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Laurel Curves

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

ENVIRONMENTAL ASSESSMENT NO. OR090-02-16
Laurel Curves Timber Sale

I. INTRODUCTION

A. BACKGROUND AND HISTORY

This action proposes timber harvest and other forest management activities within a project area located in Section 23, Township 22 South, Range 3 West, Willamette Meridian, Lane County, Oregon in the South Valley Resource Area of the Eugene District of the Bureau of Land Management (BLM).

B. PURPOSE OF AND NEED FOR THE ACTION

The project area is within the Matrix Land Use Allocation and has management objectives for Connectivity and Riparian Reserves. The purpose of the Proposed Action within Connectivity is to provide forest products while reducing stand density to accelerate diameter growth. The need for the action is established in the *"Eugene District Record of Decision and Resource Management Plan*," (June 1995) (RMP), which directs that timber be harvested from Matrix lands to provide a sustainable supply of timber. The purpose of the Proposed Action within the Riparian Reserves is to increase individual tree growth rates, canopy layering, tree species diversity, and the amount of coarse woody debris. The need for the action in the Riparian Reserves is established in the RMP, which directs that silvicultural practices be applied in Riparian Reserves to promote desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives (RMP, p. 24).

C. CONFORMANCE WITH LAND USE PLAN

The Proposed Action and alternatives are in conformance with the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl,* April 1994 (NSO ROD), and the RMP, as amended by the *Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD),* USDA Forest Service and USDI Bureau of Land Management, January 2001.

Additional site-specific information is available in the Laurel Curves Timber Sale project analysis file. This file and the above referenced documents are available for review at the Eugene District Office.

II. ISSUES

A. ISSUES SELECTED FOR ANALYSIS

Issue 1: *How will timber harvest and roading affect attainment of the following Aquatic Conservation Strategy (ACS) Objectives?*

In order for a proposal to comply with the Northwest Forest Plan, it must be shown that the project, at a minimum, does not prevent or retard attainment of the nine ACS Objectives on a watershed or landscape scale. Activities described in the Proposed Action and alternative may have some effect on BLM's ability to meet objectives 1, 3, 5, 6, 8 and 9.

Issue 2: *How will timber harvest and related activities affect dispersal habitat for northern spotted owls?*

The project area is dispersal habitat for northern spotted owls. Dispersal habitat provides owls with roosting and/or foraging habitat while seeking their own territory. Timber harvest could affect the project area's ability to function as dispersal habitat.

Issue 3: *What are the costs and benefits of cable yarding as compared to helicopter yarding?*

BLM Timber Sale Procedure Handbook 5400-1 advises that "...the contract will require the lowest cost methods to accomplish project objectives while providing, but not exceeding, the necessary or required level of environmental protection (e.g., not requiring a more expensive logging system to mitigate impacts below the level of impact anticipated in the relevant environmental impact statement (EIS) and land use plan...") (US Department of Interior, 2000). The costs of yarding methods could differ substantially. However, the amount of road construction and landing construction may also vary between logging methods.

B. ISSUES NOT ANALYZED

Effects on ACS Objectives 2, 4, and 7 were not an issue because analysis shows that activities proposed in this document would not prevent or retard attainment of these objectives. This analysis is included in the Laurel Curves project file.

III. ALTERNATIVES

Action alternatives consider timber harvest and other forest management activities on a project area of approximately 360 acres (see map).

Table 1. Laurel Curves Alternative Comparison

	Alternative 1 DM Matrix & Riparian (Proposed Action)	Alternative 2 DM Matrix	Alternative 3 Regen Matrix	Alternative 4 Helicopter Logging	Alternative 5 No Action
DM Matrix acres	70	70	0	70	0
Regen Matrix acres	0	0	70	0	0
DM Riparian Reserve acres	15	0	0	15	0
New Roads and Landings feet/acres	5,100/2.3	5,100/2.3	5,100/2.3	1,800/1.5	0
Existing Road Renovation/ Renovation (feet)	3,200	3,200	3,200	3,200	0
Volume	1 MMBF*	0.8 MMBF	2 MMBF	1 MMBF	0
Riparian Activity	Harvest to 100' from streams 19-22; to 50' from other streams; 4 tpa cut and leave LWD creation; ≈350' road construction	≈350' road construction	≈350' road construction	Harvest to 100' from streams 19-22; to 50' from other streams; 4 tpa cut and leave LWD creation	None
CWD Creation in Matrix	1.5 TPA 15-18" dbh	None	None	1.5 TPA 15-18" dbh	None
Cost per net thousand board foot	$117-154	$117-154	$64	$382-746**	

* MMBF = million board feet

**This range of costs reflects the use of a Bell 204 or K-MAX helicopter, the size helicopters that would most likely be used for logging timber of this size. Use of larger helicopters would increase fixed daily costs, increasing cost per thousand board feet, and increase service landing size and possibly log landing size.

A. ALTERNATIVE 1 - Density Management (Matrix and Riparian Reserve)

This is a density management alternative designed to provide forest products while promoting stand vigor. Approximately 1 million board feet (MMBF) or 1,750 CCF (cunits or 100 cubic feet) of timber would be offered for sale. Approximately 85 acres would be harvested, leaving approximately 275 acres of the Project Area unharvested.

Silviculture

All trees not specifically identified for retention would be cut.

Fuels reduction would include either scattering or covering and burning roadside and landing piles for hazard reduction upon completion of harvest. Small roadside piles may be burned or scattered. Large roadside piles could not be effectively scattered and would be covered and burned after sufficient fall rains have occurred.

Retention

Density Management (Matrix) (70 acres)

Conifers would be thinned from below, varying spacing as needed to reserve the largest, most vigorous trees. Large remnant seed trees and hardwoods would be reserved where possible. Approximately 70 trees per acre (TPA) would be reserved.

All existing snags that do not pose a safety hazard would be retained. Snags that do pose a safety hazard would be felled and retained as coarse woody debris.

Downed woody debris of decay classes 3, 4 and 5 would be retained where possible.

Upon completion of yarding activities, 1.5 TPA 15-18 inches diameter at breast height (DBH) would be cut and left on site.

"Plus trees" from the Genetic Improvement Program would be retained.

Density Management (Riparian Reserves) (15 acres)

The Riparian Reserves of Streams 19-22 would be treated to 100 feet from the stream, or the topography break, whichever is further from the stream. Riparian Reserves for Streams 5, 8, 9, 23, 24 above 28, 26-30, and 32-34 would be treated to 50 feet from the stream, or the topography break. Riparian Reserves would be thinned to the same specifications as the adjacent upland.

Upon completion of yarding activities, 4 TPA 15-18 inches DBH would be cut and left on site.

Reserves

The height of one site-potential tree has been determined to be 200 feet slope distance in the Upper Coast Fork Willamette Watershed. Riparian Reserves 200 feet wide on either side of non-fishbearing streams would be managed in accordance with the standards and guidelines in the NSO ROD (Appendix C, pp. 31-38). Riparian Reserves in the southeast corner of the project area (10-17, 47) would not be treated because they are already in a desirable condition and unreachable from the planned road system; Riparian Reserves for Streams 1-3, 7, 25, 38, 41, and 51-54 would not be treated because they are not accessible from the planned road system. Harvest would occur within several Riparian Reserves as described in Retention *Density Management (Riparian Reserves)*. All wetlands except #40 are less than one acre and would be reserved to their extents. Wetland #40 is outside of the proposed harvest area. Seeps and springs would be reserved to their extents or as determined by the area hydrologist.

Roads and Yarding

Approximately 5,100 feet of road would be constructed (Spurs D-G), all on BLM land. Approximately 3,200 feet would be renovated (Road No. 22-3-8, Segments I and J; and Road No. 22-3-23) with approximately 2,600 feet on BLM land and 600 feet on private land. Roads would have a 14-foot subgrade, a natural surface with no ditch, and be outsloped, where possible.

Approximately 150 feet of Spur E would be within 50-100 feet of Stream 26. Approximately 200 feet of Spur F would be within 100-200 feet of Stream 22.

Renovated roads and newly constructed roads would be blocked and waterbarred between logging seasons. Completion of the project would take no more than three years. Upon completion of the project, renovated and newly constructed roads would be blocked and subsoiled (i.e. mechanically breaking up the compacted area of the road) with a winged subsoiler. Road No. 22-3-8 (Segment J) would be blocked where it enters Section 23.

The area would be logged with both a cable yarding system and a ground-based yarding system while adhering to the relevant Best Management Practices (BMPs) listed in Appendix C of the RMP. All compacted skid roads would be subsoiled.

B. ALTERNATIVE 2 - Density Management (Matrix only)

This is a density management alternative designed to provide forest products while promoting stand vigor. Approximately 0.8 MMBF or 1,400 CCF of timber would be offered for sale. Approximately 70 acres would be harvested, leaving approximately 290 acres of the project area unharvested.

Retention

Retention design features for this Alternative would be similar to those of Alternative 1. In Alternative 2 there would be no coarse woody debris creation in the Matrix.

Reserves

No harvest and no large woody debris creation would occur within Riparian Reserves except for that needed for construction of Spurs E and F. All other Reserve features would be as described in Alternative 1, as would Silviculture and Roads and Yarding features.

