method. Shorter skidding distance in the ground based units is anticipated due to the increase in access roads. There would be a moderate risk of capture due to the amount of acres and riparian treatment.

Construction of Roads and Landings: Grubbing would be associated with 23 acres of landing and 5.3 miles of proposed temporary roads. There would be a low risk of intercepting ground water associated with the landings, and a moderate to high risk of intercepting ground water flow associated with the temporary roads. Natural flow patterns through the landscape could be interrupted and flow levels increased on small drainages, accelerating natural erosion rates and increasing sediment downstream. By insuring that proper drainage on new temporary roads and reopening of temporary roads occurs, flow would be maintained spatially. There would be additional moderate risks associated with the capture and rerouting of water from its historic path on 5.3 miles of proposed temporary road (new temporary road construction and reopening of existing temporary roads). All temporary roads constructed or reopened would be closed upon sale completion . Sub-surface flow would be drained on the surface where intercepted.

Alternative 4

Implementation of Alternative 4 is different from the previous alternatives in that no regeneration cutting occurs. Approximately 17 acres of landings would be needed and road maintenance would be similar to Alternative 2. This reduces the consequence to hydrology by reducing the potential for snow accumulation on 59 acres of units and 4 acres of landings and reduces the ground base acres by 11 acres (compared to Alternative 2). Reconstruction of about 26.16 miles of system road would improve the hydrology by maintaining the drainage network and the condition of the road system while reducing the vegetation and interception associated with these roads.

Direct and indirect effects for Alternative 4 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Felling: Effects of canopy reduction on snow accumulation and solar radiation would be the same as Alternative 2, except that 59 acres would not be regenerated under this alternative. This would reduce the time frame the effects would be noticed to 5-10 years.

Removal of Trees: Ground skidding - Capture of runoff and compaction could occur within the 278 acres of ground based units. Capture, runoff, and compaction would not occur over the entire 278 acres, but rather on a portion of this acreage. Refer to the Soil Productivity and Slope Stability section of this EA for a more thorough discussion. Hydrology could be affected if rerouting of water occurs from the skidding pattern and method. There would be a low to moderate risk associated with riparian treatment.

Reconstruction of Roads: Reconstruction of about 26.16 miles of system road would improve the hydrology by maintaining drainage network

Construction of Roads and Landings: Similar to Alternative 2, but with a reduction of 10 acres of roads and 4 acres of landings. This is due to helicopter landings being established along existing roadways. There would be a low risk associated with intercepting ground water as a result of grubbing. Since there would be no temporary road construction or reopening, there would be no additional risks associated with the capture and rerouting of water from its historic path.

Alternative 5

Under this alternative the consequence are similar to Alternative 3, but without the 1.2 miles of re-opening of temporary roads requiring construction in hydrologically sensitive areas (those crossing streams or in close proximity to streams). Unit 24 and a portion of unit 19 would be converted from ground based systems to helicopter and skyline systems. Roads utilized within this alternative are mainly existing and ridge top roads with minimal effect on the hydrology. It is anticipated that this would result in a reduction of 6 acres of disturbed ground from not building road into these units and a reduction of 4 acres in landings associated with these roads for a total reduction of 10 acres of disturbed ground. For all other units the effects would be similar to Alternative 3. A positive, less risk effect is present under this alternative for hydrology from roads being placed away from stream channels to avoid the possibility of capturing and rerouting water. Reconstruction of about 29.75 miles of system road would improve the hydrology by maintaining the drainage network and the condition of the road system while reducing the vegetation and interception associated with these roads. Direct and indirect effects for this alternative fall between Alternatives 2 and 4. The main difference is the regeneration units in Alternative 2.

Duration of Effects

Under Alternatives 2 and 4, hydrology of the area would exhibit short term changes for 5-10 years. Under Alternatives 1, 3, and 5, hydrology of the area would exhibit longer term changes, 30 years for Alternative 3 and until stand replacement disturbance for Alternative 1. These changes of low flow and peak flow may not be measurable, due to the complexity of interactions that are described in literature as occurring. Table WQ-1 compares the alternatives.

Table WQ-1 Comparison of Alternatives

Alterna-tive Number	Harvest type (ac)		Proposed Temporary Roads (acres)		Land-ings (ac)	Proposed Yarding System (ac)			Ripar-ian Treat-ment (ac)	Ripar-ian Re-serve (ac)
	Re-gen	Thin	Con-struct	Reopen		Ground	Sky-line	Heli.		
1	0	0	0	0	0	0	0	0	0	0
2	59	926	0	0	21	287	322	376	195	297
3	59	926	10	3	23	394	570	21	195	297
4	0	926	0	0	17	278	295	353	195	297
5	59	926	4	0	19	287	549	149	195	297

Cumulative Effects: Hydrologic Characteristics

Traditionally, projects involving timber harvest on the Willamette National Forest are analyzed for their cumulative impact on the quantity and timing of peak flows and water yields, using an accounting methodology known as Aggregate Recovery Percentage or ARP. The ARP model compares the amount of an analysis area within the transient snow zone that is recovered against a threshold value (Midpoint) that was calibrated for the area during development of the Forest Plan. The Midpoint values were developed based on the soil, geology, vegetation, climate, and stream channel conditions of each sub-watershed, and are intended to represent a minimum safe level of vegetative recovery in the sub-watersheds to prevent significant alteration of peak flow regimes as a result of management activities. Recovery generally occurs when stand diameters average 8” dbh and crown closures exceed 70%. The transient snow zone is generally considered to include those areas of the forest between the elevations of 1,500 and 4,000 feet respectively (Note: the entire Blowout Thin area is considered to be transient snow zone).

As a result of current vegetative conditions, sub-watersheds found within the Blowout Thin Planning Area are well above desired levels of recovery. Table WQ-2 summarizes the current levels of recovery for the sub-watersheds affected by the project area, and the Forest Plan Midpoint ARP levels. These current levels are derived from data in the Forest's VEGIS database, which includes all past harvest activities. The table also includes estimates of past and ongoing harvest activities on private lands.

Table WQ-2: ARP values for Sub watersheds.

6th Field watershed Name	Existing ARP Level	Midpoint Threshold
Lower Blowout Creek	83%	70%
Upper Blowout Creek	82%	70%

Table WQ-3: Changes in ARP by alternative:

6th Field watershed Name	Alternative 1	Alternatives 2, 3, and 5	Alternative 4
Lower Blowout Creek	83%	82%	82%
Upper Blowout Creek	82%	78%	79%

Alternative 1 (No Action)

Future restorative actions identified in the Reasonably Foreseeable Future Actions section in Chapter 3 could create a cumulative effect. These actions include large wood placement; stream channel structural maintenance; floodplain restoration; new stream structures; riparian conifer and hardwood planting; erosion seeding; and hydrologically storing about 2 miles of roadbed by clearing or ramping over shallow cut slope failures, creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. All of these activities combined would move the hydrology towards historic conditions. Historic conditions are those conditions that allow natural processes to occur both temporally and spatially. However, all of these activities are less likely to occur without a timber sale to provide funding. Hydrology tied to these actions would be the potential use of water by vegetation utilized to restore sites identified. The hydrology of the area is not anticipated to show a detrimental cumulative effect resulting from the foreseeable future actions. The hydrology is expected to maintain and or improve its resiliency to mechanisms of change. No adverse cumulative impacts are anticipated to downstream beneficial uses due to the No Action Alternative.

Alternatives 2, 3, 4, and 5

The results of ARP analysis (Tables WQ-2 and WQ-3) shows that within the Lower Blowout Creek 6th field, a very small (1%) change would occur for Alternatives 2, 3, 4, and 5. Within the Upper Blowout Creek 6th field, a 4% change would occur for Alternatives 2, 3, and 5 and a 3% change would occur for Alternative 4. This does not answer the question of cumulative effects as much as it provides a tool to determine the relative swing of possible effects. With the threshold at 70 percent for both 6th fields it is anticipated that any incremental increase in hydrology would be masked by the natural variation found within these two watersheds. Cumulative effects being masked would be the result of riparian thinning and changes to canopy structure, reduction of canopy through regeneration harvesting, road construction, fuel treatment, and typical forest management practices associated to this proposal and the protection provided. It is not anticipated that the hydrology of the area would show detrimental cumulative effects as the result of the actions proposed.

A qualitative reduction in cumulative effects would occur under Alternative 5 in relation to Alternative 3. Fewer roads equates to less ground disturbance and less potential for intercepting water and changing slope hydrology. Quantitatively 10 acres are not being disturbed under this alternative compared to Alternative 3.

Reasonably foreseeable future restorative actions identified in the Reasonably Foreseeable Future Actions section in Chapter 3 could create a cumulative effect. These actions include large wood placement, stream channel structural maintenance, floodplain restoration, new stream structures, riparian conifer and hardwood planting, erosion seeding, and hydrologically storing about 2 miles of roadbed by clearing or ramping over shallow cut slope failures, creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. All of these activities combined would move the hydrology towards historic conditions. Historic conditions are those conditions that allow natural processes to occur both temporally and spatially. Hydrology tied to these actions would be the potential use of water by vegetation utilized to restore sites identified. The hydrology of the area is not anticipated to show a detrimental cumulative effect resulting from proposed and foreseeable future actions.

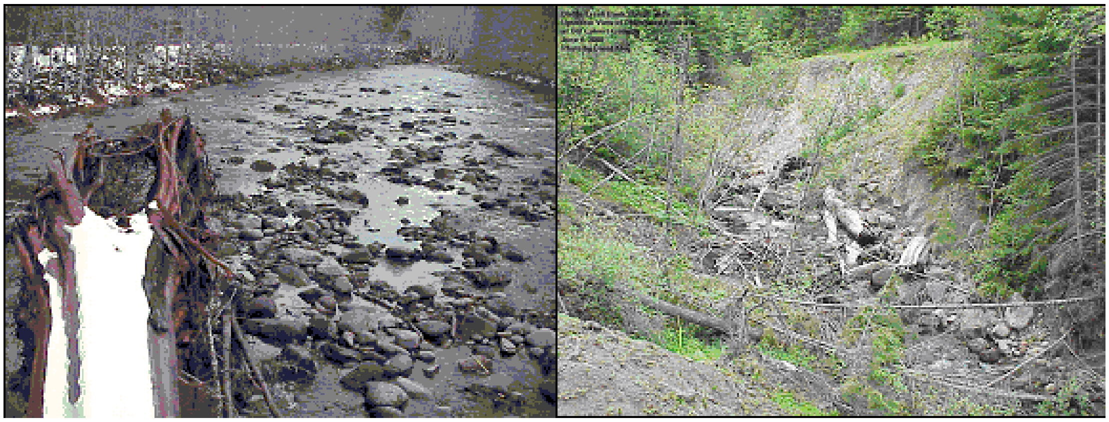
The hydrology is expected to maintain and or improve its resiliency to mechanisms of change. No adverse cumulative impacts are anticipated to downstream beneficial uses due to the type, design and timing of the action proposed in Alternatives 2-5.

Existing Condition - Stream Channels

A description of the stream channels within the Blowout watershed can be found within the Physical Domain Chapter of the Blowout Watershed Analysis (Chapter II). The following discussion relates specifically to the planning area.

Deeply incised dendritic streams are found within the project area as evidenced by first to third order stream channels. This pattern of dendritic streams is the result of high gradient channels draining colluvial, glacial, and volcanic formed slopes that have been altered by erosion. High gradient stream channels are associated with valley walls greater than 65 percent slope and contain channel bottom materials that are dominated by bedrock and boulders. These high-energy stream channels exhibit very little sinuosity. Rosgen Type Aa+, A, B, and G channels (Rosgen, 1996) are present within the proposed project area (see Photo 4).

Photo 4. Rosgen Type B and Type C Channel



Rosgen Type B channel (Blowout Creek) **Rosgen Type G Channel (Divide Creek)**

Headwater channels have low sediment storage capacity due to the lack of channel structure such as logs and boulders. Sediment storage capacity increases as streams transition into the valley regions yet is only associated to structure and meander bends. Streams within the proposed project could be typified as being transport streams. Portions of Blowout Creek do contain depositional reaches associated with wider valley segments and junctions of tributary streams.

Debris torrents have at times played an important role in the development of the first and second order stream channels in this planning area. Large earthflows dominate the erosional processes found within the watershed. Material from debris torrents and earthflows build terraces in third and fourth order stream channels, which are shaped and reshaped by peak flow events. Units 1, 5, 7, 8, 9, and 18 are adjacent to channels that are shaped by earthflow or torrent activities within the recent past (< 25 years).

Rosgen Type B channels characterize higher order channels such as Blowout Creek, Ivy Creek, Divide Creek, Hawkins Creek, Cliff Creek, K Creek, and Beard Creek. These Type B channels contain a high percentage of exposed bedrock and large boulders.

The historic morphological characteristics of stream valleys in Blowout project area are similar to existing conditions. The basic stream patterns and channel gradients are largely influenced by the underlying geology. The geology has not changed a great deal since the reference time frame, 100 years ago. The valley of Blowout has been artificially narrowed with rip-rap to protect and maintain road access into the area. This has reduced the storage capacity of the valley in these sections and maintained sediment transport through these reaches.

Environmental Consequences – Stream Channels

Direct and Indirect Effects

Alternative 1 – No Action

Implementation of Alternative 1, No Action, would maintain the stream channels in their current conditions. Changes to stream channels occur with the changes in hydrology, vegetation and physical changes. These elements change naturally and artificially through disturbance.

With no action it is anticipated that a low risk of artificial disturbance mechanisms, road crossings, and pipe installations would occur. Indirect effects could occur if riparian stands decline to a point of increasing the wood load into the stream and creating accelerated bank erosion.

Stands that are not treated have a higher risk of associated fire starts than the treated stands due to the amount of available fuel. This could result in detrimental channel damage from a hotter, intense burn. This, in turn, would reduce woody material within channels, resulting in an increase in stream energy, and allowing for accelerated bank erosion.

There would be no impact on stream banks from trees being felled onto the streambanks.

Stream channels would not be affected by capture of runoff and compaction since there would be no ground based yarding. There would be no skyline yarding through primary stream buffers.

There would be no removal of trees along road prisms that might contribute to stream bank stability.

There would be no positive benefit to stream channels from increased permeability of previously compacted sites.

Common to Alternatives 2, 3, 4, and 5

Thinning within Riparian Reserves would falls outside of the primary shade zone of perennial streams and would accelerate development of large trees adjacent to streams and provide potential for future large wood input to stream channels.

Direct and indirect effects common to Alternatives 2, 3, 4, and 5 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Future Wildfires: Reducing the fuel loading through treatment reduces the risk of hotter, intense burns and subsequent loss of woody material that assists in regulating stream energy.

Tree Felling: With the use of mitigation measures such as no-harvest stream buffers and directional felling, trees would rarely fall onto stream banks when felled. The risk for destabilization of streambanks from tree felling is low.

Tree Removal: Skyline yarding - Units or portions of units that would be skyline yarded would require corridors through primary buffers. These corridors are typically 10 to 15 feet wide. Stream channels are not anticipated to be affected due to full suspension being required with these corridors. Helicopter yarding – there would be no increased risk stream channels from helicopter yarding.

Mitigation Subsoiling: A positive effect to stream channels would occur as a result of increasing permeability of compacted areas and reducing the potential of channel routing.

Alternative 2

Implementation of Alternative 2 is designed to ground base log 287 acres. During this activity a moderate risk of capturing water and creating additional channels exists. Ground base also require crossings of existing channels to allow access to various locations in the unit. The direct effect of these crossings involves short term sediment input into the channel and disturbance to channel banks. Units with ground base in this alternative include units: 3, 4, 5, 6, 9, 11, 12, 16, 17, 18, 19, 21, 26, and 104. Each of these units has its own complexities and would for the most part be yarded away from stream courses/ channels. Units that pose the greatest risk associated to crossings under this alternative are 9, 16, 17, and 19.

Direct and indirect effects for Alternative 2 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Removal: Capture of runoff and compaction could occur on 287 acres of ground based yarding. Capture, runoff, and compaction would not occur over the entire 287 acres, but rather on a portion of this acreage. Stream channels could be affected if rerouting of water occurs from the skidding and extend drainage network. Longer skids and increased number of turns per skid road are probable in the ground based units since there would be no temporary road construction or reopening. This would increase the likelihood of having to cross a channel due to the length of skids. There would be a moderate risk of capture due to intensity of turns on skid roads and riparian treatment.

Road Reconstruction: Reconstruction of about 26.16 miles of system road would intersect numerous stream channels. Crossings would be designed to withstand 100 year flood events. The road template is currently in place. Effects to stream channels would be associated with fines being generated off the 26.16 miles of reconstructed road.

Construction of Roads and Landings: Grubbing would be associated with the construction of landings. Approximately 15 of the 21 acres in landings would require some grubbing. There would be no channel disturbance from pulling culverts since there would be no temporary roads to close.

Alternative 3

Implementation of Alternative 3 is similar to Alternative 2 in acres treated and road reconstruction, with the addition of 10 acres for temp road construction (4.1 miles) and 23 acres of landings and 3 acres of re-opened road (1.2 miles) for a total of 36 acres. This additional acreage plus proposing unit 24 and more of unit 19 for ground based yarding, compared with the other action alternatives (for a total of 394 acres ground based) affects stream channels by potential capture of surface water and expanding the channel network or intercepting flow and reducing the lag time of peak flows. This change occurs from utilization of ground based systems and the compaction, gouging, and contouring of slopes that typifies the system. Units that contain the greatest change are: units 19 and 24. Within these two units an additional 107 acres of ground based yarding would occur under this alternative, compared with Alternatives 2 and 5.

Direct and indirect effects for Alternative 3 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Removal: Ground based - Capture of runoff and compaction could occur on 394 acres. Capture, runoff, and compaction would not occur over the entire 394 acres, but rather on a portion of this acreage. Stream channels could be affected if rerouting of water occurs from the skidding pattern and method. Shorter skidding distance is anticipated due to the increase in access roads and it would be less likely to have to cross channels during skidding. There would be a moderate risk of capture due to amount of acres and ground based yarding of riparian thinning.

Road Reconstruction: Reconstruction of about 29.75 miles of system road would intersect numerous stream channels. Crossings would be designed to withstand 100 year flood events. The road template is currently in place. Effects to stream channels would be associated with fines being generated off the 29.75 miles of reconstructed road.

Construction of Roads and Landings: Grubbing would be associated with 23 acres of landing and 5.3 miles of temporary road construction and reopening. There would be a moderate risk of disturbance to channel banks associated with the road construction and creation of stream crossings. Short term instability would be created with the placement of culverts at crossing locations on the 1.2 miles of temporary road reopening. There would be additional risks associated with increasing the road net work by 5.3 miles. Risks are associated with the capture and rerouting of water from its historic path and the capturing of fines and moving them into the stream channel, which could reduce the cross sectional area of the stream channel and change the flow/channel bank interaction. 5.3 miles of temporary road would be closed upon sale completion. Pipes would be pulled and additional disturbance to channels would occur.

Alternative 4

Implementation of Alternative 4 is different from the previous alternatives in that no regeneration cutting occurs. This reduces the consequence to hydrology by reducing the potential for snow accumulation on 59 acres of units and 4 acres of landings and reduces the ground base acres by 9 acres (compared to Alternatives 2 and 5). The effect on stream channels is directly related to hydrology. Other factors influencing the stream channels is the reduction of ground based yarding practices. This reduces the risk associated with stream capture and rerouting.

Direct and indirect effects for Alternative 4 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Removal: Ground based yarding - Capture of runoff and compaction could occur on 278 acres. Capture, runoff, and compaction would not occur over the entire 278 acres, but rather on a portion of this acreage. Stream channels could be affected if rerouting of water occurs from the skidding pattern and method. There would be a low to moderate risk associated riparian treatment.

Road Reconstruction: Reconstruction of about 26.16 miles of system road would intersect numerous stream channels. Crossings would be designed to withstand 100 year flood events. The road template is currently in place. Effects to stream channels would be associated with fines being generated off the 26.16 miles of reconstructed road.

Construction of Roads and Landings: Grubbing would be associated with the construction of landings. Alternative 4 is similar to alternative 2 but with a reduction in grubbing of 10 acres. This is due to helicopter landings being established along existing roadways. There would be a low risk associated with grubbing of landings. There would be no effects to stream channels resulting from temporary road construction, reopening, or closing.

Alternative 5

Implementation of Alternative 5 would be similar to Alternatives 2 and 3 in treated acres with a reduction in area in roads and landings from Alternative 3 of approximately 10 acres. Converting 118 acres to helicopter yarding would reduce the potential impact of channeling flow and breaking down channel banks through ground skidding operations. Changing 107 acres of ground base yarding to other yarding systems would further reduce the risk of detrimentally affecting channel banks through ground based disturbances that were described in Alternative 3.

Road Reconstruction: Reconstruction of about 29.75 miles of system road would intersect numerous stream channels. Crossings would be designed to withstand 100 year flood events. The road template is currently in place. Effects to stream channels would be associated with fines being generated off the 29.75 miles of reconstructed road.

The direct and indirect effects would be similar to the other action alternatives. The mechanism of change that would show the greatest difference is removal of trees and construction of landings and roads. 10 acres would not be disturbed with roads or landings, compared with Alternative 3, reducing the risk of water capture and stream channel disturbance.

Cumulative Effects

Effects of a cumulative nature are those effects which independently do not pose a risk to water quality yet, when added together may have some measurable effect on water quality. Looking at the watershed condition types for streams found within the project area determine what management prescriptions should be followed. (Page E-10 to E-17; LRMP) "This criterion is intended to address the potential for changes in peak flows during rain-on-snow events, and the associate potential change in the stability of the stream banks and streambed." (LRMP, pg. E-6). Watershed condition types for the project include type 3, 5, and incidental reaches of type 7. With these watershed types it is recommended that ARP values be at or above the threshold. Under all action alternatives this criteria is met in Table WQ-3. Due to the growth potential of the site the watershed and stream channels are recovering at an exceptional rate. Over the last 17 years personal observations have noted clearcut areas grow into stands that are 20+ feet tall in about 15 years.

Reasonably foreseeable future restorative actions identified in the Reasonably Foreseeable Future Actions section in Chapter 3 could create a cumulative effect. These actions include large wood placement, stream channel structural maintenance, floodplain restoration, new stream structures, riparian conifer and hardwood planting, erosion seeding, and hydrologically storing about 2 miles of roadbed by clearing or ramping over shallow cut slope failures, creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. Stream channel responses to these actions are associated with those directly related to the channel. Structural maintenance and restoration within the channel directly affect the way water flows through the channel cross section. This effect is anticipated to create a positive effect for flow due to the design criteria utilized and the objectives for the project "to improve the channel conditions for flow and habitat." It is therefore anticipated that cumulative effects upon the stream channels would be well within the historic range and not create an adverse impact to downstream beneficial uses.

Cumulatively, the stream channel effects of the action alternatives are similar to the hydrology discussion. No adverse impacts are anticipated to downstream beneficial uses.

Existing Condition – Water Quality

Beneficial uses, dependent on aquatic resources, in this planning area are: domestic water use, resident fisheries use, aquatic non-fish species use, riparian dependent species use, water-related recreation, hydroelectric power generation, and water-related fire suppression and road maintenance needs. Historically, Blowout Creek provided anadromous habitat for winter steelhead and Spring Chinook prior to the construction Big Cliff and Detroit dams.

Water flowing off this project area flows into Blowout Creek and then joins water from the Breitenbush and North Santiam Rivers in the Detroit Reservoir. Water flows out of the reservoir as the North Santiam River, which serves as a domestic water supply for several downstream communities including Gates, Stayton, Turner, and Salem.

Blowout Creek is no longer listed as a 303d listed stream[1]. In April of 2001 a Water Quality Management Plan was created for Blowout Creek and its tributaries (USDA Forest Service, 2001). Department of Environmental Quality (DEQ) for the State of Oregon approved the plan in 2002 as a way of protecting the waters of the State. During the creation of the plan it was determined that the shade cover for surveyed reaches averaged 24 percent in the riparian areas. This low degree of shade perpetuates the high water temperatures within the basin.

Environmental Consequences – Water Quality

Direct and Indirect Effects

Effects to water quality could occur with increases in inputs as the result of the timber sale. These inputs could be as varied as petroleum products, sediment, or solar radiation. All of these could have an adverse effect of the quality of water within the project area.

Alternative 1 – No Action

Stands that are not treated have a higher risk of associated fire starts than the treated stand due to the amount of available fuel. This equates to detrimental water quality changes due to inputs of ash, increased solar radiation, and sediment from eroding channel banks.

There would be no increased sedimentation as a result of streambank instability caused by felled trees falling into the stream banks. There would be no reduction in water quality resulting from limbs and branches being bucked in or near streams.

There would be no risk of petroleum spills or sediment input to streams associated with ground based yarding. There would be no risk of dragging sediment and debris into streams

[1] The final delisting of Blowout Creek as a 303d listed stream is pending approval from the Environmental Protection Agency.

where skyline corridors would cross through stream buffers. There would be no risk of spills associated with helicopter service landings entering streams.

Without a timber sale in the area, money available for road maintenance does not cover adequate maintenance of the road systems. When road maintenance does not occur, there is an increased risk of sediment from road surfaces being washed when ditches fill.

There would be no grubbing associated with road or landing construction, so there would be no bare soil created that could contribute sediments into channels.

There would be a moderate risk associated with not maintaining drainage features.

There would be no positive effect to water quality from increasing permeability of compacted areas and reducing the potential of channel routing and sediment movement. There would be no risk for a potential for petroleum spill from subsoiling equipment.

There would be no risk of petroleum spills from machine slash piling equipment entering streams. There would be no risk of nutrients from burnt piles entering streams.

Common to Alternatives 2, 3, 4, and 5

Thinning within Riparian Reserves would fall outside of the primary shade zone of perennial streams and would accelerate development of large trees adjacent to streams and provide potential for future large wood input to stream channels.

Direct and indirect effects for Alternatives 2, 3, 4, and 5 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Future Wildfires: Reducing the fuel loading through treatment reduces the risk of hotter, intense burns and subsequent inputs of nutrient and radiation.

Tree Felling: With the use of mitigation measures, such as directional tree felling and no-harvest stream buffers, the potential for felled trees to fall on streambanks is low. Should this occur, however, it could destabilize the channel bank upon impact, which could result in minor, short term increases in sedimentation in streams. When trees are bucked and limbed, an increase in organic material in contact with the stream surface is possible. This increase can load a stream to a point where available oxygen is utilized and water quality is affected.

Tree Removal: Skyline yarding - Sediment and debris could be dragged into streams where skyline corridors cross stream buffers if suspension requirements are not met. Helicopter yarding/water quality risks are associated with service landing locations and potential spills.

Mitigation Subsoiling: A positive effect to water quality would occur as a result of increasing permeability of compacted areas and reducing the potential of channel routing and sediment movement. There would be a potential for petroleum spill from the subsoiling equipment.

Slash Treatment: There would be a potential for petroleum spills from the slash piling equipment. Burning of hand piles would create small (15x15 foot) areas of soils that are at risk of hydrophobic conditions. Nutrients from these piles could enter water ways. This spatial distribution of these small sites creates a low impact to water quality and is therefore not determined a risk. Machine piles tend to be larger (25 x 25 feet), and spaced at greater distance, so are also not considered to pose a risk.

Alternative 2

Direct and indirect effects for Alternative 2 are described below in terms of the mechanisms of change. The mechanism of change is the reason a particular direct or indirect effect would occur.

Tree Removal: Ground based yarding - 287 acres of skidding and risk associated to skidding would occur. Risks include spilling of petroleum products and inputs of sediment into channels. This alternative would involve longer skids in the ground based units, due to no proposed temporary roads, resulting in a higher risk in the ground based units that Alternative 2 has in common with Alternative 3.

Road Reconstruction: Reconstruction of about 26.16 miles of system road would intersect numerous stream channels and provide sources of fine sediment into the channels. Loss of current vegetative cover and loss of vegetation would increase the potential of sediment input. Minor effects would be attributed to loss of cover along the 26.16 miles of road reconstruction.

Construction of Roads and Landings: Grubbing would be associated with the construction of landings. Approximately 15 of the 21 acres in landings would require some grubbing. Creation of bare soil allows water to wash sediments into channels.

Alternative 3

Direct and indirect effects for Alternative 3 are described in terms of the mechanisms of change below:

Road Reconstruction: Reconstruction of about 29.75 miles of system road would intersect numerous stream channels and provide sources of fine sediment into the channels. Loss of current vegetative cover and loss of vegetation would increase the potential of sediment input. Minor effects would be attributed to loss of cover along the 29.75 miles of road reconstruction.

Construction of Roads and Landings: There would be additional risks associated with constructing and reopening 5.3 miles of temporary roads. There would be a moderate risk associated with the creation of bare soil and loss of fines off the road surface and creation of bare soil at six stream crossings in unit 24. Vegetation would be removed at stream crossings, potentially decreasing bank stability, increasing sedimentation, and increasing solar radiation. Grubbing would be associated with 23 acres of landings and 5.3 miles of temporary road construction and re-opening. There would be a moderate risk of water washing sediments into channels as a result of creation of bare soil through road construction and creation of stream crossings. After sale completion, temporary roads would be closed and the culverts on the1.2 miles of temporary road reopening in unit 24 would be pulled. Additional disturbance to channels would occur from pulling the culverts. A short term input of sediment would occur.

Alternative 4

Direct and indirect effects for Alternative 4 are described in terms of the mechanisms of change below:

Road Reconstruction: Reconstruction of about 26.16 miles of system road would intersect numerous stream channels and provide sources of fine sediment into the channels. Loss of current vegetative cover and loss of vegetation would increase the potential of sediment input. Minor effects would be attributed to loss of cover along the 26.16 miles of road reconstruction.

Construction of Roads and Landings: Effects would be similar to Alternative 2 with the reduction in grubbing occurring on 10 acres. This is due to helicopter landings being established along existing roadways. There would be a low risk of sediments entering streams as a result of this activity.

Alternative 5

Implementation of Alternative 5 would create similar effects to water quality as the other action alternatives. As in the hydrology and stream channel discussion, the main difference is the way in which the logs are removed from the site. Increased helicopter yarding and a reduction in road and landing acres generate a positive, less risk, option. Skid roads and corridors would not need to be created within the helicopter yarding portions, reducing the risk of contaminants or solar radiation affecting water quality.

Road Reconstruction: Reconstruction of about 29.75 miles of system road would intersect numerous stream channels and provide sources of fine sediment into the channels. Loss of current vegetative cover and loss of vegetation would increase the potential of sediment input. Minor effects would be attributed to loss of cover along the 29.75 miles of road reconstruction.

Direct and indirect effects from the mechanisms of change fall somewhere between Alternatives 2 and 4. Reduced roads and landings, 10 acres, is the greatest difference to water quality. This reduction in roads and landings reduces the risk to water quality by not having as many acres in a disturbed state.

Cumulative Effects - Water Quality

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on water quality were included in the cumulative effects analysis.

Alternative 1

Future restorative actions identified in the Reasonably Foreseeable Future Actions section in Chapter 3 could create a cumulative effect. These actions include large wood placement, stream channel structural maintenance, floodplain restoration, new stream structures, riparian conifer and hardwood planting, erosion seeding, and hydrologically storing about 2 miles of roadbed by clearing or ramping over shallow cut slope failures, creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. However, there would be a lower potential for implementing these projects without a timber sale to provide funding. Water Quality effects can best be described in the short-term and the long-term. In the short term, during the first flushing flow in the fall, additional sediment would be available as a result of wood placement, structural maintenance, and construction. This sediment would be fine grained and pulse through the channel. Background levels of sediment typically moving at this time of year would mask any risk this additional sediment poses. It is therefore anticipated no adverse cumulative effects to downstream beneficial users would occur as a result of these proposed and foreseeable future actions. Cumulatively, the water quality effects under this alternative are similar to the hydrology discussion. No adverse impacts are anticipated to downstream beneficial users.

Alternatives 2, 3, 4, and 5

Water quality cumulative affects would be similar to the hydrology and the stream channel discussions. The effects of all the activities that would occur under this proposal are tempered by the timing of the actions in relation to the recovery of the stands, the buffers required and the utilization of the Sufficiency Analysis and water quality management plan. It is not anticipated that adverse cumulative effects would occur as a result of implementing Alternative 2, 3, 4, or 5.

Future restorative actions identified in the Reasonably Foreseeable Future Actions section in Chapter 3 could create a cumulative effect. These actions include large wood placement, stream channel structural maintenance, floodplain restoration, new stream structures, riparian conifer and hardwood planting, erosion seeding, and hydrologically storing about 2 miles of roadbed by clearing or ramping over shallow cut slope failures, creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. Water Quality effects can best be described in the short-term and the long-term. In the short term, during the first flushing flow in the fall, additional sediment would be available as a result of wood placement, structural maintenance and construction, and road work. This sediment would be fine grained and pulse through the channel. Background levels of sediment typically moving at this time of year would mask any risk this additional sediment poses. It is therefore anticipated no adverse cumulative effects to downstream beneficial users would occur as a result of these proposed and foreseeable future actions.

Cumulatively, the water quality effects under this alternative are similar to the hydrology discussion. No adverse impacts are anticipated to downstream beneficial users.

Conclusion and Rationale

In looking at the direct and indirect effect for hydrology, stream channels, and water quality it is not anticipated that any of the effects would be detrimental or create significant downstream effects. Alternative 1 presents risk as the result of fire and the effects if and when a fire occurs. Due to fire management protocols fire starts within this area would be actively pursued and controlled as soon as possible. This reduces the risks associated with Alternative 1 to being low.

Alternative 2 treats 985 acres with various prescriptions and logging systems. The greatest risk associated with Alternative 2 is the increase in openings created from 59 acres of regeneration harvest and 20.5 acres in landings and the long skidding necessary to keep road construction minimized. Still the action falls well within the Forest Plan standards and guidelines. Best management practices utilized designed the units to minimize any adverse effects. Sufficiency Analysis protocol (USDA, USDI, 2005) was followed and determined that the management of riparian areas would reduce the recovery time of creating shade over the channels by 50 percent. If all BMP’s and standards and guidelines are met it has been shown through past actions that detrimental impacts to beneficial users would not occur. Under this alternative no additional roads are being constructed so the effect on hydrology, stream channels and water quality would be reduced relative to the areas disturbed.

Alternative 3 treats the same number of acres as Alternative 2. The main difference is the method by which the material is removed: 394 acres would be ground based and an additional 36 acres would be opened in roads and landings. 5.3 miles of constructed and reopened temporary roads would be utilized to allow access to areas to allow ground based systems. While being the most ground disturbing of all the alternatives proposed it is anticipated that a moderate risk is associated to the hydrology, stream channels and water quality. As Table WQ-4 shows, unit 24 poses the greatest additional risk due to the area being ground based yarded and unit 19 poses additional risk associated with 16 acres of ground based yarding. The risk associated to these two units relates to the broken ground that occurs within these two units. Both units are on old stabilized earthflows and their topography reflects this origin. Short steep slopes of 65% transition into benches that are operable with ground based equipment. Higher risks are associated with equipment accessing the steeper ground and disturbing headwall areas and building of temporary roads through this type of topography (see discussion in Direct/Indirect Effects).

Table WQ-4: Ground based acre differences by alternative.

Unit	Acres	Harvest Type	Volume/ac (MBF/ac)	Total Volume (MBF)	Ground-based yarding (acres)			
					Alt 2	Alt 3	Alt 4	Alt 5
17	104	Thinning	9	936	27	27	27	27
19	109	Thinning	13	1417	44	60	44	44
24	134	Thinning	10	1340	0	91	0	0
104	11	Regen.	30	330	9	9	0	9
Totals					80	187	71	80

Alternate 4 restricts the harvest to thinning units and does not allow for regeneration units. This alternative has the lowest risk to hydrology, stream channels, and water quality due to the area not needing to recover, approximately 35 years, to vegetation that is comparable to existing, and due to the least amount of acres being disturbed.

Alternative 5 is the same as Alternative 3 except for the differences in logging systems, temp roads, and helicopter. Road maintenance and reconstruction will be the same as in Alternative 3. The consequence are similar to Alternative 3 with the elimination of roads requiring sensitive construction (those crossing streams or in close proximity to streams) and reduce temporary road construction. For all other units the effects will be similar to Alternative 3. A positive, less risk, effect is present under this alternative for hydrology from roads being placed away from stream channels to avoid the possibility of capturing and rerouting water. Direct and indirect mechanisms of change for this alternative fall between Alternative 2 and Alternative 4, the main difference being the clear-cut regeneration units in Alternative 2. This difference prolongs the recovery time for those regeneration units while reductions in transportation systems reduces risk to water quality from direct sediment input and interruption of natural flow paths.

The critical element in the maintenance of hydrology, stream channels, water quality and Riparian Reserves in the planning area is the existing riparian areas. Provided these riparian areas are maintained in a healthy state, the stream systems would be anticipated to obtain their desired future condition. Future management activities are considered in the long term objectives for riparian areas of perennial and intermittent streams. Long-term riparian objectives are considered along with other resource goals and objectives agreed to by the interdisciplinary team. Stream-side management prescriptions are designed to maintain Aquatic Conservation Strategy Objectives (ACSO), as defined in Willamette's LRMP to meet these long term objectives.

Best Management Practices (BMP's) are utilized in the development of mitigation and compliance to ACSO's. These BMP's can be found in "General Water Quality Best Management Practices" Pacific Northwest Region, November, 1988 (USDA Forest Service 1988).

Utilizing BMP's for this project specifically address direction and guidance in the protection of water quality. Blowout Thin project mitigation measures for water quality are listed in Chapter 2 under Mitigation Measures.

Considerations of the Sufficiency Analysis and the ACSO were considered at this 6th field scale. The proposal was evaluated utilizing watershed analysis documents and recommendations set forth in those documents to determine compliance and intent. It is anticipated that the intent of the ACSO are being met at the 5th field (watershed) level making it compliant with the direction establish for the areas.

The alternatives proposed in the Blowout Thin project meet Federal and State water quality objectives. These objectives are met through the implementation of BMP's. Riparian Reserves have been established and average 172 feet on either side of the intermittent and perennial non fishbearing streams, and would average 344 feet on either side of the fishbearing or domestic water supply streams. These reserves are adequate to maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems and meet the ACS Objectives. Table WQ-5, below, shows the riparian reserve acres being treated and the buffer leave acres.

Table WQ-5: Riparian Reserve acres associated to units and riparian reserve treatment.*

Unit Number	Riparian Reserve Acres	Buffer Leave Acres in Riparian Reserve	Acres treated in Riparian Reserve
2	30	13	17
3	4	1	3
4	2	2	0
5	45	12	33
6	7	2	5
7	12	4	8
8	25	8	17
9	18	6	12
10	0	0	0
11	1	0	1
12	1	0	1
16	0	0	0
17	28	7	21
18	16	7	9
19	27	11	16

Unit Number	Riparian Reserve Acres	Buffer Leave Acres in Riparian Reserve	Acres treated in Riparian Reserve
20	13	5	8
21	6	1	5
23	3	1	2
24	54	20	34
26	5	2	3
Total	297	102	195

*Note: All riparian reserve acres are shown for the thinning units in the table above.

Riparian Reserves with intermittent or ephemeral channels have a minimum 50 foot buffer either side of the channel. In some cases, acreages did not reach 1; hence a 0 is shown in column. All streams contain some type of buffer. No cutting activity would occur in Riparian Reserves that are within or adjacent to regeneration harvest units.

Economics/Social

Introduction

This section deals with three aspects of economic and social impacts: economic viability, impacts to the local economy/employment, and environmental justice. Economic viability is dependent on costs and revenues associated with a particular timber sale. Impacts to the local economy are a reflection of District and Forest harvest levels and employment. Timber sales, fuel treatments, and associated resource work can generate employment and stimulate the local economy. Environmental justice can also be a concern if minorities are not granted equal opportunities to benefit from government programs and projects.

Regulatory Framework

The following direction and regulations were considered during the economic analysis of this project.

- The Willamette National Forest Plan includes forest-wide management goals to provide a sustained yield of timber for commercial products, enhance the amount of timber provided in the future, produce forest goods and services in the most cost efficient way, and generate revenues from permits, leases, user fees, and product receipts.
- The National Environmental Policy Act requires integrated use of the natural and social sciences in all planning and decision-making that affects the human environment.
- Executive Order 12898 (February 11, 1994) on Environmental Justice directs federal agencies to identify and address agency programs that may have disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian tribes.

Analysis Methods

A comparison of the alternatives was completed for the Blowout Thin Planning Area on the Detroit Ranger District. The Transaction Evidence Appraisal (TEA) method with the most recent product log values and TEA appraisal costs were used for evaluation.

The harvest volumes and species mix are estimates from preliminary samples taken in the planning area during field reconnaissance. Timber values were calculated using the current Product Quality Adjustment (PQA) for delivered logs, in western Oregon saw mills, which were developed for use with the Transaction Evidence Appraisal. Market conditions would fluctuate throughout the year, and depending on the time of year this sale would be offered for auction, the current estimates may or may not be accurate, which could have an impact on the final sale values.

Log Cost version 6.0 was used to develop the stump to truck logging costs for each alternative, and Haul Cost version 5.2 was used to calculate log transport costs. In addition, a brush disposal appraisal was developed for each alternative using information from the Fire and Fuels Report (Curtis, 2006) written for this Environmental Assessment. Road maintenance cost estimates were developed for each alternative, and road reconstruction costs were used from the Blowout Thin Roads and Access Report (Bennett, 2006) cost estimates.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on economic viability, local economy and employment, or environmental justice were included in the cumulative effects analysis.

Existing Condition – Economic Viability

Logging costs and road related costs are often the costs that have the most direct affect on economic viability. Road related costs include reconstruction, road maintenance, and road construction. When road access is not planned or is not possible, a higher percentage of the area is usually logged with helicopters, which is the most expensive of the logging systems. There can also be a scheduling conflict with helicopters during summer months since they are also used for fire control.

Environmental Consequences – Economic Viability

Direct and Indirect Effects

Alternative 1 – No Action

This alternative would not harvest any timber and therefore would not support direct, indirect and induced employment, or increased income to local economies. Current downward trends in timber harvesting from National Forests lands would continue into the future. Current employment in the wood products sector of the local economy would remain unchanged.

Alternative 2

Alternative 2 was found to be economically viable with a net appraised value of $2,382,227. Alternative 2 would have a higher appraised value than Alternative 4 because it includes 59 acres of regeneration harvest, which is economically more efficient than thinning. The appraised value would be less than Alternative 3 due to a higher percentage of acreage planned for helicopter yarding since there are no temporary roads planned.

Alternative 3

Alternative 3 was found to be economically viable and would have the highest appraised value at $2,949,400, primarily due having a smaller percentage of acres planned for helicopter logging. Alternative 3 has road costs associated with constructing and reopening temporary roads, but these are more than offset by the higher acreage of ground based and skyline logging systems, which are less expensive than helicopter.

Alternative 4

Alternative 4 was found to be economically viable but would have the lowest appraised value at $1,967,468, because it has less total volume, the units are all thinning with no regeneration harvest, and because there are a high percentage of its acreage in helicopter yarding since no temporary roads are planned.

Alternative 5

Alternative 5 was found to be economically viable and would have an appraised value at $2,697,169, slightly less than Alternative 3, due primarily to more helicopter yarding. Alternative 5 has road costs associated with constructing and reopening temporary roads, but not as much as in Alternative 2.

The appraisal costs for each alternative are summarized in the following chart. See Appendix D for the complete Economic Analysis.

Cumulative Effects - Alternatives 1, 2, 3, 4, and 5

No cumulative effects to economic viability are expected.

Table ES-1: Estimated Present Net Value of Alternatives

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Gross value	10,882 mbf X $674.99/ mbf = $7,345,241	10,882 mbf X $683.56/ mbf = $7,438,500	9234mbf X $680.45/mbf = $6,283,275	10,882mbf X $679.28/mbf =$7,391,925
Associated Costs	$4,695,896	$4,157,103	$4,095,015	$4,391,516
Appraisal Competition Adjustment	$267,118	$331,997	$220,792	$303,240
Net Appraised Value (Grossvalue - Assoc. Costs - Appr. Comp. Adjustment)	$2,382,227	$2,949,400	$1,967,468	$2,697,169
Cost/Benefit Ratio (Gross value/ Associated costs)	1.48	1.66	1.46	1.57

Existing Condition – Local Economy and Employment

The economy of the local communities from the Salem urban-growth boundary to Detroit depends on a mixture of tourism, recreation, timber industry, and Forest Service jobs for stability. Local businesses that rely on tourism and recreation include the marinas on Detroit Reservoir, and the lodges, restaurants, stores, gas stations, along the North Santiam River and Highway 22 corridors. Timber industry jobs include a variety of woods and mill jobs, with sawmills in Mill City and Lyons. Forest Service jobs in the vicinity are located at Detroit, Sweet Home, and Sisters Ranger Stations. Tourism and recreational activities connected with National Forest lands have been on the increase in recent years for the Detroit Reservoir and North Santiam River areas. Employment in tourism and recreation-related services has also increased accordingly.

Historically, government employment and expenditures have provided a degree of stability in rural communities such as Detroit, Mill City, Idanha, Gates, Lyons, and Mehama. With reduced Forest Service budgets and work force, and a switch to management emphasis that produces generally lower amounts and value of products, federal workforce and program expenditures has not buffered economic downturns as in the past (Oregon Department of Employment, 2001).

The current level of timber harvesting on the Willamette National Forest has dropped substantially from the levels of the late-1980s. This decrease has contributed to a decline in the number of local jobs associated with wood products industry in the area.

The primary effect on timber harvest-related employment would occur from commercial harvesting associated with the alternatives over the next two years. In addition to primary harvesting jobs, there employment associated with post-sale service contracts. Levels of harvest volume by alternative would affect employment and income in several ways:

- Directly - effects attributable to employment associated with harvesting, logging, and mills and processing plants for sawtimber, pulp, chips, veneer, and plywood;
- Indirectly - effects attributable to industries that supply materials, equipment, and services to these businesses; and
- Induced - effects attributable to personal spending by the business owners, employees, and related industries.

Environmental Consequences – Local Economy and Employment

Direct and Indirect Effects

Alternative 1 – No Action

This alternative would not harvest any timber and therefore would not support direct, indirect, and induced employment, or increased income to local economies.

Alternative 2, 3, 4 and 5

Jobs created in the logging sector in Oregon are estimated at 3.5 jobs per thousand board feet (MBF) harvested (Gebert et. al., 2002). Jobs created in the timber products manufacturing sector in Oregon (using the estimate for sawmill jobs) are estimated at 4.0 jobs per thousand (Gebert et.

al., 2002). Using these estimates, Alternatives 2, 3, and 5 would each provide about 38 jobs in the logging sector and about 44 jobs in forest products manufacturing. Alternative 4 would provide about 32 jobs in the logging sector and about 37 jobs in forest products manufacturing.

Cumulative Effects – Alternatives 1, 2, 3, 4, and 5

Other employment would continue to occur as a result of other timber sales in progress, recreation activities, and other special use receipts across the Forest. Commercial collection of non-timber forest products, such as mushrooms, could continue to occur, although the quantity of harvest is unknown. Overall, none of the alternatives would result in economic-related cumulative effects.

Existing Condition – Environmental Justice

Data regarding minorities or people with disabilities employed in the region in the timber, mining, road construction, forestry services, and recreation sectors is unavailable. Some firms contracted by the Forest Service for reforestation work have traditionally hired Hispanic workers that comprise a migratory workforce in the area. Asian and Pacific Islanders uses of the area include commercial mushroom harvesting and developed camping associated with this activity. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration.

Environmental Consequences – Environmental Justice

Direct and Indirect Effects

Alternative 1 – No Action

All current uses of the National Forest System lands would continue, including recreation, harvesting of non-timber forest products, special-use permits, subsistence uses, and spiritual/aesthetic uses. Effects to minority populations, disabled persons, and low-income groups would not be disproportionate with other users of the National Forest System lands.

Alternatives 2, 3, 4, and 5

These alternatives provide a variety of opportunities for potential contracts. The alternatives would have no impact on the contracting process or the USDA Small Business Administration program for reserving contracts for minority groups for tree planting, precommercial thinning, and road restoration. Employment and income would be available to all groups of people, subject to existing laws and regulations for set-asides, contract size, competition factors, skills and equipment, etc.

Set-asides for Small Business Administration Contracting opportunities would not be affected. Employment by firms that have hired Hispanic workers or other minority groups or low-income workers associated with reforestation or other potential contracting needs would not differ from those employed in the sectors as a whole. In the short-term (3-5 years), reforestation needs would potentially benefit this group. Alternatives 2, 3, and 5 would plant about 59 acres.

There is no existing information on how much use the area receives from minority and low-income populations. Opportunities for all groups of people to collect species from disturbed and non-disturbed sites would be maintained by all alternatives, and no disproportionate effect is anticipated to subsets of the general population. None of the alternatives would have disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian tribes.

Cumulative Effects

There are no environmental justice-related cumulative effects related to any of the alternatives.

