Shively Creek LSR Density Management

South River Field Office
Roseburg District
Bureau of Land Management

Environmental Assessment No. OR-105-04-02

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Chapter 1
PURPOSE AND NEED FOR ACTION

This chapter provides a brief description of the purpose and need for the proposed action being analyzed in this environmental assessment.

I. Background

In southwest Oregon, wildfires of varying intensity and frequency have occurred through time, resulting in the development of old-growth forests of mixed-age vegetation and a mosaic of spatial arrangement that supports a variety species dependent on late-successional forest habitat species. Late-Successional Reserves (LSRs) were established under the Northwest Forest Plan to support these species.

Management direction for LSRs was incorporated into the Roseburg District, Bureau of Land Management (BLM) *Record of Decision and Resource Management Plan* (USDI, BLM 1995 (ROD/RMP)). The ROD/RMP (p. 29) directs that LSRs are to be managed to "Protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest related species . . ."

Additional direction is contained in the South Umpqua River/Galesville LSR Assessment prepared jointly by the Roseburg and Medford Districts, BLM and the Tiller Ranger District, Umpqua National Forest (USDA, USDI 1999). The LSRA has been reviewed by the Regional Ecosystem Office (REO) which determined that it provides a sufficient framework and context for making decisions on projects and activities within the LSR. The implementation of proposed silviculture activities, as described in the LSRA that incorporate REO exemption criteria, do not require further project-level review by the REO.

II. Purpose

The South River Field Office of the Roseburg District, BLM, proposes application of a variety of density management treatments to approximately 220 acres of mid-seral stands within the South Umpqua River/Galesville LSR. The purpose of this analysis is to assess the environmental consequences of applying the proposed treatments.

Potential units have been identified in Sections 11, 12, 15 and 23, T. 31 S., R. 4 W., W.M. and Section 7, T. 31 S., R. 3 W., W.M. (See Appendix A). These units are primarily located in the Shively Creek subwatershed of the South Umpqua River Watershed. Approximately 10-15 percent of the project area is in the Upper Cow Creek Watershed on the Glendale Resource Area of the Medford District, BLM.

The South Umpqua River Watershed Analysis and Water Quality Restoration Plan (USDI, BLM 2001 p. 95) notes that there are approximately 3,700 acres of mid-seral stands, 30-80-years of age that are allocated as LSR. Management recommendations pertaining to the Upper Cow Creek portion of the project area are contained in the Upper Cow Creek Watershed Analysis (USDI, BLM 1994 p. 45).

The objective of the project would be the enhancement of wildlife habitat by application of silvicultural treatments to manipulate current stand densities. The intent would be to create conditions that place the stands on a growth trajectory that would meet LSRA objectives for late-successional habitat conditions. Among those objectives are:

- A diversity of both hardwood and conifer tree species and canopy gaps that allow germination and establishment of an understory growth of shrubs and multiple canopy layers in the overstory.
- Accelerating the growth of larger trees that will provide nesting and roosting opportunities for the northern spotted owl
- Creation of snags and accumulation of at least 8 percent coverage of coarse wood on the forest floor.

The ROD/RMP (p. 29) states that the Roseburg District will "If needed to create and maintain late-successional forest conditions, conduct thinning operations in forest stands up to 80 years of age. This will be accomplished by precommercial or commercial thinning of stands regardless of origin (e.g., planted after logging or naturally regenerated after fire or blowdown)."

This environmental assessment will serve to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI). It will consider the short and long term environmental consequences of the proposed action and no action alternatives at the project and sixth-field analytical watershed levels.

III. Need for the Proposed Action

There is a need for the project in order to meet direction for active management of the LSRs contained in the ROD/RMP, and desired future habitat conditions described in the LSRA.

The project stands are 35-55 years old. They are generally single-storied and dominated by Douglas-fir with 240-315 trees per acre, in general. Minor conifer species (grand fir, incense-cedar, etc.) and hardwood species (Pacific madrone, golden chinkapin, etc.) are few in numbers. Canopy closure exceeds 70 percent in all cases, approaching 100 percent in some instances. Snags are few in numbers. The coverage of coarse woody material, also referred to as down woody debris, is between 2 and 7 percent.