C. ALTERNATIVE 3 - Regeneration Harvest

This alternative proposes Regeneration Harvest of the Matrix. Approximately 2 MMBF or 3,500 CCF of timber would be offered for sale. Approximately 70 acres would be harvested, leaving approximately 290 acres of the project area unharvested.

Silviculture

Design features for Silviculture would be the same as Alternatives 1 and 2, with the following additions: Site preparation would include a combination of excavator piling (slopes less than 40%) and hand piling or "walking excavator" piling (slopes greater than 40%) of slash. Approximately 90% of the machine piles would be covered and burned in the fall following harvest, with 10% left as wildlife habitat. The Regeneration Harvest area would be planted with a mix of approximately 90% Douglas-fir and 10% western redcedar, if available, to 400 trees per acre.

Retention

The proposed harvest area would have 12-18 TPA selected from all diameter classes for green tree retention, and would have an additional 1.7 green TPA retained for snag recruitment from trees 15 inches DBH or larger. Downed woody debris requirements of 12 logs/acre 20 inches in diameter cannot be met at this time because there are few trees of that size in the stand. Instead, an additional 3 TPA would be retained for future coarse woody debris retention.

Design features for Reserves would be the same as Alternative 2, and Roads and Yarding would be the same as Alternatives 1 and 2.

D. ALTERNATIVE 4 - Helicopter Yarding

This alternative would be similar to Alternative 1 except that helicopter yarding would be used rather than conventional methods. There would be less new road construction. Approximately 1 MMBF or 1,750 CCF of timber would be offered for sale. Approximately 85 acres would be harvested, leaving approximately 275 acres of the Project Area unharvested.

Roads and Yarding

Existing Roads No. 22-3-8 and 22-3-23 would be renovated and decommissioned as described in Alternative 1. Spur D (600 feet) and approximately 1,200 feet of Spur G would be constructed. New road construction would impact approximately 0.8 acres. No road construction would take place within Riparian Reserves.

This analysis assumes the use of a small helicopter. Larger helicopters may increase the size of log landings and would increase the size of service landings required. Three log landings would be constructed on BLM land. At least one service landing would be constructed on BLM land. Should neighboring private landowners allow use of an existing landing for helicopter servicing (fuel, maintenance, etc.), then only one service landing would be constructed on BLM land.

The log landings would be constructed to dimensions of approximately 75 feet by 120 feet, or approximately 0.6 acres of landing area total for the three landings. The service landing(s) would be constructed to approximately 125 foot diameter or approximately 0.3 acre each, with paths cleared for ingress and egress. The service landing(s) would be rocked for dust abatement.

Cable and ground-based yarding operations would not be expected to take place except as needed for road construction.

All other Roads and Yarding features would be as described in Alternative 1, as would Silviculture, Retention, and Reserve features

E. ALTERNATIVE 5 - No Action

All timber harvest activities would be deferred; no management activities described under the Proposed Action would occur, and no timber would be offered for sale at this time. Because the project area is within the Matrix land use allocation, it may be considered for future timber harvests even if this alternative is selected at this time.

F. ALTERNATIVES CONSIDERED but Not Analyzed

No new roads - conventional logging methods: This alternative was considered but not analyzed, because without new road or skid trail construction, only about 15 acres could be reached from existing roads. This small project size would not achieve the purpose of the action.

IV. EXISTING CONDITIONS

A. GENERAL SETTING

The project area is in the Willamette Province and in the Upper Coast Fork Willamette Watershed. Watershed analysis has been completed (BLM Eugene District, Cottage Grove Lake/Big River Watershed Analysis, May 1997). Most forest stands in the Upper Coast Fork Willamette Watershed are currently in early or mid-seral stages, with approximately 15.2% of the federally managed forested land in the watershed in late-successional forest condition.

Adjacent BLM property is in Connectivity. The nearest Late Successional Reserve is approximately 3 miles to the southeast. Surrounding vegetation includes recent clearcuts to the south and west on private land. The surrounding area is a mosaic of recent clearcuts and young stands, with essentially no late-successional forest in any of the surrounding 6th field watersheds.

The plants and animals in this project area do not differ significantly from those discussed in the Eugene District Proposed Resource Management Plan/Environmental Impact Statement (RMP EIS) (Chapter 3). The following resources are also discussed in greater detail in the project file.

B. SPECIFIC RESOURCE DESCRIPTIONS

Vegetation

The common stand condition is a fully stocked overstory of Douglas-fir with minor western hemlock and western redcedar components. Much of the stand is well differentiated, with ongoing suppression mortality providing many small (less than 8 inch) snags (15-20 per acre) and down wood.

Understory hemlock regeneration is scattered throughout much of the stand at various densities. Common understory vegetation consists of vine maple, rhododendron, salal, sword fern, and Oregon-grape. Downed woody debris of decay classes 3 and 4 is moderately abundant but poorly distributed throughout the stand in pieces of various lengths and greater than 20 inches in diameter. Large snags are mostly absent. Fire hazard management likely felled many of the remnant trees in the early 1960s. A few remnant green trees are in the southeast part of the project area. Stand exam records from 1998 show an average stand age of 58 years, average stand diameter of 16 inches DBH, and an average of 180 TPA.

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Most of the proposed harvest area was logged during the 1930s with natural regeneration stocking the area with conifers by 1940. A small portion of the project area was logged in the 1950's and stocked with conifers by 1960. There have been no stand management activities in this second-growth stand since then.

Wildlife (including Special Status and Special Attention Species)

The project area is not located within spotted owl critical habitat. It is within the South Willamette-North Umpqua Area of Concern (an area providing inter-provincial linkage of spotted owl dispersal habitat between the Coast Range and Western Cascades). The Fish and Wildlife Service identified the Area of Concern as one of the areas where, due to past harvest practices, current habitat conditions, and land ownership patterns, the importance has escalated for maintaining habitat for owls to nest in and move between provinces. The project area is dispersal habitat for northern spotted owls. Thomas, et al. (1990) stated the need for dispersal habitat for owls between reserves. Dispersal habitat

is defined as habitat necessary to allow a plant or animal to move from their point of origin to another location where they subsequently produce offspring. Thomas, et al. measured adequate dispersal habitat as 50% of the forested landscape consisting of forest stands with a mean diameter at breast height of 11 inches and a canopy closure of at least 40%. They used quarter townships as units measured to ensure adequate coverage of dispersal habitat across the landscape.

The proposed action is not located within the provincial home range (1.2 miles) of any spotted owl site. There is one historic owl site just over 1.2 miles from the project area (Shortridge Creek). This site has not had a known resident spotted owl since the early 1990s. A dispersing female was located at the site in 1997; subsequent surveys have not located any owls at the site. The site will be surveyed again in 2002. The project area could provide foraging habitat for the Shortridge Creek site if it were occupied and could provide dispersal habitat for non-resident spotted owls.

Red tree vole surveys have been completed to protocol in those areas where access for timber harvest is possible. Surveys have also been conducted in areas where access is not possible, but not to protocol. Surveys resulted in 108 red tree vole nests being found; 52 were active and 56 were inactive. Red tree vole sites would be managed by setting up Habitat Areas in accordance with Management Recommendations for the Oregon Red Tree Vole, version 2.0.

Surveys for *Pristiloma arcticum crateris* (PRAR) have been completed with no PRARs found. One *Megomphix hemphilli* was found in a reserve area while conducting *Pristiloma* surveys.

There is an active red-tailed hawk nest in the SE corner of the section in the Jasper Creek tributaries' riparian area. They are nesting in one of the remnant trees. A timber sale contract would require a quarter mile seasonal restriction between March 1 - July 15.

Aquatic and Riparian Resources and Fisheries

The elevations in the project area range from 2,400 to 3,300 feet. The project area is at elevations that are considered to be in the peak rain-on-snow and the lower end of the snow-dominated precipitation zones.

The project area is situated above the Cottage Grove Dam where there are no proposed or listed fish species nor designated critical habitat under the Endangered Species Act. Nonetheless, the project area is within designated Essential Fish Habitat (EFH) for spring chinook salmon.

No fish were found within the project area. Surveys revealed the closest fish to be 0.6 miles away in East Fork Wilson Creek. Other streams with fish found in them include Jasper Creek, with cutthroat trout and sculpin found 1.8 miles from the project area, and potential for rainbow trout in the lower portion; Drue Creek, with cutthroat trout approximately 1.4 miles from the project area; Combs Creek, primarily cutthroat habitat for 0.66 miles, 2 miles from the project area; and Wilson Creek, habitat for cutthroat with sculpin and potentially rainbow trout 0.75-1.6 miles from the project area.

Forty-three streams (1-3B, 5, 7-17, 19-30, 32-34, 38, 41, 47-48, 51-54, 56-57) were identified within or near the proposed harvest area. Numerous seeps and springs (6, 31, 35, 43-46, and 58) and wetlands (4, 18, 36, 37, 39, 40, 42, 45, 49, 50 and 55) are located within or near the proposed harvest area. The headwaters for Drue Creek, Wilson Creek, Jasper Creek, and Combs Creek are all located within the proposed boundaries of the

harvest area. Most of these subwatersheds were logged between 1940-1960, significantly impacting channel morphology and aquatic habitat. Recent Oregon Department of Fish and Wildife (ODFW) surveys indicate that most aquatic habitat parameters which influence the quality of habitat for fish and other aquatic-dependent species are approaching, but still below, benchmark conditions for desirable habitat conditions.