Conclusions and Rationale

In summary, the costs above are as realistic as possible, with the information available, and no bias introduced to influence the results. The above costs and revenues could be affected by fluctuating log markets, increased inflation, changed conditions of roads after preliminary field reviews, changes in unit boundaries for resource protection during field work on the selected alternative, and other collections that may become necessary as work on the sale progresses, would affect the above costs. However, most of the changes that may occur during field work would have relatively little effect on sale values, except when volume is deleted or if additional helicopter logging is planned, or both. This is clearly shown in both Alternatives 2 and 4, with 35 to 40 percent of the planning area volume helicopter logged, and the sale values significantly reduced in both instances.

Fishery Resource

Introduction

This project has five primary elements that were included in this review: timber harvest, log yarding, road work, landings and fuel treatment. These are displayed by alternative in Table 2-7 in Chapter 2.

Streams within the project area provide habitat for Chinook salmon, rainbow trout, cutthroat trout, naturalized sockeye salmon (commonly referred to as kokanee salmon), long-nosed and black sided dace, and sculpins.

The National Marine Fisheries Service (NMFS) recently completed their final listing determinations for 16 ESUs of West Coast Salmon (70 FR 37160; effective August 29, 2005). They listed the Upper Willamette River Chinook salmon Evolutionarily Significant Unit (ESU) as threatened under the ESA, confirming their earlier determination (64 FR 14308; effective May 24, 1999). The Upper Willamette River Chinook ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon.

Artificially propagated spring-run Chinook salmon from seven hatcheries in the basin are also considered to be part of the ESU. This includes the Marion Forks Hatchery (ODFW stock # 21) on the North Fork Santiam River, the source for out-planted spring Chinook salmon above Big

Cliff and Detroit dams, and potentially utilizing their historical habitat in Blowout Creek. The NMFS determined that these artificially propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the ESU.

The NMFS has designated critical habitat for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho (70 FR 52630; effective January 2, 2006). Designated critical habitat for Chinook salmon does not extend above Big Cliff dam, and would not be affected by this project.

Similarly, the Magnuson-Stevens Fishery Conservation and Management Act lead to the designation of Essential Fish Habitat (EFH) for commercially harvested fish, which includes Chinook salmon on the Willamette National Forest. Their designation of EFH did not include any streams above Big Cliff dam, and therefore EFH would not be affected by this project.

Regulatory Framework

This project was designed using the direction and guidelines found in the Willamette National Forest Land and Resource Management Plan (LRMP), the Northwest Forest Plan, the Aquatic Conservation Strategy, and Best Management Practices, the Endangered Species Act (ESA) of 1973 (as amended), the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1996, the Clean Water Act, and Executive Order 12962, Recreational Fisheries (1995). An assessment of how each project alternative meets this guidance, are provided near the end of Chapter 3, under Consistency with Direction and Regulations.

Analysis Methods

Resource Data

Stream habitat and biological surveys have been completed for all of the fishbearing streams within the project area. The data collected with these surveys is located in the NRIS stream survey database. This data provides information on pool frequency, pool quality, surface fines, woody material quantity, and fish species composition and distribution.

The Blowout Watershed Analysis (USDA Forest Service, 2000) was reviewed to gain the larger scale historical background condition and identify concerns with existing natural watershed processes and watershed recommendations.

Existing data from the Willamette National Forest Geographic Information System (GIS) database was queried to provide values for road density, acres historically treated, riparian reserve condition, and historical and current fish distribution.

IDT input from hydrologist, soil scientist, wildlife biologist, silviculturist, fuels planners, logging system planners, and engineers was reviewed.

The project area was surveyed by Wayne Somes, district fishery biologist (retired), during the project planning stage. Streams within the project area were sampled to confirm existing distribution records, confirming fish presence/absence, and species composition. Opportunities for restoration were identified where needed. Fish passage problems and road segments with a high aquatic risk were identified and this information was shared with the IDT.

Critical habitat and ESA fish distribution maps from NMFS were reviewed.

Maps
A map was prepared through GIS that differentiates between perennial and intermittent streams, showing fish distribution, the location of project elements, haul routes, new road locations (temporary and permanent), unit boundaries, yarding techniques, specific road reconstruction elements near streams, etc.

Scale of Analysis
The site scale analysis will typically focus on the effects to the nearest stream channel. Effects to fish would be the accumulated effects to the nearest fishbearing stream reach. Cumulative effects to fish species would occur at the Analysis Area scale, which includes two HUC6 watersheds (1709000301 and 1709000302).

Sequential Flow of Information and Analysis
Effects to the fishery resource are directly and indirectly related to changes in water quality, and physical watershed processes. The analysis of effects to fish relies on the recently compiled specialist reports of changed environmental condition, completed by the Interdisciplinary Team: hydrologists, soils scientists, silviculturists, engineers, fuels specialists, and timber planners.

Existing Condition – Fishery Resource

Fish Biological Parameters
There are eight fishbearing streams within the project area that have the potential to be affected by this project (Figure 1): Blowout Creek, Beard Creek, ‘K’ Creek, Divide Creek, Ivy Creek, Hawkins Creek, Lost Creek, and Cliff Creek. Each of these streams is currently utilized by cutthroat trout and sculpin. Blowout, and Divide Creeks also provide habitat for rainbow trout, and Blowout Creek is also utilized by non-native naturalized sockeye salmon (kokanee), long-nosed dace, and black-sided dace.

Spring Chinook salmon and steelhead historically utilized the lower two miles of Blowout Creek, within the project area. Access to this habitat was eliminated in 1953 with the construction of Detroit dam, which does not provide upstream passage. Spring Chinook salmon, of hatchery origin, have been reintroduced above the dam, starting in the year 2000, with the capture, transport, and release of adult salmon. These fish are released in the Breitenbush and North Santiam Rivers, but it is probable that some of these adult salmon move downstream to Detroit Reservoir, and they may be migrating to and then utilizing the historically occupied habitat in Blowout Creek. Offspring from the reintroduced salmon may also be moving through the reservoir and might seek refugia in the lower reaches of Blowout Creek. For the purposes of this analysis, it is assumed that the historically occupied habitat in Blowout Creek is currently being utilized by both adult and juvenile spring Chinook salmon. Steelhead have not been transported and released above Big Cliff, and it is not expected that they would be moved over the dam during the time period that this project is being implemented, so they would not be affected by this project.

There is a low probability that adult Chinook salmon are successfully spawning in Blowout Creek, due to the low quality of the habitat, the effect of reservoir water level management on lower Blowout Creek, and the low expected density of adult salmon in the watershed. Likewise, the low quality of the habitat reduces the probability that juvenile fish are using the habitat for rearing. The habitat is not used for migration, as there are no other upstream reaches to access. Overall, the spring Chinook salmon habitat in Blowout Creek is of relatively low importance to recovery objectives when compared to the other major tributaries in the North Santiam River subbasin such as the Breitenbush River and the North Santiam River.

Fish Habitat Complexity

All of the fishbearing streams in the project area have been surveyed between 1991and 1998. A summary of the reach-specific stream condition is shown in Appendix A of the Fishery Resource Report.

This survey information identified a lack of habitat complexity in the lower 0.2 miles of Beard Creek, the lower 6.0 miles of Blowout Creek, all of the surveyed length of K Creek (0.8 miles), all of the surveyed length of Cliff Creek (2.8 miles), the lower 2.4 miles of Divide Creek, all of the surveyed length of Ivy Creek (2.8 miles), and all of the surveyed length of Lost Creek (1.6 miles). Deficiencies in habitat complexity are primarily related to low levels of instream wood, high width/depth ratios, and to a lesser extent, the limited availability of quality pool habitat.

A more detailed analysis of stream habitat condition for these streams is available in written reports on file at the Detroit Ranger District.

Habitat conditions in this watershed were reduced of complexity due to past management (high intensity riparian timber management), stream “cleaning” (wood removal). The streams were also naturally affected by the high flows during the 1996 flooding. Management in the last decade has emphasized protection and restoration of streams and their riparian vegetation, and conditions are expected to improve over time. Passive (natural) restoration to the stream complexity potential may take a century or more.

There are no known fish passage barriers in the project area. Distribution of spring Chinook salmon is dependent on the continued transport of these fish over Detroit dam.

Water Quality for Fish

Stream temperature

At one time, Blowout Creek from river mile 0.0 to 11.9 was listed under 303(d) classification with the State of Oregon because it exceeds the temperature criterion of 18ºC for salmonid migration and rearing. A water quality management plan was developed for the Blowout Creek watershed in 2001 (USDA Forest Service, 2001), and was approved by the Department of Environmental Quality for the State of Oregon in 2002. This plan identified the current low level

(24%) of stream shade as a concern related to stream temperature. Blowout Creek has subsequently been removed from the state's 303d list.

Monitoring of stream water temperatures in Blowout Creek has commonly shown peaks exceeding 21 degrees centigrade in the summer months.

Turbidity

Typical turbidity levels in Blowout Creek measure less than 5 NTUs (nephelometric turbidity units). During episodic storms, turbidity can increase to 25-85 NTUs. Larger juvenile and adult fish typically are little affected by episodic increases in turbidity, however, there may be some reduction in use when turbidity levels exceed 70 NTUs (Bisson and Bilby, 1982), and fry and young juvenile fish may be affected when turbidity levels exceed 25 NTUs (Sigler et al., 1984).

Stream Peak Flows

All watersheds potentially affected by this project are within the rain-on-snow zone, and are therefore more susceptible to changes in peak flows due to land management activities. The Willamette N.F. uses the ARP methodology to evaluate the potential risk that management may have on stream peak flows (see watershed specialist report). The ARP values for this project area are all above mid-point values, where the risk that flows are currently outside the range of natural variation is low. Historic management (road construction and timber harvest) in this watershed may have caused some changes to peak flows that caused channel degradation and loss of stream complexity. However, recent management levels are occurring at a reduced intensity, allowing for recovery to a more natural condition.

Environmental Consequences – Fishery Resource

Direct and Indirect Effects

Alternative 1

The hydrology and soils specialist reports for this project predicted that this alternative would have minimal negative effects to water quality or soil erosion processes. Concerns were related to the non-treatment of forested stands and the subsequent increase over time in the fuel loadings, leading to more severe burning conditions if/when the area burns. Also, existing road systems would not be maintained at a high level, increasing the probability of failure and subsequent increased delivery of fine sediment to streams.

The probability that non-treatment would result in negative effects to the fishery resource, with biological effects, reduced habitat complexity, or reduced water quality, is negligible. The existing road system was not extensively damaged during the 1996 high precipitation event, and is relatively stable. Since the 1996 storm a portion of the main 10 road has been moved out of the riparian area and away from chronically unstable areas. This relocation reduced the direct impact of the road on the stream system and further improved the overall stability of the road system. Increased fuel loadings, resulting from not capturing density induced mortality through timber harvest and slash treatment, could increase the severity of future wildfires, but large fires are relatively uncommon in the project area.

Most of the watershed is managed by the Forest Service, and degraded existing conditions would slowly recover over time, due to changed management practices, and protected stream Riparian Reserves. Passive restoration (protection) would likely result in long-term (100-300 years) recovery to desired future conditions.

Alternatives 2, 3, 4, and 5:

The alternatives for this project were all designed to minimize the negative effect to water quality, while still achieving the project objectives. The location of harvest units were selected to reduce the risk of slope failure, and streams were buffered to limit the probability of affecting stream shade, or allowing the downslope migration of disturbed soils. The action alternatives (2-5) all provide for stream protection buffers of 172 feet on either side of perennial fishbearing streams, 50 to 150 feet on either side of perennial non-fishbearing streams, 50 feet on either side of intermittent streams, and 50 to 150 feet for unstable headwalls and wetlands. These variable width buffers allow for the protection of stream shade, bank stability, and woody material contribution, while allowing for differing natural conditions observed during field reconnaissance and unit layout.

Additionally, for Alternatives 2, 3, and 5, the fish-bearing streams adjacent to units with regeneration harvest would have a protection buffer of at least 344 feet, the full-width riparian reserve width as described in the NW Forest Plan.

Due to these protection buffers and other best management practices as described in the watershed and soils specialist reports, the implementation of the action alternatives are all expected to have only minor negative effect to water quality and soils. Therefore there should be only minor negative effects realized by the fish and/or their habitat.

Differences in the probability or magnitude of negative effect to the fishery resource between the action alternatives are minor, and are described in the following assessment:

Effects to Fish Biological Parameters

The implementation of any of the action alternatives (Alternatives 2-5) associated with this project is not expected to result in a measurable change in the survival rate, distribution, or population size of any resident or anadromous fish species within the analysis area. This is due to the conclusions (see below) that the project would have only negligible negative effects on habitat complexity and/or water quality for fish.

Effects to Fish Habitat Complexity

The action alternatives for this project all have some potential (negative and positive) for affecting fish habitat complexity. An analysis of the project elements identified timber harvest and road work as those elements that have the potential to affect fish habitat complexity. The implementation of all other project elements would not likely result in any effect to water quality of the magnitude such that downstream fish habitat would be affected. The effects of timber harvest and road work are described below:

Timber harvest

Timber harvest has the potential to affect wood recruitment rates and sediment delivery rates to fishbearing streams.

Wood Recruitment to Streams: All of the action alternatives allow thinning prescription harvest near stream channels. This harvest would remove some trees that could have potentially been recruited to adjacent stream channels as woody material. All streams have a no-harvest protection buffer, with larger streams having a wider buffer. However, trees retained at high stocking levels within the protection buffers, residual trees left in treated units near streams, and the large acreage of untreated stands in the affected watersheds would leave an abundant supply of potential wood available for short-term and long-term recruitment to the stream network. Additionally, the thinning harvest would allow the residual trees to grow to a larger size more rapidly, and these trees would be healthier than if the stands were untreated. Regeneration prescriptions associated with Alternatives 2, 3 and 5 would not likely affect the wood recruitment potential for the watershed because the units are located on relatively stable slopes, and are therefore not likely to contribute wood to streams via slope failure and subsequent debris torrent mechanism. All streams are protected by full width riparian reserve buffers, allowing for the retention of all direct input potential stream recruitment trees. It is likely that all alternatives will result in a negligible negative effect on wood recruitment potential, and be offset by a long-term, small-scale positive effect.

Sediment Routing to Streams: Alternatives 2, 3,and 5 prescribe some limited regeneration harvest (59 acres) and subsequent broadcast burning. This management is more intensive than the thinning prescriptions, and there is a slightly higher risk of affecting stream flows, and accelerated soil erosion with regeneration harvest. However, the full-width riparian buffers on streams adjacent to these units would likely reduce the magnitude of any site scale effect prior to being realized in the streams. ARP modeling results show that all alternatives would not drop below the concern thresholds and no measurable change in streamflow is predicted to occur.

Unit 1 is the nearest regeneration harvest unit to ESA-listed spring Chinook salmon. The unit is located approximately 1,000 feet upslope from Blowout Creek, and 4,500 feet away from Chinook salmon habitat in Blowout Creek. Unit 14 is perched 650 feet upslope from Divide Creek which provides habitat for cutthroat trout, rainbow trout and sculpin. This unit is the closest regeneration harvest unit to a fishbearing stream. Effects due to any soil movement from these units would be filtered through the protection buffer, and then transmitted at least 650 feet downstream before any effect would be realized by fish. The probability of slope failure occurring with this action is very low (see watershed/soils specialist reports), and the wide spatial distribution of the units reduces the probability of additive effects.

It is not likely that the predicted change in sediment routing or wood recruitment, due to the timber harvest, would result in any reduction in the quality of fish habitat complexity. No changes in pool frequency, or pool quality is expected. Spawning substrate should remain available at existing levels.

Road work

Road work has the potential to affect sediment delivery rates to fishbearing streams. All action alternatives would conduct a similar amount of road maintenance and road reconstruction. This work may result in a short-term increase in sediment delivery rates to stream channels. This short-term impact is typically offset by an immediate and long lasting reduction in road surface and ditchline erosion, due to the improved drainage and surfacing.

Alternatives 3 and 5 also require temporary road construction, and Alternative 3 requires temporary road construction over streams when reopening the existing decommissioned roads, and installing new culverts. It is probable that these actions would result in increased sediment delivery to streams. Best management practices would reduce the probability and magnitude of sediment delivery, but can not completely eliminate the risk. Alternative 3 has the highest risk of roadwork-related negative effect to fish and their habitat. Multiple culverts would need to be installed, with the nearest located approximately 3,000 feet upstream from occupied fish habitat in a tributary to Divide Creek. It is probable that the majority of any increase in sediment delivered to the stream network would be stored in the stream before it was transported 3,000 feet to fishbearing reaches. However, there is some chance that this would occur, largely dependent on precipitation levels following the road work.

Alternative 5 builds fewer miles of new road and does not reopen the previously decommissioned roads, and therefore would have a much lesser probability of increasing sediment delivery to fishbearing stream reaches.

It is probable that the road work associated with Alternatives 3 and 5 would result in a minor reduction in the complexity of fish habitat due to increased fine sediment supply. There may be a slight reduction in the depth of pools, or loss of high quality side channel habitat. The extent of the negative effect is likely to be un-measurable, and therefore negligible. The probability of a measurable change is highest with Alternative 3, due to the re-opening of previously decommissioned roads and culvert installations. Road work associated with alternatives 2 and 4 would have only negligible negative effects to sediment delivery to fish habitat.

Effects to Water Quality for Fish

The action alternatives for this project all have some potential (negative and positive) for affecting water quality for fish. An analysis of the project elements identified road work as the primary project element that has the potential for negative effects. The implementation of all other project elements would not likely result in any effect to water quality of the magnitude such that downstream fish habitat would be affected. The effects due to the road work are described below:

Road work

Road work, associated with all action alternatives, has the potential to affect stream turbidity due to increased fine-grained sediment delivery to streams, as described above. This would possibly result in increased water turbidity levels during the first precipitation events following the road work. Turbidity changes are expected to be minor due to the best management practices in place, and should be short in duration (pulse effect). This change, if realized in downstream fishbearing stream reaches, may result in the short-term displacement of resident fish and there may be reduced growth rates for juvenile resident fish. Anadromous fish (spring Chinook salmon) are less likely to be affected, given the greater distance separating their habitat from the nearest activity.

Alternatives 3 and 5 also require temporary road construction, and alternative 3 requires temporary road construction over streams when reopening the existing decommissioned roads. It is probable that these actions would result in increase in site-scale turbidity levels. Best management practices would reduce the probability and magnitude of sediment delivery, but would not eliminate the risks. Alternative 3 has the highest risk of roadwork-related negative effect to fish and their habitat. Multiple culverts would need to be installed, with the nearest located approximately 3,000 feet upstream from occupied fish habitat in a tributary to Divide Creek. Alternative 5 build fewer miles of new road and would not reopen the previously decommissioned roads.

Stream temperatures should not be changed with the implementation of any of the action alternatives (watershed specialist report). Timber harvest would not occur within the primary shade zones associated with all perennial streams.

Cumulative Effects to the Fishery Resource

Past, present, and foreseeable future projects in the analysis area (two HUC6 watersheds previously identified) were reviewed. Previous road construction, timber management, and stream salvage/cleaning have affected the condition of fish habitat in the analysis area.

Existing road densities are high, approximately 3.5 miles/mile^2. Alternatives 3 and 5 would cause a short-term increase in the road density by building new or reopening decommissioned roads. New or reopened roads have the potential to cumulatively affect water runoff rates, increase sediment delivery to streams, and reduce wood transport rates to fishbearing streams. Alternatives 1, 2, and 4 use existing roads and would not result in cumulative effects. FS road 1013-220 is scheduled for hydrologic closure in the near future, and would offset some deleterious effect associated with this project.

There are 13,372 acres previously managed of the 34,000 acre watershed (39%) (Blowout WA, 2000). The vast majority of the historic timber management utilized regeneration harvest methods. All action alternatives associated with this project (alternatives 2-5) would affect timber stands that have partially recovered to their unmanaged condition. However, none of the units would result in a net increase in the total acres of disturbance in the watershed, since only previously managed or fire-disturbed stands would be treated. This action would temporarily retard the recovery due to the new disturbance, but the thinning units would also accelerate healthy stand development. Only the regeneration prescriptions in Alternatives 2, 3, and 5 would essentially reset the unit condition to an early seral stage. By planning the majority of the harvest to occur in stands that have previously been disturbed, cumulative effects would be reduced, and the only effect may be to temporarily slow the watershed recovery rate. Analysis of changes to peak flows indicates that the alternatives would not result in adverse effects to stream flows or channel conditions. Therefore, no measurable cumulative effect to watershed condition is expected.

There are approximately 10,200 acres of land in the analysis area that are classified as Riparian Reserves. Of the forested Riparian Reserves, approximately 25% have been heavily managed, 25% moderately managed, and 50% unmanaged (Blowout WA, 2000). This project would moderately manage approximately 200 acres, approximately 2% of the total watershed riparian reserve area. However, the stands that would be thinned in the reserves are primarily previously managed stands, so in actuality, there would be no net increase in riparian reserve disturbance. This project would not result in cumulative negative effects to the reserves, and there would be a minor positive effect to these areas as residual tree health and vigor would be improved.

Several stream enhancement projects are planned to occur in the foreseeable future within the analysis area. Large woody material would be added to 0.9 miles of Cliff Creek and 1.1 miles of Divide Creek. Existing stream restoration projects would be enhanced through placing additional and repositioning existing large woody material in 4.2 miles of Blowout Creek and 0.6 miles of Ivy Creek. Approximately 0.15 miles of the floodplain of Blowout Creek near the confluence with Cliff Creek would be restored. Also a reach of Blowout Creek between Beard Creek and Cliff Creek would have woody material and boulders added to increase stream complexity, in 2006. These projects would move the stream condition towards the desired future condition, and reduce the already low level negative effect that might be realized through the implementation of an alternative with this project.

Other past, present, and reasonably foreseeable actions, identified by the interdisciplinary team, would not result in any cumulative effects to fish or their habitat.

Conclusions and Rationale

Streams in the analysis area have been degraded by past management and natural events. The LRMP protection measures are allowing these streams and their associated riparian areas to slowly recover over time towards DFC. Historic, current and future planned stream and riparian enhancement projects are accelerating that recovery.

This project would accelerate the growth and improve the health of the treated stands of trees. The prescribed regeneration harvest is assigned to stands of trees that are unhealthy and past the age where thinning would benefit the residual trees. Implementation of this project would result in some short-term negative effects to stream conditions, primarily through slight increases in the sediment delivery rates to streams, and subsequent increased turbidity levels. This may result in the downstream effect to fishbearing stream reaches and Management Indicatory Species (MIS) resident fish may be affected. MIS anadromous fish (spring Chinook salmon) are less likely to be negatively affected, given the more distant proximity to the project activity. All alternatives are not likely to adversely affect spring Chinook salmon, although Alternative 3 has the highest risk of the negative effect due to the more extensive road work.

Table FR-1: Probability and Magnitude of Negative Effects to ESA and MIS Fish

Measurement Criteria for Fish		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Probability of measurable negative effects realized to occupied fish habitat	ESA Listed Fish	very low	very low	low	very low	very low
	MIS-Anadromous	very low	very low	low	very low	very low
	MIS-Resident	very low	very low	moderate	very low	low
Magnitude of negative effects to fish habitat	ESA Listed Fish	very low	very low	low	very low	very low
	MIS-Anadromous	very low	very low	low	very low	very low
	MIS-Resident	very low	very low	moderate	very low	low

Fire and Fuels

Regulatory Framework

Willamette Forest Plan

The Willamette Forest Plan includes fire management direction to ensure that fire use programs are cost-effective, compatible with the role of fire in the forest ecosystems, and responsive to resource management directions. Fire management direction in Appendix G of the Forest plan also directs that fire pre-suppression and suppression programs are cost effective and responsive to the Forest Plan.

Clean Air Act

The Clean Air Act establishes certain minimum requirements that must be met nationwide, but states may be able to establish additional requirements. Users of prescribed fire must comply with all applicable federal, state and local air quality regulations. The Clean Air Act establishes major air quality goals, and provides means and measures to attain those goals by addressing existing and potential air pollution problems.

Each state (including Oregon) has a State Implementation Plan (SIP) that provides the means by which these goals are to be attained. The SIP may contain measures such as emission standards for air pollution sources, air quality, and permit programs, and regulations controlling specific air pollutant sources such as mobile sources, wood-burning stoves and slash burning. Any burning in Oregon needs to comply with the State of Oregon Smoke Management Implementation Plan.

Analysis Methods

The fire and fuels analysis focuses on the five planning subdrainages that contain the proposed Blowout Thin harvest units: Beard 78L, Cliff 78R, Divide 78M, Westside Blowout-Ivy 78Q and Hawkins 78N. The fuels analysis area comprised of these five planning subdrainages contains 20,253 acres.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on fire and fuels or air quality were included in the cumulative effects analysis.

Fuel Profile analysis was completed using ocular and photo series interpretation methods (Maxwell and Ward, 1980). Values were then referenced to the Fire Behavior Prediction Systems Fuel Models 1-13 (Anderson, 1982).

The predicted fuel loading from harvest activities was generated using fuel prediction tables (Brown et al, 1977). Stand exam data and estimated tree removal volume was used to predict the 0-3 inch diameter fuel loading per ton.

Prescribed fire smoke emissions were calculated using First Order Fire Effects Model (FOFEM) version 5.0. FOFEM calculates particulate matter in both the 2.5 and 10 micron size class (PM 2.5 and PM 10). The Oregon State Implementation Plan regulates PM 2.5 and PM 10 levels in special Protection zones or Class I Airsheds and are highly regulated.

Cost Analysis

The expected loss tables developed for the Willamette National Forest in 1999 was used in this analysis from the Fire Management Area Zone – North Zone, Non-wilderness. Fuel treatment costs were established as follows:

- Broadcast Burning - $600/acre
- Hand piling- $650/acre (this includes construction and burning)
- Yard tops attached $600/acre (covered in logging costs)
- Grapple piling $350/acre (this includes construction and burning)

Many complex objectives on each unit increase planning, preparation and implementation time, thereby increasing the cost per acre. All treatment cost are less than the expected loss to wildland fire. Returning fire back into the ecosystem through the proposed actions would meet objectives defined in the Purpose and Need. Fuel treatments are selected on effectiveness at meeting resource objectives.

Existing Condition – Fire and Fuels

Past Disturbance

Fire is the predominant natural disturbance process in the Blowout project area. Prior to 1850 and the European settlement, fires were the result of lightning with a combination of other environmental factors, and may have been used by the Native Americans to manage the land. Most of the current old growth stands in the drainage originated in the early 1600's. It is reasonable to conclude from current information that at least 80 percent of the Blowout area burned during this period, and that most were stand replacement fires. Approximately 6,000 acres in the Blowout Watershed burned in the 1890's in the Divide Creek and Hawkins Creek drainages, creating the fire regenerated stands that are being proposed for regeneration harvest in this project.

Since the early 1900's through 1966, there are no records of any significant fires in the Blowout drainage. This is probably a result of active fire suppression. The large stand replacement fires that have occurred during this century have been minimal. In 1967 the Box Canyon fire, which was lightning caused, burned over 200 acres. In 1971 and 1979 two escaped slash burns resulted in over 200 acres being burned.

Lightning often ignites fires at higher elevations. When conditions do not promote wide spread surface fires, patch fires result commonly burning 10 acres. A variety of small variable aged stands have originated due to these fires.

The Blowout Watershed is one of the most intensely managed areas on the Detroit Ranger District. The first commercial timber entry was in the early 1890's. Approximately 140 acres were harvested from 1910 to 1939. An era of intensive road construction and timber harvest occurred across the landscape during the 1940's through the early 1980's. The harvest rate averaged 8% of the Blowout watershed per decade, but has declined in recent years.

In the last 20 years, there have been approximately 1,782 acres harvested in the Blowout Thin fuels analysis area. The fuels analysis area is comprised of Psubs Beard 78L, Cliff 78R, Divide 78M, Westside Blowout-Ivy 78Q and Hawkins 78N (see table FF-1) and comprises about 20,253 acres. The 1,782 acres harvested in the last 20 years is about 8.8% of the fuels analysis area. Almost all of these acres received some form of fuels treatment after harvest operations were completed.

Fire Regimes

The Blowout Project Area is represented primarily by Fire Regime III, mixed frequency and mixed severity and a Fire Regime IV, low frequency high severity. Fire regime refers to the rate of fire occurrence within a given area in a given period of time and severity refers to the amount of replacement in the dominant overstory.

Fire Regime Condition Class (FRCC) describes the degree of departure of current vegetation from the historic fire regime (Hann, et al, 2003). FRCC 1, 2 and 3 ranks the degree of departure with the following:

FRCC 1

- Fire regimes near historic range (departure is no more than one return interval)
- A low risk of losing key ecosystem components
- Vegetation attributes are functioning within historic range

FRCC 2

- Fire regimes have been moderately altered from historical range; moderate change in size and intensity has resulted
- Moderate risk of losing key ecosystem components
- Vegetation attributes have been moderately altered

FRCC 3

- Fire regimes have been significantly altered from their historic range; dramatic changes in fire size and severity has resulted
- Severe loss of ecosystem components
- Vegetation attributes have been significantly altered

Much of the Blowout Project Area can be quantitatively described as a FRCC 1. A current FRCC map using the Fire Regime data has not been produced (Kertis, 2005, Forest Ecologist, personal communication). This map is pending release. FRCC 1 concludes that the area is not outside of the historical range of variability for fire interval; more than one fire cycle has not been missed. However, the susceptibility to fire within the Blowout project area should be tempered with the current fuel profile. An elevated risk of high severity fire due to the continuity of vertical and horizontal fuels exists across the landscape. Continuous canopy closure and increased fuel due to fire suppression create more of a potential for large, severe fire. FRCC 1, under the existing vegetation condition understates the potential for loss of vegetation attributes due to large fires.

Fuel Models

There are two major Fire Behavior Prediction System fuel models (FM) represented within this project planning area. Fuel Model 8 constitutes 85% of the acres. This profile can be found in stands that were or were not previously harvested. Fire spread is generally slow with low flame lengths. Heavy fuel concentrations (jackpots) can flare up. Only under severe weather conditions involving high temperatures, low humidity's, and high winds do the fuels pose fire hazards. About 15% of the acres are a Fuel Model 10 represented by the mixed conifer stand with a heavy concentration of down and standing woody component. Ground fire behavior is higher in intensity than Fuel Model 8 or 9 because of the heavier fuel loading. Torching trees (fires in the crowns of trees) occurs more frequently.

Risk and Role of Fire in the Watershed

Large fire events occurred in the watershed when a combination of weather and fuel factors created optimum conditions for fire intensity and spread. The watershed experienced infrequent severe crown and surface fires that often resulted in total tree mortality around the 1600's. These large fires have often occurred in drought years, ignited by lightning and driven by east winds. Present forestry practices have probably had a dampening effect on the fire regime in the Blowout Watershed. The large numbers of roads and managed stands has increased accessibility for fire suppression efforts, and have provided fuel breaks through much of the area. The size of smaller patch fires has been kept artificially low, and the opportunity for these fires to become large stand replacing fires under certain environmental conditions (high temperatures, east winds etc.) has been greatly reduced.

Conversely, management has increased the frequency of patch fires in specific areas due to escaped slash burns and increased access to the public, which has resulted in more frequent human caused fires.

The current, fragmented landscape supports various fire intensities as the decrease or increase of vegetation responds differentially to fire. The resulting condition probably reflects an alteration in the distribution, composition and extent of plant communities that had adapted to the pre-management fire regime.

Fuel profiles in the Blowout Watershed are affected by three elements: silvicultural treatments, stochastic events and time. All three have played a role in the present fuels profile associated with the watershed. About 1,782 acres of the watershed have had silvicultural treatments in the last 20 years. Stochastic events (such as large wildfires) have played a major role in this watershed, and would most likely continue to do so.

Environmental Consequences – Fire and Fuels

Direct and Indirect Effects

Alternative 1 – No Action

Under Alternative 1, no fuels would be generated and forested stands in the area would continue on a path of natural succession. Stands that were previously managed and are currently in an overstocked condition would develop relatively slowly into diversified forests. Slow growing and weakened trees would die and contribute to the fuel buildup on the forest floor. A fairly healthy stand would be vulnerable to a change in fuel model due to overstocking and encroachment. Forest fuel loadings would continue to increase due to insect and disease caused tree mortality, forest succession, including further in-growth of understory trees and vegetation. The no-action alternative does not include any treatments to improve the stand health. Fire suppression would also continue. In the absence of management ignited prescribed fire, ladder fuels and canopy closure would continue to be high, thus providing propellants for severe, high intensity wildfires.

Alternatives 2, 3, 4, and 5 (Effects of Thinning Treatment)

The proposed thinning in the Blowout Thin Project Area would open the stands creating forest canopies that are less susceptible to sustaining a crown fire. Ladder fuels would be reduced as harvest operations remove the vertical fuel continuity. The proposed regeneration harvests would eliminate most of the canopy and ladder fuels; therefore, the potential for crown fire spreading through these stands would be low.

Increased surface fuel loads affect fire behavior by temporarily increasing fire intensity and rate of spread. The increase in fuel loading is temporary because moderate to heavy precipitation in the western Cascade Mountains accelerates the decomposition processes, especially for fine fuels. With no fuel treatments, after 3 years the 0-3 inch fuel would be less of a concern, as the needles drop off and the snow crushes the fuel closer to the ground, accelerating the fuel decomposition. As a result, fire danger in untreated stands would be highest 1-5 years after thinning and would decrease significantly thereafter. Studies have shown that Douglas fir decomposes to approximately 79% of its original volume after 5 years (Fahnestock and Dietrich, 1962). Some of the thinned units left untreated for fuels would be on the higher end of the Willamette National Forest Plan recommended levels (USDA Forest Service, 1990). The thinning would occur over a period of 2-3 years and the total fuel would not be on the ground all at once; therefore, untreated fuel would be in varied stages of height and decomposition. Acceptable levels for fire crews to suppress wildfires and build handline under normal summer conditions would result in flame lengths dropping to 4 feet or less. This is attributed to varied stages of height and decomposition of the residual fuels.

Alternatives 2, 3, and 5 (Effects of Regeneration Harvest Treatment)

The activity generated fuel loadings in the regeneration harvests would be highest immediately following the operations and would remain such until the broadcast burning and pile burning are implemented. The intention of the broadcast burn is to reduce the fine fuel loads that normally carry ground fire through the unit. Some larger fuels may remain, but fuel loads would be below the recommended levels.

Alternative 4

Alternative 4 proposes the least amount of silvicultural treatments by eliminating the regeneration units. This would also lessen the amount of activity-generated fuels and the need for fuel treatment. The fuel models in these units would not change and the fire behaviors would continue to increase in intensity. Location of fuel treatments is an important aspect in the prevention of fires spreading outside the project area.

Cumulative Effects

The fire and fuels cumulative effects analysis focuses on the five planning subdrainages that contain the proposed Blowout Thin harvest units: Beard 78L, Cliff 78R, Divide 78M, Westside Blowout-Ivy 78Q and Hawkins 78N. The fuels analysis area comprised of these five planning subdrainages contains 20,253 acres. Cumulative effects for the alternatives are described below.

Alternative 1 – No Action

Over the next five decades, Alternative 1 would result in fuel models that increase fire intensities and are arranged in large contiguous patches which increase resistance to control within the project area. The No Action alternative would increase the risk of fire spreading outside the project area to adjacent Forest Service lands. When projects occurring over the last 20 years and present projects are considered, the percentage of area within the fuels analysis area receiving fuels treatment is about 9.38% (see Table FF-1).

Alternatives 2, 3, 4, and 5

Past management or lack of management within the Blowout Thin Project area has significantly changed the tree species demographics, landscape structure and fuel loadings by removing the principal agents of change and renewal. The proposed actions result in an increase of fuel loadings that are generated by logging slash, which would decrease over time. The biomass fuel loads would decrease with the proposed actions through reduced stand density. Future management activities that may contribute to higher fuel loads would include pre-commercial thinning. Typically, the thinning slash is pulled back from the roads and allowed to decompose on site minimizing the overall risk of human ignition. Other future activities may include salvage logging within forested areas or hazard tree removal along the roadsides. The removal of dead and dying trees would reduce the risk of a large fire from developing.

All present and proposed activities in the foreseeable future would have some measure of fuel treatments, resulting in a Fuel Model 8 (both spread and intensity) after treatment.

The cumulative effects of the fuel treatments in any of the action alternatives would be minimal at the subwatershed scale. As shown in Table FF-2, Alternatives 2 and 5 would result in about 10.72 percent of the fuels analysis area treated, an incremental increase of about 1.34% over no action. Alternative 3 would result in about 10.80 percent of the fuels analysis area treated, an incremental increase of about 1.42% over no action. Alternative 4 would result in about 10.43 percent of the fuels analysis area treated, an incremental increase of about 1.05% over no action.

The action alternatives would provide a variety of fuels treatments, which reduce fire intensities within the project area. By varying the spatial patterns of fuels there is less resistance to control thereby lowering the risk of fire spreading outside the project area.

Table FF-1: Recently Past, Present, and Foreseeable Future Projects in the Fuels Analysis Area*

Project Name	Acres	Activity Type	% of Fuels Analysis Area*
Past 20 Years			
640 Salvage	232	Mortality Salvage	1.15
Beard	64	Clearcut	0.32
Beard LV	28	Clearcut	0.14
Beard LV TBV	85	Clearcut	0.42
Blow Hawk	4	Clearcut	0.02
Blow Thin	1	Commercial Thin	0.00
Butte East Salvage II	14	Seed Tree	0.07
Buzz Consultation	15	Mortality Salvage	0.07
Buzz Salvage	61	Mortality Salvage	0.30
Bypass Salvage	65	Mortality Salvage	0.32
Cub	76	Clearcut	0.38
Decadent Divide	53	Clearcut	0.26
Divide Ridge	128	Clearcut	0.63
E.Half	63	Shelterwood Final Removal	0.31
Fish Hawk Savage	8	Clearcut	0.04
Fly Salvage	123	Mortality Salvage	0.61
Ivy Blow	74	Clearcut	0.37
Kapers	90	Clearcut	0.44
Lo Ivy	9	Clearcut	0.04
Lo Ivy TBV	90	Clearcut	0.44
Lo Kay	68	Clearcut	0.34
Log Cabin	96	Clearcut	0.47
Lost Horse	26	Clearcut	0.13
Low Blow TBV	13	Clearcut	0.06
N. Blowout TBV	169	Clearcut	0.83
Outblow Salvage	61	Mortality Salvage	0.30
Pole Hawk	39	Clearcut	0.19
Tom Log	26	Clearcut	0.13
Upper Blowout	1	Shelterwood	0.00
Subtotal Past 20 Years	1782		8.80
Present Projects - Sold and Awarded			
Echo	8	Commercial Thin	0.04
Echo	40	Clearcut with Reserves	0.20
Roadway Thin	70	Commercial Thin	0.35
Subtotal Present	118		0.59
Foreseeable Future Projects			
N/A	0		
Grand Totals	1900		9.38
*Fuels Analysis Area = PSUBS 78L, 78R, 78M, 78Q, 78N (20,253 acres)			

Table FF-2: Percent and cumulative percent of the fuels analysis area treated by alternative

Alternative	Acres Fuel Treatment	% of Fuels Analysis Area	Cumulative % of Fuels Analysis Area
1	0	0	9.38
2	272	1.34	10.72
3	288	1.42	10.80
4	213	1.05	10.43
5	272	1.34	10.72

Existing Condition – Air Quality

The State of Oregon has delegated authority for attainment standards set by the 1990 Clean Air Act and the 1977 Clean Air Act and its amendments. To do this, the state developed the Oregon Smoke Management Plan. The Forest Service has adopted this plan for National Forest lands in Oregon.

The Oregon Smoke Management Plan establishes designated areas that are principal population centers and Class I Airsheds, including wildernesses and other sensitive airsheds. One purpose of the Smoke Management Plan is to protect air quality in these high priority areas. For the 985 acre Blowout Thin Project Area, the closet designated areas are the Willamette Valley and Bend (50, 60 miles respectively). The closet Class I airsheds are the Mt Jefferson Wilderness and Middle Santiam Wilderness (7 and 4 miles respectively).

Environmental Consequences – Air Quality

Direct and Indirect Effects

Alternative 1 – No Action

There are no impacts to air quality in the No Action Alternative, however, the stands would continue to store more biomass as they grow and postpone the release of smoke to the driest time of the year when the impact to people is the greatest. In the event of a wildfire, air quality impacts are considerably higher than management ignited prescribed fire. Table FF-3, below, demonstrates the differences. Acreage used for the no action alternative was the total of management acres (985 acres) in the Blowout Thin Project Area. Smoke emissions are not short term and can last for months, as witnessed by the B&B Fire in 2003. Smoke could blanket the adjacent wildernesses with significant negative effects on air quality and visibility, or intrude on at least one of the designated areas. The most likely time for a large wildfire to occur is between July 1 and September 15, which coincides with outdoor recreation activities and high public use of the National Forests.

Alternatives 2, 3, 4, and 5

Air quality in the designated areas could be affected by forest-land fuel treatments, such as broadcast application of fire to reduce fuels and burning hand, grapple or landing pile. The following table illustrates the estimated total PM 2.5 and PM 10 emissions (2.5 and 10 microns in diameter respectively) of particulate matter for broadcast and hand pile burning by alternative. The calculations are based on the pounds of particulate matter per ton of slash for prescribed burning in the Western Cascades fuel types. Average tons per acre (TPA) burned do not include landing piles due to the wide variability in landing pile characteristics, primarily size and shape.

Smoke emissions were predicted using the estimates from the debris prediction tables and FOFEM (First Order Fire Effects Model version 5.0). This model calculates particulate matter emitted based on the amount of fuel consumed. Fuel inputs were from the predicted post harvest data and based on a percentage of fuels that would most likely be consumed given the prescribed fire window. That is, weather and fuels dryness would be measured to achieve the objective of reducing the fuel profile across the unit. On average, 80% of the fine fuels (0-1inch diameter) would be consumed, 60% of the 1-3 inch diameter fuels would be consumed, and only about 20% of the 3 inch and greater fuels would be consumed. The following table summarizes particulate matter predicted for fuels treatment activities.

Table FF-3: Summary of particulate matter for the Blowout Thin Project Area

	Alternative 1 No Action Wildfire	Alternative 2, 3, and 5	Alternative 4
PM 2.5 total	511 tons	312 tons	292 tons
PM 10	603 tons	364 tons	342 tons

It is important to note these emission levels do not occur all at one time. Usually prescribed fire operations occur one unit at a time (in one day) For example, a 6 acre broadcast unit predicted to have 20 tons/acre of 0-3 inch diameter fuel post harvest would emit particulate matter in the range of 3.7 tons/unit of PM 10 and 2.9 tons/unit of PM 2.5.

The significance of emission level changes is based on the weather. During periods of atmospheric stability (inversions) particulate matter is not dispersed and debris burning would not occur. However, during atmospheric instability, vertical mixing allows particulate matter to disseminate and the emissions from debris burning are readily dispersed. Typically prescribed broadcast burning would occur in the spring when the snow has melted off and fuels are dry enough to burn and may last through July 1st. Burning resumes September 15th and after dry, east winds events has ended. Generally, both hand piles and landing pile burning occurs in the fall when the seasonal rains control and extinguish the burning.

Public use of the wilderness is highest between July 1 and September 15, not during the prescribed fire season. The affects of prescribed burning on air quality would therefore be of minimal impact to the public and meet air quality standards.

The Oregon smoke Management Plan and the Oregon Visibility State Implementation Plan (SIP) also have a number requirements designed to meet the Clean Air Act standards, reduce the amount of smoke produced, and reduce the impact on the designated and wilderness areas. All burning operations would comply with the SIP, and be planned through the Oregon Smoke Management System, FASTRACS.

Cumulative Effects

Alternative 1

Past management activities do not cumulatively add to air quality impacts from the proposed treatments. Foreseeable future activities include fuel treatments for Echo and Roadway Thin timber sales, in the fall of 2007. Echo has 34 acres of machine pile burning. Roadway Thin timber sale has 52 acres of hand piling and burning, 10 acres of landing piles, and 10 acres of machine piles to burn. These types of fuel treatments typically occur in the fall and are planned to occur in 2007.

Alternatives 2, 3, 4, and 5

No adverse effects on the air quality would result from the proposed fuel treatments. Smoke emissions would be short duration and mitigation measures would reduce the quantity of emissions during prescribed burns. Past management activities do not cumulatively add to air quality impacts from the proposed treatments. Foreseeable future fuel treatment activities would be the same as described in Alternative 1.

Wildlife Habitat

Introduction

The stands being considered for treatment include overstocked managed stands over 40 years old and overstocked fire regenerated stands about 100 years old in the Blowout Creek drainage on the Detroit Ranger District, Willamette National Forest.

The Willamette Forest Plan establishes a need for action to manage forested stands at the landscape level, while considering habitat diversity, size and shape of contiguous habitat blocks, and habitat function; and to prepare stands for safe introduction of fire to benefit wildlife and reduce risk of catastrophic wildfire.

While taking action to meet this underlying need, the project will be designed to meet the following purposes related to wildlife:

- Enhance the development of habitat diversity for wildlife on both Matrix and riparian lands; and
- Manage Riparian Reserve stands to accelerate the attainment of late-successional stand characteristics and achieve diverse multi-canopy stands for riparian dependent species and water quality.

Regulatory Framework

This project was designed using the direction and guidelines found in the Willamette National Forest Land and Resource Management Plan (LRMP) (as amended), the Northwest Forest Plan, the Endangered Species Act (ESA) of 1973 (as amended), and the Migratory Bird Treaty Act of 1918. An assessment of how each project alternative meets this guidance, are provided near the end of Chapter 3, under Consistency with Direction and Regulations.

Big Game – Existing Condition

The management objectives for big game habitat are applied to specific mapped "Emphasis Areas" within the Forest. The Blowout Thin project area encompasses all, or a portion of four Big Game Emphasis Areas (BGEA), Beard, Cliff, Divide and Upper Blowout[2]. Forest Plan Standards and Guidelines (S&G) (FW-137) directs the use of a model to evaluate the effects of projects on habitat within BGEAs. A Model to Evaluate Elk Habitat in Western Oregon (Wisdom, 1986) is used to estimate habitat effectiveness (HE), which is defined as the proportion of achievement relative to an optimum condition. The management intent is to maintain effectiveness value in the range of 0.5-1.0 with the optimum value being 1.0. HE incorporates and qualifies four key habitat attributes: size and spacing of forage (HEs), quality of forage (HEf), cover areas (HEc), and open road density (HEr) through big game habitat. Each habitat variable is calculated individually and

[2] Small portions of proposed harvest units extend into Rainbow and Log Tom BGEA's. These units total approximately 20 acres of thinning which would not change the cover or forage values in model results. These areas were not analyzed further.

allows for a comparison by variable or as a whole (known as the Habitat Effectiveness Index or HEI). The elk model considers past and ongoing activities.

BGEA's Beard and Divide are high emphasis areas with winter range. BGEA's Cliff and Upper Blowout are moderate emphasis areas with winter range. Winter range is managed for high emphasis habitat values which equates to a minimum desired rating of .5 for each variable with an overall value of .6. A moderate emphasis area should possess an HEI between 0.4 and 1.0 for each habitat value with 1.0 being optimum and less than 0.4 being marginal. The overall HEI for a moderate emphasis area should be greater than 0.5. Table WL-1 describes the current index values for the BGEA's in the Blowout Thin Project Area.

Table WL-1: Current Big Game Emphasis Area Habitat Values (2006 Model Results)

Big Game Emphasis Area	Spacing (HEs)	Cover (HEc)	Forage (HEf)	Roads (HEr)	Overall (HEI)
Beard					
High Emphasis	.96	.50	.44	.41	.54
Winter Range	.96	.51	.41	.43	.54
Cliff					
Moderate Emphasis	.80	.54	.36	.42	.51
Winter Range	.88	.52	.35	.38	.49
Divide					
High Emphasis	.87	.51	.40	.38	.51
Winter Range	.82	.55	.47	.35	.52
Upper Blowout					
Moderate Emphasis	.86	.45	.40	.30	.47
Winter Range	.91	.56	.40	.49	.56

Summary of Existing Big Game Model Variables for the Blowout Thin Project Analysis Area:

Size and Spacing of Forage: The size and spacing habitat effectiveness rating for forage and cover in these four big game emphasis areas indicates that the existing distribution of cover and forage is very good and that management goals for size and spacing are currently being met: Beard (0.96 for high emphasis habitat and winter range), Cliff (0.80 for moderate emphasis and .88 for winter range), Divide (.87 for high emphasis habitat and .82 for winter range) and Upper Blowout (.86 for moderate emphasis habitat and .91 for winter range).

Cover: The habitat effectiveness value for cover in the Beard, Cliff, Divide, and Upper Blowout areas are currently meeting the standards.

Forage: The forage quality habitat effectiveness ratings for three areas are currently below standards: Beard (0.44 for high emphasis habitat and .41 for winter range), Cliff (0.36 for moderate emphasis and .35 for winter range), and Divide (.40 for high emphasis habitat and .47 for winter range). The Upper Blowout area is at standard for the moderate emphasis habitat (.40) but below standard for the winter range (currently also at .40).

Road Density: The open road density habitat effectiveness ratings indicate that road densities are below the Forest Plan recommendations for the Beard, Cliff (winter range), Divide and Upper Blowout areas. In the Cliff's moderate emphasis habitat, forest plan recommendations are currently being met.