At present, 43 percent of Federally-managed stands within the LSR provide late-successional forest habitat. There is a need to protect existing late-successional and habitat and accelerate the development of additional habitat of this type to meet the objective of developing and managing 75 percent of Federal forest lands in the LSR as late-successional and old-growth forest. In conjunction with this effort, there is a need to:

- Maintain and enhance habitat connectivity, particularly in the area of checkerboard ownership on the north side of the LSR, to provide dispersal pathways for plant and animal species between this LSR, block Forest Service ownership to the east, and the South Coast-Northern Klamath LSR to the west.
- Enhance habitat conditions surrounding spotted owl activity centers.
- Promote the establishment, development and maintenance of large blocks of late-successional habitat.

Implementation of the proposed action would conform to management direction contained in the ROD/RMP, as amended by the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA, USDI 2001 p. 3).

Management direction from the ROD/RMP incorporates the standards and guidelines of the *Record of Decision for Amendments* (ROD) *to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA, USDI 1994b), otherwise known as the Northwest Forest Plan.

The ROD/RMP incorporates the analysis contained in the PRMP/EIS which incorporates the analysis of environmental consequences contained in the *Final Supplemental Environmental Impact Statement* (FSEIS) *on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl* (USDA, USDI 1994a).

Chapter 2
DISCUSSION OF ALTERNATIVES

This chapter describes the basic features of the alternatives being analyzed in this environmental assessment

I. Alternative One – No Action

Under this alternative, there would be no managed reduction of current stem densities in the candidate stands. They would in their present condition as dense, closed-canopy forest and continue to develop along current growth trajectories unless altered by a natural disturbance.

There would be no temporary road construction. Opportunities to improve watershed conditions by renovating and upgrading primary system roads, closing roads not required for short term management purposes, and decommissioning roads not needed for long-term management objectives would not be pursued at this time. These actions would require separate analyses at a future point in time and accomplishment under separate authorizations.

II. Alternative Two – Proposed Action

The development of late-successional and old-growth forests characteristic of southwest Oregon were largely the result of frequent fires of varying intensities. These included both natural fires and those set by indigenous peoples for the purpose of managing vegetative conditions to meet their needs. Today, there are limits to the extent in which fire may be used as a management tool for manipulating vegetative conditions, because of concerns over potential impacts to existing suitable habitat, adjoining private property and air quality.

Mechanical treatment represents the most effective method available for managing vegetation in a manner that would lead to the development of late-successional and old-growth forest habitat and provide for the desired future conditions of habitat for the northern spotted owl.

A. *Treatments*

The proposed action would apply a variety of density management treatments to mid-seral stands in the project area. Treatments would be designed to mimic natural disturbances that would move stand development toward the "desired future conditions" described in the South Umpqua River/Galesville LSRA (p. 44). The objectives that apply to upland areas, including the creation of snags and down wood, would be applicable to treated portions riparian areas, as well.

Five different treatments would be applied, with interspersed areas left untreated. Treatments would be varied within individual units and across the project area to accentuate landscape diversity and break up the homogeneity of current patterns.

Three of the treatments, based on variable spacing prescriptions, would be commercial in nature as they would involve physical removal of the timber cut. These treatments would be applied to an estimated 134 acres (units A-F), or 64 percent of the acreage proposed for treatment.

The commercial treatments would consist of light, moderate and heavy thinning. Light thinnings would retain approximately 90-100 trees per acre, while moderate thinnings would reduce stem density to between 60 and 80 trees per acre. Heavy thinning, on a broad spacing, would reduce tree density to approximately 50 trees per acre and would constitute less than 10 percent of the acres treated.

Non-commercial treatments which would consist of girdling and creation of down wood and snags would be implemented under separate service contracts. Conifers less than 8 inches in diameter at breast eight (dbh) would be girdled in overstocked and stagnated stands. Another treatment would involve felling and/or girdling of larger trees to provide snags and create coarse woody debris and snags. These treatments would be applied to an estimated 77 acres or 36 percent of the acreage proposed for treatment.

Table 1 provides a summary of the proposed action by treatment type and acres.