Streams 5, 7, 8 and 9 drain in southwest to southeast directions to Drue Creek. Streams 10-17, 47, and 48 drain in southwest to southeast directions to Jasper Creek. Streams 19-30, 32-34, and 57 drain in west to northwest directions to Wilson Creek. Stream 56 drains south to southwest to Combs Creek.

Streams 1-3, 41, and 51-54 drain in north to northwest directions to the East Fork of Wilson Creek. The headwaters of East Fork Wilson Creek were within the harvest area prior to completion of red tree vole surveys. Once red tree vole nests were identified, the headwaters of this stream were found to be inside the red tree vole habitat area and were removed from the proposed harvest area.

The stream channel morphology for these systems can be characterized as single channel, moderate to high gradient, moderately entrenched, cascading/step pool morphology, with irregular spaced drops and deep scour pools. Within the proposed harvest area, most stream reaches are greater than 15% gradient, except for the lower portions of some of the main streams which have gradients between 8-12%. Most streams have fine substrates (silt, sand, gravel) with occasional substrate as coarse as large cobble. Large woody debris in stream channels is generally low in quantity, with occasional areas of moderate density, and very few areas of high density. Existing stream canopy cover is good, with most streams having 70-90% cover, or greater. Channel complexity is considered poor. Riffles, rapids, and scour pools are the predominate habitat types.

Channel down cutting was noted on reaches of several channels. Recent bank failure was noted on the lower portion of Stream 21, but in general, bank stability for most streams is good. Sideslope gradients along stream channels within the project area are variable from gentle to steep (5% to 100%). Moderately steep to steep topography exists along portions of hydrologic features 1, 14, 16, 20-24, 31, 32, and 34. A broad, gentle ridge runs in a northeast/southwest to east/west orientation through the middle of the project area. Most of the remaining areas in the project area are moderate in topography. Several old skid trails are located within the project area, but no channel crossings with deep fills were found.

The closest water rights downstream from the proposed harvest area are located approximately 4 miles to the northwest and 3 miles to the southwest of this area. These rights are for irrigation use from Cottage Grove Reservoir and the Coast Fork of the Willamette River.

Botany

All required surveys have been completed. No threatened, endangered, or sensitive plant species were found in the project area.

One small patch of Scotchbroom is located within the project area, and a larger patch is located on one of the mainline roads leading to the project area.

Soils

Soils in the project area include Bohannen (moderately deep, well-drained, surface soils gravelly loam, subsoil gravelly loam to cobbly clay loam); Cumley (deep, well drained) Honeygrove (deep, well drained, surface layer silty clay loam, subsoil up to 60% clay); Kinney (deep, moderately well drained, cobbly loam), Klickitat (deep, well-drained, surface soil stony loam with subsoils cobbly clay loam), and Peavine (moderately deep, well drained, surface layer silty and clay loam, subsoil silty clay with 30-60% clay). All soil types are susceptible to compaction. Areas of Cumley soils identified as wetlands have been withdrawn from the proposed harvest area because they are classified Fragile Nonsuitable Woodland - Groundwater. Areas of Klickitat soils with rock outcrop have also been withdrawn because they are classified Fragile Nonsuitable Woodland - Soil Moisture.

The proposed harvest area is considered to have low potential for mass wasting. Areas within steeper slopes on the west end of the unit where stream channels have formed inner gorges are within Riparian Reserves and would have no-cut buffers that begin at the break in slopes. Otherwise, the proposed harvest area is relatively low in slope, and road stream crossings have fills less than four feet in depth. Steep slopes on the northern aspect appear stable, with no recent landslide activity apparent. No soil productivity impairments were noted except on ground-based skid trails that were not mitigated after previous harvests.

Currently, Roads No. 22-3-23 and 22-3-8 are 4-wheel drive roads that are in a degraded condition. The roadbed averages 10 feet in width, holds ponded water, has no ditchlines. The treads have gullies greater than 1 foot deep which carry concentrated flow of water during rain event. Vehicle use has created deep ruts in the roads.

V. DIRECT AND INDIRECT EFFECTS

A. UNAFFECTED RESOURCES

The following resources are either not present or would not be affected by either of the alternatives: Areas of Critical Environmental Concern; prime or unique farm lands; invasive, non-native species; Native American religious concerns; solid or hazardous wastes; Wild and Scenic Rivers; Wilderness; minority populations; cultural resources, and low income populations.

B. ISSUE 1: How would timber harvest and related activities affect attainment of Aquatic Conservation Strategy (ACS) Objectives 1, 3, 5, 6, 8 and 9?

Alternative 1 proposes density management within Riparian Reserves. Alternatives 2 and 3 propose no density management within Riparian Reserves. Alternative 4 is similar to Alternative 1, except there would be less road construction overall, no road construction in the Riparian Reserves, and helicopter yarding would be used. Alternative 5 proposes no action. The following is a site-specific analysis of the effect of all alternatives on attainment of ACS objectives 1, 3, 5, 6, 8, and 9.

1. Alternative 1 - DM Matrix and Riparian (Proposed Action)

Objective 1: This alternative is likely to maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features in relation to the aquatic systems. Harvest would not occur within the reserves of most of the streams within the project area. The unthinned riparian areas would retain existing supplies of future large woody material. This alternative would also include the falling and retention of 4 trees per acre in the Riparian Reserves to provide a pulse of coarse woody debris, a feature that is currently lacking in many of the Riparian Reserves. Treatment of the outer 100' to 150' of some of the Riparian Reserves and some of the upland areas in the residual stand would hasten the development of late-successional characteristics.

Objective 3: Alternative 1 would maintain and restore the physical integrity of the aquatic system. The unthinned buffers around all streams and wetlands and the absence of new stream crossings or yarding corridors would maintain the physical integrity of the aquatic system. Thinning within the Riparian Reserves would speed the growth of the retained trees. Larger trees would develop sooner and would provide for large woody debris recruitment. This would eventually contribute to the restoration of the physical integrity of the aquatic system. Stream bank integrity and tree/shrub root strength would be retained in the entire stream reach.

Objective 5: This alternative would not prevent or retard the restoration of the sediment regime under which this aquatic ecosystem evolved. The probability of sediments entering streams from the new spurs and landings is low due to the distance the spurs/landings would be from streams. The majority of the new road construction would be on ridge top locations or gently sloping topography with a very low risk of failure. Road construction and yarding design features and BMPs described earlier would minimize the potential for erosion and sedimentation from road construction or yarding. Unthinned buffers of 50' to 200' (or greater) around all streams are likely to provide for filtering of sediments or erosion potentially created from yarding or new roads.

The use of existing roads for timber haul could produce a short-term increase in sedimentation because the existing roads route sediment flow via ditch lines to cross

drains and stream crossings. Some surface erosion occurs from nearly all roads. Existing roads are native, gravel, and paved surface. Erosion from paved roads is usually minimal. Haul over existing gravel roads would be approximately 8 miles one-way. Haul over existing and new native surface roads would be approximately 2 miles one-way. Haul would occur during the dry season.

The increase in traffic use, and subsequent erosion of the running surface due to this action, are expected to be low and short term (1-3 seasons, summer use). Minimal disturbance of cut and fill slope vegetation of existing roads is expected. The amount of erosion/sedimentation from the use of existing roads could be lessened by maintaining an adequate lift of gravel on all roads within the haul route during the length of the contract, and by following BMPs in the maintenance of these roads.

Objective 6: Alternative 1 would not retard restoration of instream flows. Evapotranspiration and interception would decrease as a result of this action because of the removal of overstory trees. The most likely changes to peak flows from this effect are flow increases during small, frequent flow events from late summer to early winter when less precipitation is needed to recharge soil moisture. The impact is expected to be small because the treatment would be a moderate density management thinning, a large portion of the project area would be retained at the existing stocking levels, and project treatment would be spread out over three separate sub-watersheds.

Removal of vegetation and/or increases in openings can increase snow accumulation and snow melt, particularly in areas that are subject to rain-on-snow events. Clear-cut harvest of vegetation reduces interception of snow. Snow on the ground is also less affected by inter-storm melt than is snow in the canopy (WFPB 1997). Elimination of snow interception can result in more water equivalent in clear cut or open areas than in closed canopy areas (Berris and Harr 1987). Higher levels of snow accumulation and melt can be translated into more Water Available for Run-off (WAR) and higher peak flows through rain-on-snow events. Research is very limited on the effects on peak flows from alterations in canopy cover under different density management retention levels. The largest effect from rain-on-snow events is assumed to be in openings or recently clear-cut stands (hydrologically immature) that occur in the transient snow zone.

The renovated roads on BLM would be subsoiled upon completion of the project. Subsoiling is expected to partially restore infiltration rates and reduce compaction impacts on approximately 1 acre of existing compacted road.