Habitat Effectiveness Index (HEI): The overall ratings of the habitat effectiveness index find that moderate emphasis habitat in the Cliff and Upper Blowout BGEAs are above Forest plan standards, while the high emphasis and winter range habitat in the Beard, Cliff, Divide, and Upper Blowout BGEAs are not at standard.

Discussion

Current values for forage are the most limiting factor in attaining desired habitat effectiveness values. Cover exceeds overall target levels and is lower than desired in the winter range portion of the planning area. The Northwest Forest Plan altered our ability to maintain habitat effectiveness values at desired levels. Clearcuts followed by slash burning are no longer the primary harvest method. Clearcuts create much higher forage values than thinning and other types of harvest strategies. Forage values cannot be maintained at desired levels and will continue to decrease over time due to timber harvest method changes. This will bring down the overall average habitat effectiveness in all big game emphasis areas.

Hiding habitat and roadside screening in re-growing clearcuts is increasing. This is also expected to reduce the effects of open roads due to reduced visibility from the roads into the units

A winter range closure of the entire Blowout drainage takes affect approximately January 2 – April 15. The closure can occur as early as December 1 if sufficient snow has fallen to move big game into winter range.

Road closures made with previous project decisions have not been fully implemented in the analysis area. The public continues to use these roads, even though they were designated to be closed. Portions of the driveable roads that are currently used by four wheel drive enthusiasts were treated as though they are open in the HEIWEST model.

An interdisciplinary open road analysis, the Blowout/Monument Peak Open Road Area Analysis Project Environmental Assessment, covering the planning area, was completed in August 1991. A CFR closure notice was signed on December 18, 1992. Roads have been decommissioned, grown over, slumped, closure devices destroyed and various other changes have occurred since that time. At this time, the 1991 E.A. is the most recent signed decision on open road management in the area.

Big Game – Environmental Consequences

Direct and Indirect Effects

Alternative 1 – No Action

There would be no road closures with this alternative. There would be no regeneration harvest to promote forage production. HEI Model results for the direct and indirect effects of Alternative 1 would be the same as shown in Table WL-1 for the existing condition. Miles of open road within the BGEA's would remain the same as shown for the existing condition.

Alternatives 2, 3, 4 and 5 – Road closures

These alternatives contain 1.25 miles of new road closures. Road and forage values are currently below desired levels so any increase in value for these two factors would be moving the BGEA's toward desired values. As seen in Table WL-2, this movement in HE values is rather small.

Alternatives 2, 3, and 5 – Forage

Forage values would be increased in Beard, Cliff, and Divide BGEA's by the creation of small clearings (the regeneration harvest units). Some increase in forage may occur in thinning units as increased sunlight reaches forage species on the ground. Forage value would decrease as the thinned trees grow together and reduce sunlight levels to the ground. The habitat effectiveness model does not measure changes in forage values related to thinning as the forage value changes are too small. See Table WL-2 for the HEI changes in Alternatives 2-5.

Alternative 4 – Forage

No measurable habitat value changes from the existing conditions would occur. Some increase in forage may occur in thinning units as increased sunlight reaches forage species on the ground. Forage value would decrease as the thinned trees grow together and reduce sunlight levels to the ground. The habitat effectiveness model does not measure changes in forage values related to thinning as the forage value changes are too small.

Table WL-2: Direct and Indirect Effects of Harvest and New Road Closures

BGEA		Index	Existing	Alt 1	Alts 2, 3, 5	Alt 4	Desired
Beard	Entire BGEA (High Emphasis)	HEs	.96	.96	.96	.96	≥.50
		HEr	.41	.41	.41	.41	≥.50
		HEc	.50	.50	.50	.50	≥.50
		HEf	.44	.44	.44	.44	≥.50
		HEI	.54	.54	.54	.54	≥.60
		Open Rd Density (mi/sq mi)	2.72	2.72	2.69	2.69	≤1.86
	Winter Range Portion (High Emphasis)	HEs	.96	.96	.96	.96	≥.50
		HEr	.43	.43	.43	.43	≥.50
		HEc	.51	.51	.51	.51	≥.50
		HEf	.41	.41	.42	.41	≥.50
		HEI	.54	.54	.54	.54	≥.60
		Open Rd Density (mi/sq mi)	2.48	2.48	2.48	2.48	≤1.86
Cliff	Entire BGEA (Mod Emphasis)	HEs	.80	.80	.80	.80	≥.40
		HEr	.42	.42	.42	.42	≥.40
		HEc	.54	.54	.54	.54	≥.40
		HEf	.36	.36	.37	.36	≥.40
		HEI	.51	.51	.51	.51	≥.50
		Open Rd Density (mi/sq mi)	2.67	2.67	2.67	2.67	≤2.86
	Winter Range Portion (High Emphasis)	HEs	.88	.88	.88	.88	≥.50
		HEr	.38	.38	.38	.38	≥.50
		HEc	.52	.52	.52	.52	≥.50
		HEf	.35	.35	.38	.35	≥.50
		HEI	.49	.49	.50	.49	≥.60
		Open Rd Density (mi/sq mi)	3.10	3.10	3.10	3.10	≤1.86

BGEA		Index	Existing	Alt 1	3, 5	Alt 4	Desired
Divide	Entire BGEA (High Empha-sis)	HEs	.87	.87	.88	.87	≥.50
		HEr	.38	.38	.39	.39	≥.50
		HEc	.51	.51	.51	.51	≥.50
		HEf	.40	.40	.41	.40	≥.50
		HEI	.51	.51	.52	.51	≥.60
		Open Rd Density (mi/sq mi)	3.10	3.10	3.03	3.03	≤1.86
	Winter Range Portion (High Empha-sis)	HEs	.82	.82	.83	.82	≥.50
		HEr	.35	.35	.35	.35	≥.50
		HEc	.55	.55	.55	.55	≥.50
		HEf	.47	.47	.49	.47	≥.50
		HEI	.52	.52	.53	.52	≥.60
		Open Rd Density (mi/sq mi)	3.41	3.41	3.41	3.41	≤1.86
Upper Blowout	Entire BGEA (Mod Empha-sis)	HEs	.86	.86	.87	.86	≥.40
		HEr	.30	.30	.30	.30	≥.40
		HEc	.45	.45	.45	.45	≥.40
		HEf	.40	.40	.40	.40	≥.40
		HEI	.47	.47	.47	.47	≥.50
		Open Rd Density (mi/sq mi)	3.93	3.93	3.93	3.93	≤2.86
	Winter Range Portion (High Empha-sis)	HEs	.91	.91	.91	.91	≥.50
		HEr	.49	.49	.49	.49	≥.50
		HEc	.56	.56	.56	.56	≥.50
		HEf	.40	.40	.40	.40	≥.50
		HEI	.56	.56	.56	.56	≥.60
		Open Rd Density (mi/sq mi)	1.96	1.96	1.96	1.96	≤1.86

Cumulative Effects

The cumulative effects analysis area is also defined by the big game emphasis areas. Past, present, and reasonably foreseeable actions were considered in the analysis and modeled during the mapping of habitat conditions. In a general context, cumulative effects of the Blowout Thin project on big game habitat would be positive in the short-term (< than ten years), yet inconsequential in the long-term and relative to cumulative effects from past actions that have created the current habitat conditions in the BGEAs within the Blowout Thin project area. There are no foreseeable actions that would appreciably modify habitat conditions throughout the BGEAs in the project area. There are, however, some past, present, and foreseeable activities that could result in modest improvements in the HEI for the BGEAs in the project area.

Cumulative Effects - Alternative 1

During the summer of 2005, gates were installed on most roads on private land in the Beard BGEA. Open road densities were reduced by these closures. Private land is also providing forage in clearcuts which were harvested in the past 10 years. Knutson-Vandenberg (KV) funds from timber sale receipts will not be available to provide closure replacements on about 12.88 miles of roads that were previously closed, but have deteriorated. Other funding sources, such as Payments to Counties Program (PAYCO), could be available, however the probability is low.

Table WL-3 shows the expected HEI after consideration of the relevant past, present, and reasonably foreseeable activities. The assumption used in the HEIWEST model was that closure replacements would be funded since there is a chance that PAYCO funding could be available.

Echo and Roadway Thin timber sales are occurring in the planning area and will not alter road densities either by adding new roads or closing existing roads. Roadway Thin is not expected to cause any change in habitat type or value. Echo may create a small amount of forage in skid roads but not enough to cause a measurable change in habitat values. Total skid road acres for the 38 acres of harvest units is expected to be 2-3 acres. Forage enhancement, such as seeding with forage mix, was not proposed in the Echo sale EA so measurable increases in forage value are not expected to occur. Overall, then, there is no expectation that cumulative effects will result from the implementation of Alternative 1.

Cumulative Effects - Alternatives 2, 3, 4, and 5

During the summer of 2005, gates were installed on most roads on private land in the Beard BGEA. Road values were improved by these closures. Private land is also providing forage in clearcuts which were harvested in the past 10 years. New closures on about 1.25 miles of road and closure replacements on about 12.88 miles of roads that were previously closed would improve the HEI roads values (if funding is available). Knutson-Vandenberg (KV) funds from timber sale receipts would be requested to cover these activities. New closures and closure replacements are not a mitigation measure for the sale, so KV funds may not be available for these activities given the KV projects priorities (see EA Appendix E - Post-Sale Activities). Other funding sources, such as PAYCO, could be available, however the probability is low. The assumption used in the HEIWEST model was that new closures and closure replacements would be funded in Alternatives 2, 3, 4, and 5.

Miles of open road within the BGEA's after implementation of the 1.25 miles of new closures proposed in the four action alternatives and the 12.88 miles of KV-funded, foreseeable future closure replacements would be as follows: Beard (entire BGEA) – 21.40, Beard (winter range) – 16.80, Cliff (entire BGEA) – 31.30, Cliff (winter range) – 7.20, Divide (entire BGEA) – 29.40, Divide (winter range) – 17.50, Upper Blowout (entire BGEA) – 29.70, Upper Blowout (winter range) – 1.60. These foreseeable closures will move the area towards the desired HEI values for the BGEAs (see Table WL-3).

Forage seeding and fertilization on 59 acres of regeneration harvest, would increase forage values if funding becomes available for these treatments. Knutson-Vandenberg (KV) funds, from timber sale receipts, are one source of funds for this activity. As closure replacements are not mitigation for proposed project activities, KV funding is not mandatory, but may be available if the Blowout Thin Timber Sale sells for more than advertised rates (see Appendix E - Post-Sale Activities). Other funding sources, such as Appropriated Road Maintenance or the Payments to Counties Program (PAYCO), could be available, however the probability is low. See Table WL-3.

For Alternative 4, there would be no regeneration harvest or forage seeding of regeneration harvest units and, therefore, no improvement in HEI forage values from regeneration harvest or forage seeding.

The effects related to two timber sales in the area (Roadway Thin and Echo Thin) are not expected to result in any appreciable cumulative effects (see discussion of these timber sales under Alternative 1. Overall, there is an expectation that the relevant past, present, and reasonably foreseeable activities in the project area will result in positive cumulative effects and a movement towards the desired HEIs for the BGEAs in the project area.

Table WL-3: Cumulative Effects of Harvest, New Road Closures, and Foreseeable Future Reclosures

BGEA		Index	Existing	Alt 1	Alts 2, 3, 5	Alt 4	Desired
Beard	Entire BGEA (High Empha-sis)	HEs	.96	.96	.96	.96	≥.50
		HEr	.41	.42	.43	.43	≥.50
		HEc	.50	.50	.50	.50	≥.50
		HEf	.44	.44	.44	.44	≥.50
		HEI	.54	.55	.55	.55	≥.60
		Open Rd Density (mi/sq mi)	2.72	2.59	2.56	2.56	≤1.86
	Winter Range Portion (High Empha-sis)	HEs	.96	.96	.96	.96	≥.50
		HEr	.43	.44	.44	.44	≥.50
		HEc	.51	.51	.51	.51	≥.50
		HEf	.41	.41	.42	.41	≥.50
		HEI	.54	.54	.55	.54	≥.60
		Open Rd Density (mi/sq mi)	2.48	2.40	2.40	2.40	≤1.86
Cliff	Entire BGEA (Mod Empha-sis)	HEs	.80	.80	.80	.80	≥.40
		HEr	.42	.42	.42	.42	≥.40
		HEc	.54	.54	.54	.54	≥.40
		HEf	.36	.36	.37	.36	≥.40
		HEI	.51	.51	.51	.51	≥.50
		Open Rd Density (mi/sq mi)	2.67	2.65	2.65	2.65	≤2.86
	Winter Range Portion (High Empha-sis)	HEs	.88	.88	.88	.88	≥.50
		HEr	.38	.39	.39	.39	≥.50
		HEc	.52	.52	.52	.52	≥.50
		HEf	.35	.35	.38	.35	≥.50
		HEI	.49	.50	.51	.50	≥.60
		Open Rd Density (mi/sq mi)	3.10	3.01	3.01	3.01	≤1.86
Divide	Entire BGEA (High Empha-sis)	HEs	.87	.87	.88	.87	≥.50
		HEr	.38	.43	.43	.43	≥.50
		HEc	.51	.51	.51	.51	≥.50
		HEf	.40	.40	.41	.40	≥.50
		HEI	.51	.52	.53	.53	≥.60
		Open Rd Density (mi/sq mi)	3.10	2.61	2.54	2.54	≤1.86
	Winter Range Portion (High Empha-sis)	HEs	.82	.82	.83	.82	≥.50
		HEr	.35	.41	.41	.41	≥.50
		HEc	.55	.55	.55	.55	≥.50
		HEf	.47	.47	.49	.47	≥.50
		HEI	.52	.54	.55	.54	≥.60
		Open Rd Density	3.41	2.74	2.74	2.74	≤1.86

BGEA		Index	Existing	Alt 1	Alts 2, 3, 5	Alt 4	Desired
		(mi/sq mi)					
Upper Blowout	Entire BGEA (Mod Emphasis)	HEs	.86	.86	.87	.86	≥.40
		HEr	.30	.31	.31	.31	≥.40
		HEc	.45	.45	.45	.45	≥.40
		HEf	.40	.40	.40	.40	≥.40
		HEI	.47	.47	.47	.47	≥.50
		Open Rd Density (mi/sq mi)	3.93	3.85	3.85	3.85	≤2.86
	Winter Range Portion (High Emphasis)	HEs	.91	.91	.91	.91	≥.50
		HEr	.49	.49	.49	.49	≥.50
		HEc	.56	.56	.56	.56	≥.50
		HEf	.40	.40	.40	.40	≥.50
		HEI	.56	.56	.56	.56	≥.60
		Open Rd Density (mi/sq mi)	1.96	1.96	1.96	1.96	≤1.86

Snags and Downed Wood – Existing Condition

Introduction

The significance of the ecological role of snags and down wood in influencing ecosystem diversity and productivity is addressed in the Willamette National Forest Land and Resource Management Plan (1990). The significance of this relationship in coniferous forests of the Pacific Northwest is further emphasized by management S&Gs under the Northwest Forest Plan ROD (1994, 2001, 2004) and elsewhere throughout published literature (Hallett et al. 2001, Laudenslayer et al. 2002, Lewis 1998, Rose et al. 2001).

Under the Willamette Forest Plan as amended by the ROD, snag habitat shall be managed at levels capable of providing for at least 40% or greater potential populations of cavity-nesting species. Current science has questioned the validity of the potential population approach to species management. Strong support for identifying more appropriate amounts of snag and down wood habitat is being given to new approaches in addressing these habitat components. One such approach devoted to identifying appropriate levels of snag and down wood in selected habitat types is DecAID -the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon (Mellen et al. 2006).

DecAID is being used as best available science information. DecAID is a web-based advisory tool to help land managers assess impacts of forest conditions and existing or proposed management activities on organisms that use snags and down wood. It is a summary, synthesis, and integration of published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience. When using the data from unharvested inventory data in DecAID, caution should be used due to years of fire exclusion. DecAID vegetation data provide the most current scientific data available and it should be used until new information is acquired.

The Forest Plan, as amended, requires retention of snags at levels sufficient to support cavity nesting birds at 40 percent potential population levels. Biological potential models have been invalidated (Johnson and O'Neil, 2001). The DecAID advisory tool (Mellen et al. 2006) has been developed to help federal land managers evaluate effects of management activities on certain wildlife species that use dead wood habitats. DecAID displays data on wildlife use based on snag density and diameter. Data in DecAID suggests that snag retention levels for some cavity excavators may need to be higher than the levels previously calculated from biological potential population models. DecAID does not model biological potential or population viability. Furthermore, there exists no direct relationship between tolerances, snag densities and sizes used in DecAID and the measurements of population levels.

Standards and Guidelines call for down wood distribution of the appropriate quantities, sizes and species as shown on pages C-40 and C-41 of the Northwest Forest Plan ROD and Standards and Guidelines. For the Willamette National Forest, down wood standards and guidelines state that at least 240 linear feet of logs per acre greater than or equal to 20 inches in diameter; must be greater than 20 feet in length to be counted toward this total. It is the down wood in decay classes I and II that are to be counted. The down wood species to be left should be a reflection of the species mix found in the original stand.

When partial harvest occurs, these standards and guidelines still apply however, modifications should occur to reflect the timing of stand development cycles. The integrity and structure of existing down wood should be protected from yarding and slash treatment whenever possible.

Snags – Existing Condition

Blowout Thin occurs in six sub-drainages in the Blowout Creek drainage and three subdrainages of the North Santiam River. Existing snag levels are above the 40% level prescribed in the Willamette Forest Plan in all sub-drainages in which harvest of trees large enough to create snags is proposed. In the subdrainages which are below the 40% level, trees would only be harvested in stands that do not have trees large enough to create snags. Table WL-4, below, shows planning subdrainages and existing snag levels.

Table WL-4: Subdrainages and Existing Snag Levels

Subdrainage	Percent Snags
78H Bear	25.4
78I Rainbow-Cabin	41.0
78K South Side Detroit	21.5
78L Beard	40.7
78M Divide	41.9
78N Hawkins	44.3
78Q West Side Blowout Ivy	51.2
87R Cliff	51.4
78U Upper Blowout	35.5

DecAID is the second tool, besides the Willamette Forest Plan, used to suggest treatment level snag densities relative to landscape levels. The objective of the DecAID model is to mimic natural conditions across the landscape, generally defined as 20 square miles. This means not all areas of all units would have the same number of snags, some may be clumped, some may be scattered, one area may have large snags and another small snags. "DecAID presents wildlife data at three tolerance intervals (30%, 50% and 80%) for each species, which the user can interpret as increasing levels of assurance of providing for species" (Marcot, Holmann and Mellen, in prep).

At the 30% tolerance level DecAID suggests 5.3 snags per acre greater than 10" dbh with 4.8 of those snags greater than 20" dbh. This means that in units which are not capable of providing snags larger than 20" only 0.5 snags between 10" and 20" per acre are recommended. As this number is a recommendation over an entire subdrainage the number needed is easily met by adjacent stands. In the stands which do have adequate diameter trees to provide snags greater than 20"dbh 4.8 snags per acre are recommended.

Downed Wood – Existing Condition

Surveys were not conducted to determine current coarse woody debris levels. Size of trees available for future down woody debris in proposed harvest units is currently small and does not meet the general size needed to be considered coarse woody debris in the Northwest Forest Plan. In managed stands the trees are small because of the age of the trees and dense stand conditions. In natural stands that were fire-created, trees are small because growth has been retarded under high density conditions.

DecAID – If the objective is to manage down wood for wildlife, ecosystem functions, and natural conditions at the 50% tolerance level, a reasonable interpretation of the 3 sources of down wood data would be to provide for an average down wood cover of up to 10 percent and a range of 3-10%. Approximately 5% down wood cover should be comprised of wood in decay classes 1-4 and 4-4.9" dbh. The other 5% is recommended to be greater than 4.9" dbh.

No direct conversion tool is available to estimate down wood cover percent in the planning area from existing databases. Approximations can be made from habitat mapped for spotted owl effects analysis. In the planning area approximately 24,412 acres are forested and are capable of producing spotted owl habitat. Currently 2,847 acres are nesting habitat which equates to multistoried old growth, 4826 acres are foraging, roosting and atypical owl habitat which is generally defined as stands with 18" average stand diameter, 6,893 acres are dispersal only habitat which is 11" average stand diameter up to 18". An additional clarification is that all habitat with an average 11" dbh with 40% crown closure and above is dispersal habitat. When this is applied to the planning area it means 14,566 acres have an average stand diameter above 11" which is 60% of the forested habitat. Many of the remaining acres are larger than 4" dbh and smaller than 11" so are not reflected in the total owl habitat acres but are producing additional down wood of sufficient size to count toward Decaid suggested diameter ranges. Additional down wood of large diameter size left from past regeneration harvests are not reflected in this information and are present in most of the smaller diameter stands.

Snags and Downed Wood – Environmental Consequences

Direct and Indirect Effects

Alternative 1 – No Action

There would be no change from existing conditions. Snags are generally less than 20”dbh. The dense stands tend to cause mortality in smaller trees which are weakened by larger/taller trees. The lack of thinning under No Action would delay recruitment of larger snags for 20-30 years. In the fire regenerated stands, the trees are stagnated and are not expected to produce trees of adequate diameter for large snags.

For downed woody material, existing levels would be maintained. Contributions of downed woody material would continue to be from small diameter trees dying from dense tree competition related causes.

Alternatives 2, 3, and 5

Thinning harvest in stands which have average stand diameters large enough to create snags of 18” dbh or larger would occur in subdrainages 78L Beard (1.2 acres), 78Q West Side Blowout-Ivy (1.05 acres), 78R Cliff (0.66 acres) and 78U Upper Blowout (0.86 acres). Regeneration harvest in stands which have trees large enough to create snags of 18” dbh or larger would occur in 78M Divide (7.2 acres). In stands proposed for thinning, the average diameter of the stand would be increased by removal of smaller trees and accelerated growth of the residual stand. This would result in trees of a larger diameter becoming available for snags in a shorter period of time.

GTR’s[3] are expected to preserve some snags. Regeneration and thinning harvest units are expected to have low numbers of snags present after harvest. In regeneration harvest units, snags generally are in the size class less than 20”dbh as the stands being treated have dense trees following fire initiated regeneration. The dense stands tend to result in mortality in smaller trees which are weakened by competition with larger/taller trees. Without treatment, recruitment of larger snags is not expected to occur for several decades or would not be recruited naturally due to suppression of growth caused by dense stands. With removal of non-old-growth trees and management of younger, planted trees, larger trees capable of providing snag habitat would become available for wildlife use sooner than in untreated fire regenerated stands. Stagnation in growth has occurred in these overstocked stands and thinning would increase diameter growth.

At the 30% tolerance level of mimicking natural conditions, DeCAID modeling suggests modeling for 4.8 snags per acre over 20” dbh in regeneration harvest units.

Applying peregrine falcon management and best available science, 8.2 leave trees per acre should be left with 3.8 then being converted to snags following harvest.

The recommendation of 4.8 snags per acre from DecAID apply to approximately 11 acres of harvest units. Regeneration units (Alternatives 2, 3, and 5) in the Divide subdrainage of

[3] Forest Plan standards also require 15% of regeneration harvest acres (per unit) retained over multiple rotations as Green Tree Retention (GTR) Areas. Placement of GTRs would include concentrations of existing snags or down wood wherever possible. These areas act as refugia for species that require very old forests.

approximately 7.2 acres are recommended to have 4.8 trees per acre left for snag creation. Thinning units on approximately 3.8 acres would have adequate diameter trees left after harvest for recommended conversion of 4.8 snags per acre. Units 13 and 14 are within the secondary management zone for peregrine falcons which recommends 100% snag levels. In units 13 and 14, where trees of 18" diameter or larger are present, it is recommended to leave 8.2 trees per acre of the largest diameter available and top 3.8 trees per acre after harvest for peregrine falcon habitat management. After harvest, old growth trees remaining in harvest units should be evaluated for their contribution to snag habitat. Old growth trees which are providing snag habitat can be substituted for trees that would have been topped to meet density recommendations. Green tree retention areas associated with harvest units may also provide snag habitat and should be included in the analysis of available snags in the desired diameter classes. Thinning units identified with tree diameters capable of producing snags are portions of units 6, 8, 9, 10, and 12. Regeneration units identified with tree diameters capable of producing snags are portions of units 13 and 14.

Mitigation snag retention measures to be implemented would focus on meeting the levels required in the Northwest Forest Plan since they are higher levels than in the Willamette Forest Plan (see Mitigation Measures section in Chapter 2 of this EA) To meet minimum requirements snags should be provided at 1.5 per acre of snags 18" dbh diameter or larger. As most stands do not have trees of this diameter only those stands that do have trees of adequate diameter would be treated to create snags following harvest. Units to be treated are listed under the mitigation measures section of this EA.

Slash treatment methods represent the largest variable in retention of downed woody material. For large diameter down wood: If slash is piled and burned the older large diameter logs decomposing on the forest floor will be retained. If slash is removed by broadcast burning the older large diameter logs are expected to be consumed by fire. For small diameter down wood: If slash is piled and burned the smaller diameter wood already existing in the units will be collected and burned along with slash created by harvest activities. The result of this type of slash treatment is to reduce the amount of down wood in the smaller diameter classes after harvest. Broadcast burning would eliminate small diameter logs naturally occurring in the units. After thinning the recruitment of small diameter down wood will be reduced due to reduced mortality in healthier thinned stands. Stands proposed for thinning are currently providing small diameter down wood. Existing levels of downed woody material would be reduced by slash treatment and logging related activities, but in the long run quality and size of downed wood be improved.

DecAID suggested levels of down wood appear to be met in the smaller diameter range with increases desired in the larger diameter range. Stands being treated by thinning and regeneration harvest are expected have a short term reduction in production of small diameter down wood as healthy stands will not have as much natural mortality. Regeneration harvested stands will have a longer decrease in natural mortality than thinned stands. An increase in larger diameter down wood is desired in the planning area and in the next few decades average diameter will increase in the treated units and become available for recruitment of down wood.

If left untreated, units proposed for regeneration harvest will not provide downed woody material of a diameter sufficient to meet recommended levels for several decades. With regeneration of non-old-growth, fire regenerated stands and management of younger/planted trees, larger trees capable of providing down wood habitat will become available for wildlife use sooner than if left untreated.

Alternative 4

Thinning harvest in stands which have average stand diameters large enough to create snags of 18" dbh or larger would occur in subdrainages 78L Beard (1.2 acres), 78Q West Side Blowout-Ivy (1.05 acres), 78R Cliff (0.66 acres) and 78U Upper Blowout (0.86 acres). Thinning units identified with tree diameters capable of producing snags are portions of units 6, 8, 9, 10, and 12. In stands proposed for thinning the average diameter of the stand would be increased by removing the smaller trees and the remaining trees would grow faster. This would result in trees of a larger diameter becoming available for snags in a shorter period of time.

Thinning harvest units are not expected to have snags present immediately after harvest. Recruitment of larger snags is not expected to occur for several decades or would not be recruited naturally due to suppression of growth caused by dense stands. With management of younger, planted trees, larger trees capable of providing snag habitat would become available for wildlife use sooner than in untreated fire regenerated stands. Stagnation in growth has occurred in these overstocked stands and thinning would increase diameter growth.

At the 30% tolerance level of mimicking natural conditions, DecAID modeling suggests managing for 4.8 snags per acre over 20" dbh.

The recommendation of 4.8 snags per acre from DecAID apply to approximately 3.8 acres of harvest units. Thinning units on approximately 3.8 acres would have adequate diameter trees left after harvest for recommended conversion of 4.8 snags per acre. After harvest, old growth trees remaining in harvest units should be evaluated for their contribution to snag habitat. Old growth trees which are providing snag habitat can be substituted for trees that would have been topped to meet density recommendations.

Mitigation snag retention measures to be implemented would focus on meeting the levels required in the Northwest Forest Plan since they are higher levels than in the Willamette Forest Plan (see Mitigation Measures section in Chapter 2 of this EA). To meet minimum requirements snags should be provided at 1.5 per acre of snags 18" dbh diameter or larger. As most stands do not have trees of this diameter only those stands that do have trees of adequate diameter would be treated to create snags following harvest. Units to be treated are listed under the mitigation measures section of this EA.

Decaid suggested levels of down wood appear to be met in the smaller diameter range with increases desired in the larger diameter range. Stands being treated by thinning and regeneration harvest are expected have a short term reduction in production of small diameter down wood as healthy stands will not have as much natural mortality. Regeneration harvested stands will have a longer decrease in natural mortality than thinned stands. An increase in larger diameter down wood is desired in the planning area and in the next few decades average diameter will increase in the treated units and become available for recruitment of down wood.

Slash treatment methods represent the largest variable in retention of downed woody material. For large diameter down wood: If slash is piled and burned the older large diameter logs decomposing on the forest floor will be retained. If slash is removed by broadcast burning the older large diameter logs are expected to be consumed by fire. For small diameter down wood: If slash is piled and burned the smaller diameter wood already existing in the units will be collected and burned along with slash created by harvest activities. The result of this type of slash treatment is to reduce the amount of down wood in the smaller diameter classes after harvest. Broadcast burning would eliminate small diameter logs naturally occurring in the units. After thinning the recruitment of small diameter down wood will be reduced due to reduced mortality in healthier thinned stands. Stands proposed for thinning are currently providing small diameter down wood. Existing levels of downed woody material would be reduced by slash treatment and logging related activities, but in the long run quality and size of downed wood be improved.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

Salvage logging and routine hazard tree felling along roads would continue to reduce snag levels in areas where these activities occur. Thinning in managed stands in the future would increase average tree diameter and produce snags of larger diameter sooner than in unmanaged stands.

Clearcut harvest units from approximately 1940-1980 did not leave wildlife trees. In 30-50 years after harvest these stands would begin to produce trees large enough to provide snags of 18-20” dbh. Natural recruitment in unmanaged stands may take 20-30 years longer to produce the same size snags as thinning in managed stands. Stands harvested over the last 25 years have provided for wildlife tree habitat by leaving green trees in the units and topping them to create future snags as a measure to meet Forest Plan standards. Stands that have been previously managed are expected to mature, providing more snags resources in the planning area than are currently available. The future increase in acres providing snags, and managed stands providing larger snags earlier than unmanaged stands, would increase the availability and quality of snags in the planning area.

Since 1940 approximately 12,498 acres have been managed for timber harvest. Of those, about 10,643 acres were regeneration harvests, including clearcuts and shelterwoods. The other 1,855 were managed with commercial thinning, partial cutting, and salvage logging. Many timber harvest activities have reduced current down wood from historical levels. Firewood cutting along roadways open to the public reduces down wood levels adjacent to roads. Suppression of wildfires has resulted in increased down wood accumulation across the landscape. Underburning in low intensity fire areas has not occurred, creating more fuel than was historically present. Suppression of wildfires has also eliminated the large amounts of down wood created by trees killed in these fires.

Private land in the planning area is expected to have a downward trend in providing down woody debris. Past and current harvest practices on private land, which are generally clear cut and burn, generally lack wildlife trees or down wood after the harvest. Where private land abuts National Forest system lands, the Forest Service's role in providing for this important resource, becomes even greater.

Roadway Thin occurs in the roadside area where routine hazard tree felling occurs. The effect of Roadway Thin on snag levels is not expected to contribute to a cumulative reduction in snag levels as this area is already being managed for hazard tree removal. Echo timber sale is removing snag habitat and retaining wildlife trees to contribute to snag habitat after the units are harvested. Wildlife trees will be topped to meet the forest plan standards in place at the time the sale was developed. The creation of snags in the Echo sale from wildlife trees left for this purpose will compensate for snags cut during harvest activities. Cumulative effects from Echo will be a reduction in snag habitat from 100% levels prior to harvest to 40% levels after harvest and snag creation on approximately 43 acres.

Threatened, Endangered, and Sensitive Species – Existing Condition

Table WL-5, below, lists the proposed, threatened, endangered and sensitive species on the Willamette National Forest (USDA Forest Service, 2004) and whether there is potential habitat in the planning area. Additional detailed information about these species is in Appendix B, Biological Evaluation for Wildlife.

Table WL-5: Threatened, Endangered, and Regionally Sensitive Species and presence of habitat in Blowout Thin Project Area

Species	Habitat Present in Blowout Thin Project Area?	Status		
		Federal	USFS – R6	State
American peregrine falcon	Known nesting within 3 air miles	N/A	Sensitive	Endangered
Black swift	No	N/A	Sensitive	Peripheral or naturally rare
Bufflehead	No	N/A	Sensitive	Undetermined
Harlequin duck	Yes	Candidate	Sensitive	Undetermined
Northern bald eagle	Foraging	Threatened	N/A	Threatened
Northern spotted owl	Suitable dispersal, atypical nesting	Threatened	N/A	Threatened
Baird's shrew	Yes	N/A	Sensitive	N/A
California wolverine	Yes	Candidate	Sensitive	Threatened
Pacific fringe-tailed bat	Yes	N/A	Sensitive	Vulnerable
Pacific Fisher	Yes	Candidate	Sensitive	Critical
Pacific shrew	Yes	N/A	Sensitive	N/A
Cascade torrent salamander	No	N/A	Sensitive	Vulnerable
Foothill yellow-legged	No	N/A	Sensitive	Vulnerable

Species	Habitat Present in Blowout Thin Project Area?	Status		
		Federal	USFS – R6	State
frog				
Northwestern pond turtle	No	N/A	Sensitive	Critical
Oregon slender salamander	Yes	N/A	Sensitive	Undetermined
Oregon spotted frog	No	N/A	Sensitive	Critical
Crater Lake tightcoil	Yes	N/A	Sensitive	N/A
Mardon skipper	No	Candidate	Sensitive	None

The following species have no habitat in the project/analysis area and would not be discussed further in this document – black swift, bufflehead, Cascade torrent salamander, foothill yellow-legged frog, northwestern pond turtle, Oregon spotted frog and mardon skipper.

American Peregrine Falcon[4]

In the Pacific states, preferred peregrine falcon nesting sites are sheer cliffs located near water with an abundant prey source (USDA Forest Service, 1990. Willamette National Forest Plan FEIS). Suitable nest sites for peregrine falcons are found in substantial rock outcroppings, usually southern exposure, and with a small cave or overhang ledge large enough to contain 3-4 full grown nestlings (Boyce and White, 1979). Peregrine falcons feed almost exclusively on birds, many of which are associated with riparian zones and large bodies of water.

Potential nesting habitat does occur within three air miles of proposed activities. Potential nesting habitat is cliff habitat which does not have known peregrine nesting. Two known nest sites occur within three miles of the Blowout thin project. These areas are currently not surveyed to protocol for sale activities in this project. Units within a secondary management zone are 1, 13, 14, 16, 161, 18 and parts of 17 (45 acres) and 24 (6 acres). Units within the tertiary management zone are 2, 3, 4, 5, 6, 7, 11, 12, 19, 21, 23, 104, 106, 121, 191 and parts of 8 (9 acres), 17 (57 acres), 24 (128 acres), and 26 (7 acres). Units outside peregrine falcon management zones are 9, 10, 20, and 101.

Harlequin Duck

Harlequin ducks use rivers, streams, and creeks as feeding habitat and commonly nest on banks. Shrubby riparian vegetation, lack of human disturbance, and loafing sites are important factors for harlequin ducks (Cassirer and Groves, 1989). Streams with potential for harlequin duck use are located adjacent to units 7 and 8. About 8 miles of harlequin duck habitat occur in the planning area with approximately 0.5 miles of habitat adjacent to proposed harvest unit.

Northern Bald Eagle[5]

Bald Eagles are an indicator species for endangered species habitat. Bald eagles require habitat consisting of scattered old-growth conifer trees near available fish sources. Bald eagles forage widely during non-nesting season, and scavenge on carcasses such as deer and elk. Bald eagles

[4] American peregrine falcon is also a “management indicator species.” The species will be covered in full in this section.

[5] Northern bald eagle is also a “management indicator species.” The species will be covered in full in this section.

have been observed foraging along Blowout Creek in the project area. Approximately 3.5 miles of Blowout Creek are foraging habitat. Units 3, 6 and 106 are within 0.25 miles of foraging habitat. The project is not within a bald eagle management area.

Northern Spotted Owl[6]

Northern Spotted Owls are an indicator species for old-growth and mature coniferous forests.

The northern spotted owl is primarily an inhabitant of old growth and mature forests. Suitable spotted owl habitat contains adequate quantities of dead and down woody material, decadent trees, a medium to high crown closure, multiple layers in the overstory, and trees at least 200 years old, or greater than 32 inches dbh (Thomas et al, 1990). However, all of the above characteristics do not need to be present for spotted owls to be present or for spotted owls to make use of an area, and for habitat to be determined suitable.

The areas where the project would occur are in habitat suitable for spotted owl dispersal and atypical nesting habitat. Critical habitat unit (CHU) OR-14 is located in the project area. In the critical habitat unit there are 104,368[7] acres with 96,307 capable of producing spotted owl habitat, 56,540 acres are currently suitable owl habitat with and additional 5,442 acres of dispersal habitat.

Road maintenance involving the falling of dangerous snags has reduced the quality of spotted owl suitable habitat along road corridors in the planning area. Wood cutting along roadways has also reduced the amount of down wood and thus lowered the quality of suitable habitat in road corridors.

Baird's Shrew

Baird's shrew is known to inhabit forested riparian areas in the Cascade mountains. Riparian habitat does exist within the proposed project area. Approximately 7400 acres of forested riparian habitat occurs in the planning area. No surveys have been conducted to determine presence of Baird's shrews.

California Wolverine

Wilderness or remote country where human activity is limited appears essential to the maintenance of viable wolverine populations. High elevation wilderness areas appear to be preferred in summer, which tends to effectively separate wolverines and humans. In winter, wolverines move to lower elevation areas which are snowbound with very limited human activity. Wolverines make little use of young, thick, timber and clearcuts (Hornocker and Hash, 1981).

Wolverines appear to be extremely wide-ranging, and unaffected by geographic barriers such as mountain ranges, rivers, reservoirs, highways, or valleys. For these reasons, Hornocker and Hash (1981) concluded that wolverine populations should be treated as regional rather than local.

Wolverine surveys were conducted on the Detroit Ranger District in a cooperative aerial survey effort with Oregon Department of Fish and Wildlife during the winters of 1997-98, 1998-

[6] Northern spotted owl is also a "management indicator species." The species will be covered in full in this section.
[7] There are 9,329 acres of this 104,368 Critical Habitat Unit within the project area.

99, 1999-2000 and 2000-2001. Camera bait sets were used in 2002, 2003 and 2004 with no wolverines detected. Wolverine dens or tracks have not been located on the district.

An unusual snow event occurred in the fall of 2003 which allowed vehicle access to snow covered high elevation areas including the Blowout project area. An additional walk in snow tracking survey was conducted in the Marion lake area during this time. No wolverine tracks were detected on the district during this effort.

Historical records of wolverine sightings indicate they have occurred on the Detroit Ranger District.

Pacific Fisher (*Martes pennanti*)

Fishers in different regions may have different ecologies (Powell and Zielinski, 1994) and, as is true with most field study data, caution should be exercised when extrapolating results from studies conducted in one region to another. However it is commonly suggested in published literature that fisher in the Western states are closely associated with late-successional conifer forests and riparian habitats possessing an interior forest component and abundant structural diversity – particularly for use as denning habitat (Banci 1989, Heinemeyer and Jones 1994, Olson et al. 2001, Powell and Zielinski 1994, Sallabanks et al. 2001). A recent Oregon study (Yaeger, 2005) found that structural characteristics may outweigh stand age with respect to selection for use as denning or resting habitat. A spatial and seral mixture of forest habitats may represent the most optimal environment for the species because of its diverse diet and large home range (7.3-30.5 square miles for adult male).

Overall habitat composition and connectivity, especially areas comprised of riparian coniferous and mesic forest types, plus security from disturbance for reproductive females may be two key factors to address in considering management of habitat with the welfare of fishers in mind.

Habitat conditions in this area during the reference era favored the likelihood of occupancy by fisher, as it is located well within the historic range for this species and would have been relatively free from human disturbance – especially during the breeding season. Then, as now, population densities would be expected to have been low given our current understanding of fisher ecology.

Maj and Garton (1994) mapped observation records for fisher from 1961 through 1982, which show a cluster of sighting locations in Willamette River watersheds. They also mapped records from 1983 through 1993, which show a sharp decline for sightings in the same location. Occurrence and breeding status data presented by O'Neil et al. (2001) show that fisher both live and breed in Oregon. A review of local records for sightings reported between 1979 and 2005 revealed no reports of fisher sightings in the Detroit Ranger District. There is no confirmation this species occupies habitat in the vicinity of the Blowout Thin Project. There is confirmation of fisher presence within the past decade at a location approximately 60 air miles southeast of the planning area on the Umpqua National Forest. Presence was confirmed based on photographic evidence obtained at a remote camera station during a survey conducted by the Oregon Department of Fish and Wildlife.

Any fishers that may occur in this area are members of one of two genetically isolated populations remaining in Oregon. Any individuals in the southern Cascade Range population are descendants from a 1977-1981 reintroduction effort (Aubry and Lewis, 2003).

Specific field surveys for fisher have not been conducted within the planning area. Nor has any evidence of the presence of this species been detected as a result of any field reconnaissance or surveys associated with this project throughout the planning process to date. Literature suggests fisher are more likely to associate with late seral and old-growth habitat, but may also be expected to occur within younger stands if they contain necessary structural components. Mature stands and/or stands with 70% canopy closure are located throughout about forty percent (39.7%) of the planning area, and possess sufficient structural diversity to serve as suitable fisher resting and denning habitat (Yaeger, 2005). Potential forage and dispersal habitat is more extensive, and includes much of the remaining forested habitat across the planning area.

Pacific Fringe-tailed Bat

The Pacific fringe-tailed bat prefers forested or riparian areas. Nursery colonies have been located in caves, mines and buildings. The project would occur in habitat which is expected to be used by pacific fringe-tailed bats. Potential habitat for nursery colonies is located within the project boundaries in old growth trees. These trees would be retained in harvest units unless they are determined to be safety hazards.

Pacific Shrew

The Pacific shrew is found in humid forests of western Oregon, approximately 20,000 acres of which occurs in the project planning area. Surveys have not been conducted to determine the presence of Pacific shrews in the area.

Oregon Slender Salamander

Habitat for the Oregon slender salamander is under bark and moss in Douglas fir forests.

Crater Lake Tightcoil[8]

The Crater Lake tightcoil is a snail that may be found in perennially wet situations in mature conifer forests, among rushes, mosses and other surface vegetation or under rocks and woody debris within 10 meters of open water in wetlands, springs, seeps and riparian areas, generally in areas which remain under snow for long periods in the winter. Riparian habitats in the Eastern Oregon Cascades may be limited to the extent of permanent surface moisture, which is often much less than 10 meters from open water (Pilsbry, 1946).

More detailed habitat requirements can be found in the survey protocol http://www.or.blm.gov/surveyandmanage/. This species of mollusk has not been located on Detroit Ranger District.

This species requires surveys prior to ground-disturbing activities. Suspected suitable habitat for this species is present in the project area. Surveys of potential habitat areas were conducted between 07/28/2006 and 08/04/2006. Habitat that would be affected by the project which is

[8] The Crater Lake tightcoil is also a “Survey and Manage” species. It will be discusses in full in this section.

suitable for Pristiloma was identified in unit 24, in the Northwest area of the unit. Surveys for Pristiloma in suitable habitat were conducted on 08/03/2006 and 09/06/2006. No individuals were located.

Threatened, Endangered, and Sensitive Species – Environmental Consequences

Peregrine Falcon

Direct and Indirect Effects

Alternative 1 – No Action

There would be no change from current conditions.

Alternatives 2, 3, 4 and 5

While the proposed project would not impact peregrine falcon habitat, prey habitat is being altered by the project. Crown closure will be decreased which may decrease crown associated species while increases in ground associated species may increase. The more open canopy will give peregrines better access to birds using ground habitat. The effect to prey habitat is not expected to impact peregrine falcons using the area for nesting or foraging. Prey species may change densities and distribution in the project area with no expected decrease in prey availability. More area would be available for peregrine foraging as regeneration harvest opens previously closed stands and thinning opens tree canopies allowing prey to be taken inside the forest canopy.

Seasonal restrictions on operations and rock source blasting would be implemented (see Mitigation Measures for Wildlife in Chapter 2).

Cumulative Effects

Echo timber sale is a sold sale in the same planning area as Blowout Thin. Echo timber sale would clearcut 4.4. acres of peregrine falcon habitat in a secondary management zone. This will result in more snags being available for primary cavity excavators from snags left or created after the 4.4 acres are harvested. With the canopy being opened from the harvest, peregrines will have better flight access to the lower canopy areas. Primary cavity excavators such as flickers are prey for peregrines and will be easier for them to catch in open canopy harvested areas. These effects when added to the expected effects from the Blowout Thin project may result in some positive cumulative effects for the peregrine.

Harlequin Ducks

Direct and Indirect Effects

Alternative 1 – No Action

Habitat would not be altered in any alternatives and disturbance activities would not occur in the no action alternative

Alternatives 2, 3, 4 and 5

Harlequins are ground nesters adjacent to streams. Habitat is not proposed to be altered by the project and riparian buffers protect the areas adjacent to streams. Harlequins spend most of their time foraging in streams and resting on rocks and logs in the stream channel. In-stream habitat would not be impacted by the proposed project.

Seasonal restrictions on project activities in units 7 and 8 would be implemented as these units are adjacent to a stream with documented Harlequin duck use (see Mitigation Measures for Wildlife in Chapter 2).

Cumulative Effects – Alternatives 1, 2, 3, 4 and 5

There are no effects associated with past, present, and reasonably foreseeable activities in the project area that when added to the effects of the proposed action are expected to result in cumulative effects.

Northern Bald Eagle

Direct and Indirect Effects

Alternative 1 – No Action

There would be no change from the current condition.

Alternatives 2, 3, 4 and 5

No effects are expected to occur from disturbance as eagles use this area infrequently for foraging. Potential nesting habitat would not be altered by the project. The proposed project is not likely to affect bald eagles or their habitat.

Cumulative Effects – Alternatives 1, 2, 3, 4 and 5

There are no effects associated with past, present, and reasonably foreseeable activities in the project area that when added to the effects of the proposed action are expected to result in cumulative effects.

Northern Spotted Owl

Direct and Indirect Effects

Alternative 1 – No Action

Habitat proposed for thinning in Alternatives 2, 3, and 4 would remain in a small diameter condition under Alternative 1. Natural growth in the stands proposed for thinning is slow due to a high density of trees. Natural mortality will slowly decrease density and will take several decades longer than thinned stands to reach the minimum diameter needed to become spotted owl habitat. Dispersal habitat for spotted owls is the first stage reached in growing stands and requires a diameter of 11” with 40% or more crown closure. The effect of not thinning is to extend by several decades the time needed for these stands to reach an average diameter of 11”.

Alternatives 2, 3 and 5

Some of the units in the Blowout thin project occur in Critical habitat unit (CHU) OR-14. Units are partly or all within the CHU are 1, 2, 3, 4, 5, 6, 12, 13, 14, 16, 17, 18, 23, 24, 104, 106, 121 and161. Units within the CHU would be silviculturally treated as follows: 0 acres of suitable spotted owl habitat would be removed[9], 2 acres of suitable spotted owl habitat would be thinned

[9] Removing habitat refers to the alteration of spotted owl suitable or dispersal habitat so that the habitat no longer supports nesting, roosting, or foraging behavior.

(degraded)[10], 35 acres of habitat unsuitable for spotted owl dispersal would be thinned, 13 acres of habitat unsuitable for spotted owl dispersal would be removed, 268 acres of spotted owl dispersal habitat would be thinned (degraded) and 24 acres of spotted owl dispersal habitat would be removed. Overall, the number of acres of suitable habitat in the CHU either removed or degraded is low (see table WL-6).

Table WL-6 Spotted Owl Suitable/Dispersal Habitat in the CHU Degraded or Removed by Alternative

	Alternative 1	**Alternatives 2,3, and 5**	**Alternative 4**
Total acres of suitable habitat in CHU	**56,540**	**56,540**	**56,540**
Acres Removed	0	0	0
Acres Degraded	0	2	2
Total acres of dispersal habitat in CHU	**61,892**	**61,892**	**61,892**
Acres Removed	0	24	0
Acres Degraded	0	268	268

In the overall planning area (24,412 acres), prior to harvest, there are 7,673 acres of suitable spotted owl habitat which is also dispersal habitat and 6,893 of dispersal only habitat. Acres of private land are not included in spotted owl habitat or dispersal acres which means owl habitat/dispersal acres are undercounted.

On Matrix land, outside the CHU, 88 acres of habitat not suitable for spotted owl dispersal would be thinned, 17 acres of dispersal would be removed and 538 acres of spotted owl dispersal habitat would be thinned.

Seasonal restrictions for project activities with potential to disturb Northern Spotted Owls would be implemented (see Mitigation Measures for Wildlife in Chapter 2).

USFWS Biological Opinion: No affect for thinning units outside critical habitat. May affect but not likely to adversely affect for regeneration harvest units outside critical habitat and thinning units in critical habitat. May affect and likely to adversely affect critical habitat in regeneration harvest units in critical habitat. Spring burning is included in consultation as a may affect not likely to adversely affect spotted owls activity and may occur at any time of the year. These consultations are used by the USFWS to track cumulative effects to spotted owls over time at a regional scale. Status reports for the northern spotted owl are prepared every 5 years. These reports discuss effects to northern spotted owls from various sources such as timber harvest, west nile virus and barred owls. These reports can be viewed online at the USFWS website. Based on the USFWS opinions this project would not jeopardize the species

[10] To degrade habitat is to affect the quality of spotted owl suitable or dispersal habitat without altering the functionality of such habitat.