Table -1 Description of the Proposed Project
(All acreages are approximate)

Unit	No Treatment	Light Thin (90-100 TPA)	Moderate Thin (60-80 TPA)	Heavy Thin (~ 50 TPA)	Girdling	Snags/ Down Wood	Total
A	6	8	10	3	-	-	27
B	-	-	13	-	-	-	13
C	2	6	3	3	-	-	14
D	-	14	34	-	-	-	48
E	-	-	22	-	2	-	24
F	1	6	12	3	-	-	22
G	-	-	-	-	13	-	13
H	-	-	-	-	19	-	19
I	-	-	-	-	-	9	9
J	-	-	-	-		31	31
Total	9	34	94	9	65	9	220

B. *Criteria Common to All Treatments*

The following criteria would be applied consistently across all of the proposed treatments. All trees 20 inches or greater dbh would be retained. Any large remnant trees would be retained. Thinning would not be based on even spacing of leave trees, but would be variable in application to create gaps and clumps.

Sound hardwood and conifer snags would be retained and protected to the greatest degree practicable. This would be accomplished by marking rub trees around the snag(s) or by enclosing them in untreated areas. Where snag retention would pose an unacceptable safety risk or conflict with project objectives, snags would be cut and retained on site as coarse woody debris. Existing large woody debris in Decay Classes 3, 4 and 5 would be retained under contract provisions.

The selection of trees for retention would not be based solely on the retention of the healthiest best formed trees. A percentage of the trees selected for retention would be defective or have broken and deformed tops which could provide future roosting and nesting structure. Hardwoods selected for retention would generally be greater than 10 inches dbh and exhibit a reasonable likelihood of surviving the thinning operation. Minor conifer species (less common or numerous) would also be favored for retention to maintain them as stand components.

C. *Riparian Treatments*

Density management treatments would occur within selected riparian areas. The specific objectives that apply to upland areas, including creation of snags and wood debris, would also apply in these areas. Variable width, "no harvest" buffers would be established within the riparian areas selected for treatment to protect stream bank integrity, stream shading, and filter out any potential sediment in overland run-off. Trees would be felled away from these buffers.

"No-harvest" buffers would be a minimum of 20 feet in width on intermittent streams. This width would be increased on perennial and fish-bearing streams, subject to an assessment by fisheries and hydrology personnel, in consideration of adjacent topography, the condition of stream-side vegetation, proximity to fish habitation and Essential Fish Habitat, and susceptibility of individual streams to solar heating.

D. *Yarding Operations and Seasonal Restrictions*

Yarding of areas to be commercially treated would utilize a combination of ground-based and cable yarding systems.

The use of the ground-based equipment would be limited to the dry season. The dry season typically extends from mid-May to mid-October when the onset of autumn rains generally occurs. If late-spring and early summer weather is unusually wet, ground-based operations would be delayed until soil moisture is low enough to resist compaction.

If autumn weather conditions remain dry, the operating season could be extended to a provisional waiver. Under no circumstances would ground-based equipment be allowed to operate within the "no-harvest" buffers in order to prevent soil disturbance in close proximity to streams.

Cable yarding equipment would be capable of maintaining a minimum of one-end log suspension in order to reduce soil disturbance. Lateral yarding capability of at least 100 feet would be required so that yarding corridors would be spaced at intervals of 200 feet, whenever practicable. Corridors would be pre-designated and approved by the contract administrator. This would reduce the number of yarding corridors required and reduce the number of reserved trees cut to clear yarding roads and landing areas, as well as limit the area subject to potential surface disturbance. Where practical, trees cut to clear corridors would be replaced by reservation of trees otherwise intended for cutting. In the event that trees require cutting within the "no-harvest" buffers to clear yarding corridors, they would be felled toward the stream and retained for large woody debris.

To prevent damage to residual trees, no felling or yarding would take place between April 15 and July 15, during the bark slip period. The bark slip period is that time of the year when active cambial growth can result in the bark being loosely attached and at greater risk of mechanical damage. Circumstances may exist, however, where it would be practical to waive this restriction, such as in the use of harvesters and forwarders which are capable of severing trees and setting them aside without damaging adjoining trees. Table 2 displays the approximate percentages of yarding methods and seasonal operating restrictions by individual unit.