Any impacts to peak flow due to canopy closure changes would gradually diminish under this alternative and are expected to be of shorter duration than under alternative 3. Canopy closure at 70 trees/acre is expected to be at about 50% to 60%, and canopy closure would recover more quickly to pre-harvest conditions than under alternative 3.

Objective 8: Alternative 1 would maintain and contribute to the restoration of species composition and structural diversity of plant communities in riparian zones, by hastening the development of large trees for future large woody debris recruitment.

Objective 9: Alternative 1 would maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species by hastening the development of late-successional characteristics such as canopy layering and large diameter trees.

2. Alternative 2 - DM Matrix

Objective 1: This alternative is similar to Alternative # 1 in that it is likely to maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features in relation to the aquatic systems. All streams would have unthinned buffers of at least 200'. The road system needed for harvest would be identical to Alternative 1. This alternative would not include the beneficial action of falling and retaining trees for short-term coarse woody debris in the Riparian Reserves as in Alternative 1.

Objective 3: The lack of stream or corridor crossings and the large unthinned buffers would maintain the physical integrity of the aquatic system. The areas would ensure that the thinning would not affect stream bank integrity or tree/shrub root strength within the riparian areas. This alternative would not have the potential benefit of developing large trees as quickly in the Riparian Reserves as in Alternative 1 because the Reserves would not be thinned.

Objective 5: Risk of sedimentation under this alternative is expected to be the same to lower than under Alternative 1. This risk is likely to be very low because of the large unthinned buffers around all streams. Erosion from new roads or yarding corridors would be very unlikely to reach stream channels because of the filtering effect of the large buffer areas. The change in traffic levels from existing conditions would be lower under this alternative because 20% less volume would be removed under this alternative. The haul route and the period of haul would be identical to Alternative 1. The risk of sedimentation from the transportation of logs under this alternative would be similar to lower (less volume transported) under this alternative in comparison with Alternative 1. The risk of sedimentation from existing roads could be substantially reduced by maintaining the road surfaces in good condition.

Less ground would potentially be disturbed in the yarding of logs, and less vegetation would be removed than with Alternative 1. Yarding methods and best management practices utilized would be the same as under Alternative 1.

Objective 6: This alternative is likely to cause changes to summer low flows and overall water yield that are similar to slightly lower than under Alternative 1. Approximately 15 acres fewer would be harvested under this alternative than under Alternative 1, thus reducing the potential change in interception and evapotranspiration. Most of the reduction in harvest area would occur in the sub-watershed that includes the Wilson Creek drainage, where 11 fewer acres would be harvested under this alternative than under Alternative 1. About 4 fewer acres would be harvested in the sub-watershed that includes Drue and Jasper Creeks under this alternative than under Alternative 1.

Road and compaction effects on peak flow would be similar to lower than under Alternative 1. Impacts on peak flow from reduction in evapotranspiration and interception would be similar to lower than under Alternative 1. Approximately 15 acres less would be harvested under this alternative than under Alternative 1. The amount of existing roads to be subsoiled would be the same as Alternative 1.

The risk of greater snow accumulation and snow melt that is associated with rain-on-snow events would be similar to lower under this alternative than under Alternative 1. This is due to less alteration in canopy closure on about 15 acres.

The effects on peak flow under this alternative, due to greater snow accumulation and snow melt from changes in canopy closure, are expected to be similar to lower than

under Alternative 1. Fewer acres would be harvested under this alternative and a smaller overall change in canopy closure would occur.

Objective 8: Alternative 2 would maintain and not retard the natural rate of restoration of species composition and structural diversity of plant communities in riparian zones and wetlands.

Objective 9: Alternative 2 would maintain and not retard the natural rate of restoration of habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

3. Alternative 3 - Regeneration Harvest Matrix

Objective 1: This alternative is likely to maintain the distribution, diversity, and complexity of watershed and landscape-scale features in relation to the aquatic systems. Unthinned buffers around all streams would be greater than under Alternative 1 and similar to Alternative 2. All streams would have unthinned buffers of at least 200'. The road system needed for harvest would be identical to Alternatives 1 and 2. This alternative would not include the beneficial action of falling and retaining trees for short term coarse woody debris in the Riparian Reserves as in Alternative1.

Objective 3: The lack of stream and new corridor crossings and the large unthinned buffers would protect the physical integrity of the aquatic system. The large unthinned buffer areas would ensure that neither stream bank integrity nor tree/shrub root strength would be affected within the riparian areas. This alternative would not have the potential benefit of developing large trees as quickly in the Riparian Reserves as in Alternative 1 because the Reserves would not be thinned. There is a higher risk under this alternative of cumulative peak flow effects from rain-on-snow events that might potentially impact channel or bank stability.

Objective 5: The risk of sedimentation from road construction, road renovation, and yarding under this alternative is expected to be similar to lower than Alternative 1 and identical to Alternative 2. This risk is likely to be very low because unthinned buffers around all streams would be a minimum of 200' wide. Erosion from new roads or yarding corridors would be very unlikely to reach channels because of the filtering effect of the large buffer areas. The change in traffic levels from existing conditions would be higher than Alternatives 1 and 2 in the short term and similar to all alternatives in the long term. A higher amount of volume would be removed under this alternative. The haul route would be identical. The risk of sedimentation from the transportation of logs under this alternative would be identical to slightly higher (more volume transported) under this alternative than under Alternatives 1 and 2. The risk of sedimentation from existing roads could be substantially reduced by maintaining the road surfaces in good condition.

Less area would potentially be disturbed in the yarding of logs but more vegetation would be removed than under the other alternatives. Yarding methods and best management practices utilized would be the same as under Alternatives 1 and 2.

Objective 6: Increase to summer low flows and overall water yield are more likely under this alternative than under Alternatives 1, 2, 4, or 5. The reduction in evapotranspiration and interception would be highest under this alternative because of the lower retention of existing vegetation. The sub-watershed that includes the Wilson Creek drainage would have about 47 acres of regeneration harvest under this

alternative. The sub-watershed that includes Drue and Jasper Creeks would have about 22 acres of regeneration harvest under this alternative. The sub-watershed that includes Combs Creek would have about 5 acres of regeneration harvest under this alternative.

Road and compaction effects on peak flow would be similar to higher than Alternatives 1, 2, and 4. Amount of existing roads to be subsoiled would be the same as Alternative 1. Impacts on peak flow from the reduction in evapotranspiration and interception would be higher under this alternative than under any other alternatives due to the lower retention of existing vegetation.

Greater effects on peak flow under this alternative, due to greater snow accumulation and snow melt from changes in canopy closure, are more likely than under the other alternatives. The duration of the effects is also expected to be longer than the other alternatives because of the lower retention level of trees. Peak flow effects in clear cut harvest can last several decades. Peak flow response to rain-on-snow events have not been studied at the proposed retention level. Peak flow response is assumed to be higher under this alternative because of the greater reduction in canopy closure. Canopy closure would return to pre-harvest levels sooner within the retention levels under Alternatives 1 and 2. Fewer acres would be harvested under this alternative than Alternatives 1 and 2, but a much higher overall change in canopy closure would occur.

Objective 8: Alternative 2 would maintain and not retard the natural rate of restoration of species composition and structural diversity of plant communities in riparian zones and wetlands. Small wetlands (less than 1 acre) would be protected to their extents as directed by the RMP.

Objective 9: Alternative 2 would maintain and not retard the natural rate of restoration of habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

4. Alternative 4 - Helicopter Yarding

Objective 1: This alternative is similar to Alternative # 1, in that it is likely to maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features in relation to the aquatic systems. Unthinned buffers around streams would be identical to that described under Alternative # 1. There would be less new road construction under this alternative than Alternative # 1. This alternative would include the beneficial action of falling and retaining trees for short-term coarse woody debris in the Riparian Reserves as in Alternative1.

Objective 3: Alternative 4's effects on this objective would be similar to Alternative 1.

Objective 5: This alternative would not prevent or retard the restoration of the sediment regime under which this aquatic ecosystem evolved. This alternative would have a similar to slightly lower risk of impact to this objective than Alternative 1. No new road construction would occur under this alternative. Unlike Alternative 1, no new roads would be constructed within Riparian Reserve.

Compaction impacts would be lower because of less ground based and cable yarding, and because no area would be disturbed in the construction of new roads.

The use of existing roads for timber haul could produce a short-term increase in sedimentation because the existing roads route sediment flow via ditch lines to cross

drains and stream crossings. Some surface erosion occurs from nearly all roads. Existing roads are native, gravel, and paved surface. Erosion from paved roads is usually minimal. Haul over existing gravel roads would be approximately 8 miles one-way. Haul over existing native surface road would be approximately 1 mile one-way. There would be no haul over new native surface road. Haul would occur during the dry season.

The increase in traffic use, and subsequent erosion of the running surface due to this action, are expected to be low and short-term (1-3 seasons, summer use). Minimal disturbance of cut and fill slope vegetation of existing roads is expected. The amount of erosion/sedimentation from the use of existing roads could be lessened by maintaining an adequate lift of gravel on all existing gravel roads within the haul route during the length of the contract and by following best management practices in the maintenance of these roads.