Alternative 4

Critical habitat unit (CHU) OR-14 is located in the project area. Units all or partly within the CHU are 2, 3, 4, 5, 6, 12, 16, 17, 18, 23 and 24. Units within the CHU would be silviculturally treated as follows: 0 acres of suitable spotted owl habitat would be removed, 2 acres of suitable spotted owl habitat would be thinned, 35 acres of habitat unsuitable for spotted owl dispersal would be thinned, 0 acres of habitat unsuitable for spotted owl dispersal would be removed, 268 acres of spotted owl dispersal habitat would be thinned and 0 acres of spotted owl dispersal habitat would be removed (see Table WL-6).

In the planning area, prior to harvest, there are 7,673 acres of suitable spotted owl habitat which is also dispersal habitat and 6,893 of dispersal only habitat. Total forested and private forested acres in the planning area are 24,412. Acres of private land are not included in spotted owl habitat or dispersal acres which means owl habitat/dispersal acres are undercounted.

On Matrix land, outside the CHU, 88 acres of habitat not suitable for spotted owl dispersal would be thinned, 0 acres of dispersal would be removed and 538 acres of spotted owl dispersal habitat would be thinned.

Seasonal restrictions for disturbance of Northern Spotted Owls from blasting and helicopter yarding would be implemented (see Mitigation Measures for Wildlife in Chapter 2).

USFWS Biological Opinion: No affect for thinning units outside critical habitat. May affect but not likely to adversely affect thinning units in critical habitat. Spring burning is included in consultation as a may affect not likely to adversely affect spotted owls activity and may occur at any time of the year. These consultations are used by the USFWS to track cumulative affects to spotted owls over time at a regional scale. Status reports for the northern spotted owl are prepared every 5 years. These reports discuss effects to northern spotted owls from various sources such as timber harvest, west nile virus and barred owls. These reports can be viewed online at the USFWS website. Based on the USFWS opinions this project would not jeopardize the species.

Cumulative Effects – Alternatives 1, 2, 3, 4 and 5

Echo timber sale is a sold sale in the same planning area as Blowout Thin. Echo timber sale will remove 38 acres of dispersal spotted owl habitat outside critical habitat and 4.4 acres of suitable habitat in critical habitat. Consultation with USFWS for habitat modification occurred for both Echo and Blowout Thin sales under the Blowout analysis area consultation. Critical habitat consultation was submitted in 2005 as separate sale names. The biological opinion issued by the USFWS concluded that these projects will not jeopardize the species.

Roadway Thin is occurring in 2005-2006 beside existing open roads. This sale will thin approximately 10 acres of spotted owl dispersal habitat and 1 acre of suitable habitat in CHU OR-14. The habitat will remain dispersal and suitable habitat after thinning. As the habitat type will not change and disturbance is avoided with seasonal restrictions there are no cumulative effects resulting from this project.

The 5-year species status review has provided new information about potential threats to the northern spotted owl from climate change on regional vegetation patterns, sudden oak death syndrome, West Nile virus, barred owls and range wide population decline. (USDI 2004a, Anthony et al. 2004, Courtney et al. 2004).

Continued habitat loss due to timber harvest, especially on Federal lands, has declined relative to expectations in 1990 (Courtney et al. 2004). Nonetheless, past habitat loss is a current threat when compiled with current management activities. Fragmentation of old-growth and mature habitat has contributed to poor demographic performance in certain parts of this species range. This fragmentation has also allowed edge effects to become more prevalent, and as a result, predation by great horned owls has increased. Barred owls have also benefited from fragmentation and there is raised concern about potential hybridization between barred owls and northern spotted owls. Hybridization levels may increase if northern spotted owl population levels decrease significantly (Courtney et al. 2004).

Connected issues such as climate change on regional vegetation patterns, sudden oak death syndrome, West Nile virus may have also added to the range wide population decline and cumulative threats to the species (Courtney et al. 2004). With the onset of global warming, new problems arise with the potential effects to vegetation patterns. In addition, sudden oak death presents a possible future threat to northern spotted owl habitat because of its potential impact on forest tree dynamics and alteration of key habitat components, most specifically in the southern most portion of its range (Courtney et al. 2004). West Nile virus has also become an issue of concern as it has spread quite rapidly though the United States in recent years. The virus is now within the range of the northern spotted owl, although no known cases of infection are known at this time (Courtney et al. 2004).

Other factors such as fire, wind and volcanic activity have also been issues of concern and serve as potential sources of habitat loss. With the buildup of fuels in some areas of the Cascades, there is a potential for catastrophic fire events. Recent fire events such as the 2003 Biscuit Fire in southwest Oregon produced a 2.3 percent of northern spotted owl habitat loss (SEI 2004). Wind throw and volcanic activity were considered issues by the 5-year review species status review; however, such issues were insignificant in comparison to threats of wildland fires (Courtney 2004).

Although new literature updates our knowledge on the new threats listed above, the impacts of these new issues have been rated by the US Fish and Wildlife Service as Low, Moderate and Severe threats (USDI 2005). Vulnerability to natural disturbances was rated as a low threat. West Nile and sudden oak death syndrome were rated as potential threats with substantial uncertainty about their effects when compiled with management activities (USDI 2005).

Baird’s Shrew

Direct and Indirect Effects

Alternative 1 – No Action

No impact to habitat or individuals would occur under this alternative.

Alternatives 2, 3, 4 and 5

The proposed project may impact the Baird's shrew or its habitat if they are present and using the forested riparian environment in the project area. In the Blowout thin Planning Area a total of 220.2 miles of Riparian Reserves are recorded in the stream database. Of the 220.2 miles of stream recorded in the stream database 5.4 miles are within Blowout Thin units. Of the 5.4 miles of streams in Blowout thin proposed units, 5.1 miles are contained in proposed thinning units and 0.3 miles are contained in proposed regeneration harvest units. Riparian areas in thinning units typically have higher levels of canopy closure than non-riparian areas and would continue to function as habitat after harvest. Riparian habitat in regeneration harvest units is 0.14 percent of total riparian habitat in the planning area and will return to suitable habitat in the future. As harvest impacts are very small in terms of overall habitat in the planning area, impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

Echo and Roadway Thin timber sales are sold sales in the same planning area as Blowout Thin.

Echo timber sale units will contain riparian habitat. 43.4 acres of harvest are included in the Echo timber sale in the Blowout thin Planning Area. The 4 units of Echo contain approximately 0.25 mile of riparian habitat. Understory trees remaining after overstory harvest in Echo units are expected to maintain forested riparian habitat characteristics. If these units are more impactful than expected and the entire 0.25 miles of habitat are removed the percent of the total streams in the analysis area affected is approximately 0.11%. Impacts are primarily from disturbance during harvest operations. Impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Roadway Thin is a sold sale in the same planning area as Blowout Thin. About 70 acres of thinning harvest are included in Roadway Thin of which approximately 24 acres are in riparian reserve. Riparian habitat associated with the Riparian Reserves which Baird's shrews is expected to inhabit are less than the area in reserves. Approximately 3 miles of riparian reserves overlap units in Roadway Thin. Much of the riparian reserve in Roadway Thin units is road shoulders and road banks which are have little or no riparian habitat. Riparian habitat will be thinned and remain suitable habitat after harvest activities. Impacts may occur if individuals are present. Impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Blowout Thin, Roadway Thin and Echo impacts combined are estimated at 8.6 miles of the total 220.2 miles of total habitat. Most of the effect from harvest is disturbance only as the remaining habitat after thinning remains suitable. The .25 miles of Echo Thin combined with the .3 miles of Blowout Thin which may remove habitat represent 0.25 percent of the total riparian habitat present in the analysis area. As harvest impacts are very small in terms of overall habitat in the planning area, impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

California Wolverine

Direct and Indirect Effects

Alternative 1 – No Action

No impact to habitat or individuals would occur under this alternative.

Alternatives 2, 3, 4 and 5

Potential foraging may occur through the area as wolverine home ranges usually are between 170 to 270 square miles. Disturbance by equipment is of limited duration and not expected to impact wolverines which may forage through the area. The potential for effects to wolverines is reduced because the potential is low that there are any wolverines in the area.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

There are no effects associated with past, present, and reasonably foreseeable activities in the project area that when added to the effects of the proposed action are expected to result in cumulative effects.

Pacific Fisher

Direct and Indirect Effects

Alternatives 1, 2, 3, 4 and 5

No impacts to habitat or individuals are expected to occur under these alternatives. The potential for effects to fishers is reduced because the potential is low that there are any fishers in the area. Carnivore surveys on the Detroit Ranger District and the Willamette National Forest did not detect fishers. Carnivore surveys as part of a regional survey detected fishers only in those areas of southern Oregon where existing populations are descendants from individuals transplanted from other states.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

There are no effects associated with past, present, and reasonably foreseeable activities in the project area that when added to the effects of the proposed action are expected to result in cumulative effects.

Pacific Fringe-tailed Bat

Direct and Indirect Effects

Alternative 1 – No Action

No impact to habitat or populations would occur under this alternative.

Alternatives 2, 3, 4 and 5

The proposed project may impact the Pacific fringe-tailed bat or its habitat. Potential effects may occur if habitat which has potential to be used for nursery colonies of Pacific fringe-tailed bats are felled as hazard trees during harvest operations. Potential habitat is much more likely to occur in old-growth stands in the Blowout drainage which in many cases occur adjacent to Blowout Thin units. As old-growth habitat is distributed throughout the planning area, impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

Echo timber sale is a sold sale in the same planning area as Blowout Thin and includes 4.4 acres of harvest in habitat which could be used by Pacific Fringe-tailed bats. Roadway Thin units are not directly impacting habitat used by Pacific Fringe-tailed bats, although if snags hazardous to operations are felled it is possible some of them could be suitable bat habitat. If snags are felled due to their hazard potential they are generally on the edge of old growth stands which contain numerous defective trees suitable for habitat. Snags cut along the edge of old growth stands are not expected to reduce the capability of those stands to provide suitable habitat for Pacific Fringe-tailed bats. As harvest impacts are very small in terms of overall habitat in the planning area, impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Pacific Shrew

Direct and Indirect Effects

Alternative 1 – No Action

No impact to habitat or populations would occur under this alternative.

Alternatives 2, 3, 4 and 5

The proposed project may impact the Pacific shrew or its habitat. There is a potential for habitat removal and disturbance of individuals if they are present in the project area. Acres impacted by Blowout Thin are a small portion of the total forested habitat in the planning area. Thinning units are expected to retain their value as potential habitat for Pacific Shrews. Regeneration harvest units would remove suitable habitat in the short term and would return to suitable habitat in the long term. Harvest impacts are very small in terms of overall habitat in the planning area, impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

Echo and Roadway Thin timber sales are sold sales in the same planning area as Blowout Thin. Echo timber sale units are forest habitat (43.4 acres in planning area) and will remove the overstory leaving the understory trees. The understory trees are expected to continue to provide forest habitat characteristics suitable for Pacific shrews. Roadway Thin is occurring in 2005-2007 beside existing open roads. This sale will thin approximately 70 acres of forested habitat. Forested habitat would not be removed by this project and would remain suitable for use by Pacific shrews. These two sales combined are not expected to contribute cumulatively to the direct and indirect effects of Blowout Thin on the Pacific Shrew. Impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Oregon Slender Salamander

Direct and Indirect Effects

Alternative 1 – No Action

No impact to habitat or populations would occur under this alternative.

Alternatives 2, 3, 4 and 5

Proposed project activities would disturb forested environments which may contain Oregon slender salamanders. The project may impact habitat or individuals if they are present and using the forested environment in the project area. Down wood retention and post harvest additions of down wood would improve Oregon slender salamander habitat. Canopy closure in thinning units would maintain a microclimate suitable for Oregon slender salamander habitat. Impacts are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

Echo and Roadway Thin timber sales are sold sales in the same planning area as Blowout Thin. Echo timber sale units are forest habitat (43.4 acres in planning area). Roadway Thin is occurring in 2005-2007 beside existing open roads. This sale would thin approximately 70 acres of forested habitat. Forested habitat would not be removed by this project and would remain suitable for use by Oregon slender salamanders. Forest conditions suitable for Oregon Slender Salamanders will be maintained in these two sale areas so they will not contribute to cumulative habitat loss. Impacts due to disturbance are of limited duration and may add to cumulative impacts during harvest operations. Disturbance impact is limited in duration and may impact individuals but is not expected to contribute to loss of species viability in the harvest units or analysis area. Impacts from these two sales are not expected to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Migratory Land Birds – Existing Condition

Forested habitats may contain warblers, swallows, swifts and other migratory species. Riparian areas with alder and maple may also contain the same species as the forest with higher densities of riparian specialized species of warblers, flycatchers, etc. Most of the habitat in the Blowout drainage is coniferous forest. Riparian habitat associated forest types are generally not present in Blowout thin units. Riparian associated hardwood areas are located in units 2 & 24. Unit 2 has a hardwood dominated riparian area along a stream in the western portion of the unit within the riparian reseve area. Unit 24 has small hardwood patches in swampy areas inside the unit boundary which are also in riparian reserve areas. The Forest Plan provides a wide array and distribution of habitat types to promote conditions that are favorable to migratory birds.

Migratory Land Birds – Environmental Consequences

Direct and Indirect Effects

Alternative 1 – No Action

Species using forested habitats and densities of migratory birds are not expected to change.

Alternatives 2, 3, and 5

Migratory birds may be affected during proposed activities. Each type of migratory bird specializes in a habitat niche and is widely distributed across the district during the summer nesting season. Altering habitat may not favor one species and be beneficial to another. This project is not expected to significantly change habitat conditions or promote a general species preference change in the sale area. Regeneration harvest units would provide habitat for open/grass habitat specializing species. Over time, these conditions would change back to forested habitat types. Thinning units are expected to maintain the same type of habitat before and after harvest.

Alternative 4

Same effects as for Alternatives 2, 3, and 5, except there would be no regeneration harvest to provide short term habitat for open/grass habitat specializing species.

Cumulative Effects

Alternatives 1, 2, 3, 4, and 5

Echo timber sale would have a similar effect as Blowout Thin on the approximately 43 acres of regeneration harvest in the Blowout drainage. Regeneration harvest units are preferred by birds specializing in open habitat environments. The Blowout drainage is dominated by forested habitats. Regeneration harvest units would provide a mix of open habitats distributed among the dominant forested habitats. The larger landscape provides a mix and distribution of habitat types important to migratory land bird species. Stand changes provide a mix of structure and seral type conditions which provides habitat for a mix of migratory land bird species. Cumulatively the harvest activities of these sales will contribute to migratory bird habitat diversity across the landscape.

Raptors and Colonial Nesting Birds – Existing Condition

Habitat has not been field surveyed to determine the presence or absence of active raptor or colonial nesting bird roost or nest sites.

Raptors and Colonial Nesting Birds – Environmental Consequences

Direct and Indirect Effects

Alternative 1 – No Action

Active roost and nest sites for raptors and colonial nesting birds would not be disturbed.

Alternatives 2, 3, 4, and 5

Active roost and nest sites for raptors and colonial nesting birds have not been identified in the sale area. If active roost and nest sites are identified during harvest activities they would be protected and the appropriate seasonal restrictions established.

Cumulative Effects

Alternatives 1, 2, 3, 4 and 5

There are no past, present or reasonably foreseeable cumulative effects related to raptors and colonial nesting birds in the planning area.

Survey and Manage Species – Existing Conditions

Great Gray Owl

Habitat Components - Great gray owls tend to forage in meadows and other openings, including human created openings which contain important prey species. Their main prey items in the western U.S. are primarily voles and pocket gophers. Great grays nest in mature or old growth conifer forests or forests with remnant older trees or snags. Nest stands typically have >60% canopy closure with an open understory.

Suitable habitat within 1.2 miles of all potentially disturbing or habitat altering activities must be surved. Suitable habitat has 4 components: it must be within the range of the northern spotted owl, at elevations above 3000 feet, within mature stands (80+ yrs) with greater than 60% canopy cover: and within 1,000 feet of a natural meadow larger than 10 acres (Northwest Forest Plan ROD).

For all alternatives there are no direct, indirect or cumulative effects because the project is not within 1.2 miles of habitat and habitat is not being affected. Surveys are not required for this project.

Amphibians

The ranges of amphibians listed as Survey and Manage species do not extend into the Detroit Ranger District. Surveys are not needed.

Red Tree Vole

Habitat Components – Based on the literature, old-growth habitat appears to provide optimum conditions for red tree vole populations. The tall, multi-layered canopies of old growth retain humidity and intercept fog, which functions as a climatic buffer and a source of free water. Large branches provide stable support for nests, protection from storms, and travel routes (Gillesberg and Carey 1991, as cited in the Survey Protocol for the Red Tree, Vole Version 2.1). Active nests have been found in remnant older trees in younger stands indicating the importance of legacy structural characteristics (Biswell pers. Comm. as cited in the Survey Protocol for the Red Tree, Vole Version 2.1). Little is known about the minimum number or size of conifer trees, or other stand characteristics, required to sustain a local population of red tree voles.

Red tree voles have been documented in conifer stands from sea level to 5,500 feet in elevation (Manning and Maguire 1999 as cited in the Survey Protocol for the Red Tree, Vole Version 2.1).

Surveys are required for all or parts of units 1, 2, 3, 6, 7, 8, 10, 104, 12, 121, 13, 14, 18, 19, 191, and 24. Requirements for surveys are based on stand information contained in our vegetation database. In fall 2006, surveys were completed using regional Survey Protocol for the Red Tree Vole (Version 2). No active red tree vole nests were found.

Environmental Consequences – Survey and Manage Species

Red Tree Voles

Direct and Indirect Effects:

Alternative 1 – No Action

Potential habitat would not be disturbed.

Alternatives 2, 3, 4, and 5

Potential habitat occurs in proposed units 1, 2, 3, 6, 7, 8, 10, 104, 12,121, 13, 14, 18, 19, 191, and 24. Significant negative effects to the species habitat or persistence of the species would be avoided by using the Survey Protocol for the red tree vole. In fall 2006, surveys were completed using regional Survey Protocol for the Red Tree Vole (Version 2). No active red tree vole nests were found.

Known sites would be managed as directed in Management Recommendations for the Red Tree Vole, Version 2.0. The application of the recommendations, along with professional biological judgment based on local site conditions, would provide site management of these species in the context of Northwest Forest Plan goals.

Cumulative effects

Alternative 1 – No Action

Potential habitat would not be disturbed.

Alternatives 2, 3, 4, and 5

Red tree vole habitat is present in the planning area. Future projects proposed in the planning area would be reviewed for compliance with Survey and Manage requirements. Any known sites discovered during surveys would be managed as directed by management recommendations current at that time. Past management involving clearcutting removed forested habitat suitable for red tree voles. Approximately 10,500 acres of clearcutting have occurred in the planning area between 1940 -1990 (See Table 1-1 in Chapter 1). Updated Survey and Manage requirements will be reviewed as revisions occur. Known sites, if located, will be managed as directed by recommendations for red tree voles. Cumulatively survey and manage surveys and management recommendations will preserve areas with active red tree voles. Over time more red tree vole habitat will develop as young stands mature and begin providing habitat where past clearcutting practices removed suitable habitat.

Management Indicator Species – Existing Condition

Management Indicator Species (MIS) were addressed in the Willamette Forest Plan (USDA Forest Service, 1990). They include the spotted owl, pileated woodpecker, pine marten, elk, deer, cavity excavators, bald eagle and peregrine falcon. All of the management indicator species may occur in the Blowout Thin project area.

Through region-wide coordination, each Forest identified the minimum habitat distribution and habitat characteristics needed to satisfy the life history needs of MIS. Management recommendations to ensure their viability were incorporated into all WNF Plan Action Alternatives.

Current conditions for the spotted owl, bald eagle and peregrine falcon are elsewhere in the Wildlife section, under Threatened, Endangered, and Sensitive Species and in the Wildlife Biological Evaluation (Appendix B). Habitat for elk and deer is discussed in the Big Game section in this chapter. One pileated woodpecker and three pine marten management areas are located in the planning area. Cavity excavator habitat is discussed in the snag habitat section of this chapter.

Management Indicator Species – Environmental Consequences

Spotted Owl – See Threatened, Endangered, and Sensitive Species and the Wildlife Biological Evaluation (Appendix B) for effects of project.

Pileated Woodpecker – Habitat would not be affected by the project. The project would not occur in a management area for this species. One pileated woodpecker management area is located in the planning area. Forested habitat of older trees would naturally provide habitat for pileated woodpeckers outside management areas for this species. These older forested habitats are generally the same habitat as that identified as suitable habitat for spotted owls.

- Habitat Feature - old-growth and mature conifers
- Habitat is retained in blocks of approximately 300 acres for this species.
- Selection Criteria - Ecological Indicator, represents limited habitat.
- Source of management direction - NWFP Late Successional Reserves (p. C-9).

Pine Marten – Habitat would not be affected by the project. The project would not occur in a management area for this species. Three pine marten management areas are located in the planning area. Forested habitat of older trees would naturally provide habitat for Pine Marten outside management areas for this species. These older forested habitats are generally the same habitat as that identified as suitable habitat for spotted owls.

- Habitat Feature - Old-growth and mature conifers
- Habitat is retained in blocks of approximately 160 acres for this species.
- Selection Criteria - Ecological Indicator; represents limited habitat.
- Source of management direction - NWFP Late Successional Reserves (p. C-9).

Bald Eagle – Habitat is not expected to be affected by this project. See Threatened, Endangered, and Sensitive Species and the Wildlife Biological Evaluation (Appendix B) for further discussion.

Peregrine Falcon – See Threatened, Endangered, and Sensitive Species and the Wildlife Biological Evaluation (Appendix B) for effects of project.

Deer and Elk – See discussion in "Big Game" section in the Wildlife section of this E.A. for effects of project.

Cavity Excavators – Habitat would be removed by the project with snag creation prescribed after harvest and slash treatments are completed.

- Habitat Feature - Dead and decaying trees
- Selection Criteria - Ecological Indicator; represents limited habitat
- Source of management direction - Willamette Forest Plan - Wildlife Tree (Snag) Habitat - (p. IV65 - IV-67), Northwest Forest Plan - (p. C-41 - C-42)

Direct and Indirect Effects

Alternative 1

Under Alternative 1, no change to habitat of management indicator species would occur; forest stands would continue to develop following natural successional pathways.

Alternatives 2, 3, 4 and 5

For Pileated Woodpecker and Pine Marten there would be no habitat alteration resulting from the project.

Cumulative Effects

The cumulative effects analysis area for pileated woodpecker and pine marten is the Blowout Thin Planning Area.

Echo timber sale is a sold sale in the same planning area as Blowout Thin. The Echo timber sale would remove primary cavity excavator habitat on approximately 43 acres. Trees are designated for retention as wildlife trees and would be topped to make snags after harvest. Roadway Thin is not occurring in habitat which is expected to provide snags of the larger diameter type used by these species. Most snags which are created by natural mortality in the Roadway Thin units are small in diameter and are expected to be removed as they are adjacent to the road and are likely to be identified as roadside hazard trees and felled. Roadside hazard tree removal occurs periodically along all open roads on the district. After Echo, wildlife trees are topped to provide snag habitat these units will be contributing to primary cavity excavator habitat. Roadside areas associated with hazard tree management zones such as Roadway Thin units will continue to provide lower density snag habitat than areas not adjacent to roads. Cumulatively roadside areas are expected have low snag densities due to hazard tree maintenance. Echo and Blowout timber sales will continue to provide primary cavity excavator habitat as they were designed to meet forest plan primary cavity excavator habitat requirements.

Botanical Species

Introduction

The purpose of the Blowout Thin Timber Sale Project is to reduce the total number of trees per acre in order to lessen competition for nutrients, sunlight, and growing space for the remaining trees. The objectives of this project include improving the growth and vigor of the remaining trees and increase resistance to insects and disease, fire, and snow breakage, regeneration of stagnated overstocked second growth stands that will no longer respond to thinning, and regeneration of root rot pockets within the stands to be commercially thinned in order to limit the spread of *Phellinus weirii* and other root rot species.

If these objectives are met, this project can benefit sensitive and Survey and Manage botanical species by accelerating the attainment of late-successional stand characteristics, which will provide earlier opportunity for recruitment of late-successional botanical species. The small regeneration harvest units in three of the alternatives, and the regeneration of Phellinus pockets, will promote temporal and spatial diversity with an uneven aged component, and provide habitat diversity for lichens and bryophytes with the planting of host hardwoods and conifers that are not root rot susceptible.

Diversity can also be achieved with the promotion of native understory species growth and recruitment by opening up the canopy and reducing competition for resources. With mitigation measures that prevent and control the spread of weeds, competition from these unwanted species should be reduced.

Regulatory Framework

The following direction and regulations were considered during the botanical species analysis of this project. A more thorough discussion of the Regulatory Framework is contained in the Botanical Species Specialist Report (Roantree, 2006) in the analysis file.

Sensitive Botanical Species:

A biological evaluation for sensitive botanical species was conducted for the Blowout Thin EA in compliance with Forest Service Manual (FSM) 2670 direction (see Appendix A).

In 1994, the NW Forest Plan established Survey and Manage guidelines for rare, uncommon, and poorly understood old-growth forest related species.

In January 2001, the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA, USDI, 2001) adopted new standards and guidelines for Survey and Manage and protection buffer species, and other mitigating measures.

Noxious Weeds:

Direction that applies to this project pertaining to noxious weeds includes:

- The Willamette National Forest Integrated Weed Management Plan (IWMP) (USDA Forest Service, 1999) for managing invasive weeds.
- The Region 6 Preventing and Managing Invasive Plants FEIS (R6 2006 FEIS), which culminated in a Record of Decision (R6 2005 ROD) that amended the Willamette National Forest Plan by including direction regarding invasive plant management (USDA Forest Service, 2005a).
- The Managing Competing and Unwanted Vegetation Environmental Impact Statement (USDA Forest Service, 1988) and the associated Mediated Agreement (1989).

Special Habitats:

Special habitats (SHABs) are nonforested areas which include such habitat types as meadows, wetlands, rock outcrops, cliffs, and talus slopes. The following direction applies to SHABS:

The Willamette Forest Plan and associated FEIS (USDA Forest Service, 1990) standard and guideline FW-211 directs us to protect these habitats and the associated ecotones.

The Willamette National Forest Special Habitat Management Guide (USDA Forest Service, 1996) provides descriptions of each special habitat and recommendations on protective measures.

Analysis Methods

For the purposes of existing condition and effects analyses for botanical species, the area analyzed will be restricted to the Blowout Thin Planning Area.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on sensitive or Survey and Manage species, noxious weeds, or special habitats were included in the cumulative effects analysis.

Sensitive Botanical Species:

There are three steps in a plant biological evaluation which fulfill the requirements dictated by the USFS Manual (2672.4):

1) Each area to be affected by management actions is investigated for sensitive plant habitat in the pre-field review. Effects of actions on sensitive plant populations are analyzed to determine whether actions are consistent with direction. If effects are unknown, field reconnaissance is the next step.

2) Field reconnaissance is generally conducted as an intuitive controlled survey, with the search focused on high probability habitat.

3) If a sensitive plant is found on or adjoining a site where an action is proposed, risk assessment (an analysis of the effects of a proposed action on species and their habitats) must be performed and documented in the biological evaluation. A risk assessment considers (a) the likelihood of beneficial/adverse effects and (b) the consequences of these effects on sensitive plant populations to determine cumulative effects on the overall population. Management recommendations are then made to mitigate adverse effects.

There are 16 species of fungi for which surveys were not conducted. Fungi fruit inconsistently and will require multiple surveys each year for several years to determine their presence, therefore surveys are considered impractical (USDA, USDI, 2001).

Noxious Weeds:

A preliminary inventory of noxious weeds along roadsides of the Detroit Ranger District was conducted in 1992. This inventory was manually recorded on maps as well as digitized into GIS computer files. An additional survey limited to Himalaya and evergreen blackberry occurrence on roadsides in the Detroit Tributaries and Little North Santiam watersheds was completed in 1997. Priority treatment sites covered by the Willamette National Forest Integrated Weed Management Plan are also mapped and tracked in a database.

Special Habitats:

Special habitats are inventoried during the course of vegetation typing and project area survey for sensitive botanical species. This information is also stored in GIS files.

Existing Condition - Sensitive and Survey & Manage Botanical Species

Before the 2004 sensitive species surveys, one Region 6 sensitive plant species had been documented in the Blowout Thin Planning Area. Thompson's mistmaiden (R*omanzoffia thompsonii*) occurs near the top of Beard Creek drainage, 1/2 mile from the nearest proposed Blowout Thin thinning unit. Habitat for this species is limited to seepy meadow slopes at low to mid elevations. One sensitive lichen species, *Pseudocyphellaria rainierensis*, had been documented along Divide Creek. Another Region 6 sensitive plant, Gorman's aster (*Aster gormanii*) has been documented on Coffin Mountain immediately adjacent to the eastern watershed boundary, one mile from the nearest thinning unit. Gorman's aster occurs on dry, exposed scree slopes at mid to high elevations. These populations appear to be stable, and would not be affected by activities within the Blowout Thin Planning Area.

Environmental Consequences – Sensitive and Survey & Manage Botanical Species

Direct and Indirect Effects

Seventy-one Region 6 sensitive plant, lichen and fungal species were evaluated to determine if they or their habitat would be impacted by this project. Many sites of sensitive lichen species were found in or adjacent to the planned thinning units.

Habitat exists for 40 of the 71 species. Of the 40 species, 16 are fungi for which no surveys were conducted. Fungi are listed in Survey and Manage Categories B and D, for which surveys are considered impractical (USDA, USDI 2001). Eleven of these fungi are mycorrhizal, four are saprophytic on duff or wood and one is a parasite on truffles. In general, the habitat requirements of fungal species found on the Willamette National Forest sensitive species list and on the Survey and Manage list are poorly understood. Surveys were done for the remaining 24 species.

Four sensitive lichen species were documented as occurring within the Blowout Thin Planning Area during 2004 field surveys. These lichens are: Leptogium cyanescens, Nephroma occultum, Peltigera pacifica, and Pseudocyphellaria rainierensis. No currently listed bryophyte species are documented in this project area, and the one listed vascular plant species occurring in the watershed, Romanzoffia thompsonii, is more than ½ mile from proposed project work. Therefore direct, indirect, or cumulative effects are not anticipated as a result of implementation of any of the alternatives for vascular plants and bryophytes.

Most common substrates:

- *Leptogium cyanescens*: Down logs, rocks, and mostly hardwood bark.
- *Nephroma occultum*: Conifer boles and branches, mostly mid to upper canopy, found in litter.
- *Peltigera pacific*a: Down logs, soil, moss, rocks, and tree bases.
- *Pseudocyphellaria rainierensis*: Hardwood and conifer branches and boles, also found in litter.

Alternative 1 – No Action

No direct or indirect effects are anticipated in the no action alternative; although an indirect effect of this alternative that might develop could include the continued build up of dense stands, with either no creation or slower creation of the late-successional characteristics likely beneficial to these lichen species.

Alternatives 2, 3, 4, and 5

All action alternatives for Blowout Thin include 926 acres of commercial thinning, and all but Alternative 4 includes 59 acres of regeneration harvest. Due to mitigation measures in the action alternatives, no direct effects to known lichen sites are anticipated. It is likely that individual sites of fungi may be negatively affected in the short term by host tree removal, physical disturbance, soil compaction, and disruption of mycelial networks if the fungi are present (Kranabetter and Wylie 1998; Amaranthus and Perry 1994). Although individual and short term impacts may occur, it is not likely to result in a trend toward Federal listing or loss of viability for Survey and Manage and sensitive fungi species.

Indirect effects to Survey and Manage and sensitive species and their habitats vary. The stand prescriptions include the creation of ¼ to 1 acre gaps that would decrease laminated root rot mortality and increase stand complexity over the long term (20-100 years). The 59 acres of regeneration harvest proposed in Alternatives 2, 3, and 5 should convert dense, stem exclusion stands into future late-successional habitat. However, two studies have shown that fungal species richness declines in forest openings (Durall, et al, 1999; Kranabetter and Wylie 1998). Therefore, in the short term, the proposed action may reduce habitat for sensitive mycorrhizal fungi. The harvest effort should result in enhanced late-successional characteristics in the long term. This includes greater diversity in stand structure and stand species. The addition of understory trees and shrubs may benefit the sensitive mycorrhizal species. Duff retention and coarse woody debris creation would benefit the sensitive saprophytic species. Late-successional forest provides better habitat for sensitive lichens as well.

Buffers around sensitive lichen species protect the sites from direct disturbance but may have indirect adverse effects as the trees grow and a dense canopy results. Big-leaf maple may get shaded out, therefore no longer providing habitat for Leptogium cyanescens.

Cumulative Effects

Alternatives 1, 2, 3, 4, and 5

Cumulative effects include habitat disturbance of the approximately 10,650 acres of regeneration harvest (clearcut and shelterwood) that occurred in the 27,320 acre Blowout Thin Planning Area from 1940 to 1990 (See Table 1-1 in Chapter 1). An additional 1,855 acres were managed with commercial thinning, partial cutting, and salvage logging. Most of the acres managed for timber since the 1960's have had some sort of fuel treatment, including broadcast burning, pile burning, and yarding of unuseable material. Current activities in the watershed include Echo and Roadway Thin timber sales, which together account for an additional 40 acres of regeneration harvest and 78 acres of commercial thinning.

Pseudocyphellaria rainierensis and *Nephroma occultum* are likely to have been most adversely affected by historical management activities. Fungal diversity also declines with clear-cutting, soil disturbance, and fire (Byrd et al 2000; Bruns et al 2002).

Despite the large amount of past harvest activity there are 12, 860 acres of mature and old-growth forests still remaining in the watershed. These forests serve as refugia for many Survey and Manage and sensitive species that would be able to re-colonize the younger stands as they mature and become more complex in structure and diversity.

Alternatives 2, 3, 4, and 5

Risk to the continued viability of these species and their local populations as a result of implementation of any of the action alternatives is considered low due to the relatively large number of local sites recently documented, the long term improvement in old growth characteristics promoted by thinning these stands, and mitigation measures included in project implementation.

Existing Condition - Noxious weeds

Noxious weeds and invasive non-native plants are a threat to native plant communities. These species thrive in a new environment because they arrive without the complement of predators, disease, and other ecosystem components found in their native region of the world. Most of these species take advantage of disturbance gaps such as logged units, roads, rock quarries, burned areas, the areas surrounding human structures, and trails. Weed seeds and other propagules can be introduced into an area by a variety of agents, most notably wind, highway and off-road vehicles, and construction equipment. They can also disperse by way of water, animals, and humans. Once established, these populations serve as a seed source for further dispersal, generally along road and trail corridors.

Due to its proximity to human settlement and main transportation routes, and to its highly productive low elevation growing sites, the Blowout Thin Planning Area has experienced the heaviest logging disturbance over the longest period of time on the Detroit District. These conditions are conducive to weed invasion and establishment, and explain the large weed populations found in the watershed at present. Tansy ragwort, St. John's-wort, and Scotch broom have established large populations along Blowout Road (FS 1000) and many of its main arterials (1003, 1013, etc.). St. John's-wort occurs in a dry rock garden atop Cooper's Cliffs, and this population is growing. The remaining two species on the forest established species list, Canada and bull thistles, are also present.

Blowout Thin Planning Area contains one of the few known populations of the recently introduced spotted knapweed that occurs away from Highway 22, discovered during this year's survey. Other new invaders that are expanding into the area include Himalayan and evergreen blackberry, white sweet clover, and reed canarygrass. Six new sites of Himalayan and evergreen blackberry were documented during this year's survey, and added to the treatment database. Of recent concern is the proliferation of giant knotweed. Although it is still relatively uncommon on the Detroit Ranger District, a number of plants have been found in the towns of Detroit and Marion Forks. One plant was discovered along the Blowout Road five years ago, and has not come back after treatment.

Under the Willamette's integrated weed management program, spotted knapweed populations and other new noxious weed invaders may be subject to spot herbicide spraying in order to prevent establishment. Bio-control and manual control efforts focus on tansy ragwort and Scotch broom.

Environmental Consequences - Noxious weeds

Direct and Indirect Effects

Alternative 1 – No Action

The direct, indirect and cumulative effects on native plant communities as a result of noxious weed occurrence and spread would not change from the existing condition under the no action alternative. However, loss of mitigation and monitoring opportunities present under the action alternative may result.

Alternatives 2, 3, 4, and 5

It is a combination of soil disturbance and transport of seed that constitutes the direct effects of timber harvest on weed introduction and persistence. In any action alternative, areas that would be permanently opened up to light and disturbance would be most at risk, e.g., roads and landings. These areas are disproportionately subject to ground disturbance and exposure to vehicles and equipment that may bring seed in. In addition, the type of logging system can determine risk, with ground based systems posing a higher disturbance and seed transportation risk, skyline a moderate risk, and helicopter the lowest risk. Only Alternatives 3 and 5 construct 4.1 and 3.1 miles of new temporary road respectively, and reconstruct slightly more system road (29.75 miles) than Alternatives 2 and 4 (26.16). Alternative 3 also includes 1.2 miles of temporary road reopening. Haul road maintenance miles are slightly higher in Alternatives 3 and 5 (56.57) than in Alteratives 2 and 4 (26.16). Alternative 3 proposes the most ground based logging (394 acres), while Alternative 2 proposed the most helicopter logging (376 acres). Risk also decreases as the harvest prescription goes from heavy conifer removal (regeneration units) to smaller gaps (root rot removal pockets) to commercial thinning (see Risk Matrix below).

Time, place, and opportunity are the operative concepts for indirect effects. The length of time a disturbed area remains open habitat for noxious weed invasion is important. During project work, noxious weed seed may be transported in and could accumulate in the seed bank. The next rainfall and/or disturbance would lead to germination and possible establishment. Seed may be dropped at another location along the transportation system. Risk decreases in areas where roads and landings are closed, rehabilitated, and seeded with desirable species. Mitigation and monitoring can balance these indirect effects by removing noxious weed populations and their seed source before recruitment and establishment in newly disturbed areas can take place.

In the Risk Matrix below, Alternative 3 shows the highest risk of promoting noxious weeds due to a larger level of ground disturbance and habitat modification represented by regeneration harvest, more disturbance via ground-based and skyline harvest vs. helicopter harvest, and the construction and reopening of temporary roads. Alternative 4 shows least risk, due to no planned regeneration harvest, more helicopter harvest, no temporary roads, and KV collected for mitigation.

Risk Matrix – Risk comparison of noxious weed introduction and establishment by alternative.

Table B-1: Risk of Noxious Weed Introduction and Establishment by Alternative

Activity	Risk of Noxious Weed Introduction and Establishment*				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Regeneration harvest	0	2	2	0	2
Harvest system	0	0	2	0	1
Construct temp. roads	0	0	1	0	.5
Helicopter Landings	0	1	0	1	.5
No KV collected (mitigation)	2	0	0	0	0
Totals	2	3	5	1	4

*Assigned risk values of 0 = no risk; 1 = small risk; 2 = moderate risk; and 3 = large risk. Derived from relative risk of noxious weed introduction and establishment by alternative based on the level of weed promoting activities within each alternative.

Cumulative Effects

Alternative 1 – No Action

The impact of noxious weeds on native plant communities is cumulative. The more disturbance and activity any given area is subject to, the more the risk of noxious weed introduction, establishment, and/or expansion. The increase of mostly timber harvest related activities over approximately 12,000 acres in the Blowout Thin Planning Area from 1940 to 1990 gradually increased the suitable (disturbed) habitat for weeds and the vectors for introduction (vehicles and equipment). More recently, public recreation use has increased and contributes to an upward trend in weed introduction and spread risk along roadsides and off road (ATVs). Roadsides represent a long term conversion to disturbed habitat and the most stable habitat for weeds, and these established populations facilitate spread into other semi-disturbed habitats (streamsides, rock pits, landings from older sales, private land, meadows, etc.).

Alternatives 2, 3, 4, and 5

The rate of timber sale activity from 1990 to present (approximately 60 acres regeneration, and 920 acres partial cut) has dramatically slowed from past levels, and this has allowed time for canopy closure and presumably the shading out of many weed species. The further addition of 926 acres of thinning in all action alternatives, and 59 acres of regeneration harvest (Alts. 2, 3, and 5) would not significantly increase risk of weed spread with the implementation of mitigation measures that include weed monitoring and control, off-road equipment washing and preventative measures (see Mitigation and Monitoring).

Road work and maintenance are more important factors in weed spread (Parendes, 1997). Of the 170.7 miles of system Forest Roads in the planning area, close to 53 miles of road are currently closed with gates, berms, or other structures, which helps retard weed movement. The Blowout Thin alternatives propose an average of 53 miles of haul road maintenance and 28 miles of reconstruction. More significant risk for weed spread is habitat conversion represented by the temporary road construction proposed in Alternatives 3 (4.1 miles, plus 1.2 miles temporary re-openings) and 5 (3.1 miles). This is offset slightly by the 1.25 miles of new road closures proposed in all action alternatives.

Existing Condition - Special Habitats

The special (non-forested) habitats (SHABs) found in Blowout Thin Planning Area are mainly represented by rock type habitats including outcrops, vine maple/talus, and scree slopes (e.g., dry rock gardens). Plant diversity within these rock dominated SHAB types is generally low. Exceptions to this pattern include the moist rock garden at Blowout Saddle, the ponds/meadow complex at Pinnacle Peak, and some of the dry rock gardens found at higher elevations, including Coopers Cliffs.

Environmental Consequences - Special Habitats

Direct and Indirect Effects

Alternative 1 – No Action

There would be no change to special habitats.

Alternatives 2, 3, 4 and 5

Very few special habitats exist within the stands where project work is planned. Of those that do, none occur in proximity to planned regeneration harvest units, planned temporary road construction, or planned landings. Trees left in commercially thinned stands provide sufficient protection from microclimatic fluctuations and invasive weed introduction. No direct or indirect effects to special habitats are anticipated as a result of implementation of any alternative.

Cumulative Effects – Alternatives 1, 2, 3, 4, and 5

No cumulative effects to special habitats are expected.

Recreation and Scenic Quality

Regulatory Framework

The 1990 Forest Plan sets the regulatory framework as it applies to Visual and Recreation Resources. For a description of Management Area allocations occurring in the planning area, see Chapter 1. The Northwest Forest Plan designated other allocations within this management area that include Riparian Reserves and other more restrictive management allocations. The Northwest Forest Plan (NWFP) did not identify Recreation Opportunity Spectrum (ROS) opportunities so the 1990 Forest Plan allocation and prescription for ROS are still valid.

Blowout Thin harvest units occur in management areas (MA-14a) General Forest and MA-11a Scenic-Modification Middleground.

The following direction was considered during the recreation and scenic quality analysis of this project. A more thorough discussion of the Regulatory Framework is contained in the Recreation and Scenic Quality Specialist Report (Pavoni, 2006) in the analysis file.

Analysis Methods

For recreation, use patterns are based on field observations and dispersed site condition analysis. Dispersed campsites in proximity to proposed harvest activities within the planning area were located and field visited to evaluate potential effects.

The Forest Plan's goal for scenic management areas is to, "maintain desired visual characteristics of the forest landscape through time and space." Maximum disturbance rates and harvest rate objectives for each allocation were analyzed by planning subdrainage within Management Area 11a to determine the existing condition.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on recreation or visual quality were included in the cumulative effects analysis.

Existing Condition - Recreation

The project area receives low to moderate recreation use when compared to other watersheds in the North Santiam Basin that include the Detroit Lake Area, Breitenbush River, North Santiam River corridor and Opal Creek Scenic Recreation Area. Use in the planning area includes big game hunting, driving for pleasure and sightseeing, camping and boating in the Blowout Arm. There is only one trail (# 3426) in the planning area located at the Blowout Arm of Detroit Lake at the Suspension Bridge. Most of the concentration of use is at the lower end of the planning area along Blowout Creek and lower Divide Creek (near the Blowout Bridge) and is mostly attributable to the close proximity of the lake. The relocation of Road 10 has eliminated vehicle access to many popular dispersed sites that were located along Blowout Creek. Seventeen dispersed campsites have been located within the planning area with 12 of them within about ½ mile of proposed harvest units. One very low use dispersed site is located within Unit 8;

however, it appears to not have received any use during the 2005 season. Another infrequently used site is located at proposed helicopter landing H5.

The area where proposed actions are being analyzed should be managed to meet a roaded modified Recreation Opportunity Spectrum (see Forest Plan for definition). The area's characteristics currently meet this physical setting.

Access within the planning area is by main-line roads and many shorter 'dead-end' spur logging roads. Many have gates for wildlife and resource protection closures. Many gates that are encountered have also been vandalized and there is evidence of some use by vehicles. In addition, there are many roads that are below current maintenance standards and are not drivable.

Environmental Consequences - Recreation

Direct/Indirect Effects:

Alternative 1 – No Action:

The no action alternative would maintain existing conditions as described above. Existing dilapidated gates would continue to be vandalized. Vehicles would still have access to closed roads that are no longer blocked. Existing roads would not be improved. There would be no increased noise disturbance from helicopter yarding to campers or hunters in the area.

Alternatives 2, 3, 4, and 5

Thirteen units exist within ½ mile of dispersed campsites for all action alternatives. The following units and helicopter landings may have an effect on recreationists at nearby dispersed sites: Unit 1 (Alts 2/3), unit 2 (Alts 2/4), unit 3 (Alts. 2), unit 8 (Alt. 2/4) and unit 14 (Alts 2/3/5), and helicopter landings H2 (Alts 2/3/5), H3 (Alt. 2, 3) and H4 (Alts 2), and H5 (Alts. 2/3/4/5). The largest effect would be the perception of noise disturbance by helicopter activities in alternatives 2 and 4, primarily in the region of the confluence of Blowout Creek and Divide Creek. These dispersed campsites are occupied primarily during weekends between Memorial Day and Labor Day weekends. Noise becomes most disruptive during early morning hours and on weekends. Depending on when and where harvest activities occur, there could be minimal effects to recreational users during the low use season, or up to one month of noise disturbance during the peak season.

There is a ¼ to ½ mile buffer between the closest helicopter units and dispersed sites. Alternatives 2, 3 and 5, each have one unit (14) and a helicopter landing (H2) within ¼ mile of one popular dispersed site along Divide Creek. Alternative 2 has the most potential noise disturbance potentially affecting 13 campsites near the Blowout Creek, followed by Alternative 4 potentially affecting 10 sites, then Alternatives 3 and 5 potentially affecting 2 sites. One dispersed site located within unit 8 would be directly affected by harvest activities and closed during operations for public safety. The inconvenience is expected to be minor because the site does not appear to have annual use, and the short duration of the operation in the unit may displace a camper to another site temporarily. Helicopter service landing H5 is a dispersed site that would also be closed during harvest. It is expected that this landing would be used for a period of two months but would likely be split up to one month periods over two consecutive years.

Helicopter logging also creates more noise disturbance to big game based on comments made by hunters in the field during hunting seasons. The proposed activities would likely occur during the late summer through fall and may have an impact to hunters surrounding these units and landings if operations are conducted during hunting season. The duration of noise disturbance is expected to last a few days to 2 weeks for any one unit/landing and is distributed over space and time throughout the planning area during the course of harvest activities. It is anticipated that service landings (H5 and H6) may be used for a one to two month period each but used over the course of two seasons of operation. Noise associated with ground based and skyline operations is more localized than helicopter logging, and is not anticipated to have any significant effect to recreationists.

Table RS-1: Helicopter Landings Used by Units

Unit	Acres	Helicopter Landing Used	Alternatives
1	7	H3	2, 3
2	75	H10	2, 4
3	20	H4	2
5	123	H12	2, 4
8	66	H15	2, 4
10	17	H19	2, 4
14	6	H2	2, 3, 5
16	20	H1	2, 3, 4, 5
17	104	H7	2, 4
18	40	H8	2, 4
19	109	H16	2, 3, 4, 5
24	134	H7,H8	2, 4, 5
101	6	H19	2
161	1	H1	2, 3, 5
191	12	H16	2, 5
Totals	985		

Table RS-2: Days of Helicopter Landing Use by Alternative

Helicopter Landing	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Type of Landing
H1	3	3	2	3	Log
H2	4	4		4	Log
H3	2				Log
H4	1		2		Log
H5	49	10	41	21	Service
H6	26		26	13	Service
H7	13		13	1	Log
H8	13		13	12	Log
H10	5		5		Log
H12	5		5		Log
H14	4		4		Log
H15	5		5		Log
H16	14	3	12	14	Log
H19	6		3		Log
Service Landing = about every 2 hrs turnaround to fuel up.					

Log hauling traffic can conflict with recreational traffic during the peak use season as exposure increases during this time. For the Blowout and Straight Creek Roads, peak use is between Memorial Day and Labor Day weekends. Weekend traffic is higher than weekday traffic during any season. Log hauling would be restricted between Memorial Day and Labor Day weekends, which would reduce commercial traffic during high recreational use periods. No road closures are expected as a result of operations but there may be short traffic delays that may cause an inconvenience to the public for several days to several weeks activities are occurring at roadside landings. Helicopter landings H2, H5, H6, H15 and H16 are all located on main roads which may delay traffic during operations.