Table 2 - Yarding Methods/Seasonal Restrictions

Unit	Acres	Yarding Method by Percentage of Unit		Operations Restricted to the Dry Season	
		Ground-Based	Cable	Yes	No
A	27	---	100	---	X
B	13	---	100	X	---
C	14	---	100	---	X
D	48	30	70	X	---
E	24	10	90	X	---
F	22	---	100	X	---
G	13	---	---	---	X
H	19	---	---	---	X
I	9	---	---	---	X
J	31	---	---	---	X
Total	220				

E. *Access*

Access would be provided by existing roads and construction of approximately 0.9 miles of temporary roads. Temporary roads would be located on stable ridge-top or side-slope locations, removed from proximity to streams.

The intent would be to construct, use and decommission the temporary roads in the same operating season. If the roads could not be utilized in that time frame because of events such as extended fire closure, they would be winterized, at the BLM's discretion, and held over for use the following year. Winterizing would involve applying mulch or other erosion control measures, and blocking the road(s) to vehicular access during the wet season. In either event, the intent would be to decommission the roads upon completion of use, rather than retain them as a part of the permanent transportation system.

Approximately 1.73 miles of roads would be renovated as described in Table 3 below. Closure of approximately 1.53 miles of roads is proposed upon completion of density management.

Table 3 – Proposed Road Renovation/Closure

Road #	Current Surfacing	Length (Miles)	Post-Use Treatment
31-4-11.2	Aggregate	0.20	---
31-4-1.2	Natural	0.74	Close with gate
31-4-11.1	Natural	0.79	Close with gate

F. *Evaluating Achievement of Coarse Wood and Snag Objectives*

The potential need for additional trees to meet snag and coarse wood needs has been factored into the marking prescriptions. On average, an additional ten trees per acre would be designated for retention.

Transects would be conducted following the first winter after density management treatments were completed, in order to monitor levels of coarse wood and numbers of snags. In the event of deficits, trees from among those reserved would be felled or girdled to meet the appropriate objectives. Felling and/or girdling would be accomplished under a service contract or by qualified District personnel.

III. Alternatives Considered but Eliminated From Detailed Study

The following alternatives to the proposed action were considered. These alternatives were previously considered by the Interdisciplinary Team or proposed by members of the public, but were found to be unacceptable as described below.

A. No Removal of Material

Retention on site of all timber designated for cutting was suggested as an alternative to the yarding and removal of merchantable timber cut in the process of conducting density management. Girdled trees would provide a small-diameter snag component in the short term before falling over and becoming coarse woody material. Retention on site of cut trees for density management in Units A-F was not considered viable because of the following risks.

Insect Risk

Research indicates that the risk of Douglas-fir beetle infestation increases when three or more trees per acre greater than 12 inches dbh are killed in a single year, though beetles have also been found to utilize trees as small as 8 inches dbh. Felled or girdled trees in full or partial shade would provide prime brood habitat for beetles. Newly hatched generations could then infest and damage, or kill other trees in treated or adjoining stands (Goheen 1996)

Beetle outbreaks generally persist for four years, during which time beetles typically attack the larger trees in a stand. In an outbreak it may be expected that, on average, four live trees would be attacked and killed for every 10 felled or girdled trees. If beetle populations are large, all trees may be killed in pockets up to 2 acres in size. Douglas-fir beetles are strong fliers and 10-20 percent of the time will migrate and infest other stands at distances of 5 miles or more from where they hatched (Goheen 2001).

To achieve the desired stand characteristics for these units, the number of trees which would require cutting would greatly exceed three trees per acre. According to Organon growth models (Hann, et. al. 1999), for the areas proposed for the light thinning treatments an average of 23 trees per acre 12-16 inches dbh would be left on the ground. For the moderate and heavy thinning treatments, and average of 46 – 63 trees per acre 12-16 inches in dbh would be left.

According to the data presented above, leaving this many trees on site in one year would pose an unacceptable risk to other forest stands managed by Federal agencies, private timber companies, and individual property owners. It would also be inconsistent with management objectives for the protection of existing late-successional and old-growth forest habitat within the LSR.