Objective 6: The impacts to flow would be similar to lower than Alternative 1. The same number of acres would be harvested with the same density management prescription under this alternative as under Alternative 1. Amount of existing roads to be subsoiled would be the same as Alternative 1.

Objective 8: Alternative 4 would have effects on this objective similar to Alternative 1.

Objective 9: Alternative 4 would have effects on this objective similar to Alternative 1.

5. Alternative 5 - No action

Objective 1: Alternative 5 would maintain and not retard the natural rate of restoration of the distribution, diversity, and complexity of watershed and landscape-scale features in relation to the aquatic systems. This alternative would include neither the beneficial action of falling and retaining trees for short-term coarse woody debris in the Riparian Reserves as in Alternatives 1 and 4, nor the treatment of some of the Riparian Reserves to hasten the development of late-successional characteristics in the Riparian Reserves.

Objective 3: Alternative 5 would maintain and not retard the restoration of the physical integrity of the aquatic system.

***Objective 5*:** This alternative would maintain and not prevent or retard the natural rate of restoration of the sediment regime under which this aquatic ecosystem evolved. This alternative would not result in the felling and retention of 4 trees per acre in the Riparian Reserves.

Objective 6: Alternative 5 would maintain and not retard the natural rate of restoration of instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.

This alternative would not result in subsoiling existing roads and would neither partially restore infiltration rates, nor reduce compaction impacts on approximately 1 acre of existing compacted road, in contrast to the action Alternatives.

Objective 8: This alternative would maintain and not retard the natural rate of restoration of the species composition and structural diversity of plant communities in riparian zones and wetlands.

Objective 9: This alternative would maintain and not retard the natural rate of restoration of the species composition and structural diversity of plant communities in riparian zones and wetlands.

Based on the above analyses of the effects on attainment of the ACS Objectives, Alternatives 1, 2, 3, 4, and 5 are consistent with the ACS and the objectives for the Riparian Reserves, and would not prevent or retard attainment of any of the ACS Objectives. Alternatives 1 and 4 would speed attainment of ACS objectives 1, 3, and 9.

C. ISSUE 2: How would timber harvest and related activities affect northern spotted owl dispersal habitat?

1. Alternative 1 - DM Matrix and Riparian Reserve (Proposed Action)

Alternative 1 would degrade 85 acres of dispersal habitat provided by the existing stand. Alternative 1 would maintain canopy closure above 40%, but would open up the canopy, possibly cause snags to be felled (for safety reasons), and possibly disturb the downed wood through yarding operations. Research has shown that spotted owls avoid foraging in thinned stands after harvest (Anthony, et al. 2001). As the stand grows and the canopy closes (approximately 10-20 years), foraging habitat would improve. Accelerating the development of late-successional stand characteristics as a result of density management would ultimately benefit this species. Only 13% of the section would be treated and the rest of the section would provide an undisturbed area of dispersal habitat. Alternative 1 may affect but is not likely to adversely affect northern spotted owls.

2. Alternative 2 - DM Matrix

Alternative 2 would have effects similar to Alternative 1, but of somewhat lesser magnitude because 15 fewer Riparian Reserve acres would be harvested; 11% of the section would be treated. The untreated Riparian Reserves would sustain dispersal habitat in its present condition. By not treating the Riparian Reserves, portions of the stand would remain available for foraging by owls. In the future, the Riparian Reserves may not develop late-successional characteristics (e.g., large trees) to the same extent as would occur with Alternative 1. Alternative 2 may affect but is not likely to adversely affect northern spotted owls.

3. Alternative 3 - Regeneration Harvest Matrix

Alternative 3 would remove dispersal habitat provided by the existing stand in the South Willamette/North Umpqua Area of Concern. Eleven per cent of the dispersal habitat in the section would be removed. Dispersal habitat on federal land in the quarter township would drop by 70 acres from 67% to 64%. Untreated Riparian Reserves would provide patches of dispersal habitat within the unit. The risk of predation for spotted owls would be greater than Alternatives 1 and 2, and there would be less available foraging habitat. The new stand would not become dispersal habitat for approximately 40 years. Because the amount of dispersal habitat in the quarter township would remain above 50% and only 11% of the dispersal habitat in the section would be removed, Alternative 3 may affect but is not likely to adversely affect northern spotted owls.

4. Alternative 4 - Helicopter Yarding

Alternative 4 would have effects similar to Alternative 1. Alternative 4 may affect but is not likely to adversely affect the northern spotted owl.

5. Alternative 5 - No Action

Dispersal habitat would not be degraded, and foraging habitat would be maintained. The forest stand, however, would not be expected to develop late-successional forest characteristics (suitable habitat), including large trees, as quickly or to the same extent as it would with a density management treatment. Northern spotted owls would not be affected at this time by the No Action alternative.

C. ISSUE 3: What are the costs and benefits of helicopter logging?

Using the Helipace program, helicopter logging is estimated to cost in the range of $382-746/MBF (thousand board feet). These costs assume the use of a smaller helicopter, such as the Bell 204 or K-MAX, which are of the size that would most likely be used to log timber of this size. Rocking the roads and landings is not proposed, limiting operations to periods of dry soil conditions. Since this often coincides with fire season, costs may increase as many helicopters are used for fighting fires and may be considered rare resources during fire season.

A recent regeneration harvest appraisal, using conventional logging methods, was estimated at $64/MBF. The last five density management projects sold in the South Valley Resource Area, using combinations of cable and ground-based logging methods, have been appraised at costs ranging between $117-154/MBF. It is reasonable to expect the Laurel Curves project would cost somewhere within this range using conventional logging methods.

The final economic cost, using the estimated volumes and estimated logging costs, would be $117,000 - $154,000 subtracted from timber receipts should Alternative 1 be selected; $93,600-123,200 subtracted should Alternative 2 be selected; approximately $128,000 should Alternative 3 be selected, and $382,000-746,000 should Alternative 4 be selected.

Under Alternative 4, there would be less road and landing construction. Implementing this alternative would require new road construction of approximately 1,785 feet, as compared to 5,100 feet in Alternatives 1, 2, and 3. This alternative would eliminate the need to construct 350 feet of road within Riparian Reserves. Finally, this alternative would have slightly less surface disturbance for landing construction (1.5 acres, as compared to 2.3 acres with the other action alternatives).

VI. CUMULATIVE EFFECTS

This analysis incorporates by reference the analysis of cumulative effects in the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (NSO FSEIS) (Chapter 3 & 4, pp. 4-10), the RMP EIS (Chapter 4), and the S&M ROD. Those documents analyze most cumulative effects of timber harvest and other related management activities. Neither of the alternatives analyzed here would have cumulative effects on soils or air quality beyond those effects analyzed in the above documents. The following section supplements those analyses, providing site-specific information and analysis particular to the alternatives considered here.

It is likely that other stands on BLM-administered lands within the Upper Coast Fork Willamette Watershed would be harvested, either through regeneration or thinning, over the next several years. I Spy I-5, Little Creek, Wilson Top, and Ackerson Butte are proposed for future analysis. Hobart Butte and Jasper Creek are currently being analyzed. Twin Prairie was analyzed and is scheduled to be sold in 2002. Alton Hill was sold in 2000.

On private lands in the watershed, more intensive timber management actions, including clearcutting and broadcast burning, are occurring and are likely to continue. Also, it is possible that some forest stands on private land will be converted to non-forested land, for either agricultural or residential use. Private lands would continue to provide habitat for deer, elk, and neotropical birds, but would primarily alternate between early- and mid-seral stages.

A. ISSUE 1: How would timber harvest and related activities affect attainment of Aquatic Conservation Strategy (ACS) Objectives 1, 3, 5, 6, 8 and 9?

Objective 1: This alternative is likely to maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features in relation to the aquatic systems. Harvest would not occur within the reserves of most of the streams within the project area. The unthinned riparian areas would retain existing supplies of future large woody material. This alternative would also include the falling and retention of 4 trees per acre in the Riparian Reserves to provide a pulse of coarse woody debris, a feature that is currently lacking in many of the Riparian Reserves. Treatment of the outer 100' to 150' of some of the Riparian Reserves and some of the upland areas in the residual stand would hasten the development of late-successional characteristics.

Objective 3: Alternative 1 would maintain and restore the physical integrity of the aquatic system. The unthinned buffers around all streams and wetlands and the absence of new stream crossings or yarding corridors would maintain the physical integrity of the aquatic system. Thinning within the Riparian Reserves would speed the growth of the retained trees. Larger trees would develop sooner and would provide for large woody debris recruitment. This would eventually contribute to the restoration of the physical integrity of the aquatic system. Stream bank integrity and tree/shrub root strength would be retained within the unthinned buffers.

Objective 5: Alternatives 1, 2, 3 and 4 include planned road construction and decommissioning that would result in a net decrease in the total area converted to road surface. The cumulative effect is improvement of the current concentration of flows on existing dirt roads. Little short- or long-term negative cumulative effects to soil productivity are anticipated as a result of implementing the alternatives. Adhering to BMPs should help

reduce surface runoff potential to streams and result in insignificant growth-loss effects. Selection of Alternative 5 would result in no net decrease in road surface.