Eight roads equaling 1.25 miles are proposed to be closed under all Action Alternatives. Most of these roads are very short spurs ranging from 0.07 mile to 0.28 miles (see Table RS-3, below). Road 1003-450 is currently not drivable, while others have infrequent use, mostly by hunters and other dispersed users. There is no observable evidence that people disperse camp on any of these roads. If dispersed camping occurs, it is likely to be infrequently used (up to once a year), which is characteristic of similar sites on similar types of spur roads in the area. It is possible that some dispersed camping sites would no longer be accessible after these road closures. However, there are similar sites available within the planning area for campers to choose from and they still could camp outside the road closure barrier. As roads are being closed, there is opportunity to create parking at the closure to 'replace' any dispersed sites that are no longer accessible by vehicle.

Table RS-3: Road Closures Proposed in Alternatives 2-5

Road #	Closure method*	Closed by default due to closure on	Total miles behind re-closure	Drivable** miles behind closure
1000-101	D	1000-112	0.07	0.07
1000-112	B		0.26	0.26
1003-354	G		0.20	0.20
1003-456	G		0.08	0.08
1011-557	G		0.13	0.13
1011-558	D	1011-557	0.12	0.12
1003-448	G		0.28	0.28
1003-450	D	1003-448	0.11	0.00
Total			1.25	1.14

*G = Gate closure. B = Boulder closure.
D = Closed by default (road is tributary to a road to be closed with gate or boulders).
**Drivable means currently drivable with a 4 wheel drive vehicle.

Alternative 2

Reconstruction of 26.16 miles of system roads would improve the condition and safety of those roads needed for haul and used by the public.

Alternative 3

Construction of 4.2 miles of temporary roads and to reopening of 1.2 miles of existing temporary road. These roads would be closed to the public once operations are complete so there is no effect to the public since they weren't existing roads with established use. Alternative 3 would reconstruct 29.75 miles of system roads, which would improve the condition and safety of three more miles of roads needed for haul and used by the public than in Alternatives 2 and 4.

Alternative 4

Like alternative 2, this alternative would reconstruct 26.16 miles of system roads which would improve the condition and safety of those roads needed for haul and used by the public.

Alternative 5

Construction of 3.1 miles of temporary roads. These roads would be closed to the public once operations are complete so there is no affect to the public since they weren't existing roads with established use. Alternative 5 would reconstruct 29.75 miles of system roads, which would improve the condition and safety of three more miles of roads needed for haul and used by the public than in Alternatives 2 and 4.

Cumulative Effects

Alternatives 1, 2, 3, 4, and 5

In the foreseeable future, gates could be replaced on 12 roads. This would, in effect, "re-close" 22 roads (including tributary roads), or 12.88 miles that were previously closed to public vehicular access (by CFR closures in 1992) by replacing gates that were vandalized or damaged by snow (see Table RS-4 below). Most of these roads are short spurs ranging from .05 to 1.31 drivable miles. Five of these roads are not drivable because they are overgrown with vegetation. Road 1013-220 is a 2.94 mile road of which the first .33 miles could be drivable but does not appear to be used by the public. There should be no effect as a result of permanently closing this road. Many previously gated roads have been open for numerous years, and the public has begun resuming use of these roads. There is no observable evidence that people disperse camp on any of these roads. If dispersed camping occurs, sites are likely to be infrequently used (up to once a year), which is characteristic of sites on similar spur roads in the area. Users would be displaced to other sites within the area. Repairing the gates and resigning them would discontinue illegal use and would have no greater effect on the human environment than was already analyzed under previous NEPA analysis.

Table RS-4: Foreseeable Future Gate Replacements and Tributary Roads

Road #	Closure method	Closed by default due to gate replaced on	Total miles behind gate replacement	Drivable** miles behind gate replacement
1000-056	G		0.49	0.00
1000-062	D	1000-067	0.19	0.19
1000-067 (the portion south of jct. with 1000-083)	G		0.44	0.44
1003-440 (the portion west of jct. with 447 spur)	G		0.93	0.93
1003-441	G		0.19	0.19
1003-443	G		0.60	0.60

Road #	Closure method	Closed by default due to gate replaced on	Total miles behind gate replacement	Drivable** miles behind gate replacement
1003-444	D	1000-443	0.10	0.10
1011-520	G		1.24	1.24
1011-545	G		0.53	0.00
1011-650	G		1.10	0.00
1011-651	D	1011-650	0.11	0.00
1012-810	G		0.26	0.26
1013-180	G		1.31	1.31
1013-181	D	1013-180	0.12	0.12
1013-182	D	1013-180	0.37	0.37
1013-183	D	1013-180	0.05	0.05
1013-185	D	1013-180	0.28	0.28
1013-220	G		2.94	0.33
1013-224	D	1013-220	0.16	0.00
1013-279	G		0.95	0.95
1013-281	D	1013-279	0.18	0.18
1013-282	D	1013-279	0.34	0.34
			12.88	7.88
*G = Gate closure. D = Closed by default (road is tributary to a road with a planned gate replacement. **Drivable means currently drivable with a 4 wheel drive vehicle.				

Alternatives 2, 3, 4, and 5

The 1.25 miles of new closures proposed with Alternatives 2-5 would have a cumulative effect to the public, when considered in the context with past closures, as more road miles are closed. Other activities planned for the area that involve helicopter use include timber sales (Roadway Thin and Echo) and aerial fertilization, which may increase the effects (duration, frequency) of noise disturbance and exposure to hauling traffic, as described in Direct and Indirect Effects, above.

Existing Condition – Scenic Quality

Currently no acres are considered in disturbed condition as defined by the Forest Plan for visual allocations in the planning area. This is attributable to only 9.7 acres regeneration harvests occurring within MA-11a in the planning area since 1990, and has since recovered. For management area 11a, the maximum disturbed condition should not exceed 24% of the acres available and suited for timber harvest. A harvest unit is considered disturbed until the regenerated stand is 4.5 feet in height.

Environmental Consequences – Scenic Quality

Direct/Indirect Effects:

Alternative 1 – No Action:

The no action alternative would maintain existing visual conditions as described above.

Alternatives 2, 3, and 5

There are two units, Units 1 and 11, partially located within a visual allocation. Regeneration harvest is proposed for unit 1 (7 acres) in alternatives 2, 3, and 5 only. About 4.23 acres of unit 1 actually lie within the 11a visual allocation. Unit 11 is 36 acres in size and partially within MA11c. Thinning is proposed for this unit in all action alternatives. Thinning treatments have no adverse effects to the visual character of the area because it maintains a naturally appearing forested canopy. In the long term, these stands would be healthier and more vigorous, which would maintain scenic integrity over a longer period of time. Created openings as a result of regeneration harvest of unit 1 in Alternatives 2, 3, and 5 would meet standards and guidelines, and would result in 0.0004% area in disturbed condition in the portion of the planning area that contains MA-11a. Maximum harvest unit size allowed for this allocation is 30 acres. Unit 1 (7 acres) is not visible from Detroit Lake but can be seen from Road 10 adjacent the unit. This unit has an irregular shape to blend into the landscape more naturally than many symmetrical created openings of the past.

Alternatives 2, 3, and 5 have a total of 59 acres of proposed regeneration harvests of which 52 acres are in general forest Matrix land. Nine proposed regeneration harvest units range from 1 to 12 acres. Although all proposed harvest activities are consistent with the Forest Plan in regards to meeting visual quality objectives, some members of the public will continue to disagree with the principle and dislike the appearance of regeneration harvests. Others may support regeneration harvests such as hunters who like to see stand treatments that promote forage for big game. Based on encounters with hunters, many have conveyed that all the old plantations have since grown and the hunting is “not as good as it used to be.”

Minor affects to scenery are short term (up to a year) with slash and slash piles present near and along roads until fuel treatment to reduce these are complete. With mitigation measures, no adverse impacts to scenic resources are expected as a result of implementation of the project.

Alternative 4

Alternative 4 contains no regeneration harvest treatments. Only one unit (unit 11) is partially located within a visual allocation (MA-11c). Unit 11 is 36 acres in size. Thinning is proposed for this unit in all action alternatives. No openings would be created as a result of regeneration harvest in Alternative 4 in MA-11a. This alternative meets standards and guidelines, and would result in no additional disturbance in MA-11a.

Minor affects to scenery are short term (up to a year) with slash and slash piles present near and along roads until fuel treatment to reduce these are complete. With mitigation measures, no adverse impacts to scenic resources are expected as a result of implementation of the project.

Cumulative Effects

Alternative 1 – No Action

No cumulative effects to scenic quality are expected.

Alternatives 2, 3, 4, and 5

Other activities occurring in the project area, such as Roadway Thin and Echo Timber Sales, would not involve regeneration harvest, so would not add to the cumulative effect of created openings in Management Area 11a.

Mitigation measures for recreation and visuals are included in the Mitigation Measures section in Chapter 2.

Conclusions and Rationale

Action alternatives are not expected to have adverse impacts to visual and recreation resources. The proposed actions adhere to forest plan direction for recreation and visual quality objectives. Duration and time of operations are relatively short term. Noise disturbance would occur during a small window of time between a week to a month in any one location. Displacement would occur at two infrequently use dispersed sites during the sale operations; however, there are many similar sites in the planning area that would be available for use. Minor affects to scenery are short term (up to a year) with slash and slash piles present near and along roads until fuel treatment to reduce these are complete. Some currently drivable roads, would have gates replaced or closed by new gates and would eliminate public vehicular use.

Heritage Resources

Introduction

The purpose of this report is to analyze the effects of Timber Sale Harvest activities proposed under the Blowout Thin Environmental Analysis (EA) on cultural heritage resources. Heritage resources are fragile and irreplaceable resource that chronicle the history of people utilizing the forested environment.

Regulatory Framework

The following direction and regulations were considered during the heritage resources analysis of this project. A more thorough discussion of the Regulatory Framework is contained in the Heritage Resources Specialist Report (Kelly, 2006) in the analysis file.

- Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992)
- 36 CFR800 (Protection of Historic Properties)
- 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places)
- 36 CFR 296 (Protection of Archaeological Resources)
- The 1994 Programmatic Agreement (PA) (amended in 2004) between the USDA Forest Service PNW, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer Regarding Cultural Resource Management in the State of Oregon by the USDA Forest Service.
- The National Environmental Policy Act
- The National Forest Management Act (NFMA) of 1976
- The Archaeological Resources Protection Act (ARPA) of 1979
- The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990
- Executive Order 13007 (Indian Sacred Sites)
- The Willamette National Forest Land and Resource Management Plan

Analysis Methods

District Archaeologist Cara Kelly designed a modified unit-based heritage resource inventory based on information gleaned from the district heritage resource files (inventory reports, site reports, historic maps, GLO maps and ethnographic information), topographic maps, and Geographic Information Systems (GIS).

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on heritage resources were included in the cumulative effects analysis.

Two objectives were considered in creating the survey. First it must cover the possible discovery of the various site types known to occur within the project area; and second it must cover heritage properties known or believed to exist within the project area for purposes of monitoring their conditions or verifying their location.

Along with the above objectives three requirements were incorporated into the overall survey design:

1) One hundred percent of the high probability ground and 20 percent of the low probability ground must be covered unless it has been covered by a recent inventory survey, which meets current standards, given that no change in surface visibility has occurred since the time of the survey. Low probability ground over 65 percent should be considered but does not need to be surveyed.

2) The effect on heritage resources, both discovered and undiscovered, expected to occur during the course of the proposed Blowout Thin Timber Sale harvest shall be determined.

3) All heritage resources will be avoided when they are found to be in conflict with the proposed timber harvest units and associated roads and landings. Determination of property avoidance will be made after all the fieldwork is completed.

Previous Surveys Used for Coverage

The entire proposed project area was previously surveyed under the Blowout Planning Area Inventory Report (Kelly, 1994). The survey of this area was conducted for a proposed timber sale that received no contractors bid due to the small size of the trees. The survey was conducted during the 1993 summer months by district archaeologist Cara Kelly, and archaeological technicians, Brigitte Ranne, Matt Brown, David Nicholas, Robert Martin, Forrest Fidler, Andy Vanlaere, and Van Holstad. The survey was conducted following SHPO survey and report writing standards and the Willamette National Forest Inventory Plan. The District received SHPO concurrence on May 13, 1994 for a No Effect finding on cultural resources. Because the entire area was previously survey, only a 76 percent of the high probability ground was resurveyed and none of the low probability ground was resurveyed under the current proposed Blowout Thin Timber sale. However, some low probability ground was covered opportunistically between high probability areas.

Description of Field Surveys

Ground surveys for the proposed Blowout Thin Timber sale occurred during six days in June, two days in August and two days in September 2004, mainly on sunny to partly cloudy days. Surveys were conducted at parallel, compass-orient transects spaced from 15 to 20 meters apart, in accordance with current survey standards. When possible, surveyors would zigzag within their respective swaths in order to inspect areas of either high visibility such as exposed mineral soil or areas of high probability such as obvious trails or landmarks. Every thirty meters within the high probability ground each surveyor exposed to mineral soil a surface area of 1-x-1 meter square. This was done with greater frequency in locations especially likely to contain heritage resources. Boundary markers for each of the units still exist from the layout of the previously proposed unsold timber sale. This helped insure that survey areas were covered in the field as designed.

A total of 352 acres of high probability ground were surveyed for the Blowout Thin Timber Sale. As a result of this inventory, two new isolated finds were discovered. Prior to this inventory, ten heritage properties had been recorded within or adjacent to the selected timber stand units and their associated access routes.

Existing Condition – Heritage Resources

The prehistory and history of the North Santiam Subbasin and the Blowout watershed have previously been summarized in The Prehistory of the North Santiam Subbasin, on the Western Slopes of the Oregon Cascades (Kelly, 2001), and in the Cultural Resource Overview of the Willamette National Forest, Western Oregon (Minor, 1987). These documents are of sufficient detail to serve as the basic reference of ethnographic and historic background for this report.

Ethnographic evidence suggests that highly mobile groups indigenous to the western Cascade Mountains lived during the winter along low elevation streams, accessing the uplands during the summer and fall to hunt game and gather berries and other important plant resources. Extensive trail networks were important for traversing the Cascade Mountains, linking the Molala Indians with each other, surrounding tribes and important resource procurement and trade centers. The common activity at many of the sites is the manufacture and maintenance of lithic tools and biface reduction. The site distribution pattern within the Blowout Timber Sale area suggests that past Indian groups were traveling along the ridgelines to access high elevation meadows, huckleberry fields and big game.

The 1931 Santiam National Forest map and the 1947 Willamette National Forest maps reveal a trail that begins in Township 10 South, Range 6 East, Section 34 and leads west through the middle of Section 34 and 33 south of Coopers Ridges. The 1931 map also depicts a trail leading west from Coffin Mtn area through the bottom of Township 11 South, Range 6 East Section 9 and 10 up through the top portion of Section 8 eventually linking up with a way trail that follows portions of Blowout creek to the West. None of the historic trails depicted on the historic maps go through any of the proposed Blowout Thin units.

Environmental Consequences – Heritage Resources

The reentry field survey for the Blowout Thin Timber Sale did not locate any new sites. However, previous surveys in the project area located three lithic scatter sites immediately adjacent to the timber sale boundaries. These three sites are considered potentially eligible to the National Register of Historic Places (NRHP) and must be protected from project activities or evaluated to determine their eligibility to the NRHP.

Direct and Indirect Effects

Alternative 1(No Action)

Implementation of the no action alternative would not directly nor indirectly affect heritage resources since there would be no change to the integrity of heritage resource sites.

Alternatives 2, 3, 4, and 5

Implementation of Alternatives 2 through 5 would not directly nor indirectly affect heritage resources. The potentially eligible sites have been protected by redesigning timber sale unit boundaries to protect the sites from Timber Harvest and associated project activities.

Cumulative Effects – Alternatives 1, 2, 3, 4, and 5.

It is not anticipated that there would be cumulative effects to the potentially eligible heritage resources in the Blowout Thin Project Area from any of the proposed activities.

Roads and Access

Introduction

The proposed development for the Blowout Thin Analysis Area under the action alternatives would utilize but not expand the existing transportation system. Work would be required on the existing system roads either as reconstruction, pre-haul maintenance, during haul maintenance, or post-haul maintenance under all the action alternatives. Temporary road construction would be included in Alternatives 3 and 5 only. Re-opening of existing temporary roads would be included in Alternative 3 only. About 1.25 miles of roads would be closed under the action alternatives, as described in Chapter 2. If funding is available, about 12.99 miles of roads would receive gate replacement, as described under Activities that Contribute to Cumulative Effects in the beginning of Chapter 3. The objective for the existing transportation system will be to maintain it to the level necessary to facilitate haul during the recommended season of use and comply with the current Road Management Objectives.

Regulatory Framework

An interdisciplinary open road analysis, covering the planning area, was completed and a CFR closure notice signed on December 18, 1992.

A Roads Analysis for the Willamette National Forest was completed in 1998 (and updated in 2003) consistent with current direction (USDA Forest Service, 2003). All roads within the planning area boundary and roads that would be used for timber haul were included in this analysis.

The objective for the existing transportation system would be to maintain it to the level necessary to facilitate haul during the recommended season of use and comply with the current Road Management Objectives.

Analysis Methods

Field reconnaissance for determining the existing condition of roads in the project area and along the haul route was conducted in summer and fall of 2005.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on roads and access were included in the cumulative effects analysis.

Existing Condition – Roads and Access

Primary access to the Blowout Thin Planning Area is provided by arterial roads 10 (Blowout Road) and 11 (Straight Creek Road). Both roads are paved; Road 11 is single lane paved with turnouts for its entire length on the Detroit District and Road 10 is either double lane or single lane paved with turnouts for 9 miles of its length. All other roads tributary to these major access roads are single lane gravel, pitrun, or native surfaced roads with turnouts which have been built and maintained primarily for timber harvest activities. These roads are either termed collector or local roads. Most local roads have been closed by some method for wildlife issues. All system roads designated for haul in the Blowout Thin Planning Area have been previously rocked with either crushed aggregate or pit-run material, with the possible exception of 1000-091 and 1000-095. The remaining quality and quantity of rock varies by road.

Roads 10 and 1000-060 also access private land holdings in the planning area. An undetermined number of non-system roads exist, usually consisting of short spurs that accessed landing locations in previously logged areas.

The thirty seven roads to be used for hauling activities for the Blowout Thin Planning Area are shown in Table RA-3, by alternative. The current closure status of these roads and the level of work required for preparation of hauling activities are displayed in Table RA-4. Twenty five roads are currently open to 4 wheel drive access. These include roads without closure devices as well as those with damaged or missing barriers, effectively allowing access. Twelve roads are currently closed to access by four wheel drive vehicles due to closure devices in place and functioning or by closure due to overgrowth by brush and trees.

Road density information for the affected subwatersheds within the Blowout Thin Planning Area are shown in the table below.

Table RA-1 Road Density Summary

Watershed Number	Area of Subwatershed (Square Miles)	Total Miles of Road	Miles of Open Roads	Miles of Closed Roads	Total Road Density	Open Road Density	Closed Road Density
170900350301	30.84	128.5	96.1	32.4	4.17	3.12	1.05
170900350302	22.98	75.4	53.8	21.6	3.28	2.34	0.94

Environmental Consequences – Roads and Access

Direct and Indirect Effects

Alternatives 1,2,3,4, and 5

No new system roads would be constructed in any alternative. However new road closures would result should money become available from KV or other sources not connected with timber sale operations, which would decrease the open road densities.

Alternative 1 – No Action

Road conditions would remain the same. Road maintenance activities would occur according to established patterns. No additional road maintenance, reconstruction, or construction would occur with this alternative. If current Forest Service budgetary trends continue, it would be uncertain that funding would be available to fully support road maintenance, which could lead to some roads becoming unsuitable for passenger vehicles, making public and agency administrative traffic difficult. Culverts that may potentially plug and cause washouts could go undetected on roads not maintained and impassible to administrative traffic.

Alternatives 2, 3, 4, and 5

New road closures would result should money become available from KV or other sources not connected with timber sale operations, which would decrease the open road densities.

A total 77.30 miles of road would be used for hauling activities. All would receive some level of maintenance except 8.89 miles of Road 1000000 pavement (2.32 miles would be reconstructed), Road 2233, a paved road which accesses McCoy Rock source, and Road 11, which is paved and would be reconstructed. Five currently open roads and their associated spurs are proposed to be closed by gates or boulders. The barrier closure on Road 1013220 could foreseeably be upgraded to a gate closure in the future, if funding is available.

Refer to the Roads and Access Report (Bennett, 2006) for a table showing the haul roads to be reconstructed along with the costs and anticipated major work activities associated with each reconstruction segment. Significant expense can occur in the maintenance of roads for haul. The most significant costs are generally for spot rock placement. These costs are shown in the Roads and Access Report (Bennett, 2006). Six roads are proposed to receive maintenance rock for a total of 2,800 cubic yards and cost of $56,000.

Alternatives 2 and 4

The total length of roads to be reconstructed is 26.16 miles at a total cost of about $373,600 for Alternatives 2 and 4.

These alternatives do not involve any temporary road work. Consequently three roads are needed in these alternatives to access helicopter landings that are not necessary in Alternative 3 or 5. These roads are 1000-068, 10000-070, and 1013180. The 1013-180 Road would be receiving maintenance only at an estimated cost of $1,400 while the 1000-070 and 1000-068 roads would be reconstructed plus maintenance at an estimated cost of $16,500 and $5,100, respectively. See Roads and Access Report, (Bennett, 2006). The total additional cost for these three roads is then $23,000.

Alternatives 3 and 5

Rights of way would be necessary to provide roaded access to unit 1 within the planning area and would be obtained prior to harvest activities. A short temporary spur would be constructed at the end of a private road to access unit 1.

The total length of roads to be reconstructed is about 29.75 miles for a total cost of about $363,600 for Alternatives 3 and 5.

Alternative 3

Three road segments would be used in this alternative that are not utilized in Alternatives 2 and 4. These roads are 2236000 (Milepost 5.73-8.09), the private road into unit 1, and the last 4.12 miles of Road 1000000. Maintenance-only costs apply to the first two road segments and are estimated at $7,800 for the Private Road access and $17,000 for the 2236000 Road, a total of $24,800. The cost to address the reconstruction and maintenance needs for the last 4.12 miles of Road 1000000 is estimated to be $57,680. Also, 5.38 miles of temporary road work are associated with this alternative at a cost of $56,800. The grand total of additional estimated costs for this alternative is $139,280.

Alternative 5

Alternative 5 is very similar to Alternative 3. The only difference in road work would be due to the deletion of most of the temporary road work in unit 24 (1.19 miles of opening of existing spurs and 0.14 miles of temporary road construction) and all of the temporary road work in unit 19, leaving 3.1 miles of temporary road to be built. The additional costs for road work in Alternative 5 are $112,180.

A comparison of road costs beyond road work required by all action alternatives is shown in the table below. Alternative 3 shows the highest increased cost at $139,280, followed by Alternative 5 at $112,180. Alternatives 2 and 4 have the lowest increased road costs at $23,000.

Table RA-2: Increased Road Cost by Alternative

Alternative	Increased Road Cost
1	+0
2	+$23,000
3	+139,280
4	+$23,000
5	+112,180

Table RA-3: System Haul Roads and Maintenance and Reconstruction by Alternative

Road Number	Alternative 2 (Miles)		Alternative 3 (Miles)		Alternative 4 (Miles)		Alternative 5 (Miles)	
	Mtce.	Reconst.	Mtce.	Reconst.	Mtce.	Reconst.	Mtce.	Reconst.
1000000	6.59	4.91	10.71	9.03	6.59	4.91	10.71	9.03
1000056	0.25	-------	0.25	-------	0.25	-------	0.25	-------
1000057	0.23	-------	0.23	-------	0.23	-------	0.23	-------
1000060	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
1000068	0.03	0.03	N/A	N/A	0.03	0.03	N/A	N/A
1000070	0.50	0.50	N/A	N/A	0.50	0.50	N/A	N/A
1000090	0.20	-------	0.20	-------	0.20	-------	0.20	-------
1000091	0.60	-------	0.60	-------	0.60	-------	0.60	-------
1000095	0.08	-------	0.08	-------	0.08	-------	0.08	-------
1000120	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
1000345	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
1000350	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
1000510	0.25	-------	0.25	-------	0.25	-------	0.25	-------
1003000	9.24	1.95	9.24	1.95	9.24	1.95	9.24	1.95
1003355	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
1003358	0.20	-------	0.20	-------	0.20	-------	0.20	-------
1003409	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
1003416	3.61	3.61	3.61	3.61	3.61	3.61	3.61	3.61
1003440	1.62	-------	1.62	-------	1.62	-------	1.62	-------
1003447	0.59	-------	0.59	-------	0.59	-------	0.59	-------
1003448	0.11	-------	0.11	-------	0.11	-------	0.11	-------
1003450	0.11	-------	0.11	-------	0.11	-------	0.11	-------
1003456	0.08	-------	0.08	-------	0.08	-------	0.08	-------
1011000	3.41	-------	3.41	-------	3.41	-------	3.41	-------
1011545	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
1012000	6.10	-------	6.10	-------	6.10	-------	6.10	-------
1013000	4.38	-------	4.38	-------	4.38	-------	4.38	-------
1013108	0.05	-------	0.05	-------	0.05	-------	0.05	-------
1013112	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
1013120	0.60	-------	0.60	-------	0.60	-------	0.60	-------

Road Number	Alternative 2 (Miles)		Alternative 3 (Miles)		Alternative 4 (Miles)		Alternative 5 (Miles)	
1013180	0.59	-------	N/A	-------	0.59	-------	N/A	-------
1013220	0.24	-------	0.24	-------	0.24	-------	0.24	-------
1100000	-------	10.23	-------	10.23	-------	10.23	-------	10.23
1133000	3.84	-------	3.84	-------	3.84	-------	3.84	-------
2236000	1.34**	-------	3.76	-------	1.34**	-------	3.76	-------
Pvt. Rd. to Unit 1	N/A	-------	0.60	-------	N/A	-------	0.60	-------
2233000**	0.78	-------	0.78	-------	0.78	-------	0.78	-------
Total	50.55 Miles	26.16 Miles	56.57 Miles	29.75 Miles	50.55 Miles	26.16 Miles	56.57 Miles	29.75 Miles
**Rock Haul Only								

Table RA 4: Haul Road Closure Status and Level of Work Activity Required for Haul

Road Number	Haul Miles	Total Miles	Mainten-ance	Recon-struction	Open to 4WD Travel	Closed To 4WD Travel	Mtce. Level Before Sale Activity	Mtce. Level After Sale Activity	Proposed Closures and Foresee-able Closure Replace-ments
1000000	20.10	20.10	X (10.71 Miles)	X (9.03 Miles)	X		4/3	4/3	
1000056	0.25	0.49	X			X	1	1	X**
1000057	0.23	0.57	X			X	1	1	
1000060	0.64	1.27		X	X		1	1	
1000067	0.00	0.44					1	1	X**
1000068	0.03	3.46	X		X		2	2	
1000070	0.50	0.84		X		X	1	1	
1000090	0.20	1.31	X			X	1	1	
1000091	0.60	0.60	X			X	1	1	
1000095	0.08	0.08	X			X	1	1	
1000112	0.00	0.26					1	1	X*
1000120	0.40	1.16		X	X		2	2	
1000345	0.16	0.16		X		X	1	1	
1000350	0.16	0.16		X	X		1	1	
1000510	0.25	0.43	X			X	2	2	
1003000	9.24	9.99	X (9.24 Miles)	X (1.95 Miles)	X		3	3	
1003354	0.00	0.20					2	1	X*
1003355	0.19	0.19		X		X	1	1	
1003358	0.20	0.52	X			X	1	1	
1003409	2.24	3.83	X		X		2	2	
1003416	3.61	3.84		X	X		2	2	
1003440	1.62	1.62	X		X		2	1	X**
1003441	0.00	0.19					1	1	X**
1003443	0.00	0.60					1	1	X**
1003447	0.59	0.79	X		X		1	1	
1003448	0.11	0.28	X		X		1	1	X*
1003450	0.11	0.11	X		X		1	1	
1003456	0.08	0.08	X		X		1	1	X*
1011000	3.41	3.41	X		X		3	3	
1011520	0.00	1.24					1	1	X**
1011545	0.53	0.53		X		X	1	1	X**
1011557	0.00	0.13					1	1	X*
1011558	0.00	0.12					1	1	

Road Number	Haul Miles	Total Miles	Mainten-ance	Recon-struction	Open to 4WD Travel	Closed To 4WD Travel	Mtce. Level Before Sale Activity	Mtce. Level After Sale Activity	Proposed Closures and Foresee-able Closure Replace-ments
1011650	0.00	1.10					1	1	X**
1012000	6.10	6.10	X		X		3	3	
1012810	0.00	0.26					1	1	X**
1013000	4.38	6.80	X		X		2	2	
1013108	0.05	0.30	X		X		1	1	
1013112	0.61	0.61		X		X	1	1	
1013120	0.60	2.19	X		X		2	2	
1013180	0.59	1.31	X		X		1	1	X**
1013220	0.24	2.94	X		X		2	1	X**
1013279	0.00	0.95					1	1	X**
1100000	10.22	10.221/		X	X		4	4	
1133000	3.84	3.84 1/	X		X		3	3	
2236000	3.76 2/	8.09	X		X		3	3	
Private Road to Unit 1	0.60	0.60	X			X	N/A	N/A	
2233000 3/	0.78	9.04	X		X		3	3	
Total	77.30 Miles	113.35 Miles	27 Roads	12 Roads	24 Roads	13 Roads			17 Roads

*New Closure Device
**Replace Existing Closure Device
1/ Within Detroit District Boundary
2/ MP 0.00-1.40 Access to Cub Point rock Source
MP 5.73-8.09 Access to Unit 10
3/ Access to McCoy Rock Source

Road Maintenance Levels for the table above are at five levels. Maintenance Level 1 - Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Roads receiving Level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open to traffic. However, while being maintained at Level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized traffic. Maintenance Level 2 - Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level.

Maintenance Level 3 - Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities.

Maintenance Level 4 - Assigned to roads that provide a moderate degree of user comfort and convenience. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated.

Maintenance Level 5 - Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities.

Cumulative Effects – Alternatives 2, 3, 4, and 5

The effect of past management actions have created a road system within the Blowout Thin Planning Area that requires consistent road maintenance levels to provide adequate resource protection.

Proposed road closures with gates or boulders would provide longer term incremental effects of decreasing access (public, administrative and commercial), decreasing the current effective open road density, improving drainage structures to decrease sediment, and reducing road maintenance costs. However, there would be fewer roads for public and administrative vehicle access for recreation, reforestation, fire and noxious weed control. There are no additional foreseeable future management actions that would have cumulative effects on the roaded condition of the project analysis area.

Current and foreseeable future adverse conditions (such as heavy traffic and delays) to haul roads for the Blowout Thin Planning Area may result from the following activities: Shore 'Nuf, Echo, and Timber Sales hauling timber on Roads 10 and 1012 respectively; hauling on Roadway Thin Timber Sale would cause minor traffic delays on Roads 11, 10, 1011, 1012, and 1013. The completion date for Roadway Thin is anticipated to be April 2007; traffic associated with the rock crushing contract at Hawkins Quarry, primarily impacting Road 1013; and Road 11 would receive some reconstruction involving asphalt patch placements under the Road 11 Reconstruction Project This work is expected to be completed by October 2006.

Due to the location of 1013-220 and the current existence of small failures, it is foreseeable that this road would be brushed and cleared to milepost 2.27 to provide access to equipment for accomplishment of longer term hydrological storage activities (described below), if funding is available. Currently, there is at least one minor road slump approximately 75-feet in length and a 30 cubic yard material slide across the roadway with scattered areas of cutbank ravel and blowdown that would need to be cleared to provide access for equipment to do the restoration work. Culvert inlets and outlets as well as roadway ditches would be cleaned and/or reshaped. Non-ditch relief culverts would be lowered to provide water escape with minimal damage to the roadway in the event of future culvert failures. Additionally, the road would be waterbarred and a new gate would be installed near the beginning of the road. This restoration work would minimize the number of potential future road failures and their impacts on this road. While in this extended storage condition, the road would still be available for future management activities such as fire suppression and timber harvest, without the investment of large costs for reopening the road.

Soil Productivity and Slope Stability

Introduction

The major short-term impacts to soil productivity from harvest activity, as discussed in the Willamette National Forest Final Environmental Impact Statement (USDA Forest Service, 1990) include displacement, compaction, nutrient loss, and instability. In most situations, preventing soil impacts is the most effective and feasible way of ensuring long-term soil productivity. The Environmental Consequences sections discuss in detail how implementation of the alternatives may affect the soil resource for each of these four topics plus an additional topic, Spur Roads. Mitigations that can be utilized to avoid potentially undesirable effects are listed in Chapter 2 under Mitigation Measures for Soil Productivity and Slope Stability. All action alternatives contain the same soil protection measures. In most situations, preventing soil impacts is the most effective and feasible way of ensuring long-term soil productivity.

Fire is a natural ecological component of the Cascade Range ecosystem. Fire recurrence intervals of 100 to 200 years are apparent in the natural system, with shorter intervals recorded in some critical high lightning areas. The actual thinning or harvest of these units is not as much concern for long term soil productivity as the resulting slash accumulation and the potential for wildfire. On the other hand, no action is considered detrimental to long-term soil productivity. Overstocked stands would rapidly see density increase, growth slow, and mortality rise. Accumulations from blow down, snow down, and bug kill provide an ever- increasing amount of fuel loading. Activities that reduce stocking levels, improve stand vigor, and eliminate excessive fuel loading are favored so as to reduce the potential for severe fire effects on soils.

Slope instability is also a natural ecological component of the Cascade Range ecosystem, and failure recurrence intervals of 50 to 150 years are apparent in the natural system, primarily in conjunction with large storm events. Slope failures carry large wood and rock to stream systems. These are the building blocks required to both create suitable structure for sediment storage and provide the gravels required for fish habitat. Numerous failures, without the associated boulder or log structure, can overload a system with sediment and degrade or destroy functioning habitat.

Excessive soil compaction from heavy, mechanized equipment, used during logging operations, can decrease soil productivity by restricting root growth, reducing rainfall infiltration rates, and increasing over land flow and run off.

Regulatory Framework

The following direction and regulations were considered during the soils analysis of this project. A more thorough discussion of the Regulatory Framework is contained in the Soil Productivity and Slope Stability Specialist Report (Shank, 2006) in the analysis file.

Laws and Regulations

- 36 C.F.R. 219.14(a) directs the Forest Service to classify lands under their jurisdiction as not suited for timber production if they fall into certain categories.

Regional Guidelines

- Forest Service Manual R-6 Supplement No. 2500.98-1 (Title 2520 Watershed Protection and Management) clarifies direction for planning and implementing activities, redefines soil displacement, and provides guidance for managing soil organic matter and moisture regimes.
- The USDA FS Pacific Northwest Region handbook on General Water Quality Best Management Practices (USDA Forest Service, 1988) provides a guide on practices which are applicable in conducting land management activities.

Forest Plan Direction and General Water Quality Best Management Practices

- Chapter IV of the Willamette Forest Plan states the Forest-wide Standards and Guidelines for a variety of resources and activities.
- Soil and Water Quality protection are addressed in the section from FW-079 to FW-114.
- Based on direction in the Forest Wide Standards and Guides, FW-079 and FW-080 and BMP T-1, T-2 and T-3, the following activities were performed as part of the planning process: verifying the present SRI land type boundaries, determining the location of unsuited and unmanageable land types, prescribing slash treatment and suspension objectives for the possible units, and evaluating potential watershed impacts from management.
- The logging suspension requirement for a proposed unit is mandated in the Forest Plan to protect the soil from excessive disturbance or displacement (FW-107 and BMP T-12). The area near tail trees and landings is generally excluded from this suspension constraint.
- Unless otherwise stated or mitigated, all designated streams require full suspension or yarding away from the stream course during the yarding process (MA-15-27).
- To adequately protect the soil resource, the primary yarding objective for all units will either be skyline with partial suspension or a ground based system with designated skid roads, or some combination of the two.
- The major source of compaction (and also much disturbance) is ground based skidding equipment. Unrestricted tractor yarding and tractor piling are not considered an option on those landtypes where sideslopes are gentle enough (generally less that 30%) to support tractor usage (BMP T-9 and VM-1, and FW-107). Restricted tractor yarding from pre-designated skid roads (LTSR) is considered an option if the adversely affected area is less than 20% of the activity area (BMP T-11).
- Management activities will be planned to maintain enough large woody debris (dead and down) to provide for a healthy forest ecosystem and ensure adequate nutrient cycling (FW-085).
- Road Construction and Maintenance S&Gs – FW-094 to FW-102 will be utilized for any spur road or landing construction.

Analysis Methods

On numerous days throughout the summer and fall field season of 2004, the project geologist conducted a field reconnaissance of potential harvest units and surrounding areas in order to help implement Willamette National Forest program direction. Those dates include March 31, April 20, September 10, 13, 14, 15, 17, October 1, 4, 5, 6, 7, 12, 13, and November 10.

Past, present, and reasonably foreseeable future actions listed in the beginning of Chapter 3 were reviewed. Actions that would have a cumulative effect on soil resources were included in the cumulative effects analysis.

Field investigation standards

A major portion of the field investigation was directed at distinguishing the various identifiable landtype components within the study area and mapping them on the photo overlays. Some of the landtype analysis referenced in this report was originally conducted for previous timber sale planning activities. Much of that earlier work was reevaluated and updated with this project. The information was then transferred to registered overlays in order to represent the data on a standard map base. Too large to be included with this report at a meaningful scale, a complete copy of the remapped SRI landtypes for this particular project area is on file at both the Detroit and Sweet Home Ranger Districts. In general, the field investigation confirmed some of the original 1973 SRI designations and much of the previously mapped work. However, considerable refinement and subdivision of the various boundaries were noted because of the in-depth field reconnaissance with this project. Many of the landtypes have several components that were not separated initially because of the mapping scale that was utilized. Field investigation of landtypes and their specific attributes formed the basis for the site-specific recommendations and mitigations that follow in this report.

Description and discussion of landtypes

Unsuited and unmanageable landtypes have been delineated within the project area as part of the landtype mapping process (FW-180). Unsuited and unmanageable landtypes occur in two basic categories - those acres that cannot be regenerated and those where harvest will cause irreversible impacts. Those landtypes that are considered to have regeneration difficulties (BMP T-20) could include 1, 2, 3, 4, 5, 6, 7, 62, 210, 310, 610, and 710 or combinations of these landtypes. Almost all have numerous rock outcrops and cliffs, shallow gravelly soils with rock fragment content generally greater than 70%, and talus. Landtypes 6 and 7 are wet and dry meadows, respectively, and most areas of Landtype 6 are considered "wetlands" (BMP T-17 and W-3). All are currently considered noncommercial forestland or non-reforestable in the five-year time frame. Officially, 210, 310, and 610 are defined as marginally reforestable, at least to extensive levels on easterly and northerly aspects, and non-reforestable in the five-year time frame on southerly and westerly aspects. However, almost no successful timber management has ever occurred on any aspect related to these specific landtypes on the Detroit District. Consequently, the north and east aspects of 210, 310, and 610 are considered unmanageable (no sufficient assurance of regeneration within the five year time frame) land in this report.

Landtypes considered unsuited because harvest will result in irreversible resource damage are primarily those that are actively unstable or potentially highly unstable (FW-105, BMP T-6). They could include the primary Landtypes 25 and 35, and the complexes of 255 (25 plus 35), 256, and 356. Landtypes 256 and 356 have actively unstable areas very closely associated and generally in direct contact with stream riparian areas or stream courses. These areas all commonly display slump type topography and include such features as tension cracks, bare soil scarps, leaning and fallen trees, sags and depressions, seeps, and disrupted drainages. Failure depths are such that root strength probably has little affect. However, the instability problem can be aggravated by timber harvest, as removing the trees tends to raise ground water levels due to the loss of evapotranspiration. This in turn reduces the soil strength and can cause increased or renewed instability. On the other hand, thinning these areas can create thriftier stands that have greater root strength and increased evaporation over time. Other landtype complexes that contain elements of 25 or 35, such as 225, 235, 251, 252, 253, 254, and 353, need to be evaluated on a case-by-case basis as management activities are proposed.

Landtype complexes, such as 201-214, 55-233 or 13-212-214 have elements of both (or all) landtypes that were either not differentiable at the photo scale, or sufficient field time was not available to distinguish the various components.

The remaining landtypes are adequately discussed in the Soils Resource Inventory (Legard & Leroy, 1973). This document, first developed in 1973 and updated in 1990, was made to provide some basic soil, bedrock and landform information for management interpretations in order to assist forestland managers in applying multiple use principles. The 1973 text and descriptions are used here. A copy of this document is on file at both the Detroit and Sweet Home Ranger Districts.

Existing Condition

The following information is summarized from the Soils and Geology Report for the Blowout Watershed Analysis (February 16, 1994). Additional information can be obtained from that report.

The Blowout Thin Planning Area, located entirely within the Western Cascades physiographic region, is composed of older Tertiary lava flows, tuff and intrusive rocks.

The surface expression of these rock formations has been extensively modified by erosion since late Miocene time with both glacial activity and slope instability. The Blowout Thin Planning Area contains geomorphically complex terrain with a diverse topographic expression. Landforms range from highly glaciated upland benches and flats at the headwaters of Ivy Creek, to steep rocky canyons and crags of Cliff Creek, to the large scale stabilized slump/earthflow complexes and associated glacial deposits of Hawkins and Divide Creeks, to the flat stable river terraces at the confluence of Blowout and Ivy Creeks. The remains of one or more Pleistocene glaciations exist at the higher elevations, particularly at Pinnacle Peak and the headwaters of Ivy Creek. Cirque basins, hanging valleys, and assorted morainal deposits all reside on the landscape, but most have been extensively altered by stream erosion and slope instability.

Locally, the materials of the Little Butte Series or "Tu" of Walker and Duncan (1989), weather to form deep colluvial and residual soils that give rise to unstable soils with both rotational (slump type) and translational (debris chute) failures common. Stabilized slump/landflow features, such as sag ponds, bench and scarp topography, and disrupted drainages, are common in Cliff Creek, Hawkins Creek and Divide Creek. In localized areas of most drainages, actively unstable remnants of these larger landflows can still be found scattered within the stabilized terrain. The storm of 1996, a thirty to fifty year event in this drainage, caused numerous small slumps and debris chutes throughout the drainage. All-in-all the Blowout has about 5 to 6% of its land base within potentially highly unstable or actively unstable terrain.

Existing Condition - Soil Displacement

Displacement is defined as the removal of more than 50% of the topsoil or humus enriched soil horizons from an area of 100 square feet, which is at least 5 feet in width (FW-081). Displacement may have occurred in the past with the initial timber harvest, especially in the areas of landings and where tractor piling may have occurred. At this point in time almost the entire ground surface of any unit is now covered with litter, duff and ground vegetation. Essentially, no exposed soil is present in any unit, and soil displacement from past logging is not considered a concern.

Environmental Consequences - Soil Displacement

Direct and Indirect Effects

Alternative 1 – No Action

Short-term impacts from harvest, such as soil displacement, would not occur.

Alternatives 2, 3, 4, and 5:

Ground based yarding systems, primarily tractor, could be utilized in all or portions of most units, except perhaps 1 and 23. Ground-based yarding systems may be employed on those acres in each unit where slopes are generally 30% or less. Small areas from one to a few acres in size, usually along flatter ridges, adjacent to roads or near skyline landings, could be harvested with a ground-based system. This would minimize additional spur road and landing construction. Displacement that occurs is generally closely related to compaction.

Monitoring has shown that with appropriate suspension during logging there is a minimal amount of displacement and off-site erosion from skyline and helicopter yarding, and off-site erosion is essentially non-existent (Doug Shank, Zone Geologist, information on file at Sweet Home Ranger Station). Soil displacement from slash piling is not expected to occur because tractor piling of slash is no longer a practice and grapple piling of slash results in no measurable soil displacement.

Disturbance from yarding would be well within the Regional standard and significant adverse impacts are not anticipated. During harvest, the retention of trees adjacent to streams and the requirement of full suspension yarding over stream courses would minimize or eliminate off-site erosion.

Cumulative Effects – Alternatives 1, 2, 3, 4, and 5:

No cumulative effects to soil displacement are expected. Any displacement that occurred in the past has been ameliorated over time by revegetation and duff development.

Existing Condition – Soil Compaction:

In most cases, the units proposed for harvest in the Blowout Thin project were originally cable yarded, though suspension may have been limited. In some instances, ground based systems were utilized, especially on the flatter ground. This activity occurred prior to the establishment of regional standards. For units with gentler side slopes originally logged with ground based systems, the compaction may have exceeded regional standards at one time. Much of that compaction has ameliorated over time with freeze/thaw and bioturbation.

Transects in a few of the flatter areas indicated primary skid roads occupy about 8 to 10% of the more gently sloping terrain. For example, three transects, each several hundred feet in length, were walked in unit 11, a ground-based unit. The results were existing compaction levels of 8%, 8%, and 12%. Long transects in unit 16, showed old skid road densities at 6 and 7%. The only concern found in the field reconnaissance at this point was unit 21, which showed skid roads or landings in 15 to 17% of the unit. This unit would be monitored closely during project implementation and would be the highest priority for subsoiling.

Environmental Consequences – Soil Compaction

Direct and Indirect Effects

Alternative 1 – No Action

In areas already compacted or disturbed by the initial entries, the soil building process would continue to return the soil to near pre-harvest conditions. Impacts from harvest, such as soil compaction, would not occur.

Alternatives 2, 3, 4, and 5

Skyline yarding and helicopter yarding are proposed for those units that were originally tractor harvested on terrain that is now considered too steep to operate. This is on some slopes greater than 30% most are greater than 40%. Skyline operations in thinning units and small regeneration units yarding small diameter timber and using intermediate supports usually impact less than 1% of the unit area. Compaction from helicopter yarding is negligible.

On the flatter terrain, ground based systems would again be utilized, and the original skid roads, haul roads, and landings would be reused as much as is practical. In many units, temporary spur road construction would be entirely on old spur road locations. Monitoring has shown that when designated skid roads are properly utilized in conjunction with line pulling and directional falling, ground based tractor operations, generally result in detrimental soil conditions on about 10 to 15% of the activity area (Doug Shank, Zone Geologist, information on file at Sweet Home Ranger Station).

With tractor yarding, skid roads would be pre-designated and approved in advance of use by the Timber Sale Officer and generally located 150 to 200 feet apart. With a processor/forwarder system the skid roads are usually only about 50 to 60 feet apart, but the number of trips for each individual road are substantially less than with skidding. Reducing the effective weight of the tractors and reducing the number of trips over a piece of ground are other means to reduce the risk of soil compaction and displacement. Yarding over frozen ground or over a deep, solid snow pack (24 inches of dense snow or equivalent) also reduces soil disturbance and compaction (BMP VM-4).

The silty nature of the fine- grained soils, and evidence that significant soil moisture is available most of the year indicate that any type of unrestricted tractor yarding and piling (even low ground pressure) would lead to unacceptable soil compaction and/or disturbance.

Research shows that compaction from grapple piling is generally negligible but in some cases may be an additional 1 to 2% (Doug Shank, Zone Geologist, information on file at Sweet Home Ranger Station). The grapple piling machine sits on slash, piles slash within its reach, and then moves to a new location, moving over each piece of ground only once.

At the completion of harvest activities, some subsoiling is proposed as mitigation in order to reduce compaction at heavily used haul roads (dirt spurs), skid roads, and landings. Subsoiling would not occur on all skid roads, reused and new, because of the potential for problems with root pruning and excessive soil disturbance. Mitigation subsoiling generally reduces the activity area in a detrimental soil condition by about 1 to 3% (Doug Shank, Zone Geologist, information on file at Sweet Home Ranger Station).

Cumulative Effects

Alternative 1 – No Action

No cumulative effects to soil compaction are expected.

Alternatives 2, 3, 4, and 5

Residual compaction from the original harvest of these plantations needs to be considered. Skyline and helicopter landings are primarily planned at old existing landings, road turnouts, and road junctions. No cumulative effects from skyline or helicopter yarding in the proposed units in this project are anticipated.

The existing area in a detrimental soil condition resulting from previous tractor logging is generally about 8 to 10%. Compaction from current ground based tractor operations, generally increases the area to about 10 to 15%(Doug Shank, Zone Geologist, information on file at Sweet Home Ranger Station). Therefore, the incremental effect of compaction from ground based logging in the Blowout Thin project is expected to be about 2 to 5% of the activity area. Post-harvest subsoiling is expected to decrease the area in a detrimental soil condition to about 9-12%, and the effect of grapple piling on compaction is expected to be negligible. Therefore, the cumulative effect from past and current ground based yarding, grapple piling, and mitigation subsoiling is expected to be 9 to 12% of the activity area in a compacted condition, which is within the Forest Plan Standards and Guidelines.

Existing Condition – Soil Nutrient Loss:

An important ingredient in soil productivity is the presence of down wood. These stands were harvested 30 to 40 years ago when utilization was less intense than in more recent decades. Extensive concentrations of down logs are present in some areas. On the other hand, many of the stands were also burned when duff retention standards were not in place. Consequently, in some areas, little or no down decomposing organic matter remains.