Objective 6: It is possible that Alternatives 1, 2, 3 and 4, together with other actions both on federal and private lands, could contribute to an increase in peak flows in the Wilson Creek drainage. The Wilson Creek drainage is approximately 2100 acres in size. Part of it is in the elevation band considered to be the peak rain-on-snow dominated precipitation zone. Approximately half of the watershed is considered hydrologically mature (older trees - high canopy closure).

Should Alternative 1 be selected, there is very low risk that there would be changes in peak flows at the Watershed (5th field) and Sub-watershed (6th field) scales. This alternative would involve treatment of less than 1% of the area of any of the three Sub-watersheds (6th field) in which it occurs. This alternative would involve treatment of less than 0.1% of the area of the Watershed (5th field) in which it occurs. A high percentage of the existing canopy closure would be maintained under the proposed retention of 70 trees per acre. The treatment area for this project would include three separate drainage areas. Only 5 acres would be density management harvested in the Combs Creek drainage under this alternative. Approximately 26 acres of density management would occur in the Jasper/Drue Creek drainage under this alternative. Approximately 58 acres of density management would occur in the Wilson Creek drainage under this alternative.

The greatest potential for change in peak flow at the drainage (or smaller) scale under this alternative would be in the Wilson Creek drainage. The effect of this alternative on peak flows at the smaller spatial scales is expected to be small because of the high retention level of canopy closure within the project area and the relatively small treatment area.

The greatest potential for change in flows from cumulative effects under this alternative is also likely to be in the Wilson Creek drainage. Short and long term cumulative effects to flow are anticipated to be minor under this alternative.

Should Alternative 2 be selected, effects on peak flow changes would be expected to be similar to slightly lower than those expected from Alternative 1 because fewer acres would be harvested. Cumulative effects on peak flow due to changes in canopy closure were also analyzed under this alternative. The greatest potential for change in peak flows under this alternative was again determined to be in the Wilson Creek drainage. Slightly lower peak flow changes are likely under this alternative than under Alternative 1. The duration of the effects would be identical to Alternative 1, since the retention level of trees (70 trees per acre) would be the same.

The greatest potential for change in peak flow at the drainage scale under Alternative 3 appears to be in the Wilson Creek drainage, as under Alternatives 1 and 2. The potential for peak flow changes is higher under this alternative, because of the higher risk of response to rain-on-snow events and greater change in evapotranspiration and interception. There is much uncertainty as to the extent of effects at this retention level due to lack of research of rain-on-snow response at the proposed treatment retention level. There might be an increase in peak flows under certain storm conditions due to the openings that would be created in the canopy under this alternative.

As a result of the potential for increased peak flows in the Wilson Creek drainage, there would be greater potential for cumulative flow effects from this alternative in combination with the actions of other landowners in the drainage(in comparison to the other alternatives) due to higher potential for change in flow and the longer duration of effects. The cumulative

effects on flow in the Wilson Creek drainage are expected to be higher under this alternative than any other alternative due to the much greater alteration in the existing vegetation under this alternative. The duration of effects would also be greater under this alternative because of the greater reduction in canopy closure.

Should Alternative 4 be selected, there would be lower temporary compaction impacts when compared to Alternative 1 because there would be less new road construction and less potential for compaction from yarding due to use of helicopters.

Should Alternative 5 be selected, no alteration to the timing and magnitude of flow would occur as a result of this alternative. Changes to flow could still occur over time through actions by other agencies, companies, or individuals. The effects would vary greatly at different spatial scales depending on the extent of change and the timing of the actions. Private timber lands that are currently at or near suitable harvest age could be harvested in the near future all at approximately the same time or could be harvested over a long period of time.

Objective 8: Alternatives 1 and 4 could contribute to the restoration of the species composition and structural diversity of plant communities in riparian zones and wetlands in the watershed. Alternatives 2, 3 and 5 would not.

Objective 9: Alternatives 1 and 4 could contribute to the restoration of the species composition and structural diversity of plant communities in riparian zones and wetlands in the watershed. Alternatives 2, 3, and 5 would not.

B. ISSUE 2: How would timber harvest and related activities affect northern spotted owl dispersal habitat?

In the short term (approximately 10-40 years), Alternative 1, 2 or 4, along with the proposed Jasper Creek, Hobart Butte and I Spy I-5 sales would contribute to the degradation of 385 acres or loss of 75 acres of spotted owl dispersal habitat within the South Willamette/North Umpqua Area of Concern. Dispersal habitat for spotted owls on federal land in the quarter township is presently at 67%. These alternatives, in combination with the proposed Jasper Creek density management thin located one mile to the south, would degrade up to 8% (165 acres) of the dispersal habitat on BLM land within the quarter township. In the long-term (40 plus years), Alternatives 1, 2, and 4 could accelerate the development of mature and late-successional forest characteristics, thereby improving spotted owl habitat.

Alternative 3, the regeneration harvest, together with the other proposed harvests, would contribute to the removal (145 acres) and degradation (315 acres) of spotted owl dispersal habitat within the South Willamette/North Umpqua Area of Concern. This alternative would remove approximately 70 acres of dispersal habitat, reducing the amount of dispersal habitat on BLM land within the quarter township by 3% (to 64%). Also within the quarter township, the proposed Jasper Creek thinning would degrade approximately 80 acres more of dispersal habitat, or 4%. Together, the two timber harvests would affect a total of 7% of dispersal habitat on BLM land within the quarter township; 60 percent would remain. In 10-20 years, the canopy would again be closed at Jasper Creek and dispersal habitat would no longer be degraded.

VII. CONSULTATION AND COORDINATION

A. LIST OF PREPARERS

The proposed action and alternatives were developed and analyzed by the following interdisciplinary team of BLM specialists.

Jeff Apel	Engineering
Alison Center	Threatened and Endangered Wildlife Species
Rick Colvin	Landscape Planner
Alan Corbin	Timber Management
Richard Hardt	Ecology
Pete O'Toole	Silviculture
Mike Southard	Cultural Resources
Steve Steiner	Hydrology
Chuck Vostal	Fisheries
Molly Widmer	Botany
Karin Baitis	Soils

B. CONSULTATION

Pursuant to the Endangered Species Act, formal consultation was completed with the Fish and Wildlife Service on this Proposed Action. It is included in the Fish and Wildlife Service Biological Opinion "Formal and informal consultation on Fiscal Year 2002 routine habitat modification projects within the Willamette Province [FWS reference 1-7-02-F-200]" issued on May 6, 2002.

In 1992, the project area was surveyed for cultural resources in conjunction with the Laurel Top Thinning. No cultural resources were found. The State Historic Preservation Office (SHPO) was notified of a harvest proposal in this section (Laurel Top Thinning) and determined, in accordance with 36 CFR 800.5(b), that the proposed undertaking would have no effect on cultural resources.

C. PUBLIC PARTICIPATION

A public notice advertising the availability of this EA and preliminary FONSI was published in the Eugene Register-Guard on June 26, 2002. Additionally, the environmental assessment was sent to eight groups or businesses, six state or local government agencies, and 11 individuals. A 30-day public comment period for the EA ended on July 26, 2002. One comment letter was received from the Oregon Natural Resources Council (ONRC). The paragraphs below summarize specific comments of ONRC and the response to their comments.

Comment: The age of the stand was not readily apparent from the EA. In the future, it'd be really useful to know the age of the stand, stand history, and if there are any residual old-growth trees remaining.

Response: Stand age and history are summarized on page 7 of the EA.

Comment: It is unfortunate that you have to build almost a mile of new road. As you know, BLM lands are already heavily roaded and roads are a significant source of environmental degradation. The EA describes nearby roads with deep ruts caused by 4WD vehicles. We do not want to see new roads created that will only encourage expansion of this inappropriate activity.

Response: The new temporary roads that would be constructed under the Proposed Action are not connected to the roads referenced in the comment. The new temporary roads would be subsoiled and blocked upon completion of the project (EA page 4).

Comment: It would be good to develop and choose an alternative that uses helicopters or other means to accomplish the yarding in areas inaccessible from existing roads.

Response: See Alternative 4. This alternative still would require some road building in order to access suitable terrain for helicopter landing sites.

Comment: Maybe some areas could be thinned without removing the trees so that the density management gets done but not the roading and timber extraction.

Response: One of the stated purposes of the action is to provide timber products (EA, page 1), so thinning an area and not removing the trees would not accomplish the purpose of the action. In addition, because of the size of the trees, leaving sufficient number of trees on the ground to accomplish the purpose of the thinning would create a fire and bark beetle hazard.

Comment: Please protect significant snags by leaving no-entry buffers around them.

Response: Large snags are mostly absent from the harvest area (EA, page 7). Logging contracts specify that snags not be cut unless they present a danger to woods workers. Any snag that is felled would be left on-site as coarse woody debris.

Comment: The EA did not describe the specific management for areas near known Red tree vole nests. Will there be no-cut buffers? If not, what is the rationale and is it back-up by science?