Environmental Consequences – Soil Nutrient Loss:

Direct and Indirect Effects

Alternative 1 – No Action

Stands would continue to develop. Many stands currently have little understory vegetation because of the lack of sunlight to the forest floor. Intermediate and suppressed trees would slowly die and fall over through mortality and decay. In areas of heavy stocking, stands would stagnate. In general, plant diversity would diminish as well as soil biota because of the lack of sunlight. In areas already compacted or disturbed by the initial entries, the soil building process would continue to return the soil to near pre-harvest conditions. Short-term impacts from harvest, such as pile burning would not occur. Existing large down logs would not be disturbed.

Alternatives 2, 3, 4, and 5

On typical thinning, hand piles number about 40 per acre and occupy about 20 square feet per pile for a total of about 800 square feet per acre or about 1.8% per acre. Burning the piled slash may develop sufficient heat to affect the underlying soil. However, this effect would be minor because pile burning is usually done when there are spring-like conditions (could be fall or spring), when duff and soil moistures are higher, and this helps reduce the heat effects on soil.

Another aspect of long term nutrient availability and ectomycorrhizal formation is the amount of larger woody material retained on site. Management activities would be planned to maintain enough large woody debris (dead and down) to provide for a healthy forest ecosystem and ensure adequate nutrient cycling (FW-085). At this time, site specific needs would be considered commensurate with wildlife objectives as outlined in FW-212a and FW-213a (as amended). In most instances, yarding and piling of unmerchantable timber (PUM) is not recommended in order to provide retention of additional woody debris to further minimize sloughing and raveling on the steeper slopes (FW-084), and for added nutrient recycling (FW-085) and wildlife habitat (FW-212a).

Grapple piling (on the gentler slopes), the minor spot burning of concentrations, or hand pile and burn may be other options to evaluate. This would have to be considered on a case-by-case basis in conjunction with silvicultural and slash treatment objectives.

In summary, duff depth retention objectives are provided on a unit-by-unit basis in the General Mitigation Measures in this report in the integrated prescriptions. With the retention of adequate duff and woody debris (including retention of concentrations of larger down logs that were produced with the initial harvest), potential adverse direct or indirect impacts to long-term soil productivity are not anticipated.

Alternatives 2, 3, and 5

For the proposed regeneration units in Alternatives 2, 3, and 5, duff depth retention standards have been established for each individual unit, based on landtype, site specific soil conditions, and existing duff development. These values are located in the General Mitigation Measures, by unit. Extensive monitoring has shown that when duff retention standards are achieved, off site soil erosion does not occur and long term productivity is maintained (Doug Shank, Zone Geologist, information on file at Sweet Home Ranger Station).

Cumulative Effects

Alternative 1 – No Action

No cumulative effects to soil nutrient loss are expected.

Alternatives 2, 3, 4, and 5

No cumulative effects to soil nutrient loss are expected.

Existing Condition – Soil Instability

Slope instability has been an active agent in the down slope movement of soil in most of the analysis area for centuries, or perhaps millennia. The Blowout project area, located in the Cascade Range physiographic province, lies on either steep, shallow-soiled side slopes or deeper gently sloping uplands of eroded Tertiary volcanic strata. Both translational (debris chute) and rotational (slump type) failures can commonly be found in this drainage. At the larger scale (hundreds of acres), stabilized slump/earthflow terrain is found throughout the Blowout and occupies over one third of its land base. Several units (5, 7, 8, 12, 13, 19, 20, 26, and 21) contain stabilized earthflow terrain. None of these earthflows are a concern because they are stabilized.

Both natural and management related translational failures are present in this landscape. Management induced debris chute type slope instability from road sidecast failures and root strength loss from headwall harvest are evident in many units. The recent intense rainstorms from 1996 to 2000, produced numerous additional soil failures within this study area. Most were related either to road sidecast and fill failures on nearby road systems or within actively or potentially highly unstable areas. No recent failures, actively unstable areas, or potentially highly unstable zones are included in any unit, except for unit 19 (see Direct and Indirect Effects, below).

Environmental Consequences – Soil Instability

Direct and Indirect Effects

Alternative 1 – No Action

There will be no direct or indirect effects to soil stability from Alternative 1.

Cumulative Effects

Alternative 1 – No Action

No cumulative effects to soil stability are expected.

Alternatives 2, 3, 4, and 5.

The potential for significant adverse cumulative effects are quite low. In addition, the potential for some improvement in long term slope stability may result from restoration treatments on certain sites listed as foreseeable future actions at the beginning of Chapter 3. The sites are along Rd. 1013-220 and a decommissioned road east of proposed unit 19 (former road number 1013-140).

Existing Condition – Spur Roads

There is a network of existing operator spur roads in many of the proposed units. Some of these old roads would be re-used and some would not, either because of their location or because they are not needed for the logging system proposed.

Environmental Consequences – Spur Roads

Direct and Indirect Effects

Alternatives 1, 2, and 4

There would be no temporary road construction or re-opening of existing operator spur roads with these alternatives, so there would be no direct or indirect impacts to soils from temporary roads.

Alternatives 3 and 5

Some units have proposed temporary roads to access suitable landing sites for ground-based, skyline, or helicopter yarding systems. In all cases, new temporary roads would be located on gentle stable side slopes in common material. In Alternative 5, no full bench construction would be required and no active drainages are crossed. One unit in Alternative 3 (unit 24) would be accessed by re-opening existing operator spur roads constructed many decades ago. In Alternative 3, six streams would be crossed with the re-opening of these old operator spur roads, requiring fills and culvert replacements in most cases. In Alternatives 3 and 5, some units are accessed by using newer Forest Service system roads that now require some additional work to maintain adequate road drainage and surface integrity. In summary, development of the transportation system for this sale would maintain slope stability, would produce little or no off site erosion, and would provide opportunity to rehabilitate old road courses.

Cumulative Effects

Alternative 1, 2, and 4

There would be no construction or reopening of temporary roads with these alternatives, so there would be no cumulative impacts to soils from temporary roads in these alternatives.

Alternatives 3 and 5

Since temporary roads constructed or reopened with this project would be mostly located on existing operator spur locations and would be decommissioned after use, there will be no cumulative effects to soils from temporary roads

Conclusions and Rationale

At this time, no single unit measure of long-term soil productivity is widely used. Information on the survival and growth of planted seedlings may indicate short-term changes in site productivity. However, the relationship of short-term changes to long-term productivity is not fully understood. Experience indicates that the potential impacts on soils are best evaluated on a site specific, project-by-project basis. The major soils concerns - compaction, nutrient loss, displacement and instability - are most effectively reviewed, for both short and long-term effects, at the project level. With proper project implementation, as specified by the project's mitigation and design measures, unacceptable cumulative effects on the soils resource are not anticipated from any of the action alternatives (BMP W-5). Deviations from the standards and guidelines would be the primary trigger for cumulative effects. No deviations are planned.

The various proposed harvest units are located on productive soils. Localized unsuited areas of rocks and cliffs or potentially unstable areas were avoided. Recent thinning on similar landtypes on this and other Ranger District has shown that 1) by avoiding sensitive landtypes, slope stability has been maintained after harvest; 2) with appropriate suspension during logging, soil disturbance is minimal and off-site erosion is essentially non existent; and 3) with appropriate contract language and enforcement, excessive compaction from unrestricted tractor yarding did not occur.

Soil Protection Measures, SRI Landtypes, and Monitoring

Table 2-6 in the Mitigation Measures section in Chapter 2 displays mitigations for duff depth retention and Soil Resource Inventory Landtypes on a unit-by-unit basis. The information and recommendations were developed based on direction in the Willamette Forest Plan Standards and Guides (primarily FW-079, FW-090 and FW-179) to maintain or enhance soil productivity and stability, field reconnaissance, and experience gained from extensive monitoring of similar projects.

Monitoring requirements for soil protection are listed in the Monitoring section of Chapter 2.

Consistency with Direction and Regulations

Stand Growth, Health and Vigor:

The recommended silvicultural treatments prescribed for this project are consistent with direction set forth in the Willamette National Forest Land and Resource Plan as amended (USDA Forest Service, 1994). Treatments for vegetation management are consistent with the Final EIS for Managing Competing and Unwanted Vegetation and Mediated Agreement (USDA Forest Service, 1988). Regeneration harvests comply with requirements under the National Forest Management Act (1976) and Forest Service Manual direction in that stands have reached 95% of the culmination of mean annual increment (CMAI) and for assuring that areas can be restocked within five years after harvest.

Water Quality:

The following list shows the direction and regulations that were utilized in the development of the prescriptions for this proposal. In all action alternatives unit layout and design considered and applied the intent of the direction and regulation. All of the units were reviewed on the ground and recommendations and effects considered. All actions within the alternatives are anticipated to be consistent with the following direction in regards to water quality, hydrology, and stream channel protection: Willamette National Forest Land and Resource Management Plan Watershed requirements; Memorandum of Understanding, Oregon Department Environmental Quality; Northwest Forest Plan Aquatic Conservation Strategy Objectives (ACSO);Clean Water Act; Sufficiency Analysis for Stream Temperature, 303(d) listing, Water Quality Management Plan; and Best Management Practices.

All effects were discussed and disclosed utilizing a spatial view. Planning subdrainages (PSUBS) were evaluated and determined to be within the applicable laws and regulations as outlined in the Forest Plan as amended. Collectively these PSUBS were considered to determine the effect on the next spatial scale of 6th field (subwatershed). Considerations of the Sufficiency Analysis and the ACSO were considered at this 6th field scale. The proposal was evaluated utilizing watershed analysis documents and recommendations set forth in those documents to determine compliance and intent. It is anticipated that the intent of the ACSO are being met at the 5th field (watershed) level making it compliant with the direction establish for the areas.

Economics/Social:

Alternatives are consistent with the following Forest Plan goals as follows: Provide a sustained yield of timber for commercial products - all alternatives are consistent with this goal. Enhance the amount of timber provided in the future through increased growth rates and by reducing the loss from fire, insects, and disease -all action alternatives are consistent with this goal because of the thinning harvest. However, Alternatives 2, 3, and 5 go a step farther by regenerating stagnant fire origin stands that are susceptible to fire, insect, and disease damage. Produce forest goods and services in the most cost efficient way consistent with maximizing net public benefits - Alternative 3 is the most consistent with this goal, though Alternatives 2, 4, and 5 are also consistent. Generate revenues from permits, leases, user fees, and product receipts - Alternatives 2, 3, 4, and 5 are consistent with this goal.

Fishery Resource:

The following determinations of consistency relate to the direction and regulations specified in the Regulatory Framework in the Fishery Resource section.

The Willamette National Forest Land and Resource Management Plan (USDA Forest Service, 1990), as amended.

This project was designed to meet the LRMP standards and guidelines, goals, and objectives. All alternatives would meet these criteria. Alternative 3 has the highest potential for potentially reducing the progress toward the LRMP goal for Wildlife, Fish and Plants due to potential conflict between the alternative and "minimizing the conflicts of human activities and occupancy with wildlife, fish and plant habitats." The MIS fish groups identified in the LRMP would continue to persist as viable populations under all alternatives.

The Northwest Forest Plan (USDA, USDI, 1994) as amended.

All alternatives are consistent with the NW Forest Plan guidance. Alternative 3 approaches non-compliance level with RF-2, due to the road work being proposed across streams.

Aquatic Conservation Strategy (ACS) as amended in 2003.

All alternatives would manage stands in the Riparian Reserves. Carefully selected design criteria reduce the probability that this work would retard the attainment of ACS objectives. The WA states that: "Commercial thinning can develop desired stand structure within Riparian Reserves with an emphasis on growing large trees and logs and other late successional characteristics." None of the watersheds affected by this project were identified as a Key Watershed. The Blowout Watershed Analysis was completed in 2000. Watershed restoration projects are planned for the area in the near future. Therefore, this project is consistent with the ACS.

Best Management Practices (BMPs)

The BMPs applicable to this project are identified in the Watershed and Soils Specialist's reports. Implementation of the identified BMPs would limit the potential negative effect to water quality, and therefore to the fishery resource.

The Endangered Species Act (ESA) of 1973 (as amended)

Consultation for this project is ongoing. The biological assessment prepared for this project reached the determination of may affect, not likely to adversely affect Upper Willamette River Chinook salmon. Designated critical habitat does not extend upstream from Big Cliff dam, and therefore, the project would not affect it.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1996 as amended.

None of the streams above Big Cliff dam were designated as essential fish habitat. This project would have no effect on essential fish habitat, and MSA consultation is not required.

Clean Water Act.

Alternatives for this project would not reduce stream shade to the extent where any change in stream temperature would be realized. This project is consistent with the Clean Water Act.

Wild and Scenic Rivers Act

None of the streams affected by this project are designated or proposed to be Wild or Scenic.

Executive Order 12962, Recreational Fisheries (1995)

Recreational fishing is an identified use in the analysis area, primarily on lower reaches of Blowout Creek. This project would not result in any appreciable reduction in the fish population numbers or otherwise negatively affect the fishing opportunity. All alternatives are consistent with this Order.

Fire and Fuels

Willamette National Forest Plan

Alternative 1 (No Action) is not responsive to the objectives and standards in the Forest Plan, as it would not allow the utilization of prescribed fire in the future because the fuel loadings would be high and outside of historical range. These fuel loadings would create conditions allowing for another high severity fire. Potential for excessive emissions impacting air quality from high intensity fire is higher.

Alternatives 2, 3, 4, and 5 are responsive to the objectives and standards in the Forest Plan. Proposed fuel reduction activities would reduce the level of fire severity during the next wildland fire. These activities also result in a more cost efficient protection program, as fires would show more moderate resistance to control. These activities would meet standards relating to air quality.

Wildland and Prescribed Fire Management Policy and Implementation Procedures and Reference Guide:

Alternative 1 does not address principles developed to guide the Federal wildland fire management program that are relevant to this project such as providing for firefighter and public safety, protecting land management objectives, or contributing to ecosystem sustainability

Alternatives 2, 3, 4, and 5 addresses the principals by achieving fuel reduction objectives, reducing the resistance to fire control and providing a safer environment for fire fighters and the public.

Laws and Regulations:

State and Federal air quality regulations would be followed. All burning would be done in accordance with the Oregon State Smoke Management Plan in order to ensure that clean air requirements are met.

Wildlife Habitat

All alternatives are consistent with Willamette Forest Plan Standards and Guidelines as amended; Northwest Forest plan Standards and Guidelines as amended; Regional directives; Biological Assessments; USFWS Biological Opinions, letters of concurrence, reasonable and prudent measures, and terms and conditions for big game, snags, down wood, green tree retention, Migratory Bird Treaty Act, raptors and colonial nesting birds, Management Indicator Species, Threatened, Endangered, Regionally Sensitive, and Survey & Manage species.

With recommended mitigation measures the project is consistent with all applicable plans, directives, and regulations.

Botanical Species

All alternatives are consistent with and comply with Willamette Forest Plan Standards and Guidelines as amended; Northwest Forest plan Standards and Guidelines as amended; Forest Service Manual (FSM) 2670 direction, the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA, USDI, 2001), the Willamette National Forest Integrated Weed Management Plan (USDA Forest Service, 1999), the Willamette National Forest Noxious Weed Prevention Guidelines (USDA Forest Service, 2005b), the Region 6 Preventing and Managing Invasive Plants FEIS (USDA Forest Service, 2005a), and the Managing Competing and Unwanted Vegetation Environmental Impact Statement (USDA Forest Service, 1988) and the associated Mediated Agreement (1989). With recommended mitigation measures this project is consistent with all applicable plans, directives, and regulations.

Heritage Resources

Three heritage sites in the Blowout Thin Timber Sale area are potentially eligible for inclusion to the NHRP. All sites that have been evaluated as eligible or potentially eligible will be strictly avoided during ground-disturbing activities. Log landings or other ground disturbing activities will not be permitted near the eligible or potentially eligible historic properties. State Historic Preservation Office consultation has been completed under the terms of the 1995 Programmatic Agreement (amended 2004).

Roads and Access

Alternatives 2,3,4 and 5 would bring the area closer to Forest Plan Standards and Guidelines for road densities. Alternative 1 would not change the road densities.

Soil Productivity and Slope Stability

Prescriptions for soil protection, watershed considerations and riparian needs of the sub-basin take into account past and predicted future land management activities. The soils mitigation measures, as well as the streamside management zones, are designed to provide a level of riparian habitat protection and erosion control that is consistent with the standards and guidelines of the Willamette National Forest's Land and Resource Management Plan (USDA Forest Service, 1990).

On site sedimentation is anticipated to be within National Forest and Oregon State Guidelines. All prescriptions or mitigation measures discussed in this report are designed to meet or exceed the requirements outlined in the General Water Quality Best Management Practices Handbook (USDA Forest Service, 1988).

With the use of designated skid roads, the reuse of the existing skid road system, and the subsoiling of primary landings and skid roads, compaction is not anticipated to exceed the 20%

value (Willamette Forest Plan) in any unit and should be below the 15% level (or lower) in all units.

Other applicable Standards and Guides and/or Best Management Practices may exist which were not directly referenced in this document. Their exclusion does not indicate that they were overlooked or are inapplicable. As project development proceeds, appropriate constraints or mitigations may be added or changed in order to better meet the intent of adequate resource protection or enhancement as directed in the 1990 Willamette National Forest Land and Resource Management Plan and Final Environmental Impact Statement.

Compliance with Other Laws, Regulations, and Policies

This section describes how the action alternatives comply with applicable State and Federal laws, regulations and policies.

The Preservation of Antiquities Act, June 1906 and the National Historic Preservation Act, October 1966

Before project implementation, State Historic Preservation Office consultation is completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated June 2004. Field surveys where ground-disturbing activities would occur in the Blowout Thin Project area have been completed. The surveys did not identify any sites. Should sites be found during ground disturbing activities, contract provisions would provide protection and the Detroit District Archaeologist would be immediately notified. These measures resulted in a determination of No Historic Properties Affected. Because heritage resources would not be affected by proposed activities under any action alternative, there would be no effect to any historic property listed in or eligible to the National Register of Historic Places.

The Endangered Species Act (ESA), December 1973

The ESA establishes a policy that all federal agencies would seek to conserve endangered and threatened species of fish, wildlife and plants. Biological Evaluations for plants and wildlife have been prepared (Appendices A and B), which describes possible effects of the proposed action on sensitive, and other species of concern that may be present in the project area. A Biological Assessment (BA) was prepared for the northern spotted owl and for the threatened spring chinook salmon. See “Consultation and Coordination – Coordination with Other Governments and Agencies”, in this chapter.

Clean Air Act Amendments, 1977

The alternatives are designed to meet the National Ambient Air quality standards through avoidance of practices that degrade air quality below health and visibility standards. This project is consistent with the 1990 Clean Air Act and the 1977 Clean Air Act and its amendments (see Chapter 3, Fire and Fuels Section).

The Clean Water Act, 1972

This act establishes a non-degradation policy for all federally proposed projects. Compliance with the Clean Water Act would be accomplished through planning, application and monitoring of Best Management Practices (BMPs).

Blowout Creek and its tributaries are no longer listed by Oregon Department of Environmental Quality as 303(d) water quality limited based on water temperature. (See Water Quality section, Chapter 3)

Water Quality Restoration Plan

Under the 1972, 1977 and 1986 Clean Water Act, waters of the State are to be protected. In 1998, Blowout Creek was listed as a Water Quality Limited stream in the State of Oregon for water temperature. The listed reach extended from Detroit Reservoir upstream to its headwaters. Temperature is the parameter that did not meet the standard for salmonid rearing in the summer. In April of 2001, a Water Quality Management Plan for the Water Quality Limited Streams in the North Santiam Watershed, specifically Blowout Creek and its tributaries, was prepared (USDA Forest Service, 2001). In 2002, the plan was approved by Oregon Department of Environmental Quality (DEQ). The Forest-wide goals are further refined to: “maintain the role and function of rivers, streams, wetlands and lakes in the landscape ecology.”

This is to be accomplished through:

- “Protection and rehabilitation of the aquatic and terrestrial riparian habitat.”
- “Maintenance and improvement of water quality while minimizing risks of downstream flooding.”
- “Restoration and maintenance of the ecological health of watersheds and aquatic ecosystems contained within them on public lands.”

Federal Mine Safety and Health Act of 1977, Public Law 91-173, as amended by Public Law 95-164.

Development of rock pits would conform to the requirements of the act, which sets forth mandatory safety and health standards for each surface metal or nonmetal mine. The purpose for the standards is to protect life by preventing accidents and promoting health and safety.

Magnuson-Stevens Fishery Conservation and Management Act, 1976, amended 1996 (MSA)

§ 305(b)(2) of the MSA directs that “Each Federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act.”

The MSA implementing regulations (50CFR part 600), specifically §600.920(a) states that “Federal agencies must consult with National Marine Fisheries Service (NMFS) regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect EFH.

Chinook salmon are the only MSA fish species on the Willamette National Forest. Essential fish habitat has been delineated in the Willamette River Basin based on the process described in

MSA §303(a)(7). Federal agencies are to minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat (MSA §303(a)(7)). The designation of EFH did not include any streams above Big Cliff dam, and therefore EFH would not be affected by this project. MSA consultation is not required.

Wild and Scenic Rivers Act, 1968

There are no Wild and Scenic Rivers in the planning area, and there would be no affect on Wild and Scenic Rivers.

Inventoried Roadless Areas and Wilderness

There are no actions proposed within Inventoried Roadless Areas (IRAs) or Wilderness in the Blowout Thin project, and no actions would affect these designations where they occur adjacent to the project area.

Executive Order 13186: Neotropical Migratory Birds

There are 85 bird species recognized as neotropical migrants on the Willamette National Forest. Thirty-five of these species found on the Willamette have been identified as species of concern (Sharp, 1992). A Memorandum of Understanding was signed between the USFS and USFWS to complement the January 2001 Executive Order. The Blowout Thin Project Area contains populations of migratory land birds typical of the western Cascades. See the Migratory Land Bird section in the Wildlife Habitat section of Chapter 3 for further discussion of effects on neotropical migratory birds.

Executive Orders 11988 and 11990: Floodplains and Wetlands

Executive Order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Proposed harvest treatments would not occur within 100-year floodplains. Implementation of Alternatives 2, 3, 4, and 5 could generate funding that could be used for a foreseeable future floodplain restoration project on Blowout Creek near its confluence with Cliff Creek, as identified in Activities that Contribute to Cumulative Effects in the beginning of Chapter 3.

Executive Order 11990 requires government agencies to take actions that minimize the destruction, loss, or degradation of wetlands. Streamside Riparian Reserves, seeps, springs, and other wet habitats exist in the Blowout Thin Project Area. These areas would be either avoided or managed to comply with amended Willamette Forest Plan Standards and Guidelines. Riparian Reserves would also be protected with Mitigation Measures detailed in Chapter 2. Proposed harvest treatments would be consistent with Executive Orders 11988 and 11990.

Executive Order 12898: Environmental Justice

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of the Proposed Action or any of the alternatives, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area, and nearby communities would mainly be affected by economic impacts connected with contractors implementing harvest, road reconstruction, tree thinning, planting, and fuels treatment activities. Racial and cultural minority groups could also be prevalent in the work forces that implement timber harvest, road reconstruction, tree thinning, planting, and fuels treatment activities. Contracts contain clauses that address worker safety.

The National Environmental Policy Act (NEPA), 1969

NEPA establishes the format and content requirements of environmental analysis and documentation. Preparation of the Blowout Thin Project EA was done in full compliance with these requirements.

The National Forest Management Act (NFMA), 1976

All proposed harvest units are planned on suitable land. All regeneration harvest units would be capable of restocking within 5 years of harvest by either natural or artificial means. Proposed commercial thinning would increase the rate of growth of remaining trees, and would favor species or age classes most valuable to wildlife. Reduced stress on residual trees would make treated stands less susceptible to pest-caused damage. Mitigations have been identified to protect site productivity, soils, and water quality.

The burning of activity fuels would reduce long-lasting hazards from wildfire over the project area. Air quality would be maintained at a level that would meet or exceed applicable Federal, State, and local standards. All proposed activities would provide sufficient habitat to maintain viable populations of fish and wildlife, and critical habitat for threatened or endangered species would be protected. Proposed activities are designed to accelerate development of forest habitats that are currently deficient within the analysis area, enhancing the diversity of plant and animal communities in the long-term. See discussions under the applicable resource sections above, for further support that proposed activities would comply with the seven requirements associated with vegetative manipulation (36 CFR 219.27(b)), riparian areas (36 CFR 219.27(e)), and soil and water (36 CFR 219.27(f)).

Forest Plan Consistency

The Willamette National Forest produced a Forest Plan in accordance with the National Forest Management Act of 1990, as amended. Chapter 1 names and describes major amendments to the Willamette Forest Plan since 1990. This plan provides guidelines for all natural resource management activities and establishes management standards. Current Forest Plan direction identifies fuel standards by management area across the forest.

The vegetative manipulation (commercial and non-commercial thinning) associated with the Blowout Thin project is consistent with the Willamette National Forest Land and Resource Management Plan FEIS and Record of Decision. See the Silviculture Report (Leach, 2005) and the Silvicultural Prescriptions, both in the Analysis File, for details.

Other Jurisdictions

There are a number of other agencies responsible for management of resources within the Blowout Thin Project Area. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife has been contacted regarding this analysis.

Proposed harvest treatments within riparian areas have been designed to comply with the Sufficiency Analysis (USDA, USDI, 2005) to achieve and maintain stream temperature water quality standards. This document was prepared in collaboration with Oregon Department of Environmental Quality and United States Environmental Protection Agency to provide documentation of Northwest Forest Plan compliance with the Clean Water Act with regard to state water quality standards for stream temperatures. As such, it redeems several of the Forest Service responsibilities identified in “Memorandum of Understanding between USDA Forest Service and Oregon Department of Environmental Quality To Meet State and Federal Water Quality Rules and Regulations” (USDA Forest Service and Oregon DEQ, 2002). The Sufficiency Analysis provides current scientific guidance for management of riparian vegetation to provide effective stream shade, including appropriate methods of managing young stands for riparian objectives other than shade, such as production of large wood for future recruitment.

Oregon Department of Environmental Quality and the Oregon Department of Forestry are responsible for regulating all prescribed burning operations. The USDA Forest Service Region 6 has a Memorandum of Understanding with Oregon Department of Environmental Quality, Oregon Department of Forestry, and the USDI Bureau of Land Management regarding limits on emissions, as well as reporting procedures. All burning would comply with the State of Oregon's Smoke Management Implementation Plan and. For greater specificity, see the memorandum of understanding.

Energy Requirements and Conservation Potential

Some form of energy would be necessary for proposed projects requiring use of mechanized equipment: Commercial thinning would involve small machines, while projects such as road reconstruction and maintenance could require heavy machinery for a small amount of time. Both possibilities would result in minor energy requirements. Alternatives that harvest trees could create supplies of firewood as a by-product, which would contribute to the local supply of energy for home space heating.

Prime Farmland, Rangeland, and Forestland

No prime farmland, rangeland, or forestland occurs within the analysis area.

Irreversible/Irretrievable Commitments of Resources

“Irreversible" commitment of resources refers to a loss of future options with nonrenewable resources. An "Irretrievable" commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

No new construction of permanent roads is planned. Temporary roads would be constructed and reopened in some of the alternatives, but would be hydrologically stored or obliterated following operations. Log landings would produce irretrievable changes in the natural appearance of the landscape. Rock used to surface roads would be an irreversible commitment of mineral resources.

Reduced fish population viability could be an irretrievable commitment of resources, but is not expected due to the application of Northwest Forest Plan Standards and Guidelines.

The soil and water protection measures identified in the Forest Plan Standards and Guidelines, Mitigation and Design Measures in Chapter 2, and Best Management Practices are designed to avoid or minimize the potential for irreversible losses from the proposed management practices.

Concerning threatened and endangered plant, wildlife, and fish species, a determination has been made that the proposed actions would not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives.

With Alternative 1 (No Action): There would be an irretrievable loss of growth within the untreated, overstocked forest. The ability to protect forest within the analysis area from catastrophic fire could also be irretrievably lost. There would be an irreversible loss of timber value due to poor tree growth related to crowded conditions, insects and disease.

With all Action Alternatives (2, 3, 4, and 5): Tree removal would result in an irretrievable loss of the value of removed trees for wildlife habitat, soil productivity, and other values. Log landings would produce irreversible changes in the natural appearance of the landscape. The visual effect of log landings would be somewhat lessend by mitigation measures and design measures to reduce soil compaction and erosion (subsoiling, seeding and waterbarring for example). Little irreversible loss of soil should occur due to extensive mitigation associated with timber harvest and prescribed fire (harvest only on slopes less than 35 percent, full log suspension, etc.).

Alternatives 2, 3, 4, and 5, if implemented, would use a variety of rock aggregate types, such as crush, rip rap, or pit run, for road reconstruction, drainage stabilization, or landing construction. Rock material would come from within the existing development limits, and pit plans would be produced to control the time, method of entry, and quantities removed. This would be an irreversible commitment of rock (considered to be a resource). This rock would come from one or more of the following sources:

- Hawkins - T. 11 S., R. 6 E., Section 8, SE 1/4 of the NW1/4. Rd. 1013 at milepost 0.8
- McCoy - T. 10 S., R. 6 E., Section 23, NE1/4 of the SE1/4. Rd. 2233000 at milepost 0.8
- Cub Point - T. 11 S., R. 6 E., Section 3, NE1/4 of the SE1/4, Rd. 2236000, at milepost 1.4

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Chapter 4. Consultation and Coordination

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

Interdisciplinary Team (IDT) Members:

Eric Ornberg, IDT Leader, Writer/Editor
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Mike Roantree, Botanist
Doug Shank, Geologist
Wade Sims, Fisheries Biologist
Daryl Whitmore, Wildlife Biologist

Federal, State, and Local Agencies:

Heritage Resources

State Historic Preservation Office consultation has been completed under the terms of the 1995 Programmatic Agreement (amended 2004).

Wildlife (Spotted Owls)

The first Biological Opinion (BO) received from the U.S. Fish and Wildlife Service for spotted owl habitat modification in the Blowout analysis area was 1-7-95-F-290. Under this BO, 132 acres of regeneration harvest and 1501 acres of thinning was consulted on. Blowout Thin proposes to harvest a maximum of 60 acres by regeneration harvest and a maximum of 926 acres by thinning harvest.

The second BO for habitat modification in the Blowout analysis area was 1-7-97-F-396. Under this BO, 350 acres of regeneration harvest was consulted on. No sales were developed under this proposal. Records indicate sale planning was cancelled for these acres due to other priorities.

Two Biological Assessments (BAs) were submitted to USFWS for treatments occurring in critical habitat unit OR-14, for effects to critical habitat, in August of 2005. One BA addressed units categorized as may affect not likely to adversely affect designated critical habitat. The second BA addressed units categorized as may affect and are likely to adversely affect designated critical habitat.

Biological opinion 1-7-05-I-0516 was issued on 09/22/2005 and concurred with our determination of may affect, but is not likely to adversely affect northern spotted owl designated critical habitat. No additional terms and conditions were included in opinion 1-7-05-I-0516.

Biological opinion 1-7-06-F-0047 was issued 02/16/2006 and concurred with our determination of may affect, likely to adversely affect northern spotted owl designated critical habitat. This opinion requires seasonal restrictions from March 1 – July 15 on units 13, 104, 106, 121, 161 that are LAA, where activities have the potential to disturb nesting spotted owls.

Fishery Resource

In October 2006, consultation was initiated for the project.

Tribal Organizations:

The scoping letter for Blowout Thin was mailed to the Confederated Tribes of Siletz Indians, Confederated Tribes of Grand Ronde, and the Confederated Tribes of Warm Springs on June 22, 2004. No comments were received from the tribes. Program of Work meetings were held on March 10, 2005 with the Grand Ronde and on March 16, 2005 with the Confederated Tribes of Siletz Indians.

Elected Officials

Mayor Harold Hills, City of Detroit
Mayor Kathy A Sherman, City of Gates
Mayor Tim Kirsch, City of Mill City
Mayor Pat Kauffman, City of Lyons
Mayor Karen Clark, City of Idanha
Mayor Gary Aboud, City of Stayton
Senator Ron Wyden
Senator Gordon Smith
U.S. Representative Darlene Hooley

Individuals and Organizations:

Scoping comments were received in response to the scoping letter from Oregon Natural Resources Council (ONRC) and Freres Lumber Co. Additional clarification of ONRC’s comments was made by Chandra La Gue of ONRC during a telephone conversation March 23, 2005.

Appendix A – Botanical Biological Evaluation

United States Department of Agriculture | Forest Service | Willamette National Forest
Detroit Ranger District | HC 73 Box 320
Mill City, OR 97360
Tel (503) 854-3366
FAX (503) 854-4239

File Code: 2670 **Date:** 07/11/2006
Route To:

Subject: Botanical Biological Evaluation for Blowout Thin Timber Sale

To: Eric Ornberg/Project Files

Michael Roantree, Botanist Date 07/11/06

Introduction

Forest management activities that may impact populations of or alter habitat for PETS (proposed, endangered, threatened, or sensitive) species require a Biological Evaluation (FSM 2671.44) to be completed. The Biological Evaluation process (FSM 2672.43) is used to assist in determining the possible effects the proposed management activities have on:

A. Species listed or proposed to be listed as endangered (E) or threatened (T) by the U.S. Fish and Wildlife Service (FWS).

B. Species listed as sensitive (S) by the USDA Forest Service, Region 6. There are 69 organisms listed on the Regional Forester's Sensitive Botanical List that are documented or suspected to occur on the Willamette National Forest (Attachment 1).

Project Location and Description

The Blowout Thin Analysis Area encompasses approximately 27,320 acres in the southwestern portion of the Detroit Ranger District, Willamette National Forest. It includes several sub-drainages that flow into Blowout Creek. *Legal location - Willamette Meridian, Linn County*:
T10S, R5E, Sections 21-28, 34-36; T10S, R6E, Sections 19, 28-33; T11S, R5E, Sections 1-3, 10-15, 22-25; T11S, R6E, Sections 2-11, 14-23, 27-34; T12S, R6E, Sections 4-5

Proposed Action and Alternatives
The Detroit Ranger District proposes to take the following actions on approximately 985 acres in various management allocations of the Blowout Watershed Analysis Area.

1. Thin approximately 925 acres of managed and fire-regenerated second growth timber stands, through the harvest of commercial products such as saw logs and post and poles. Within managed stands the intent of the thinning is to encourage diameter and height growth of the remaining trees and to improve stand vigor and health. Thinning of fire-regenerated stands will generate increased volume and leave the stands in a better physiological condition to extend the rotation age about two more decades.

2. Regenerate stagnant second growth stands on approximately 60 acres, in Matrix allocations, through clearcutting with reserve trees. Fifteen percent of the area of the stand would be left in reserve, with the majority of reserve trees clumped in 2.5 acres areas and the remainder scattered individually around the harvest unit.

3. Minimize *Phellinus weirii* (root rot) infection spread, both within and outside proposed thinning stands, by clearcutting infected and host conifer species in an area that includes the infection site and a 50 foot buffer surrounding it. Generally infection sites are an acre or less in size, but rarely reach 5 acres in size. The harvested area will be replanted with non-susceptible species such as white pine, western redcedar, or hardwoods

4. Develop late-successional characteristics in selected riparian areas where these characteristics have been delayed due to fire exclusion, or where denser stands are a result of past timber management objectives. Silvicultural practices, such as thinning, may be applied within selected riparian reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy Objectives. Thinning would take place outside of the wet area of the riparian reserve and outside of the portion contributing to channel bank stability.

Actions connected to this proposal include:
Constructing temporary access roads to harvest units, as necessary and when compatible with other resource objectives. All road construction would be decommissioned by ripping, seeding, and reestablishing drainage patterns after harvest activities. Reconstructing existing roads needed to access harvest units. Reconstruction needs vary by road, but include such things as reconditioning of roadways and ditches, adding culverts, and cut-slope repair. Constructing landings for harvest units.

Proposed Alternatives:

I. No Treatment.
II. Includes approx 925 acres of commercial thinning and 60 acres of regeneration harvest on all planned units except those dropped for silvicultural no treatment, areas within primary peregrine zone, and portions of units buffered around perennially wet areas and sensitive botanical species occurrences. Riparian areas would be thinned. Temporary roads will neither be re-opened nor constructed under this alternative.
III. Same as Alternative II except it allows temporary roads to be constructed or re-opened.
IV. Same as Alternative II except with no regeneration harvest.
V. Same as Alternative II except it allows fewer temporary roads to be constructed (and none to be re-opened) than Alternative III, and correspondingly increases the amount of acreage designated for helicopter logging and helicopter landings.

Biological Evaluation Process

Under the suggested procedure for conducting a biological evaluation as described in a memo issued August 17, 1995 by the Regional Foresters of regions 1, 4, and 6, the Biological Evaluation is a 7 step process to evaluate possible effects to Proposed, Endangered, Threatened, and Sensitive (PETS) species. The seven steps are as follows:

1. Review of existing documented information.
2. Field reconnaissance of the project area.
3. Determination of effects of proposed actions on PETS species
4. Determination of irreversible or irretrievable commitment of resources (required for listed and proposed species only).
5. Determination of conclusions on effects
6. Recommendations for removing, avoiding, or compensating adverse effects
7. Documentation of consultation with other agencies, references, and contributors

Evaluation of effects for each species may be complete at the end of step #1 or may extend through step #5, depending on project details. Steps 1, 2, 3, and 5 from above are included in this document. Step 6 is included in the Environmental Assessment, and will not be discussed in detail in this document.

Evaluation and Survey of the Planning Area

Pre-field review was performed for the Blowout Thin Analysis area in the summer of 2004 in order to determine the presence of known sites or habitat for PETS species. Using the current list of potential PETS species (compiled from USFWS listings, Oregon Natural Heritage Program listings, Oregon Department of Agriculture listings, and the Regional Forester's sensitive species list), maps of known sensitive plant populations were checked for previously reported sites and aerial photos and topographical maps were scrutinized for potential habitat.

In areas where pre-field review identified potential habitat, field reconnaissance was done in accordance with established protocols and level of detail (see attachment 2). Surveys were done in the summer and fall of 2004. All units in the planning area were field surveyed at level B intensity.

Tables 1a and 1b display the results of pre-field review, the level of field surveys performed (if applicable), and the results of the surveys.

Table 1a: Summary of Evaluation Process for PETS Botanical Species in Blowout Thin Timber Sale for surveyable species

Species	**Prefield Review**	**Field Recon.**	**Species Presence**
Agoseris elata	habitat not present		
Arabis hastatula	habitat not present		
Arnica viscosa	habitat not present		
Asplenium septentrionale	habitat present	level B, low	No
Aster gormanii	habitat present	level B, mod	No
Botrychium minganense	habitat present	level B, mod	No
Botrychium montanum	habitat present	level B, mod	No
Botrychium pumicola	habitat not present		
Bridgeoporus nobillisimus	habitat not present		
Calamagrostis breweri	habitat not present		

Carex livida	habitat not present		
Carex scirpoidea var. *stenochlaena*	habitat not present		
Castilleja rupicola	habitat present	level B, mod	No
Chaenotheca subroscida	habitat present	level B, low	No
Cimicifuga elata	habitat present	level B, high	No
Coptis trifolia	habitat not present		
Corydalis aqua-gelidae	habitat present	level B, mod	No
Dermatocarpon luridum	habitat present	level B, low	No
Eucephalis(Aster) vialis	habitat present	level B, low	No
Frasera umpquaensis	habitat not present		
Gentiana newberryi	habitat not present		
Hypogymnia duplicata	habitat not present		
Iliamna latibracteata	habitat present	level B, mod	No
Leptogium burnetiae var. hirsutum	habitat not present		
Leptogium cyanescens	habitat present	level B, high	Yes
Lewisia columbiana var. *columbiana*	habitat not present		
Lobaria linita	habitat not present		
Lupinus sulphureus var. kincaidii	habitat not present		
Lycopodiella inundata	habitat not present		
Montia howellii	habitat not present		
Nephroma occultum	habitat present	level B, high	Yes
Ophioglossum pusillum	habitat not present		
Pellaea andromedaefolia	habitat present	level B, mod	No
Pannaria rubiginosa	habitat present	level B, low	No
Species	**Prefield Review**	**Field Recon.**	**Species Presence**
Peltigera neckeri	habitat present	level B, mod	No
Peltigera pacifica	habitat present	level B, high	Yes
Pilophorus nigricaulis	habitat present	level B, low	No
Polystichum californicum	habitat not present		
Potentilla villosa	habitat not present		
Pseudocyphellaria malota	habitat present	level B, high	Yes
Pseudocyphellaria rainierensis	habitat present	level B, high	Yes
Ramalina pollinaria	habitat present	level B, low	No
Ramaria gelatiniaurantia	habitat not present		
Rhizomnium nudum	habitat present	level B, high	No
Romanzoffia thompsonii	habitat present	level B, high	No
Scheuchzeria palustris var. *americana*	habitat not present		
Schistostega pennata	habitat not present		
Scirpus subterminalis	habitat not present		

Scouleria marginata	habitat present	level B, mod	No
Sisyrinchium sarmentosum	habitat not present		
Tetraphis geniculata	habitat not present		
Tholurna dissimilis	habitat present	level B, low	No
Usnea longissima	habitat present	level B, mod	No
Utricularia minor	habitat not present		
Wolffia borealis	habitat not present		
Wolffia columbiana	habitat not present		

Table 1b: Summary of Evaluation Process for PETS Botanical Species in Blowout Thin Timber Sale for species deemed unsurveyable

Group	Species	Prefield Review/Rationale
Mycorrhizal Fungi	*Boletus pulcherrimus*	level A, low / rare, no info
	Cortinarius barlowensis	level A, mod / local, no info
	Gomphus kaufmanii	level A, mod / local, no info
	Leucogaster citrinus	level A, mod / local, no info
	Phaecollybia attenuata	level A, low / not local,no info
	Phaeocollybia dissiliens	level A, mod / local, no info
	Phaeocollybia pseudofestiva	level A, mod / local, no info
	Phaeocollybia sipei	level A, mod / local, no info
	Ramaria amyloidea	level A, low / not local,no info
	Ramaria aurantiisiccescens	level A, mod / local, no info
	Ramaria largentii	level A, mod / local, no info
Saprophytic on Litter Fungi	*Cudonia monticola*	level A, mod / local, no info
	Mycena monticola	level A, mod / local, no info
	Sowerbyella rhenana	level A, mod / local, no info
Saprophytic on Wood	*Gyromitra californica*	level A, mod / local, no info
Parasitic Fungi	*Cordyceps capitata*	level A, mod / local, no info

Potential Effects on PETS Species

Potential effects are listed in accordance with the formats put forth for listed species in the 1986 Endangered Species Act regulations (50 CFR Part 402), the March 1998 FWS/NMFS Endangered Species Consultation Handbook; and, for sensitive species, in the Forest Service Manual section 2670 and in the May 15 and June 11, 1992 Associate Chief/RF 2670 letters on this topic. The suggestion to use this format was also included in a memo issued August 17, 1995 by the Regional Foresters of Regions 1, 4, and 6. Attachment 3 gives details on these effects categories. Table 2 shows conclusions for effects of proposed actions on sensitive species with respect to each alternative in the Environmental Assessment. More detailed information on potential project effects on PETS species is found in the Environment Assessment for the project.

ALTERNATIVES:

I. No Treatment.
II. Includes approx 925 acres of commercial thinning and 60 acres of regeneration harvest on all planned units except those dropped for silvicultural no treatment, areas within primary peregrine zone, and portions of units buffered around perennially wet areas and sensitive botanical species occurrences. Riparian areas would be thinned. Temporary roads will neither be re-opened nor constructed under this alternative.
III. Same as Alternative II except it allows temporary roads to be constructed or re-opened.
IV. Same as Alternative II except with no regeneration harvest.
V. Same as Alternative II except it allows fewer temporary roads to be constructed (and none to be re-opened) than Alternative III, and correspondingly increases the amount of acreage designated for helicopter logging and helicopter landings.

General Effects

There is debate as to whether commercially thinning overstocked conifer stands is advantageous in the long term for those species that have adapted to late-successional conditions. As might be expected, there are different responses to environmental change by different species groups, both within and between groups. Recent studies have compared the species compositions of old growth, thinned and un-thinned stands (*Muir*, et al, 2002). Thinning of most stands, depending on age distribution and site productivity, resulted in the formation of late-successional characteristics such as multi-layered canopies and overall vegetation diversity within the stand age parameters of the studies. In general, while herbaceous vascular plants benefited from thinning in both abundance and species richness, certain forage lichens benefited in abundance and in species richness, and there was little change in these variables for bryophytes in thinned stands. But for all species groups, there seemed to be definite increases in abundance and species richness when structural diversity was promoted by variable density thinning, protecting hot spots of diversity, and retaining legacy components such as old down wood, snags, and large trees. What is not as clear is to what degree do overstocked stands self thin over time and achieve late-successional characteristics on their own, what is the role of fire in this process, and absent disturbance over time, do un-thinned stands lack the characteristics to support relict old-growth species? A partial answer contributed by these studies is that the relationship between a tree's diameter at age 200 years and its diameter and growth at age 50 show that trees that were large at age 200 years were generally large and fast growing when young, indicating a requirement of early release from competition in order for trees to attain large size.

For fungi species, the literature indicates increasing species abundance and diversity with increasing stand age, although younger stands tend to have more ectomycorrhizal sporocarps (mushrooms, e.g.) in the organic layer, and less lower soil profile fungi (truffles, e.g.) than old growth (*Bradbury et.al.*, 1998; *Smith, et.al.*, 2002). But like the other species groups, fungi benefit from retaining a certain amount of structure (host trees and large down wood for fungi) for long term source of nutrients, moisture, and inoculum, and fare much better when direct disturbance of habitat is minimized (*Amaranthus, et al.*, 1996; *Amaranthus and Perry,* 1994). However, two studies have shown that there is an optimal amount of organic debris and of moisture, and too much of either can be detrimental (*Harvey, et.al.*, 1981; *O'Dell, et.al.*, 1999).

Numerous studies have shown there to be a definite gradient of decreasing fungi diversity and abundance from forest interior, to edge, into smaller openings, and finally very small fungi presence in the middle of large openings (*Durall, et.al.*, 1999; *Kranabetter and Wylie*, 1998; *Perry, et.al.*, 1989). For patches left within openings, larger interior habitat provides more abundance and diversity than smaller patches (*Berglund and Jonsson*, 2003). Regarding thinning, a study in Arizona concluded "preliminary results indicate that populations of arbuscular mycorrhizal fungi can rapidly increase following restoration thinning in Northern Arizona ponderosa pine forests.... Two main processes control population densities of mycorrhizal fungi following disturbance: immigration of new propagules from nearby areas and survival and spread of residual propagules." (*Korb, et.al.*, 2001). Closer to home, a study in a western hemlock-western red-cedar forest concluded that although harvesting, thinning, and fertilizing will directly affect ectomycorrhizal mushroom abundance and species composition , that "partial cutting systems could allow some timber removal without necessarily reducing ectomycorrhizal mushroom communities", and "partial cutting that favors retention of a diverse mix of ectomycorrhizal tree species over western redcedar (a non-host species) may benefit ectomycorrhizal mushroom richness." (*Kranabetter and Kroeger*, 2001).

The Blowout watershed has been characterized as having a large number of overstocked stands. The Blowout Watershed Analysis (2000) attributes much of this condition to efficient fire exclusion in a heavily managed area, easily accessed from the ranger station and with an extensive road system. The result of implementing Blowout Thin will be increased structural diversity in the watershed in the form of increased tree, shrub, and forb growth, some degree of variable density thinning with dense stems/acre around water features and sensitive species occurrences (more acreage in Alts. III and IV), and creation of occasional small openings around *Phellinus weirii* pockets (and larger openings with regeneration harvest in Alts. II and III). Hardwood and shrub species will be retained where possible and appropriate, as will large old growth trees and down woody material. Detrimental results from thinning include increased forest floor compaction and loss of organics, inadvertent disturbance of sensitive species habitat due to host tree or substrate (shrub, soil, log, e.g.) loss, and microclimate change due to canopy loss, all of which can lead to short term temperature fluctuations and to short-term moisture, nutrient, and soil structure losses from the ecosystem.

Vascular Plants, Lichens and Bryophytes

Four sensitive lichen species were documented as occurring within the Blowout Thin project area during 2004 field surveys. These lichens are: *Leptogium cyanescens, Nephroma occultum, Peltigera pacifica*, and *Pseudocyphellaria rainierensis*. No currently listed bryophyte species are documented in this project area, and the one listed vascular plant species occurring in the watershed, *Romanzoffia thompsonii*, is more than ½ mile from proposed project work. Therefore direct, indirect, or cumulative effects are not anticipated to vascular plants and bryophytes as a result of implementation of any of the alternatives.

Most common substrates: *Leptogium cyanescens*: Down logs, rocks, and mostly hardwood bark.
Nephroma occultum: Conifer boles and branches, mostly mid to upper canopy, found in litter.
Peltigera pacifica: Down logs, soil, moss, rocks, tree bases.
Pseudocyphellaria rainierensis: Hardwood and conifer branches and boles, also found in litter.

Effects by Alternative

Alternative I: No **direct or indirect** effects are anticipated in the no action alternative; although an indirect effect of this alternative that might develop could include the continued build up of dense stands, with either no creation or slower creation of the late-successional characteristics likely beneficial to these lichen species.

All Action Alternatives: All action alternatives for Blowout Thin include 926 acres of commercial thinning, and all but **Alternative 4** include 59 acres of regeneration harvest. Due to mitigation measures in the action alternatives, no **direct effects** to known lichen sites are anticipated. It is likely that individual sites of fungi may be negatively affected in the short term by host tree removal, physical disturbance, soil compaction, and disruption of mycelial networks if the fungi are present (*Kranabetter and Wylie 1998, Amaranthus and Perry 1994*). Although individual and short term impacts may occur, it is not likely to result in a trend toward Federal listing or loss of viability for survey and manage and sensitive fungi species.

Indirect effects to survey and manage and sensitive species and their habitats vary. The stand prescriptions include the creation of ¼ acre gaps that will decrease laminated root rot mortality and increase stand complexity over the long term (*20-100 years*). The 59 acres of clercuts with reserves proposed in **Alternatives 2, 3, and 5** should convert dense, stem exclusion stands into future late-successional habitat. However, two studies have shown that fungal species richness declines in forest openings (*Durall, et al, 1999, Kranabetter and Wylie 1998*). Therefore, in the short term, the proposed action may reduce habitat for sensitive mycorrhizal fungi. Ultimately, the overall harvest effort should result in enhanced late-successional characteristics in the long term. This includes greater diversity in stand structure and stand species. The addition of understory trees and shrubs may benefit the sensitive mycorrhizal species. Duff retention and coarse woody debris creation will benefit the sensitive saprophytic species. Late-successional forest provides better habitat for sensitive lichens as well. Buffers around sensitive lichen species protect the sites from direct disturbance but may have indirect adverse effects as the trees grow and a dense canopy results. Big-leaf maple may get shaded out, therefore no longer providing habitat for *Leptogium cyanescens*.

Cumulative Effects include habitat disturbance of the approximately 10,650 acres of regeneration harvest (clearcut and shelterwood) that occurred in the 27,320 acre Blowout watershed from 1940 to 1990. An additional 1,855 acres were managed with commercial thinning, partial cutting, and salvage logging. Most of the acres managed for timber since the 1960's have had some sort of fuel treatment, including broadcast burning, pile burning, and yarding of unutilizable material. Current and presently planned activities in the watershed include Echo, Coffin Thin, Nasty, Pin, Skyhawk, and Shore Nuf Timber Sales, which account for an additional 96 acres of regeneration harvest, and 921 acres of commercial thinning. Roadway Thin is currently thinning not more than 70 acres along 8.5 miles of road in the watershed, for roadside safety.

Pseudocyphellaria rainierensis and *Nephroma occultum* are likely to have been most adversely affected by historical management activities. Fungal diversity also declines with clear-cutting, soil disturbance, and fire (*Byrd, et al 2000, Bruns, et al 2002*).

Despite the large amount of past harvest activity there are 12, 860 acres of mature and old-growth forests still remaining in the watershed. These forests serve as refugia for many survey and manage and sensitive species that will be able to re-colonize the younger stands as they mature and become more complex in structure and diversity.

Risk to the continued viability of these species and their local populations as a result of implementation of any of the action alternatives is considered low due to the relatively large number of local sites recently documented, the long term improvement in old growth characteristics promoted by thinning these stands, and mitigation measures included in project implementation such as protection of the individual species sites and retention of hardwood and large down woody components.

Fungi

Table 1b reflects that given the current (lack of) information on the listed unsurveyable fungi species documented or suspected on the Willamette National Forest, it is presumed that habitat may exist for some or all of these species in the project area. Those with documented occurrences within approximately 25 miles of the project area are given a moderate probability of occurrence, while those that are rarely found or not found locally are given a low probability of occurrence.

Direct effects of commercial thinning to fungal habitat include the possible loss of host trees, and the disruption of mycelial networks (*Kranabetter and Wylie*, 1998; *Amaranthus and Perry*, 1994).

Indirect effects of commercial thinning to fungal habitat include the short-term loss of moisture retention capabilities due to the drying effect of over-story shade removal, and the reduction of water storage with the disturbance or removal of forest floor organic material and large wood. Loss of large woody material and host trees also represents a reduction of available nutrients and possible inoculum source for future fungal regeneration and expansion. Soil compaction resulting from harvesting equipment and the creation of temporary access roads can reduce host tree root growth and root tip availability for fungi (*Amaranthus, et.al.*, 1996; *Amaranthus and Perry*, 1994).

Table 2: Summary of Conclusion of Effects

Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Asplenium septentrionale	NI	NI	NI	NI
Aster gormanii	NI	NI	NI	NI
Botrychium minganense	NI	NI	NI	NI
Botrychium montanum	NI	NI	NI	NI
Botrychium pumicola	NI	NI	NI	NI
Castilleja rupicola	NI	NI	NI	NI
Chaenotheca subroscida	NI	NI	NI	NI
Cimicifuga elata	NI	NI	NI	NI
Corydalis aqua-gelidae	NI	NI	NI	NI

Dermatocarpon luridum	NI	NI	NI	NI
Eucephalis(Aster) vialis	NI	NI	NI	NI
Iliamna latibracteata	NI	NI	NI	NI
Leptogium cyanescens	NI	NI	NI	NI
Nephroma occultum	NI	NI	NI	NI
Pannaria rubiginosa	NI	NI	NI	NI
Pellaea andromedaefolia	NI	NI	NI	NI
Peltigera neckeri	NI	NI	NI	NI
Peltigera pacifica	NI	NI	NI	NI
Pilophorus nigricaulis	NI	NI	NI	NI
Pseudocyphellaria malota	NI	NI	NI	NI
Pseudocyphellaria rainierensis	NI	NI	NI	NI
Ramalina pollinaria	NI	NI	NI	NI
Rhizomnium nudum	NI	NI	NI	NI
Romanzoffia thompsonii	NI	NI	NI	NI
Scouleria marginata	NI	NI	NI	NI
Tholurna dissimilis	NI	NI	NI	NI
Usnea longissima	NI	NI	NI	NI

Key to Abbreviations in Table 2 (See attachment 4).

NI = No Impact

MIIH = May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Loss of Viability for the Population or Species

WOFV* = Will Impact Individuals or Habitat with a Consequence That the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability for the Population or Species

BI = Beneficial Impact

* Considered a trigger for a significant action in NEPA

ATTACHMENT 1: **Regional Forester's Sensitive Botanical Species List for the Willamette National Forest (Revised 2004).** Species of federal, state and local importance are included on the R-6 list.

Species	Occurrence on WNF	ONHP Status	State Status	Federal Status	Habitat Types
Agoseris elata	S	2			MM,DM
Arabis hastatula	D	1		SofC	RO
Arnica viscosa	S	2			RS
Asplenium septentrionale	S	2			RO
Aster gormanii	D	1			RS
Boletus pulcherrimus	D	1			CF
Botrychium minganense	D	2			RZ,CF
Botrychium montanum	D	2			RZ,CF
Botrychium pumicola	S	1	LT		HV
Bridgeoporus nobilissimus	D	1			CF
Calamagrostis breweri	D	2			MM,RZ
Carex livida	S	2			WM
Carex scirpoidea var. stenochlaena	D	2			RO
Castilleja rupicola	D	2			RO
Chaenotheca subroscida	D	3			CF
Cimicifuga elata	D	1	C		CF
Coptis trifolia	S	2			WM,CF
Cordyceps capitata	D	not listed			CF
Corydalis aqua-gelidae	D	1	C		RZ,CF
Cudonia monticola	D	not listed			CF
Dermatocarpon luridum	S	3			RZ on rock
Eucephalis (Aster) vialis	S	1	LT	SofC	CF
Frasera umpquaensis	D	1	C		MM
Gentiana newberryi	D	2			MM
Gomphus kaufmanii	D	3			CF
Gyromitra californica	D	2			CF
Hypogymnia duplicata	S	3			CF
Iliamna latibracteata	S	2			CF,RZ
Leptogium burnetiae var. hirsutum	S	3			CF
Leptogium cyanescens	D	3			CF
Leucogaster citrinus	D	3			CF
Lewisia columbiana var. *columbiana*	D	2			RS
Lobaria linita	D	2			RO
Lupinus sulphureus var. kincaidii	S	1	LT	LT	MM,DM
Lycopodiella inundata	D	2			WM
Lycopodium complanatum	D	2			CF

Species	Occurrence on WNF	ONHP Status	State Status	Federal Status	Habitat Types
Montia howellii	D	4	C		RZ
Mycenia monticola	D	not listed			CF
Nephroma occultum	D	4			CF
Ophioglossum pusillum	D	2			WM
Pannaria rubiginosa	D	2			CF
Pellaea andromedaefolia	S	2			RO
Peltigera neckeri	D	not listed			CF
Peltigers pacifica	D	not listed			CF
Phaeocollybia attenuata	D	4			CF
P. dissiliens	D	3			CF
P. pseudofestiva	D	3			CF
P. sipei	D	3			CF
Pilophorus nigricaulis	D	2			RO
Polystichum californicum	D	2			RO
Potentilla villosa	D	2			RS, RO
Pseudocyphellaria rainierensis	D	4			CF,RZ
Ramalina pollinaria	D	2			CF, RZ
Ramaria amyloidea	D	2			CF
R. aurantiisiccescens	D	4			CF
R. largentii	D	3			CF
Rhizomnium nudum	D	2			CF
Romanzoffia thompsonii	D	1			RS
Scheuchzeria palustris var. americana	D	2			WM
Schistostega pennata	D	2			CF
Sisyrinchium sarmentosum	S	1	C	SofC	MM,DM
Sowerbyella rhenana	D	3			CF
Tetraphis geniculata	S	2			CF
Tholurna dissimilis	D	2			CF
Usnea longissima	D	3			CF,RZ
Utricularia minor	D	2			SW
Wolffia borealis	S	2			SW
Wolffia columbiana	S	2			SW

Occurrence on Willamette National Forest:
S = Suspected
D = Documented

Oregon Natural Heritage Program (ORNHP):
1 = Taxa threatened or endangered throughout range.
2 = Taxa threatened or endangered in Oregon but more common or stable elsewhere.
3 = Species for which more information is needed before status can be determined, but which may be threatened or endangered (Review).
4 = Species of concern not currently threatened or endangered (Watch).

Oregon State Status:
LT = Threatened
LE = Endangered
C = Candidate

Federal Status: These plant species were originally published as CANDIDATE THREATENED (CT) in the Smithsonian Report, **Federal Register**, July 1, 1975, or as PROPOSED ENDANGERED (PE) in a later report, **Federal Register**, June 16, 1976. The latest **Federal Register** consulted was dated September 30, 1993. Updated listings appear periodically in the Notice of Review (USFWS); the status of several species is categorized as follows:
LE = Listed as an Endangered Species
LT = Listed as a Threatened Species
PE = Proposed as an Endangered Species
PT = Proposed as a Threatened Species
C = Candidate for Listing as Threatened or Endangered
Sof C = Species of Concern; taxa for which additional information is needed to support proposal to list under the ESA.

Habitat Types:

MM = Mesic meadows	RS = Rocky slopes, scree
WM = Wet meadows	RO = Rock outcrops, cliffs
DM = Dry meadows	DW = Dry open woods
RZ = Riparian zones, floodplains	HV = High volcanic areas
CF = Coniferous forest	SW = Standing water

ATTACHMENT 2:

Field reconnaissance survey levels for determining presence potential for TES species.

Level A: Aerial photo interpretation and review of existing site records. Determination of the potential for a listed species to occur within the proposed project area. No field surveys completed.

Low potential: Less than 40% potential for listed species inhabiting the project area.

Moderate potential: 40-60% potential for a listed species inhabiting the proposed project area.

High potential: Greater than 60% potential for listed species inhabiting the proposed project area.

Level B: Single entry survey of probable habitats. Areas are identified by photos and existing field knowledge. Field surveys are conducted during the season most favorable for species identification.

Low intensity: Selected habitat surveys (approximately 5-10% of area) are conducted with a single entry for listed species inhabiting the proposed project area.

Moderate intensity: Selected habitat surveys (approximately 10-40% of area) are conducted with a
single entry for listed species inhabiting the proposed project area.

High intensity: Selected habitat surveys (approximately 40-60% of area) are conducted with a
single entry for listed species inhabiting the proposed project area.

Level C: Multiple entry surveys are conducted for listed species likely to inhabit the proposed project area.

Low intensity: Selected habitat surveys (approximately 5-10% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

Moderate intensity: Selected habitat surveys (approximately 10-60% of area) are conducted with
repeated entries for listed species inhabiting the proposed project area.

High intensity: Selected habitat surveys (approximately 60-80% of area) are conducted with
repeated entries for listed species inhabiting the proposed project area.

ATTACHMENT 3:

Conclusions Of Effects For Use In Biological Evaluations and Assessments
USDA Forest Service - Regions 1, 4, and 6
August, 1995

Sensitive Species:

1. No Impact (NI)

   A determination of "No Impact" for sensitive species occurs when a project or activity will have no environmental effects on habitat, individuals, a population or a species.

2. May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)

   Activities or actions that have effects that are immeasurable, minor or are consistent with Conservation Strategies would receive this conclusion. For populations that are small - or vulnerable - each individual may be important for short and long-term viability.

3. Will Impact Individuals or Habitat With a Consequence That the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (WIFV)

   Loss of individuals or habitat can be considered significant when the potential effect may be:

   1. Contributing to a trend toward Federal listing (C-1 or C-2 species);
   2. Results in a significantly increased risk of loss of viability for a species; or,
   3. Results in a significantly increased risk of loss of viability for a significant population (stock).

4. Beneficial Impact (BI)

   Projects or activities that are designed to benefit, or that measurably benefit a sensitive species should receive this conclusion.

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Appendix B – Wildlife Biological Evaluation

United States Department of Agriculture | Forest Service | Willamette National Forest
Detroit Ranger District | HC 73 Box 320
Mill City, OR 97360
Tel (503) 854-3366
FAX (503) 854-4239

File Code: 2670 **Date:** 07/25/2006
Route To: Paul Matter, District Ranger
EA Project Files

Subject: Biological Evaluation for Blowout Thin Timber Sale

Daryl Whitmore, Botanist Date 07/12/06

Summary of Effects:

1. Baird's shrew - The proposed project may impact the Baird's shrew or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

2. Pacific shrew - The proposed project may impact the Pacific shrew or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

3. Oregon slender salamander - The proposed project may impact the Oregon Slender salamander or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

4. Northern Spotted Owl – No affect for thinning units outside critical habitat. May affect but not likely to adversely affect for clearcut with reserve units outside critical habitat and thinning units in critical habitat. May affect and likely to adversely affect critical habitat for spotted owls in clear cut with reserve units in critical habitat.

5. Pacific Fringe Tailed Bat - The proposed project may impact the pacific fringe-tailed bat or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

6. Peregrine Falcon - The proposed project may impact the peregrine falcon or its habitat. Nesting may be disrupted by harvest activities if peregrine falcon pairs occupy potential habitat in the project area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Summary of mitigation/restrictions:

1. Peregrine Falcon - Alternatives 2, 3, 4

Restrict all operations in units 1, 13, 14, 16, 161, 17, 18, 24 from January 15 – July 31. Restrict air operations only in units 2, 3, 4, 5, 6, 7, 8, 11, 12, 19, 21, 23, 26, 104, 106, 121 & 191 from January 15 – July 31. Restrict rock source blasting at Hawkins and Cub point pits from January 15 – July 31. Rock crushing, hauling, etc is not restricted. Clearcut with reserve units 1, 161, 13 & 14, in the secondary peregrine falcon management zone, I recommend providing snags at the 100% level for potential population of cavity excavator species.

Alternative 5

Restrict all operations in units 1, 13, 16, 161, 17 south of road 1003, 18 from January 15 – July 31. Restrict air operations only in units 4, 6, 7, 11, 12, 14, 17 north of road 1003, 19, 21, 23, 24, 26, 104, 106, 121 & 191 from January 15 – July 31. Currently units 104, 106, 121 & 191 do not have helicopter yarding proposed. Restrict rock source blasting at Hawkins and Cub point pits from January 15 – July 31. Rock crushing, hauling, etc is not restricted. Clearcut with reserve units 1, 161, 13 & 14, in the secondary peregrine falcon management zone, I recommend providing snags at the 100% level for potential population of cavity excavator species.

2. Peregrine Falcon - Clearcut with reserve units 1, 161, 13 & 14, in the secondary peregrine falcon management zone, will have snags at the 100% level for potential population of cavity excavator species.

3. Harlequin Duck - Restrict project activities in units 7 & 8 from March 15 – July 15 or until surveys indicate a lack of harlequin activity in the sale area.

4. Crater lake tightcoil - Perennially flowing streams will be buffered by a 50’ no disturbance zone to avoid potential pristiloma habitat.

5. Northern Spotted Owl - The following recommendations comply with terms and conditions as stated in Biological Opinion 1-7-06-F-0047 for Likely To Adversely Affect units in Critical Habitat, harvest units 13, 104, 106, 121 and 161. Project related activities within 1/4 mile of occupied or suitable unsurveyed habitat, having the potential to disturb spotted owls, are restricted from March 1 – July 15. Helicopter activities within 1/2 mile of occupied or suitable unsurveyed habitat, having the potential to disturb spotted owls, are restricted from March 1 – July 15. Portions of units 2, 4, 5, 17, 24 & 104 are more than 1/4 mile from unsurveyed suitable spotted owl habitat and are not restricted except for blasting and helicopter use.

Units 13, 104, 106, 121 & 161 are restricted for helicopter operations from March 1 – September 30. Currently only unit 161 is proposed to be helicopter yarded. This restriction extension is the result of re-consultation with USFWS for units in critical habitat that are likely to adversely affect spotted owls or their habitat. At the decision makers request combine operational restrictions for unit 161 with unit 16 so both have a helicopter restriction from March 1 – September 30.

No blasting shall occur within 1.0 mile of occupied or unsurveyed suitable spotted owl habitat in any land use allocation between March 1 and July 15. Blasting may occur between July 16 and September 30 only in the Matrix land use allocation.

Restrict rock source blasting and rock crushing at Hawkins and Cub Point pits from March 1 – July 15. Rock loading and hauling is not restricted. McCoy pit is inside a late successional reserve, blasting and rock crushing are restricted from March 1 – September 30. The suitable habitat at McCoy pit is surveyed yearly which may result in restrictions being lifted earlier than September 30. The habitat adjacent to McCoy pit is occupied by a pair of spotted owls that nested in 2004 and not in 2005. These recommendations comply with the terms and conditions from the Biological Opinions from USFWS for this project.

Introduction

The **Blowout Thin** is proposed to occur in the Blowout drainage. There is need to manage the Blowout Thin planning area to provide multiple-use benefits, as directed in the Willamette Forest Plan , which includes an expected output of timber products at the optimum level to meet the long-term sustained-yield capacity. The Willamette Forest Plan describes the goal to meet timber outputs at IV-227, and sets forth Standards and Guidelines for harvest scheduling at FW-176 and 177. The Willamette Forest Plan establishes a need for action to manage forested stands at the landscape level, while considering habitat diversity, size and shape of contiguous habitat blocks, and habitat function; and to prepare stands for safe introduction of fire to benefit wildlife and reduce risk of catastrophic wildfire.

The Northwest Forest Plan Final Supplemental Environmental Impact Statement (FSEIS), which amended the Willamette Forest Plan, recognizes that “the need for forest products from forest ecosystems is the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies on a predictable and long-term basis.” (Northwest Forest Plan FSEIS, page 1-4)

The Blowout Watershed Analysis (USDA Forest Service, 2000), Section V, Management Implications, page 8, places a high priority on recommendations for thinning within Riparian Reserves to develop desired stand structure within riparian reserves with emphasis on growing large trees and logs and other late-successional characteristics. Implementing this objective needs to be tempered with the hydrology, stream channel, water quality, aquatic, and wildlife objectives for these areas to allow the attainment of the Aquatic Conservation Strategy objectives at the fifth field watershed scale. There is also a need to manage the area in a way that reflects the range of historic conditions described in the Blowout Watershed Analysis.

The project is located in township 10 south, range 5 east sections 24 & 26, township 10 south, range 6 east sections 31, 32, 33, & 34, township 11 south, range 5 east sections 1, 12 & 13, township 11 south, range 6 east, sections 3, 4, 5, 6, 7, 8, 9, 16, 17, 20 & 22..

This biological evaluation addresses the potential effects of the proposed project on Threatened, Endangered, or Sensitive species listed in the R-6 Sensitive Species List dated 11/15/00. Analysis of effects of this proposed project on Federally listed Threatened, Endangered and Proposed species ensures compliance with the provisions of the Endangered Species Act of 1973, P.L. 93-205 (87 Stat. 884), as amended.

All Actions are taken to ensure that management activities do not jeopardize the continued existence of sensitive species or result in an adverse modification of their essential habitat (FSM 2670.3, Region-6 ID 2670-92-1, 1/91). The U.S. Forest Service, Region-6, presently has not completed Conservation Strategies designed to ensure viability of sensitive species.

Habitat for the Yellow Rail and Least Bittern are not present on the Detroit Ranger District so are not analyzed further in this document. They are categorized as regionally sensitive species.

The no action alternative is not expected to have any effects on Threatened, Endangered or Sensitive (TE&S) animal species. Only potential effects of the Action Alternatives will be discussed further in this document.

Analysis of effects to Threatened, Endangered and Sensitive species are summarized in Tables 1 & 2. Analysis of impacts was done based on the process established in Section 2670 of the Forest Service Handbook and the R-6 Interim Direction R-6 2670-92-1. In addition to these and the following documents, personal knowledge of the area, professional judgment, and other studies were used to assess the risk of the proposed project adversely affecting a Threatened, Endangered, or Sensitive Species.

Spotted Owls:
∗Land and Resource Management Plan, Willamette National Forest, as amended, 1990.
∗Record of Decision, for amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, U.S. Department Of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management, April 13, 1994.

Bald Eagles:
∗Pacific States Bald Eagle Recovery Plan, USFWS, 1984.
∗Land and Resource Management Plan, Willamette National Forest, as amended, 1990.

American Peregrine Falcons:
∗Pacific Coast Recovery Plan for the American Peregrine Falcon, USFWS, 1982.
∗Biological Assessment Supplement, Appendix X. Project Design Criteria: Protection Measures for Peregrine Falcons, R-6, USDA Forest Service, 1998.
∗Land and Resource Management Plan, Willamette National Forest, as amended, 1990.

Table 1. Alternative One - No Action:

Species	Step #1 Pre-field Review	Step #2 Field Recon.	Step #3 Conflict Determination	Step #4 Analysis of Significance	Step #6 FWS Review
Birds					
American Peregrine Falcon	Habitat present	Not Conducted	None	No impact	
Black Swift	Habitat not present	Not Conducted	None	No impact	
Bufflehead	Habitat present	Not Conducted	None	No impact	
Harlequin duck	Habitat present	Not Conducted	None	No impact	
Northern Bald Eagle	Habitat present	Not Conducted	None	No effect	
Northern Spotted Owl	Habitat present	Not Conducted	None	No effect	
Mammals					
Baird’s Shrew	Habitat present	Not Conducted	None	No impact	
California Wolverine	Habitat present	Not Conducted	None	No impact	
Pacific Fisher	Habitat present	Not Conducted	None	No impact	
Pacific Fringe-tailed Bat	Habitat present	Not Conducted	None	No impact	
Pacific Shrew	Habitat present	Not Conducted	None	No impact	
Herpetiles					
Cascade Torrent Salamander	Habitat not present	Not Conducted	None	No impact	
Foothill Yellow-legged Frog	Habitat not present	Not Conducted	None	No impact	
Northwestern Pond Turtle	Habitat not present	Not Conducted	None	No impact	
Oregon Slender Salamander	Habitat present	Not Conducted	None	No impact	
Oregon Spotted Frog	Habitat not present	Not Conducted	None	No impact	
Mollusks					
Crater Lake Tight coil snail	Habitat not present	Not Conducted	None	No impact	

Insects					
Mardon Skipper	Habitat not present	Not Conducted	None	No impact	

Table 2. Action Alternatives:

Species	Step #1 Pre-field Review	Step #2 Field Recon.	Step #3 Conflict Determination	Step #4 Analysis of Significance	Step #6 FWS Review
Birds					
American Peregrine Falcon	Habitat present	Not Conducted	None	May impact	
Black Swift	Habitat not present	Not Conducted	None	No impact	
Bufflehead	Habitat present	Not Conducted	None	No impact	
Harlequin duck	Habitat present	Not Conducted	None	No impact	
Northern Bald Eagle	Habitat present	Not Conducted	None	No effect	
Northern Spotted Owl	Habitat present	Not Conducted	Yes	May affect likely to adversely affect	Yes
Mammals					
Baird's Shrew	Habitat present	Not Conducted	Yes	May impact	
California Wolverine	Habitat present	Not Conducted	None	No impact	
Pacific Fisher	Habitat present	Not Conducted	None	No impact	
Pacific Fringe-tailed Bat	Habitat present	Not Conducted	Yes	May impact	
Pacific Shrew	Habitat present	Not Conducted	Yes	May impact	
Herpetiles					
Cascade Torrent Salamander	Habitat not present	Not Conducted	None	No impact	
Foothill Yellow-legged Frog	Habitat not present	Not Conducted	None	No impact	
Northwestern Pond Turtle	Habitat not present	Not Conducted	None	No impact	
Oregon Slender Salamander	Habitat present	Not Conducted	Yes	May impact	
Oregon Spotted Frog	Habitat not present	Not Conducted	None	No impact	
Mollusks					
Crater Lake Tight coil snail	Habitat not present	Not Conducted	None	No impact	
Insects					

Mardon Skipper	Habitat not present	Not Conducted	None	No impact	

Species by Species Evaluation

Birds

1. American Peregrine falcon (*Falco peregrinus anatum*)
   Status: Federal: R6: Sensitive
   State: Endangered

The proposed project will not impact peregrine falcons or their habitat.

Habitat: In the Pacific states, preferred peregrine falcon nesting sites are sheer cliffs located near water with an abundant prey source (Willamette National Forest FEIS, 1990). Suitable nest sites for peregrine falcons are found in substantial rock outcroppings, usually southern exposure, and with a small cave or overhang ledge large enough to contain 3-4 full grown nestlings (Wilderness Research Institute, 1979). Peregrine falcons feed almost exclusively on birds, many of which are associated with riparian zones and large bodies of water.

Pre-field review: Potential nesting habitat does occur within 3 air miles of proposed activities. Potential nesting habitat is cliff habitat which does not have known peregrine nesting. Two known nest sites occur within 3 miles of the Blowout thin project. These areas are currently not surveyed to protocol for sale activities in this project. Units within a secondary management zone are 1, 13, 14, 16, 161, 18 & parts of 17 (45 acres) and 24 (6 acres). Units within the tertiary management zone are 2, 3, 4, 5, 6, 7, 11, 12, 19, 21, 23, 104, 106, 121, 191 and parts of 8 (9 acres), 17 (57 acres), 24 (128 acres) & 26 (7 acres). Units outside peregrine falcon management zones are 9, 10, 101 & 20.

Field reconnaissance: Surveys of potential nesting areas within 3 miles of this project should be surveyed to protocol. Surveys were conducted in 2003 for all potential habitat. Surveys were conducted in 2004 & 2005 for known sites in the project area.

Analysis of effects

All Action Alternatives:

Direct effects: Peregrine falcon prey habitat is being altered by the project. The effect to prey habitat is not expected to impact peregrine falcons using the area for nesting or foraging. Prey species may change densities and distribution in the project area with no expected decrease in prey availability. More area will be available for peregrine foraging as regeneration harvest opens previously closed stands and thinning opens tree canopies allowing prey to be taken inside the forest canopy.

Potential nest sites will not be surveyed for occupancy before or during harvest activities. If peregrine falcon pairs occupy potential habitat in the project area nesting may be disrupted by harvest activities.

Indirect effects: None.

Cumulative effects: Echo timber sale is a sold sale in the same planning area as Blowout Thin. 4.4 acres of habitat in a secondary management zone for peregrine falcons will be clearcut in Echo timber sale.

Conflict determination/risk assessment: If peregrine falcon pairs occupy potential habitat in the project area nesting may be disrupted by harvest activities. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Recommendations:

Alternatives 2, 3, 4

Restrict all operations in units 1, 13, 14, 16, 161, 17, 18, 24 from January 15 – July 31.
Restrict air operations only in units 2, 3, 4, 5, 6, 7, 8, 11, 12, 19, 21, 23, 26, 104, 106, 121 & 191 from January 15 – July 31. Restrict rock source blasting at Hawkins and Cub point pits from January 15 – July 31. Rock crushing, hauling, etc is not restricted. Clearcut with reserve units 1, 161, 13 & 14, in the secondary peregrine falcon management zone, I recommend providing snags at the 100% level for potential population of cavity excavator species. Surveys should be conducted, as recommended in appendix F of the USFWS Biological Assessment for Habitat Modification Projects 1998, for potential or occupied sites within 3 miles of sale related activities. Surveys are not funded or planned for potential habitat in the project area.

Alternative 5

Restrict all operations in units 1, 13, 16, 161, 17 south of road 1003, 18 from January 15 – July 31. Restrict air operations only in units 4, 6, 7, 11, 12, 14, 17 north of road 1003, 19, 21, 23, 24, 26, 104, 106, 121 & 191 from January 15 – July 31. Currently units 104, 106, 121 & 191 do not have helicopter yarding proposed. Restrict rock source blasting at Hawkins and Cub point pits from January 15 – July 31. Rock crushing, hauling, etc is not restricted. Clearcut with reserve units 1, 161, 13 & 14, in the secondary peregrine falcon management zone, I recommend providing snags at the 100% level for potential population of cavity excavator species.

Communication with U.S. Fish and Wildlife Service: None needed, peregrine falcons were taken off the endangered species list.

No Action Alternative: No change from current conditions.

2. Black Swift (*Cypseloides* *niger*)
Status: Federal: R6: Sensitive
State: Peripheral or naturally rare, assumed breeding population

The proposed project will not impact black swifts or their habitat.

Habitat: Black swifts are known to nest on cliff faces near waterfalls.

Pre-field Review: Suitable cliffs are not located in or adjacent to this project.

Field Reconnaissance: Potential habitat was not located in the project area.

All Alternatives

Analysis of Effects

Direct Effects: None.

Indirect Effects: None.

Cumulative Effects: None.

Recommendations: None.

Conflict Determination/Risk Assessment: None.

Communication with US Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

3. Bufflehead (*Bucephala* *albeola*)
Status: Federal: R6: Sensitive
State: undetermined status, breeding population

The proposed project will not impact buffleheads or their habitat.

Habitat: Buffleheads forage in lake and pond environments and nest in tree cavities along the shore.

Pre-field Review: Lake and pond habitat is found near the project area.

Field Reconnaissance: Habitat suitable for bufflehead breeding was not found in or adjacent to the project area.

Analysis of Effects

All Alternatives:

Direct Effects: None. Buffleheads may forage in blowout ponds in the project area adjacent to units 2, 4 & 5. Foraging activities are not expected to be impacted by project activities. Nesting habitat is not located in the project area.

Indirect Effects: None.

Cumulative Effects: None.

Recommendations: None.

Conflict Determination/Risk Assessment: No impact.

Communication with US Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

4. Harlequin Duck (*Histrionicus histrionicus*)
Status: Federal: Candidate R-6: Sensitive
State: undetermined status, breeding population

The proposed project is not expected to impact harlequin ducks.

Habitat: Harlequin ducks use rivers, streams, and creeks as feeding habitat and commonly nest on banks. Shrubby riparian vegetation, lack of human disturbance, and loafing sites are important factors for harlequin ducks (Cassirer and Groves, 1989).

Pre-field Review: Streams with potential for harlequin duck use are located adjacent to units 7 & 8. Approximately 8.4 miles of harlequin duck habitat occur in the planning area with approximately .5 miles of habitat adjacent to harvest unit.

Field Reconnaissance: Not Conducted.

Analysis of Effects

All Action Alternatives:

Direct Effects: None. Harlequins are ground nesters adjacent to streams. Habitat is not proposed to be altered by the project and riparian buffers protect the areas adjacent to the stream.

Indirect Effects: None.

Cumulative Effects: None.

Recommendations: Seasonal restrictions on project activities in units 7 and 8 will be implemented as these units are adjacent to a stream with documented Harlequin duck use. Seasonally restrict units 7 and 8 from March 15 – July 15 to avoid potential disturbance. Surveys may be conducted to determine if harlequin duck activity is occurring adjacent to or within the sale units. If harlequin ducks are determined, by protocol surveys, to not be present in the sale area this restriction may be lifted for the year surveys are conducted.

Conflict determination/risk assessment: None.

Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative: Habitat will not be altered in any alternatives and disturbance activities will not occur in the no action alternative.

5. Northern bald eagle (*Haliaeetus leucocephalus*)

Status: Federal: Threatened
State: Threatened
Indicator species for endangered species habitat

The proposed project is not likely to affect bald eagles or their habitat.

Habitat: Bald eagles require habitat consisting of scattered old-growth conifer trees near available fish sources. Bald eagles forage widely during non-nesting season, and scavenge on carcasses such as deer and elk.

Pre-field review: Bald eagles have been observed foraging along blowout creek in the project area. Approximately 3.5 miles of blowout creek are foraging habitat. Units 3, 6 & 106 are within .25 miles of foraging habitat. The project is not within a bald eagle management area. Harvest activities are not expected to disturb foraging bald eagles.

Field reconnaissance: Not conducted.

Analysis of effects

All Alternatives:

Direct effects: No effects are expected to occur from disturbance as eagles use this area infrequently for foraging. Potential nesting habitat is not being altered by the project.

Indirect effects: None. Project is not altering habitat for bald eagles.

Cumulative effects: None.

Conflict determination/risk assessment: No affect.

Recommendations: None.

Communications with U.S. Fish and Wildlife Service: Not recommended.

6. Northern spotted owl (*Strix occidentalis caurina*)

Status: Federal: Threatened

State: Threatened

Indicator species for Old-growth and mature coniferous forests.

No affect for thinning units outside critical habitat. May affect but not likely to adversely affect for clearcut with reserve units outside critical habitat and thinning units in critical habitat. May affect and likely to adversely affect critical habitat in clear cut with reserve units in critical habitat.

Habitat: The northern spotted owl is primarily an inhabitant of old growth and mature forests. Suitable spotted owl habitat contains adequate quantities of dead and down woody material, decadent trees, a medium to high crown closure, multiple layers in the overstory, and trees at least 200 years old or greater than 32 inches dbh (ISC Report 1990). **However, all of the above characteristics do not need to be present for spotted owls to be present or for spotted owls to make use of an area, and for habitat to be determined suitable.**

Pre-field review: The areas where the project would occur are in habitat suitable for spotted owl dispersal and atypical nesting habitat. Critical habitat unit (CHU) OR-14 is located in the project area. In the critical habitat unit there are 104,368 acres with 96,307 capable of producing spotted owl habitat, 56,540 acres are currently suitable owl habitat with and additional 5,442 acres of dispersal habitat.

Alternatives 2, 3 & 5

Some of the units in the Blowout thin project occur in Critical habitat unit (CHU) OR-14. Units are partly or all within the CHU are 1, 2, 3, 4, 5, 6, 12, 13, 14, 16, 17, 18, 23, 24, 104, 106, 121 &161. Units within the CHU will be silviculturally treated as follows: 0 acres of suitable spotted owl habitat will be removed, 2 acres of suitable spotted owl habitat will be thinned (degraded), 35 acres of habitat unsuitable for spotted owl dispersal will be thinned, 13 acres of habitat unsuitable for spotted owl dispersal will be removed, 268 acres of spotted owl dispersal habitat will be thinned (degraded) and 24 acres of spotted owl dispersal habitat will be removed.

In the planning area, prior to harvest, there are 6,175 acres of suitable spotted owl habitat and 6,076 of dispersal habitat. Total forested and non-forested acres in the planning area is 20,268.

On matrix land, outside the CHU, 88 acres of habitat not suitable for spotted owl dispersal will be thinned, 17 acres of dispersal will be removed and 538 acres of spotted owl dispersal habitat will be thinned.

Seasonal restrictions for disturbance of Northern Spotted Owls from blasting and helicopter yarding will be implemented (see Mitigation Measures for Wildlife in Chapter 2).

USFWS Biological Opinion: No affect for thinning units outside critical habitat. May affect but not likely to adversely affect for clearcut with reserve units outside critical habitat and thinning units in critical habitat. May affect and likely to adversely affect critical habitat in clearcut with reserve units in critical habitat.

Alternative 4

Critical habitat unit (CHU) OR-14 is located in the project area. Units all or partly within the CHU are 2, 3, 4, 5, 6, 12, 16, 17, 18, 23 & 24. Units within the CHU will be silviculturally treated as follows: 0 acres of suitable spotted owl habitat will be removed, 2 acres of suitable spotted owl habitat will be thinned, 35 acres of habitat unsuitable for spotted owl dispersal will be thinned, 0 acres of habitat unsuitable for spotted owl dispersal will be removed, 268 acres of spotted owl dispersal habitat will be thinned and 0 acres of spotted owl dispersal habitat will be removed.

On matrix land, outside the CHU, 88 acres of habitat not suitable for spotted owl dispersal will be thinned, 0 acres of dispersal will be removed and 538 acres of spotted owl dispersal habitat will be thinned.

Field reconnaissance: Not conducted.

Analysis of effects

Direct effects: No affect for thinning units outside critical habitat. May affect but not likely to adversely affect for clearcut with reserve units outside critical habitat and thinning units in critical habitat. May affect and likely to adversely affect critical habitat for spotted owls in clear cut with reserve units in critical habitat.

Indirect effects: None.

Cumulative effects: Echo timber sale is a sold sale in the same planning area as Blowout Thin. Echo timber sale will remove 38 acres of dispersal spotted owl habitat outside critical habitat and 4.4 acres of suitable habitat in critical habitat. Consultation with USFWS for habitat modification occurred for both Echo and Blowout thin sales under the Blowout analysis area consultation. Critical habitat consultation was submitted in 2005 as two separate Biological Assessments.
Roadway thin is occurring in 2005-2006 beside existing open roads. This sale will thin approximately 10 acres of spotted owl dispersal habitat and 1 acre of suitable habitat in CHU OR-14. The habitat will remain dispersal and suitable habitat after thinning.

Road maintenance involving the falling of dangerous snags has reduced the quality of spotted owl suitable habitat along road corridors in the planning area. Wood cutting along roadways has also reduced the amount of down wood and thus lowered the quality of suitable habitat in road corridors.

Recommendations: The following recommendations comply with terms and conditions as stated in Biological Opinion 1-7-06-F-0047 for Likely To Adversely Affect units in Critical Habitat, harvest units 13, 104, 106, 121 and 161.

Excluding helicopter and blasting, project related activities within 65 yards of occupied or suitable unsurveyed habitat, are prohibited from March 1 – July 15. Helicopter operations within ¼ mile of occupied or suitable unsurveyed habitat are prohibited during the entire breeding season, March 1 – September 30. Blasting is prohibited within 1.0 mile of occupied or unsurveyed suitable spotted owl habitat in any land use allocation between March 1 and July 15, and within ¼ mile of any occupied or unsurveyed suitable spotted owl habitat from July 15 to September 30th.

Rock crushing at Hawkins and Cub Point pits will be restricted within 180 yards of any occupied or unsurveyed suitable spotted owl habitat from March 1 – July 15. Rock loading and hauling is not restricted. McCoy pit is inside a late successional reserve, blasting and rock crushing are restricted from March 1 – September 30. The suitable habitat at McCoy pit is surveyed yearly which may result in restrictions being lifted earlier than September 30. The habitat adjacent to McCoy pit is occupied by a pair of spotted owls that nested in 2004 and not in 2005.

The following recommendations comply with terms and conditions as stated in Biological opinion 1-7-95-F-290 for all units excluding those listed under opinion 1-7-06-F-0047 above.

Prohibit timber harvest activities within a minimum of 0.25-mile radius (or further if deemed necessary by the action agency biologist) of unsurveyed suitable habitat between March 1 and June 15. All units are within .25 miles of unsurveyed suitable habitat.

Conflict determination/risk assessment: None.

Communications with the U.S. Fish and Wildlife Service: Conducted.

The first biological opinion for habitat modification in the blowout analysis area is 1-7-95-F-290. Under this biological opinion 132 acres of regeneration harvest and 1501 acres of thinning was consulted on. Under this opinion Echo timber sale will remove 43.4 acres of suitable habitat by regeneration harvest. Blowout thin proposes to harvest a maximum of 60 acres by regeneration harvest and a maximum of 926 acres by thinning harvest.

The second biological opinion for habitat modification in the blowout analysis area is 1-7-97-F-396. Under this biological opinion 350 acres of regeneration harvest was consulted on. No sales were developed under this proposal. Records indicate sale planning was cancelled for these acres due to other priorities.

Two Biological Assessments (BA) were submitted to USFWS for treatments occurring in critical habitat unit OR-14, for effects to critical habitat, in August of 2005. One BA addressed units which were may affect not likely to adversely affect designated critical habitat, the second BA addressed units which were may affect and are likely to adversely affect.

Biological opinion 1-7-05-I-0516 was issued on 09/22/2005 and concurred with our determination of may affect, but is not likely to adversely affect northern spotted owl designated critical habitat. No additional terms and conditions were included in opinion 1-7-05-I-0516.

Biological opinion 1-7-06-F-0047 was issued 02/16/2006 and concurred with our determination of may affect, likely to adversely affect northern spotted owl designated critical habitat. This opinion requires seasonal restrictions from March 1 – July 15 on units 13, 104, 106, 121, 161 that are LAA, where activities have the potential to disturb nesting spotted owls.

No Action Alternative:

Direct effects: No habitat alteration and no potential disturbance would occur.

Indirect effects: Habitat which is proposed to be treated by the action alternative would remain in a small diameter condition. Dispersal habitat and stands below the average stand diameter of 11” needed to qualify as dispersal would continue to be small in diameter with little growth expected.

Cumulative effects: None.

Recommendations: None.

MAMMALS

7. Baird’s Shrew (*Sorex bairdi* *permiliensis*)
Status: Federal: R-6: Sensitive
State: None

The proposed project may impact the Baird’s shrew or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Habitat: Baird’s shrew is known to inhabit forested riparian areas in the Cascade mountains. Riparian habitat does exist within the proposed project area. Approximately 7400 acres of forested riparian habitat occurs in the planning area. No surveys have been conducted to determine presence of Baird’s shrews.

Pre-field Review: Riparian habitat does exist within the proposed project area.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Action Alternatives:

Direct effects: The proposed project may impact the Baird’s shrew or its habitat if they are present and using the forested riparian environment in the project area. In the Blowout thin planning area a total of 220.2 miles of riparian reserves are recorded in the stream database. Of the 220.2 miles of stream recorded in the stream database 5.4 miles are within Blowout Thin units. Of the 5.4 miles of streams in Blowout thin proposed units, 5.1 miles are contained in thinning units and 0.3 miles are contained in clearcut with reserves units. Riparian areas in thinning units typically have higher levels of canopy closure than non-riparian areas and would continue to function as habitat after harvest. Riparian habitat in clearcut units is 0.14 percent of total riparian habitat in the planning area and will return to suitable habitat in the future. As harvest impacts are very small in terms of overall habitat in the planning area, impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Indirect effects: None.

Cumulative effects: Echo timber sale is a sold sale in the same planning area as Blowout Thin. Echo timber sale units will contain riparian habitat. 43.4 acres of harvest are included in the Echo timber sale in the Blowout thin planning area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Roadway Thin is a sold sale in the same planning area as Blowout Thin. 64 acres of thinning harvest are included in Roadway thin of which approximately 24 acres are in riparian reserve. Riparian habitat associated with the riparian reserves which Baird’s shrews are expected to inhabit are less than the area in reserves. Impacts may occur if individuals are present. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Recommendations: None.

Conflict determination/risk assessment: May impact habitat and individuals if they are present and using the forested riparian environment in the project area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.
Indirect effects: None.
Cumulative effects: None.
Recommendations: None.

8. California Wolverine (*Gulo gulo luteus*)
Status: Federal: Candidate R6: Sensitive
State: Threatened

The proposed project is not expected to have an adverse impact on wolverines.

Habitat: Wilderness or remote country where human activity is limited appears essential to the maintenance of viable wolverine populations. High elevation wilderness areas appear to be preferred in summer, which tends to effectively separate wolverines and humans. In winter, wolverines move to lower elevation areas which are snowbound with very limited human activity. Wolverines make little use of young, thick, timber and clear-cuts (Hornocker and Hash, 1981).

Wolverines appear to be extremely wide-ranging, and unaffected by geographic barriers such as mountain ranges, rivers, reservoirs, highways, or valleys. For these reasons, Hornocker and Hash (1981) concluded that wolverine populations should be treated as regional rather than local.

Pre-field review: Historical records indicate they have occurred here.

Field reconnaissance: Wolverine surveys have been conducted on the Detroit Ranger District. Cooperative aerial surveys with Oregon Department of Fish & Wildlife were conducted during the winters of 1997-98, 1998-99, 1999-2000 and 2000-2001. Camera bait sets were used to detect carnivores in the winters 2002, 2003 & 2004 with no wolverines detected. Wolverine dens or tracks were not located on the district.

An unusual snow event occurred in the fall of 2003 which allowed vehicle access to snow covered high elevation areas including the Blowout project area. An additional walk in snow tracking survey was conducted in the Marion lake area at this time. No wolverines were detected on the district during these surveys.

Analysis of effects

All Action Alternatives:

Direct effects: None. Potential foraging may occur through the area as wolverine home ranges usually are between 170 to 270 square miles. Disturbance by equipment is of limited duration and not expected to impact wolverines which may forage through the area.

Indirect effects: None.

Cumulative effects: Echo and Roadway thin timber sales are occurring in the same area and are not expected to impact California wolverines.
Recommendations: None.
Conflict determination/risk assessment: No impact.
Communication with U.S. Fish and Wildlife: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.
Indirect effects: None.
Cumulative effects: None.
Recommendations: None.

9. Pacific Fisher (*Martes pennanti*)
Status: Federal: Candidate for listing R-6: none
State: Critical

The proposed project is not expected to have an adverse impact on the pacific fisher or its habitat.

Habitat: The Pacific fisher is found in a wide variety of forested habitats. Fishers are opportunist feeders and one would find more flying squirrels in their diet than snowshoe hares. Very little is known about fishers in Oregon. Fishers are not known to exist in the project area or on the Detroit ranger district.

Pre-field Review: Carnivore surveys using automated cameras at bait sets were conducted on the Detroit Ranger District during the winters of 2002 & 2003. No fishers were detected at these stations. An unusual snow event occurred in the fall of 2003 which allowed vehicle access to snow covered high elevation areas. Surveys during this unusual event did not locate fisher tracks. A walk in snow tracking survey was conducted in the Marion lake area at this time. No fishers were detected during these surveys.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Action alternatives:

Direct effects: None. Fishers are not known to exist in the project area or on the Detroit ranger district.

Indirect effects: None.

Cumulative effects: Echo and Roadway thin timber sales are occurring in the same area and are not expected to impact Pacific Fishers.

Recommendations: None.

Conflict determination/risk assessment: No impact.

Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.
Indirect effects: None.
Cumulative effects: None.
Recommendations: None.

10. Pacific Fringe-tailed Bat (*Myotis thysanodes vespertinus*)
Status: Federal: R-6: Sensitive
State: Vulnerable

The proposed project may impact the pacific fringe-tailed bat or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Habitat: Prefers forested or riparian areas. Nursery colonies have been located in caves, mines and buildings.

Pre-field Review: Project is within the range of the Pacific Fringe-tailed bat. The project is altering habitat which is expected to be used by pacific fringe-tailed bats. Potential habitat for nursery colonies is located within the project boundaries in old growth trees. These trees will be retained in harvest units unless they are determined to be safety hazards.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Action Alternatives:

Direct effects: The proposed project may impact the pacific fringe-tailed bat or its habitat. Potential effects may occur if habitat which has potential to be used for nursery colonies of pacific fringe-tailed bats are felled as hazard trees during harvest operations. Potential habitat is much more likely to occur in old-growth stands in the Blowout drainage which in many cases occur adjacent to blowout thin units. As old-growth habitat is distributed throughout the planning area, impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Indirect effects: None.

Cumulative effects: Echo timber sale is a sold sale in the same planning area as Blowout Thin. 4.4 acres of harvest are included in the Echo timber sale in the Blowout thin planning area in habitat which could be used by Pacific Fringe-tailed bats. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Roadway thin is a sold sale in the same planning area as Blowout thin. Roadway thin is not impacting habitat that could be used by bats for roosting or nesting.

Recommendations: None.
Conflict determination/risk assessment: None.
Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.

Indirect effects: None.

Cumulative effects: None.

Recommendations: None.

11. Pacific Shrew (*Sorex pacificus cascadensis*)
Status: Federal: R-6: Sensitive
State: None

The proposed project may impact the Pacific shrew or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Habitat: The Pacific shrew is found in humid forests of western Oregon. Approximately 20,000 acres humid forested habitat occurs in the project planning area. Potential habitat may exist in the project area. Surveys have not been conducted to determine the presence of Pacific shrews in the area.