Response: Habitat areas for red tree voles were delineated around active nests and inactive nests within 300 feet of an active nest, in conformance with the "Management Recommendations for the Oregon Red Tree Vole, version 2.0" (USDI 2000). Habitat areas are intended to provide for protection of the physical integrity of the nest and retain adequate habitat for the expansion of the number of active nests at that site. As such, habitat areas are excluded from any timber harvest.

IX. REFERENCES

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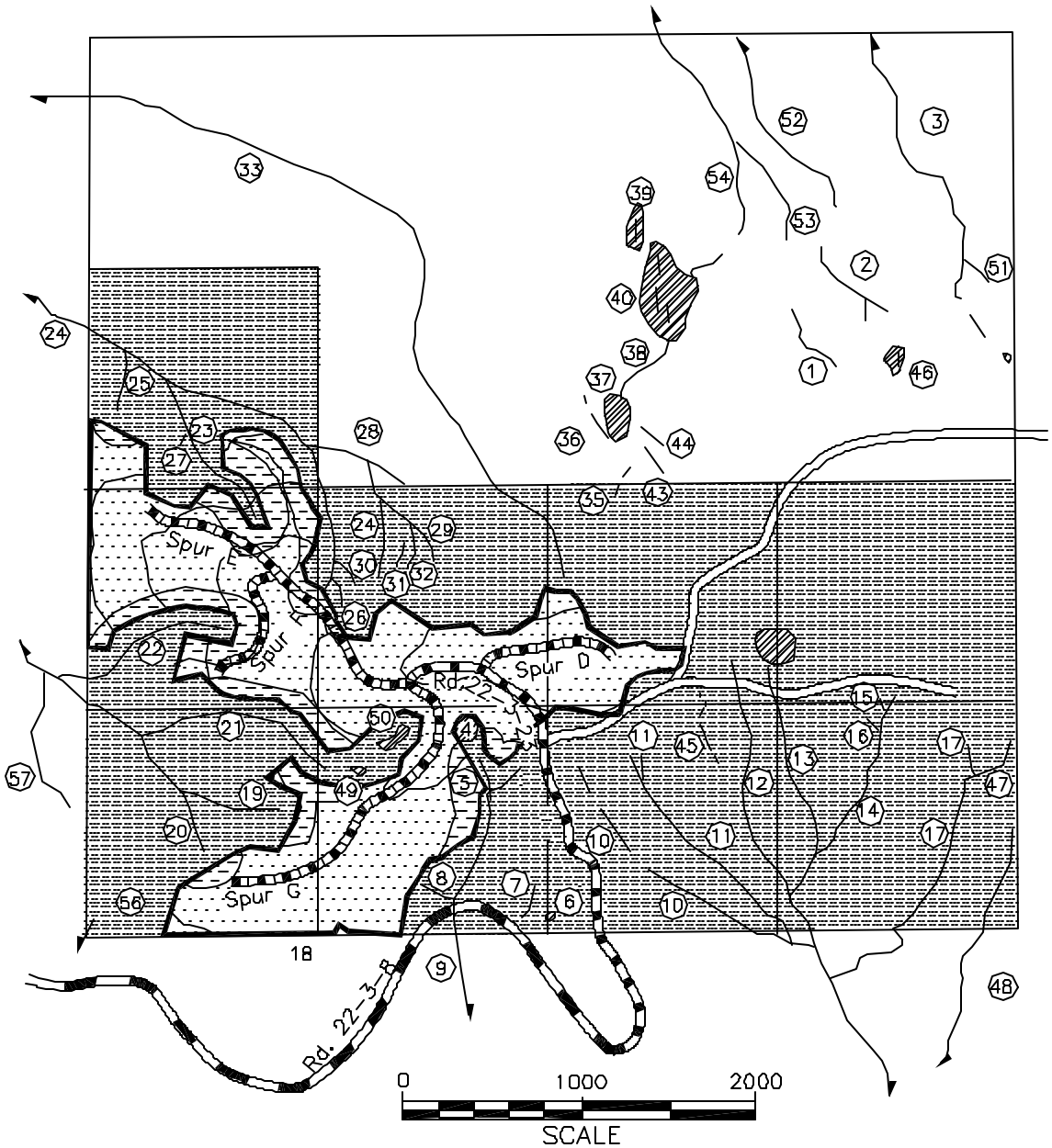
BUREAU OF LAND MANAGEMENT

PROJECT AREA PLANNING MAP

LAUREL CURVES

Alternative 1 – Proposed Action

T. 22 S., R. 3 W., Section 23



LEGEND

- DENSITY MANAGEMENT MATRIX
- DENSITY MANAGEMENT RIPARIAN RESERVE
- RESERVE AREA
- WETLAND
- ROCKED ROAD
- DIRT ROAD
- ROAD TO BE CONSTRUCTED
- ROAD TO BE RENOVATED
- STREAM

DATE: 6/3/02

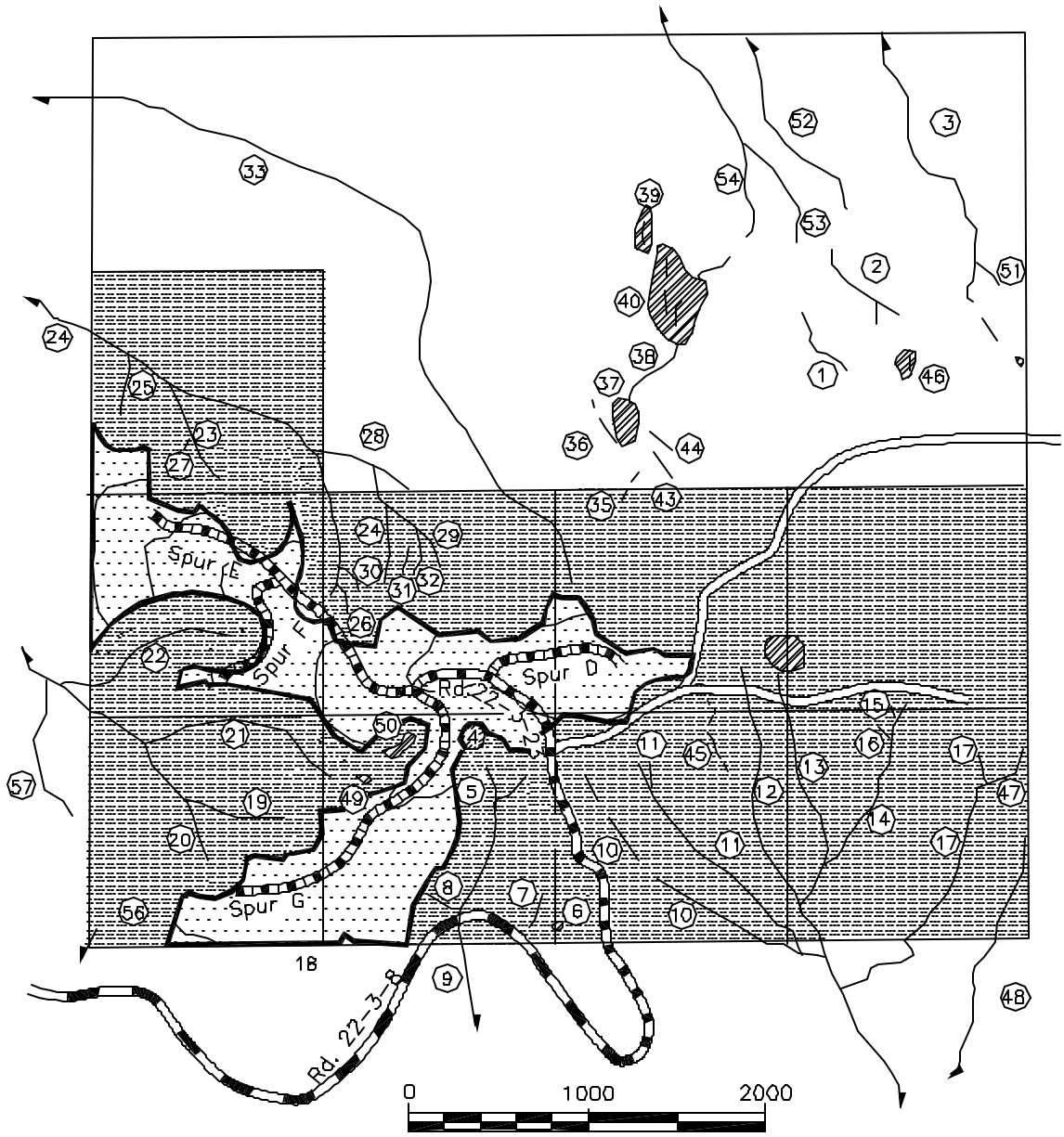
BUREAU OF LAND MANAGEMENT

PROJECT AREA PLANNING MAP

LAUREL CURVES

Alternative 2

T. 22 S., R. 3 W., Section 23



LEGEND

- DENSITY MANAGEMENT MATRIX
- RESERVE AREA
- WETLAND
- ROCKED ROAD
- DIRT ROAD
- ROAD TO BE CONSTRUCTED
- ROAD TO BE RENOVATED
- STREAM