Pre-field Review: Potential habitat may exist in the project area.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Action Alternatives:

Direct effects: The proposed project may impact the Pacific shrew or its habitat. There is a potential for habitat removal and disturbance of individuals if they are present in the project area. Acres impacted by Blowout thin are a small portion of the total forested habitat in the planning area. Thinning units are expected to retain their value as potential habitat for Pacific Shrews. Clearcut with reserve units will remove suitable habitat in the short term and will return to suitable habitat in the long term. Harvest impacts are very small in terms of overall habitat in the planning area, impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Indirect effects: None.

Cumulative effects: Echo timber sale is a sold sale in the same planning area as Blowout Thin. Echo timber sale units are forest habitat. 43.4 acres of harvest are included in the Echo timber sale in the Blowout thin planning area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Roadway thin is occurring in 2005-2006 beside existing open roads. This sale will thin approximately 62 acres of forested habitat. Forested habitat will not be removed by this project and will remain suitable for use by Pacific shrews. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Recommendations: None.
Conflict determination/risk assessment: May impact habitat and individuals if they are present and using the forested environment in the project area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.
Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.
Indirect effects: None.
Cumulative effects: None.
Recommendations: None.

HERPETILES

12. Cascade Torrent Salamander (*Rhyacotriton cascadae*)
Status: Federal: R-6: Sensitive
State: Vulnerable

The proposed project is not expected to impact the Cascade torrent salamander or its habitat.

Habitat: In streams with flowing cold water and wet areas immediately adjacent to streams.

Pre-field Review: Habitat for Cascade torrent salamanders is not located in the project area.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Action Alternatives:

Direct effects: None. Perennially wet riparian areas are being buffered by 50 feet and will not be disturbed by the sale.

Indirect effects: None.

Cumulative effects: None.

Recommendations: None.

Conflict determination/risk assessment: No impact.

Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.

Indirect effects: None.

Cumulative effects: None.

Recommendations: None.

13. Foothill Yellow-legged Frog (*Rana boylii*)
Status: Federal: R-6: Sensitive
State: Vulnerable

The proposed project will not impact the foothill yellow-legged frog or its habitat.

Habitat: Permanently flowing streams with rocky bottoms. Foothill yellow-legged frogs are not known to occur on the Detroit Ranger district. Populations are known to occur on the South Santiam river and south in Oregon. Possibly located below national forest lands on the North Santiam river.

Pre-field Review: Habitat not present.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Alternatives:

Direct effects: None. Habitat is not present.

Indirect effects: None.

Cumulative effects: None.

Recommendations: None.

Conflict determination/risk assessment: No impact.

Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

14. Northwestern Pond Turtle (Clemmys marmorata marmorata)
Status: Federal: R-6: Sensitive
State: Critical

The proposed project will not impact the Northwestern Pond turtle or its habitat.

Habitat: The northwestern pond turtle inhabits marshes, sloughs, moderately deep ponds, and slow-moving portions of creeks and rivers, and prefers those having rocky or muddy bottoms and aquatic vegetation (watercress, cattails, etc.).

Pre-field Review: These turtles are not known to be present on the Detroit Ranger District. Potential habitat for the pond turtle is not present in the project area. Ponds which do not retain water all year are present adjacent to units 2, 4 & 5. These areas are dominated by canary reed grass and are not expected to be suitable for northwestern pond turtle habitat needs.

Field Reconnaissance: Not conducted.

Analysis of Effects:

All Alternatives:

Direct Effects: None.

Indirect Effects: None.

Cumulative Effects: None.

Recommendations: None.

Conflict Determination/Risk Assessment: No impact

Communication with US Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

15. Oregon Slender Salamander (*Batrachoseps wrighti*)
Status: Federal: candidate R-6: Sensitive
State: Undetermined status

The proposed project may impact the Oregon Slender Salamander or its habitat. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Habitat: Under bark and moss in Douglas fir forests.

Pre-field Review: Proposed project will disturb forested environments which may contain Oregon slender salamanders.

Field Reconnaissance: Not conducted.

Analysis of Effects

All Action Alternatives:

Direct effects: The proposed project may impact the Pacific shrew or its habitat.

Indirect effects: None.

Cumulative effects: Echo timber sale is a sold sale in the same planning area as Blowout Thin. Echo timber sale units are forest habitat. 43.4 acres of harvest are included in the Echo timber sale in the Blowout thin planning area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Recommendations: None.

Conflict determination/risk assessment: May impact habitat and individuals if they are present and using the forested environment in the project area. Impacts are not expected to jeopardize the species or move it toward federal listing as a threatened or endangered species.

Communication with U.S. Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative.

Indirect effects: None.

Cumulative effects: None.

Recommendations: None.

16. Oregon Spotted Frog (*Rana pretiosa*)
Status: Federal: R-6: Sensitive
State: Critical

The proposed project will not impact the Oregon Spotted frog or its habitat.

Habitat: Spotted frogs are found from southeast Alaska through British Columbia, Washington, and Oregon to southeast California. Their range continues east through Idaho northern Nevada to western Montana, western Wyoming and Northern Utah (Corkran and Thoms 1996; Leonard et al. 1993). The western population of the spotted frog occurs west of the Cascade crest, though including populations located within the Klamath River Basin (Hayes 1994a).

Pre-field Review: Records indicate that spotted frogs once inhabited the Willamette valley, however recent studies by Hayes indicate that these populations are extinct (1994b). Further implications are that spotted frogs have disappeared throughout 90% of their historical range in western Oregon (Hayes 1994). Extant populations in western Oregon are all over 4000 ft. elevation and are in areas where hydrological modification and macropredators, the two factors believed to be responsible for the disappearance of this taxon at low elevations, are reduced.

The western population of the spotted frog, the most aquatic native frog, inhabits marshes, permanent ponds, edges of lakes and sluggish streams, usually associated with non-woody wetland plant communities. Breeding occurs in February or March at lower elevation and as late as early May or early June at higher elevation (Leonard et al. 1993). They deposit eggs in very shallow water and in aggregated clusters from different females. Unlike the other native ranids of the Pacific Northwest, which are generally associated with cold water systems, the spotted frog typically inhabit waters that are over 20 degrees celsius.

Habitat is not present in the project area.

Field Reconnaissance: Not conducted.

Analysis of Effects:

All Alternatives:

Direct Effects: None. Habitat is not present.

Indirect Effects: None.

Cumulative Effects: None

Recommendations: None.

Conflict Determination/Risk Assessment: No impact

Communication with US Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

MOLLUSKS

17. Crater Lake Tightcoil (*Pristiloma arcticum crateris*)
Status: Federal: R-6: Sensitive
State: None

The proposed project is not expected to impact the Crater Lake Tight coil or its habitat.

Habitat: The Crater Lake Tight coil is a snail that may be found in perennially wet situations in mature conifer forests, among rushes, mosses and other surface vegetation or under rocks and woody debris within 10 m. of open water in wetlands, springs, seeps and riparian areas, generally in areas which remain under snow for long periods in the winter. Riparian habitats in the Eastern Oregon Cascades may be limited to the extent of permanent surface moisture, which is often much less than 10 m. from open water. (Pilsbry, 1946).

Pre-field Review: Habitat is present in the project area.

Field Reconnaissance: Not Conducted. Riparian areas with habitat suitable for pristiloma are being buffered and will not be disturbed by project activities.

Analysis of Effects:

Action Alternatives:

Direct Effects: The proposed project may impact the Crater Lake Tight coil or its habitat. Riparian areas with habitat suitable for the Crater Lake tightcoil are being disturbed by project activities and surveys have not been conducted to determine presence.

Indirect Effects: None.

Cumulative Effects: None

Recommendations: None.

Conflict Determination/Risk Assessment: No impact

Communication with US Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

No Action Alternative:

Direct effects: No impact to habitat or individuals would occur under this alternative. Perennially flowing streams are being buffered by a 50’ no disturbance zone to avoid potential pristiloma habitat.

Indirect effects: None.

Cumulative effects: None.

Recommendations: Perennially flowing streams are being buffered by a 50’ no disturbance zone to avoid potential pristiloma habitat.

INSECTS

18. Mardon Skipper (Polites mardon)
Status: Federal: Candidate R-6: Sensitive
State: None

The proposed project will not impact the Mardon Skipper or its habitat.

Habitat: The Mardon Skipper *(Polites mardon)* was added to the Regional Forester’s sensitive animal list in September 2002 based on its status as a candidate species under the federal ESA. The mardon skipper is a butterfly in the family Hesperiidae (skippers) and the subfamily Hesperiinae (grass skippers).

The mardon skipper is a small, tawny-orange butterfly currently found at only four, small, geographically disjunct areas in Washington, Oregon, and California. In Washington, nine of 18 historic sites are known to be occupied. Grasslands of the Puget prairies and Washington’s southern Cascades are believed to support just a few hundred individuals. Much less has been documented for Oregon and California sites.

In the southern Washington Cascades, sites vary in size from small, ½ acre or less meadows, to large grassland complexes, and site conditions range from dry, open ridgetops, to areas associated with wetlands or riparian habitats. Within these environments a variety of nectar source plants are important.

Mardon skippers complete one life cycle annually. In Washington, adults typically emerge between May and July for a month-long flight period. Emergence dates are earlier at low-elevation Puget Prairie sites than at South Cascades sites. The mardon skipper is a sedentary butterfly - it does not migrate. Dispersal distance is unknown, but is believed to be limited. Females are known to deposit their eggs into tufts of native bunchgrass *(Festuca* spp.) after mating. Eggs hatch approximately one week later, then larvae feed on fescue grass for approximately 3 months. At South Cascades (WA) sites, larvae have been confirmed feeding on native bunchgrass species and adults have been observed nectaring on vetch *(Vicia* spp.), penstemon *(Penstemon* spp.), sego lily *(Calochortus* spp.), and wallflower *(Erysimum capitatu*m). It is then believed that pupae hibernate through winter in a loose cocoon in the grass.

Pre-field Review: Habitat is not present in the project area.

Field Reconnaissance: Not conducted.

Analysis of Effects:

All Alternatives:

Direct Effects: None.

Indirect Effects: None.

Cumulative Effects: None

Recommendations: None.

Conflict Determination/Risk Assessment: No impact

Communication with US Fish and Wildlife Service: Not needed. Not federally listed as threatened or endangered.

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APPENDIX I.

REGIONAL FORESTER'S SENSITIVE ANIMAL LIST FOR THE WNF (REVISED 2001)

SPECIES	OCCURRENCE ON WNF	OREGON STATE STATUS	FEDERAL STATUS
BIRDS			
Falco peregrinus anatum American peregrine falcon	D	E	S
Cypseloides niger Black Swift	S	P/N	S
Bucephala albeola Bufflehead	D	U	S
Histrionicus histrionicus Harlequin Duck	D	U	S
Haliaeetus leucocephalus Northern Bald Eagle	D	T	T
Strix occidentalis caurina Northern Spotted Owl	D	T	T
MAMMALS			
Sorex bairdi permiliensis Baird’s Shrew	D	-	S
Gulo gulo luteus California wolverine	D	T	S
Lynx Canadensis Canada Lynx	D	-	T
Sorex pacificus cascadensis Pacific Shrew	D	-	S
Myotis thysanodes vespertinus Pacific Fringe-tailed Bat	D	V	S
Martes pennanti Pacific Fisher	S	C	S

SPECIES	OCCURRENCE ON WNF	OREGON STATE STATUS	FEDERAL STATUS	
INSECTS				
Polites mardon				
Mardon Skipper	U	-	S	
AMPHIBIANS AND REPTILES				
Batrachoseps wrightii	D	U	U	S
Oregon Slender Salamander				
Rhyacotriton cascadae	D	V	S	
Cascade Torrent Salamander				
Rana boylii	D	V	S	
Foothill Yellow-legged Frog				
Rana pretiosa	D	C	S	
Oregon Spotted Frog				
Clemmys marmorata marmorata	D	C	S	
Northwestern pond turtle				

Occurrence on Willamette NF:
S = Suspected
D = Documented

State Sensitive Status: (Oregon Department of Fish and Wildlife, Oregon Natural Heritage Data Base Etc.)
C = Critical. Listing as threatened or endangered is pending, or for which listing may be appropriate.
V = Vulnerable. Listing as threatened or endangered is not believed to be imminent or can be avoided through continues or expanded use of adequate protective measures and monitoring.
P = Peripheral. Those whose Oregon population are on the edge of their range.
N = Naturally rare. Those species which had low population numbers historically in Oregon because of naturally limiting factors.
U = Undetermined Status. Species for which status is unclear.

Federal Status:
T = Threatened
E = Endangered
S = Sensitive
P = Proposed for Listing
C = Candidate (Needs further information to confirm the appropriateness of proposing the taxon to the list of Endangered or Threatened species)

Appendix C –Biological Assessment

Blowout Thin Project

Amended Biological Assessment

(Gifford Pinchot Lawsuit Sale)[1]

A. Scope of the Action

The amended Biological Assessment (BA) is limited to proposed activities in the Blowout Thin project that might modify northern spotted owl critical habitat. The area of the assessment is limited to Critical Habitat Unit (CHU) OR-14 located on the Santiam River Zone (formerly Detroit and Sweet Home) Ranger District in the Detroit Reservoir-Blowout Divide Creek 5th field watershed of the Willamette National Forest (WNF).

All Blowout Thin project activities addressed by this assessment will have a signed NEPA (National Environmental Policy Act of 1969) record of decision, decision notice or decision memo.

B. Basis for the Assessment

The basis for reinitiation of consultation on this timber sale within northern spotted owl critical habitat on the Willamette National Forest is due to a recent appellate Gifford Pinchot Task Force decision[2] that partially invalidates five biological opinions (FWS Biological Opinions: 1071995F290; 1071996F207; 1071996F459; 1071997F396; 1071998F381) which cover Forest Service and Bureau of Land Management activities in the Willamette Province.

C. Consultation History

The project is identified as a Willamette National Forest – Detroit Ranger District activity in the FY 1997 Biological Assessment (BA) Habitat Modification projects in the Willamette Province and is covered by FWS Biological Opinion (BO) #1-7-96-F-459.

D. Assessing New Information

There is new information that has come to light since the completion of consultation with FWS on these proposed activities. This section will briefly discuss and disclose the differences of the new information from that used in the previous biological assessments

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[1] This sale was over-looked in the submittal of Forest GP lawsuit sales to the FWS on May 19, 2005 and is now going through reinitiation of consultation separately for the critical habitat portion of this activity.

[2] On August 6, 2004, the Ninth Circuit Court of Appeals rendered a decision in the Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service, No. 03-35279, finding that the Service's regulatory definition of "destruction or adverse modification" of critical habitat, at 50 C.F.R. §402.02, is contrary to law.

for these activities. The updated information will be used in this assessment to evaluate the potential affects of the proposed activities on critical habitat.[3]

5-Year Owl Trend Information

The effects to the spotted owl from this proposed project have been reviewed and evaluated in light of new information to spotted owls. New information includes potential threats to the spotted owl from barred owls, West Nile virus, sudden oak death syndrome, wildfires, climate change on regional vegetation patterns, effects of past timber harvest, and spotted owl population declines. Although the effects to the spotted owl from these threats is in some cases uncertain, the project effects analysis and the affect determinations in the original BO (listed above) remain valid with respect to the northern spotted owl. The FY 2005- FY 2006 Habitat Modification BA and BO provides a thorough analysis of the new information from the potential threats to the spotted owl listed above (USDA/USDI 2005, pp. 15 to 28).

The District wildlife biologist on the Willamette NF has reviewed the new information from the 5-year status trend of the northern spotted owl on all the proposed activities listed in Table 1 (Courtney, S.P., et al., 2004). The results of their review is that the original effect determinations made on the northern spotted owl for this sale, remains unchanged from the effects identified in the individual project biological assessment and accompanying FWS Biological Opinion (FWS BO-1071996F459).

New Northern Spotted Owl Information

The Central Cascade Demography Area has been surveyed for the northern spotted owl since 1987. Annual surveys are conducted on 364,225-acre area (approx. 600 sq. miles), which includes portions of the McKenzie River and Sweet Home Ranger Districts, where over 120 pairs of owls have been tracked.

The analysis of owl populations and habitat during the first ten years of implementing the Northwest Forest Plan found that the largest average rate of decline to be 7.1 percent annually (occurred in the 4 demographic areas of Washington). The Plan estimated a 3.4 percent rate of decline. This report presents results from monitoring spotted owl populations and habitat during the first ten years of implementation of the Northwest Forest Plan (the Plan). Results from the H.J. Andrews study area indicate a 20 to 30 percent decline in the population (Lint et al. 2004 in press).

E. Proposed Action

The proposed action is to lightly thin 270 acres and regeneration harvest 24 acres of northern spotted owl dispersal habitat in Critical Habitat Unit OR-14 on the Santiam River Zone of the Willamette National Forest. In addition, there will 18 acres of regeneration harvest and 30 acres of light thinning in non-owl habitat that is slated to

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[3] Refer to Willamette NF Biological Assessment for the reinitiation of consultation for the Gifford Pinchot Lawsuit (May 19, 2005) for updated owl habitat and CHU baseline conditions.

occur in this CHU with the project. The project is not located within the Santiam Area of Concern, or in an LSR.

F. Environmental Baseline[4]

Table 5 describes the various ownership patterns in critical habitat unit OR-14 located on the Willamette NF.

Table 5. 2004 Critical Habitat Unit Ownership Statistics

CHU	BLM	Corps of Engineers	Willamette NF	Total	State	Private Land
OR-14	0	315	61,676	61,992	0	868

Table 6 describes the reserve allocation statistics for CHU OR-14 on the Willamette NF. These special reserve allocations are a result of the management guidance from the NWFP and each has a unique set of conditions and requirements that must be met for both vegetation and "wildlife" species. This table provides a quick overview of the land use allocations within CHU OR-14 on the Forest. 85% of the land area is this CHU is in reserve allocations designed to ensure an adequate distribution of owl habitat across the landscape.

Table 6. Acres of Reserve Areas by Critical Habitat Unit

CHU#	LSR	LSR 100 ac	CRA	Matrix	RR	AMA	AWA	Non FS**
OR-14	42,709	1,269	602	8,698	8,065	0	579	938

Table 9 summarizes northern spotted owl critical habitat on the Forest. Each CHU is described by the amount of NRF and dispersal habitat that is contained within an individual CHU.

Table 9. 2004 Critical Habitat Statistics

CHU	Total Acres of CHU	NRF Owl Habitat	Percent of CHU	Dispersal Habitat	Percent of CHU
OR-14	62,860	34,451	52	7,094	11

[4] All relevant number and tables are taken directly from the May 19, 2005 WNF BA covering the GP Lawsuit Sales

G. Effects of the Proposed Action

CHU OR-14

Critical Habitat Unit OR-14 is located just south of Detroit Lake along the western boundary of the Forest (Detroit and Sweet Home Ranger Districts) and consists of approximately 62,860 acres The Middle Santiam Wilderness and LSR RO213 cover a large portion of this CHU on the Forest. Approximately 17,342 acres of this CHU falls outside of the LSR, wilderness boundary, and 100-acre LSRs (located in the original reinitiation package).

The 2002 Lucky Fire (81 acres) has affected stand conditions in this CHU. Since most of these acres (50+) were unsuitable in 1995 and are still unsuitable only about 5 acres of NRF habitat was affected.

Table 10 lists the LAA activities that are proposed in CHU OR-14. The Echo project has already been consulted on (reinitiation BO 1-7-05-F-0599; 8/11/05). This assessment is to amend the GP Lawsuit Sales for the Willamette NF Supplemental BA for LAA Timber Sales and subsequent BO 1-7-07-F-0599 with units 13, 104, 106, 121, 161 of the Blowout Thin project.

Table 10. Proposed Activity Statistics in Critical Habitat Unit OR-14

Sale and Unit#	Acres of CH	Harvest Rx	NSO Habitat Type	Post Harvest Effect to NSO Habitat	Effects Call	Land Allocation
Echo U-3	5	HCR	NRF	Remove	LAA	Matrix
Blowout Thin Units 13, 104, 106, 121, 161	24	HCR	DISP	Remove	LAA	Matrix

Table 11 lists the NLAA activities that are proposed in CHU OR-14. The Shore Nuf project has already been consulted on (reinitiation LOC 1-7-05-I-0516; 8/04/05). This assessment is to amend the GP Lawsuit Sales for the Willamette NF Supplemental BA for NLAA Timber Sales and subsequent LOC 1-7-05-I-0516 with units 2-6, 12, 16, 17, 18 to the Blowout Thin project.

Table 11. Proposed Activity Statistics in Critical Habitat Unit OR-14

Sale and Unit#	Acres of CH	Harvest Rx	NSO Habitat Type	Post Harvest Effect to NSO Habitat	Effects Call	Land Allocation
Shore Nuf U-13	76	LThin	DISP	Degrade	NLAA	Matrix
Blowout Thin Units 2, 3, 4, 5, 6, 12, 16 17, 18	268	LThin	DISP	Degrade	NLAA	Matrix
Blowout Thin Unit 12	2	LThin	NRF	Degrade	NLAA	Matrix
Blowout Thin Units 1, 12, 14, 16, 23, 24, 121	48	LThin/HCR	Non-Owl	Resetting Stand[5]	Not Applicable	Matrix

A. Direct and Indirect Effects

Units[6] 2 – 6, 12, 14, 16, 17, 18, 23, 24, 104, 106, 121 and 161 of the Blowout Thin project are proposed within Critical Habitat Unit OR-14. The project proposes to harvest with a light thin (LThin) and regeneration prescription approximately 294 acres of northern spotted owl critical habitat. The LThin prescription in dispersal habitat is designed to provide greater than 60% canopy closure post harvest and therefore, should not appreciably reduce the ability of the stand to provide for owl dispersal. In addition, there will be 18 acres of regeneration harvest and 30 acres of LThin in non-owl habitat.

In Blowout Thin units 2, 3, 4, 5, 6, 16[7] 17 and 18 where a LThin prescription is applied to 268 acres of dispersal habitat, the objective is to improve the health, vigor and overall size and diameter of the trees in the stand. The same objective applies to the non-owl habitat, but occurs in these stands at an earlier age. The prescription should improve the ability of the future stand to provide the components for late-successional stands. In the 2 acres of NFR habitat in Blowout Thin unit 12[8] the LThin would retain snags, clumps of large trees, down wood to meet existing northwest Forest Plan requirements. The stands would provide for greater than 60% canopy cover and still provide for owl dispersal post harvest.

In Blowout Thin units 13, 104, 106, 121[9] and 161, the HCR prescription is applied to 24 acres of dispersal habitat retaining less than a 30% canopy closure and generally setting the stand back for 20-30 years before dispersal conditions for owls are provided again.

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[5] The thinning of non-owl habitat is to increase the average stand diameter of stand to promote dispersal habitat conditions sooner.

[6] Blowout Thin units 1, 12, 14, 16, 23, 24, 121 are in non-owl habitat that is capable of producing owl habitat.

[7] Unit 16 contains 10 acres of dispersal and 8 acres of non-owl habitat.

[8] Unit 12 contains 2 acres of NRF and 13 acres of non-owl habitat.

[9] Unit 121 contains 1 acre of dispersal and 5 acres of non-owl habitat.

Even though some structural components (snags, clumps of large trees, down wood) would be retained to meet existing Northwest Forest Plan requirements, the overall effect to dispersal habitat, is the stand would no longer function as dispersal habitat.

The units in this sale occur within the matrix land allocation of the Northwest Forest Plan (NWFP). The effects on this CHU are minimal as there are currently 34,451 acres of NRF, 7,094 acres of dispersal habitat and 21,547 acres of capable but currently non-habitat (FWS BO 1-7-05-f-0228) that are distributed across this CHU prior to this activity (*see table 9*). Ninety-eight (98%) of CHU OR-14 is managed by the Willamette NF, of which 70% of the area is under LSR or congressionally reserved area management (see Table 6 and 8). About 86% of this CHU is in LSR, LSR100, Riparian Reserve, Congressionally Reserved or Administratively Withdrawn Area land allocations that are distributed across the CHU and provide habitat for owl dispersal. This activity will not diminish the functionality of this CHU to provide for habitat conditions that support the recovery of the northern spotted owl.

B. Fragmentation within an Individual CHU

The western portion of this CHU (outside the Forest boundary) is comprised of Bureau of Land Management (BLM) and private land holdings and is considered to be moderately to heavily fragmented due to ownership patterns and past and present harvest activities. On the Forest, CHU OR-14 has large complexes of NRF habitat throughout a majority of the CHU, especially where the Middle Santiam Wilderness and LSR RO213 overlay the CHU. This area is considered to be lightly fragmented (*see Map 1*). The western edge of the CHU is moderately fragmented, especially the portions of the CHU outside of the LSR. However, good connectivity for owl movement in this part of the CHU remains (*see Map 1*).

The 294 acres of treatment in 2, 3, 4, 5, 6, 12, 13, 16, 17, 18, 104, 106, 121 and 161 of the Blowout Thin timber sale occur within large blocks of dispersal habitat and NRF habitat (2-acres) along the northeastern boundary of the CHU. Degrading 270 acres of dispersal and NRF habitat and removing 24 acres of dispersal habitat will not have an appreciable effect on the ability of this CHU to provide dispersal for owls. Overall, the surrounding stands and rest of the CHU provide well-connected NRF and dispersal habitat where owls can disperse. This activity will not appreciably diminish the functionality of this CHU to provide for habitat conditions that support the recovery of the northern spotted owl.

Post harvest large blocks of NRF habitat remain and are managed under LSR standards in this portion of the CHU. Approximately 71% of this CHU is in LSR, LSR100 and Congressionally Reserved land use allocations. An additional 14% is in Riparian Reserve or Administratively Withdrawn Area land allocations. These distributed across the CHU provide additional habitat for owl dispersal (*see Table 8*). This harvest activity will not appreciably diminish the functionality of this CHU to provide for habitat conditions that support the recovery of the northern spotted owl.

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C. Fragmentation between CHU's

Approximately 7 miles to the north of CHU OR-14 is CHU OR-12. These two CHUs are physically separated by Detroit Lake and small amounts of private land (*see Map 1*). Past harvest activities have removed a considerable portion of the NRF habitat between these two CHUs, but there still remains a good network of dispersal habitat conditions, which provide areas for owls to disperse north and south.

Approximately 2.5 miles to the east and northeast of CHU OR-14 is CHU OR-13. Private land and past harvest activities have fragmented the connection (*see Map 1*). Due east of CHU OR-14 are considerable amounts of NRF and dispersal habitat that are generally located within matrix lands, 100-acre LSRs and in riparian reserve corridors.

Owl movement to the northeast is more limited than owl movement due east of CHU OR-14. However, there remains a viable network of NRF and dispersal habitat to provide areas where owls can disperse across to CHU OR-13. There is keen interest in the management of the eastern edge of CHU OR-14, and the western edge of CHU OR-13, because of the location of the Santiam AOC.

D. Cumulative Effects of State and Private Lands

There are no parcels of State land within the CHU. Approximately 868 acres of private land consisting of patent mining claims and private timberlands occur within the boundary of the CHU, but is not designated as critical habitat. The private land was cut a number of years ago and currently about 75% of the acres provide dispersal type conditions for owls. The remaining 25% of the private land is considered to be non-owl habitat.

H. EFFECTS DETERMINATION

The effects determination for Blowout Thin units 2, 3, 4, 5, 6, 12 16, 17, 18 on northern spotted critical habitat is a, "***may affect, but not likely to adversely affect.***" This determination is based on the fact that affected stands post harvest will still function as nesting, roosting, forage and dispersal habitat. The treatment is of low impact where only scattered individual down trees are removed and the designated stands. Therefore, with only a minor intrusion from this activity, the stands will retain the same structure and functions post harvest as they did after the storm event and should not diminish the functionality of this CHU to provide for habitat conditions that support the recovery of the northern spotted owl.

The effects determination for Blowout Thin units 13, 104, 106, 121, 161 on northern spotted critical habitat is a, "***may affect, and is likely to adversely affect.***" This determination is due to the removal of currently functional dispersal habitat, thereby, resetting the biological clock on these stands. While the activity alters the biological setting in a portion of the CHU, it also adds cumulatively to the decline of the primary constituent elements dispersal habitat) of northern spotted owl critical habitat within this portion of the CHU.

AMENDED BA was developed by:

/s/ *Daryl Whitmore* 8/15/05

Daryl Whitmore
Wildlife Biologist
Santiam River Zone Ranger District

/s/ Fred Wahl 8/15/05

Fred Wahl
Forest Wildlife Biologist
Willamette National Forest

United States Department of Agriculture | Forest Service | Willamette National Forest | 211 East 7th Avenue
P.O. Box 10607
Eugene, Oregon 97440

File Code: 2670
Date: August 23, 2005

Kemper McMaster
Oregon State Supervisor
USDI Fish and Wildlife Service
2600 SE 98th Avenue, Suite 100
Portland, OR 97266

Dear Mr. McMaster:

I have enclosed an amended biological assessment to the Willamette Province programmatic biological assessment for the fiscal years 2005 and 2006 for the proposed Blowout Thin project on the Santiam River Zone Ranger District (formerly the Sweet Home and Detroit Ranger Districts) of the Willamette National Forest that would modify critical habitat of the northern spotted owl.

The type of project evaluated by this assessment is: light thinning and regeneration harvest in northern spotted owl critical habitat.

We request:

> You amend the informal consultation letter of concurrence, for those actions described in the assessment that may affect, but are not likely to adversely affect the northern spotted owls; and
>
> That you amend the formal consultation and biological opinion, for those actions described in the assessment that may affect, likely to adversely affect the northern spotted owls.

The amended biological assessment describes how the project might modify the habitat of the northern spotted owl. All activities of the proposed project are consistent with the Record of Decision for the Northwest Forest Plan, and with the approved land use plan for the Willamette National Forest.

This project is expected to have a decision on it in December of 2005 and logging would commence in 2006.

If you have questions concerning the amended biological assessment, please contact Fred Wahl, Willamette National Forest (541-225-6433), or Sonja Weber, Willamette National Forest (541-225-6449). Thank you.

Sincerely,

/s/ Y. Robert Iwamoto (for)
DALLAS J. EMCH
Willamette Forest Supervisor

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Appendix D – Economic Analysis

Blowout Thin Economic Analysis

A comparison of the alternatives has been completed for the Blowout Thin planning area on the Detroit Ranger District. The harvest acres and volumes used for this analysis are from the Alternative Comparison Chart, in Chapter 2 of the Blowout Thin Environmental Assessment (E.A.). The Transaction Evidence Appraisal (TEA) method with the most recent product log values and TEA appraisal costs were used for evaluation.

The harvest volumes and species mix are estimates from preliminary samples taken in the planning area, during field recon. Timber values were calculated using the current Product Quality Adjustment (PQA) for delivered logs, in western Oregon saw mills, which were developed for use with the Transaction Evidence Appraisal. Market conditions will fluctuate throughout the year, and depending on the time of year this sale will be offered for auction, the current estimates may or may not be accurate, which could have an impact on the final advertised sale values.

Log Cost version 6.0 was used to develop the stump to truck logging costs for each alternative, and Haul Cost version 5.2 was used to calculate log transport costs. In addition, a brush disposal appraisal was developed for each alternative using information from the Fire and Fuels Analysis written for this E.A. Road maintenance cost estimates were developed for each alternative, and road reconstruction costs were used from the Blowout Thin Roads & Access Report cost estimates.

The appraisal costs for each alternative are summarized in the following charts.

Table 1: Economic Analysis Summary

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Gross value	10,882 mbf X $674.99/ mbf = $7,345,241	10,882 mbf X $683.56/ mbf = $7,438,500	9234mbf X $680.45/mbf = $6,283,275	10,882mbf X $679.28/mbf =$7,391,925
Associated Costs (from table 5)	$4,695,896	$4,157,103	$4,095,015	$4,391,516
Appraisal Competition Adjustment	$267,118	$331,997	$220,792	$303,240
Net Appraised Value (Grossvalue - Assoc. Costs - Appr. Comp. Adjustment)	$2,382,227	$2,949,400	$1,967,468	$2,697,169
Cost/Benefit Ratio (Gross value/Associated costs)	1.48	1.66	1.46	1.57

Table 2: Logging and Haul Costs

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Tractor	848 mbf x $165.57/mbf = $230,639	1,367 mbf x $156.70/mbf = $299,454	932 mbf x $165.57/mbf = $230,639	728 mbf x $165.74 = $210,821
Mechanized Harvester	2249 mbf x $100.89/mbf = $226,902	2,809 mbf x $98.91/mbf = $277,838	1919 mbf x $100.41/mbf = $192,687	2,330 mbf x $100.97 = $235,260
Skyline	3,577 mbf x $211.54/mbf = $641,812	6,232 mbf x $233.57 = $1,328,546	2,780 mbf x $214.54/mbf = $497,518	5,878 mbf x $231.69 = $1,235,834
Helicopter	4208 mbf x $394.94/mbf = $1,661,908	474 mbf x $479.38 = $227,226	3603 mbf x $413.74/mbf = $1,490,705	1,946 mbf x $376.01 = $731,715
Haul Cost	$599,085	$614,988	$495,236	$614,988
Totals	$3,384,967	$2,789,869	$2,929,360	$3,064,496

Table 3: Road Costs

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Road Maintenance ($5.50/MBF.)	$5.50 x 10,882 = $59,851	$5.50 x 10,882 = $59,851	$5.50 x 9,234 = $50,787	$5.50 x 10,882 = $59,851
Reconstruction	$373,600	$362,600	$373,600	$362,600
Temporary Road Constr.	0	$41,900	0	$27,100
Temp. Road Re-opening in U24	0	$14,900	0	0
Totals	$433,451	$479,251	$424,387	$449,551
Volume (mbf)	10,882	10,882	9,234	10,882
Total $/mbf	$39.83	$44.04	$45.96	$41.31

Table 4: Fuel Treatment Costs

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Fuel Survey $10/ac	$9,850	$9,850	$9,260	$9,850
Grapple Pile and Burn $500/ac	$500/ac X 167 = $83,500	$500/ac X 183= $91,500	$500/ac X 167 = $83,500	$500/ac X 167 = $83,500
Hand Pile and Burn $1500/ac	$1,500/ac X 26 ac = $39,000	$1,500/ac X 26 ac = $39,000	$1,500/ac X 26 ac = $39,000	$1,500/ac X 26 ac = $39,000
Cover Piles $100/ac.	204 ac. X $100/ac = $20,400	220 ac. X $100/ac. = $22,000	204 ac. X $100/ac. = $20,400	204 ac. X $100/ac = $20,400
Yard Tops Attached	Covered in logging costs	Covered in logging costs	Covered in logging costs	Covered in logging costs
Hand Fireline Construction $6336/Mile	2.45 miles X $6,336 = $15,523	2.45 miles X $6,336 = $15,523	0	2.45 miles X $6,336 = $15,523
Machine Fireline Construction $1,848/Mile	1.02 miles X $1,848 = $1,885	1.02 miles X $1,848 = $1,885	0	1.02 miles X $1,848 = $1,885
Broadcast Burn $600/ac	$600/ac X 59 ac = $35,400	$600/ac X 59 ac = $35,400	0	$600/ac X 59 ac = $35,400
Burn Landings $100/ac.	10 acres X $100 = $1,000	10 acres X $100 = $1,000	10 acres X $100 = $1,000	10 acres X $100 = $1,000
Overhead Costs	$32,896	$33,809	$19,213	$32,896
Totals	$239,454	$249,967	$172,373	$239,454

Table 5: Total Associated Costs

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Logging Costs (from Table 2)	$3,384,976	$2,789,869	$2,929,360	$3,064,496
Road Costs (from Table 3)	$433,451	$479,251	$424,387	$449,551
Fuel Treatment Costs (from Table 4)	$239,454	$249,967	$172,373	$239,454
Total Post-Sale Activity Costs*	$638,015	$638,015	$568,895	$638,015
Total Costs	$4,695,896	$4,157,103	$4,095,015	$4,391,516

*From Appendix F: Post-Sale Activities

In summary, the costs in the above tables are as realistic as possible, with the information available, and no bias introduced to influence the results. Fluctuating log markets, increased inflation, changed conditions of roads after preliminary field reviews, changes in unit boundaries for resource protection during field work, on the selected alternative, and other collections that may become necessary as work on the sale progresses, will affect the above costs. However, most of the changes that will occur during field work, will have relatively little effect on sale values, except when volume is removed or if additional helicopter logging is planned, or both. This is clearly shown in both Alternatives 2 and 4, with 35 to 40 percent of the planning area volume helicopter logged, and the sale values significantly reduced in both instances.

Alan Raines
Logging Systems Specialist
Detroit Ranger District

Appendix E – Post-Sale Activities

Post-Sale Activities

The following projects would be funded with KV money if available. The projects have been selected based on a preliminary sale area boundary. If the sale area boundary changes when the contract is prepared, then some of the projects may be eliminated as candidates for KV funding. This list was prioritized at an Interdisciplinary Team meeting on 11/15/05 at Detroit R.S.

Alternatives 2, 3, and 5

Priority		Amount	Unit	Cost/unit	Total cost
	KV Required				
1	Tree Planting – Regeneration harvest units	59	ac	$650	$38,350
1	Tree Planting – Root rot pockets in thinning units	3	ac	$650	$1,950
1	Plantation Survival Exams	62	ac	$20	$1,240
	Total KV Required				$41,540
	KV Mitigation				
2	Wildlife tree creation - units 13,14 (regen)	46	trees	$65	$2,990
2	Wildlife tree creation - units 1 (regen)	21	trees	$65	$1,365
2	Wildlife tree creation - units 161 (regen)	4	trees	$65	$260
2	Wildlife tree monitoring - units 1,13,14,161 (regen)	20	ac	$5	$100
2	Wildlife tree creation - units 6,8,9,10,12 (thinning)	75	trees	$65	$4,875
2	Wildlife tree monitoring - units 6,8,9,10,12 (thinning)	49	ac	$5	$245
2	Coarse woody debris creation - regen units	118	trees	$35	$4,130
2	Coarse woody debris monitoring - regen units	59	ac	$5	$295
2	Coarse woody debris creation - thinning units	926	trees	$35	$32,410
2	Coarse woody debris monitoring - thinning units	926	ac	$10	$9,260
2	Noxious weed survey and treatments	40	ac	$200	$8,000
2	Noxious weed post-treatment monitoring	20	ac	$100	$2,000
2	Planting of skyline corridors in riparian thinning with western redcedar	4	ac	$650	$2,600
2	Subsoiling of some temp spurs, skid roads, landings				$6,000
2	Heritage resource monitoring of areas to be subsoiled with high probability				$825
2	Monitoring of water temperatures in Blowout Watershed				$1,250
	Total KV Mitigation				$76,605
	KV Other				
	Protection and Restoration Projects:				
3	Erosion control seeding, slope stabilization, soil restoration				$16,000
4	Gate replacements and new closures				$48,700
5	Precommercial thinning including pruning of white pine				$195,000
6	Cleanup of slash piles and landing debris to improve visuals above fuel reduction.				$5,000
6	Rehab of popular dispersed sites along Blowout and Divide Creeks				$12,000
7	Stream restoration - large wood, structure maintenance, floodplain restoration				$87,400
	Enhancement Projects:				
8	Forage seeding of regeneration harvest units for big game forage				$20,650
9	Aerial fertilization				$135,120
	Total Additional KV Opportunities				$519,870
	Total KV				**$638,015**

Alternative 4

Priority		Amount	Unit	Cost/ unit	Total cost
	KV Required				
1	Tree Planting – Root rot pockets in thinning units	3	ac	$650	$1,950
1	Plantation Survival Exams	3	ac	$20	$60
	Total KV Required				$2,010
	KV Mitigation				
2	Wildlife tree creation - units 6,8,9,10,12 (thinning)	75	trees	$65	$4,875
2	Wildlife tree monitoring - units 6,8,9,10,12 (thinning)	49	ac	$5	$245
2	Coarse woody debris creation - thinning units	926	trees	$35	$32,410
2	Coarse woody debris monitoring - thinning units	926	ac	$10	$9,260
2	Noxious weed survey and treatments	40	ac	$200	$8,000
2	Noxious weed post-treatment monitoring	20	ac	$100	$2,000
2	Replanting of skyline corridors in riparian thinning	4	ac	$650	$2,600
2	Subsoiling of some temp spurs, skid roads, landings				$6,000
2	Heritage resource monitoring of areas to be subsoiled with high probability				$825
2	Monitoring of water temperatures in Blowout Watershed				$1,250
	Total Mitigation				
	KV Other				
	Protection and Restoration Projects:				
3	Erosion control seeding, slope stabilization, soil restoration				$16,000
4	Gate replacements and new closures				$48,700
5	Precommercial thinning including pruning of white pine				$195,000
6	Cleanup of burned piles and landing debris to improve visuals above fuel reduction				$5,000
6	Rehab of popular dispersed sites along Blowout and Divide Creeks				$12,000
7	Stream restoration - large wood, structure maintenance, floodplain restoration				$87,400
	Enhancement Projects:				
8	Aerial fertilization				$135,120
	Total Additional KV Opportunities				$499,220
	Total KV				**$568,895**

KV Required (Priority 1):

Tree planting on approximately 59 acres of regeneration harvest units and about 3 acres of Phellinus root rot pockets as described in Chapter 2 (Alternatives 2, 3, 5)
62 X $650/ac ac = 40,300.

Plantation survival exams on approximately 59 acres of regeneration harvest units as described in Chapter 2 (Alternatives 2, 3, 5).
62 ac X $20/ac = 1,240.

KV Mitigation (Priority 2): *Note: Mitigation Measures are required to be done and all have the same priority. These mitigations could be funded with KV. If KV funding is expected to be limited, then they will be funded in another way or the sale will be modified in a way that the mitigation measure is not needed.*

Wildlife tree creation in portions of selected regeneration harvest units. (Alternatives 2, 3, 5).

In regeneration harvest units 13 & 14 – leave 8.2 trees per acre of the largest diameter available and top 3.8 trees per acre after harvest and slash treatment in each unit.
12 ac X 3.8 trees/ac = 47 trees
46 trees X $65/tree = $3,055

Units 1 & 161 need to be evaluated to determine if trees of adequate diameter are available for snags. If they are available,
Leave 21 trees in unit 1
21 trees X $65/tree = $1,365
Leave 4 trees in unit 161
4 trees X $65/tree = $260
Total cost wildlife tree creation in regen units: $4,680

Wildlife tree monitoring in selected regeneration harvest units (Alternatives 2, 3, 5).
$5/ac X 20 ac = $100

Wildlife tree and/or cavity nest structure creation in portions of selected commercial thinning units. (Alternatives 2, 3, 4, 5)
In thinning units 6, 8, 9, 10 & 12 leave and top 1.5 trees per acre of the largest available. For unit 6 this will be 15 trees, unit 8 – 17 trees, unit 9 – 14 trees, unit 10 – 14 trees and unit 12 – 15 trees, for a total of 75 trees.
$65/tree X 75 trees = $4,875

Wildlife tree and/or cavity structure monitoring in portions of selected thinning units, (Alternatives 2, 3, 4, 5)
Unit 6 – 10 ac, unit 8 – 11 ac, unit 9 – 9 ac, unit 10 – 9 ac, unit 12 – 10 ac, for a total of 49 acres.
$5/ac X 49 ac = $245

Coarse woody debris creation in regeneration units. (Alternatives 2, 3, 5)
2 trees/ac X 59 acres = 118 trees
$35/tree X 118 trees = $4,130

Coarse woody debris monitoring in regeneration units (Alternatives 2, 3, 5).

$5/ac X 59 ac = $295

Coarse woody debris creation in thinning units. (Alternatives 2, 3, 4, 5)
1tree/ac X 926 ac = 926 trees
$35/tree X 926 trees = $32,410

Coarse woody debris monitoring in thinning units. (Alternatives 2, 3, 4, 5)
926 ac X $10/ac = $9,260

Noxious weed control and monitoring (Alternatives 2, 3, 4, 5)
In harvest units and on haul roads in the Sale Area, following the Willamette NF weed EA and Regional EIS.
Survey and Weed Treatment: 40 ac X $200/ac = $8000
Post Treatment Monitoring: $100/ac X 20 ac = $2000

Replanting of skyline corridors in riparian thinning areas with western redcedar. (Alternatives 2, 3, 4, 5)
4 ac X $650/ac = $2,600

Subsoiling (Alternatives 2, 3, 4, 5)
At the completion of harvest activities, some subsoiling is proposed in order to reduce compaction at heavily used haul roads (dirt spurs), primary skid roads, and landings as needed. Subsoiling would not occur on all the skid roads, reused and new, because of the potential for problems with root pruning and excessive soil disturbance. The subsoiling would be concentrated for the most part in the ground based portions of units.
$6000.

Heritage resource monitoring (Alternatives 2, 3, 4, 5)
Will be conducted in all high probability areas planned for subsoiling.
$825

Monitoring of water temperatures in the Blowout Watershed. (Alternatives 2, 3, 4, 5)
$1,250

KV Other

Protection and Restoration Projects:

Priority 3) Erosion control, slope stabilization, and soil restoration projects: (Alternatives 2, 3, 4, 5)
Seeding and fertilizing of cutbanks as needed within the sale area, especially in or near the following units: along Rd. 10 south of unit 1, along Rd. 1011 in unit 3, unit 9, and the earthflow between units 17 and 7. Riparian hardwood and conifer planting and minor shaping and drainage work on a wet area (about 5 acres) associated with an earthflow across a decommissioned road (former road number 1013-140) east of proposed Unit 19. Hydrological storage work on Road 1013-220: This road would be made accessible for storage work by brushing and bucking out the old growth logs across road, clearing the shallow cut slope failures, and ramping over or removing cutslope failures. Then, the road would be put in storage by creating drivable waterbars, scraping the roadbed over culverts with a dip (leaving culverts in place), and mulching and seeding cutslopes that have failed. This work would only be performed from the junction

with the 1013 road to the bridge on Hawkins Cr., because the bridge is not useable. The gate at the beginning of the road will be replaced (gate included in gate costs above) and the road will be placed in hydrological storage (Maintenance Level 1). Subsoiling of approx 5 acres of old skid trails/landings from previous harvest.
$16,000

Priority 4) Gate Replacements and New Closures (Alternatives 2, 3, 4, 5):
<u>Gate Replacements</u>: The following gate replacements are foreseeable and were originally identified for closure in a previous NEPA decision. An interdisciplinary open road analysis, covering the planning area, was completed and a CFR closure notice signed on December 18, 1992. Roads have been decommissioned, grown over, slumped, closure devices destroyed and various other changes have occurred since that time. At this time the 1992 closure is the most recent signed decision on open road management in the area. These gates will replace previously approved closure devices and pipe barriers that have been damaged on Roads 1000-056, 1000-067, 1003-440 beyond the junction with the 447 spur, 1003-441, 1003-443, 1011-520, 1011-545, 1011-650, 1012-810 ,1013-180, 1013-220, and 1013-279. Tributary roads behind these gate replacements include 1000-062, 1003-444, 1011-651, 1013-181, 1013-182, 1013-183, 1013-185, 1013-224, 1013-281, 1013-282.
<u>New Closures:</u> The following roads would be closed and closure devices would be installed: These roads do not currently have CFR closures on them. Boulders would be used to close Rd. 1000-112. Gates would be installed on Roads 1003-448, 1011-557, 1003-456, and 1003-354. Tributary roads that would be closed by default because they are behind the above closures would include Roads 1000-101, 1003-450, 1011-558.

Gate replacements and new gates: 16 gates X $3,000/gate = $48,000
1 boulder closure = $700
Total gate replacements and new closures= $48,700

Priority 5) Pre-commercial thinning: (Alternatives 2, 3, 4, 5)
On about 558 acres, including pruning of white pine.
$195,000

Priority 6) Dispersed sites rehab and of burned pile cleanup to improve visuals:
(Alternatives 2, 3, 4, 5)
Cleanup of slash piles and landing debris to improve visuals along main roads and dispersed recreation sites.
$5000
Dispersed site rehab of more popular sites along Blowout and Divide Creeks.
$12,000

Priority 7) - Stream Restoration: (Alternatives 2, 3, 4, 5)
Large wood placement with boulder material used for anchoring - approximately 2.0 miles (0.9 miles in Cliff Cr. and 1.1 miles in Divide Cr.).
Structure maintenance - approximately 4.8 miles (4.2 miles in Blowout Cr. and 0.6 miles in Ivy Cr.).
Floodplain restoration – (tearing out an old road fill) approximately 0.15 miles in Blowout Creek near the confluence with Cliff Cr., in the NW ¼, NW ¼, Section 6, T11S, R6E.
$87,400

Enhancement Projects

Priority 8- Forage seeding (Alternatives 2, 3, 5)
On regeneration harvest units and disturbed areas, after slash treatment has occurred, for the purpose of increasing forage valued for big game.
20,650

Priority 9- Aerial fertilization (Alternatives 2, 3, 4, 5)
On 926 acres of commercial thinning units proposed for harvest in the Blowout Thin Timber Sale. Approximately 200 acres of young stands in site class IV and V needing pre-commercial thinning will be reviewed for growth response after pre-commercial thinning to determine the need for aerial fertilization
$135,120.