DATE: 6/3/02

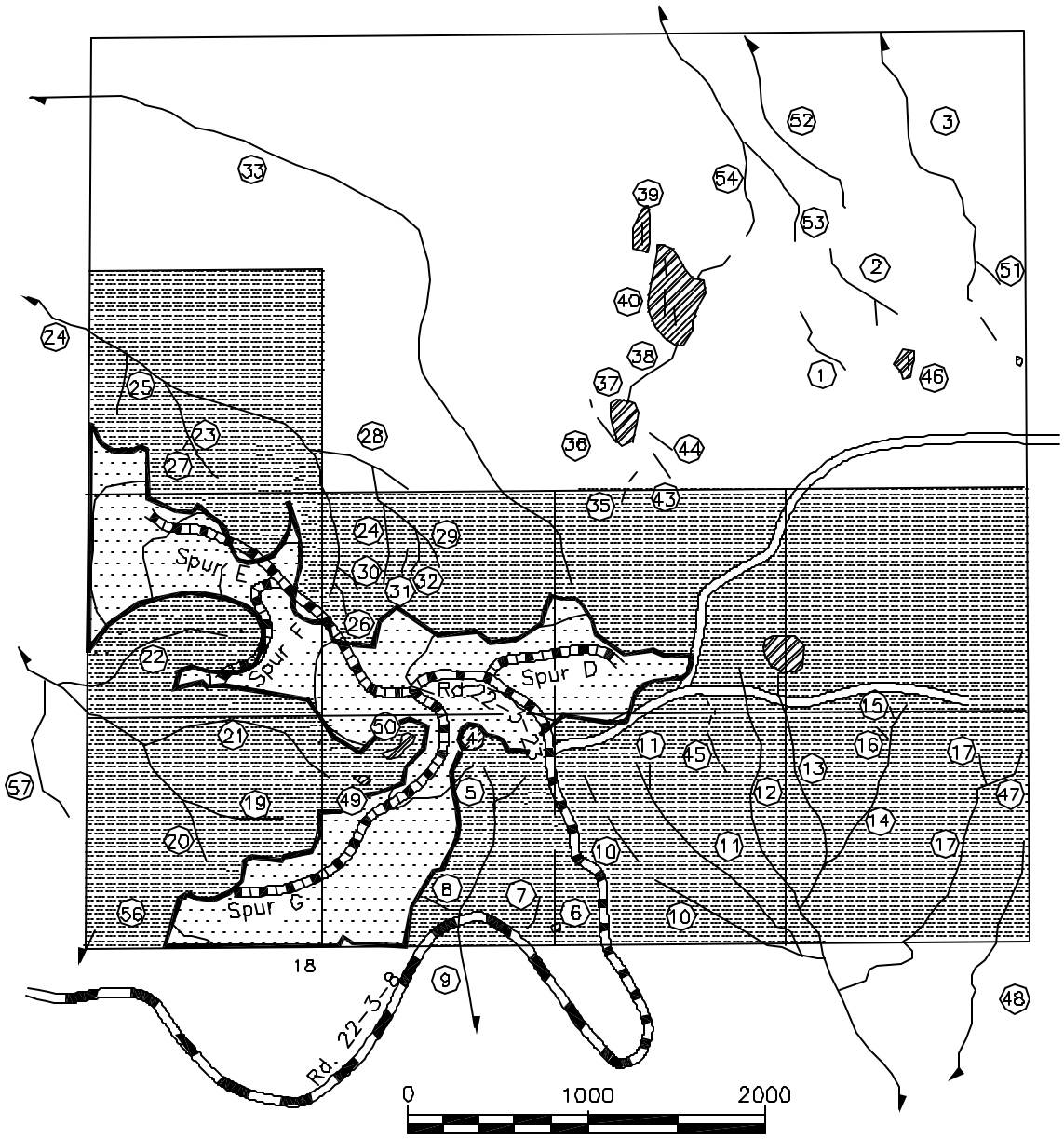
BUREAU OF LAND MANAGEMENT

PROJECT AREA PLANNING MAP

LAUREL CURVES

Alternative 3

T. 22 S., R. 3 W., Section 23



LEGEND

- REGENERATION HARVEST MATRIX
- RESERVE AREA
- WETLAND
- ROCKED ROAD
- DIRT ROAD
- ROAD TO BE CONSTRUCTED
- ROAD TO BE RENOVATED
- STREAM

DATE: 6/3/02

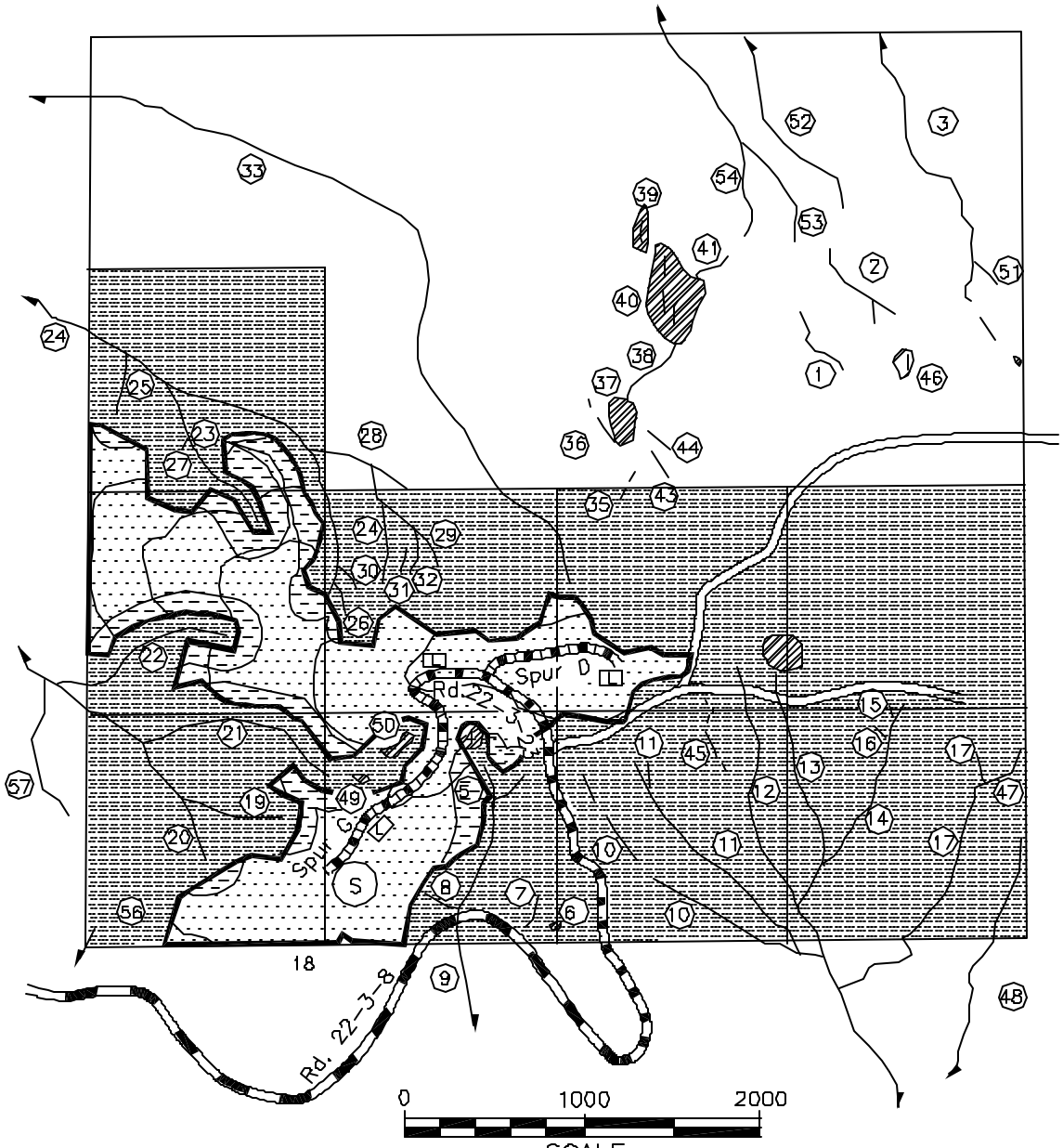
BUREAU OF LAND MANAGEMENT

PROJECT AREA PLANNING MAP

LAUREL CURVES

Alternative 4

T. 22 S., R. 3 W., Section 23



SCALE

LEGEND

- DENSITY MANAGEMENT MATRIX
- DENSITY MANAGEMENT RIPARIAN RESERVE
- RESERVE AREA
- WETLAND
- (S) APPROXIMATE LOCATION OF SERVICE LANDING
- ROCKED ROAD
- DIRT ROAD
- ROAD TO BE CONSTRUCTED
- ROAD TO BE RENOVATED
- STREAM
- APPROXIMATE LOCATION OF LOG LANDING

DATE: 6/3/02

ENVIRONMENTAL ASSESSMENT NO. OR090-02-16

Laurel Curves
Timber Sale Tract No. E-02-351

Prepared by
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Forester

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United States
Department of the Interior
Bureau of Land Management
Eugene District Office
South Valley Resource Area