Fire Risk

If all of the trees felled were retained on-site, surface fuel loadings would be increased by 30 to 68 tons/acre depending on whether the treatment was light, moderate or heavy (Fire Program Solutions/Acacia Services, 2003). Fuels greater than 3 inches in diameter would constitute approximately 72 – 78 percent of the surface fuel increases.

Fine fuels less than ¼ inches in diameter have the greatest influence on a fires rate of spread, represent the means by which larger fuels are ignited, but constitute only 10-15 percent of the estimated fuel increases. The increased risk posed by increased fine fuels

resulting form thinning is considered a short-term risk. Needles are cast from the slash and the small diameter debris decays rapidly within 1-3 years after the completion of individual thinning treatments.

Fuels greater than 3 inches in diameter are characterized as large fuels. Large fuels persist upwards of 15 years. The larger the diameter, the longer the fuels persist. They contribute primarily to increased fire intensity, duration and severity. The 20-50 ton/acre increases in large fuels that would occur if felled and left on site would create a long-term increased risk that any fire could result in complete stand replacement.

For light to heavy thinning treatments, approximately 9 to 11 tons/acre of surface fuels (slash, branches) would be left on the forest floor if the merchantable timber was removed. Under these conditions, a surface fire would grow to 3-4 acre in approximately one hour, with little tree mortality. In a light thinning treatment, leaving the cut trees would result in an increase of fuels to approximately 30 tons/acre. Under these conditions a surface fire could burn approximately 8 acres in one hour. Tree mortality of 75 -100 percent from crown scorch would also result.

For the heavy thinning treatments, approximately 56 tons/acre of fuels would remain on the forest floor if cut trees were not removed. A surface fire in this amount of fuel could consume 42 acres in one hour, and result in up to 100 percent crown scorch and tree mortality within the fire perimeter.

The South Umpqua River/Galesville LSR is located in an area noted for its short fire-return intervals. As illustrated in recent years, wildfires in the area may be severe, especially during prolonged drought and in the presence of abnormally high levels of available fuels. Retention of all cut material would create an increased risk of fire that would not be consistent with stated LSRA objectives to manage mid-seral forest stands for the development of late-successional habitat characteristics, while protecting late-successional habitat that already exists.

B. Staggered Cutting

Staggered cutting was also considered as a means of achieving the desired stand densities. A portion of the trees requiring cutting would be felled or girdled each year, until the desired stand density was achieved. This alternative was also deemed impractical, for the following reasons.

Bark beetles infestation would remain a concern unless three or fewer trees per acre in the 12-to-20 inch dbh classes were cut each year. The first treatment would treat trees less than 12 inches dbh in the same way as the proposed action. Initial treatments would need to be applied around hardwoods to prevent suppression mortality and maintain hardwood presence in the stands. Subsequent treatments would treat 12 to 20 inch diameter conifers only. Based on the number of 12-16 inch dbh trees identified previously, it would take 15 – 20 years to reduce stand density. These staggered treatments would not reduce Relative Density Index (RDI) below a level of 0.50.

RDI compares the current density of a stand with the theoretical maximum. For a given average stand diameter, there is a maximum number of trees per acre that can exist on the site, or in another perspective, for a given number of trees per acre there is a maximum average size that these trees can reach. This value varies by species and has been given the term maximum stand density index. It is an indicator for determining whether a stand is growing well, is in need of thinning, can support an understory, or is experiencing mortality suppression.

An RDI of approximately 0.50 would not allow sufficient light to reach the forest floor for establishment and growth of an understory. After an initial decrease in canopy closure, tree crowns would fill the openings in a few years, returning closure to near 100 percent, where it would remain until a subsequent disturbance. Residual trees would be released slowly and crowns would continue to recede. This would not achieve LSR objectives for understory development and a stratified, multi-layered forest canopy.

C. Removal of Trees Cut in Units G and H

Removal of material from units G and H was deemed impractical due to the nature and history of the stands. Units G and H consist of mid-seral, densely stocked, Douglas-fir dominated stands where no previous management has occurred. Though no stand exams were performed, general surveys determined that these are suppressed, stagnated stands that consist primarily of Douglas-fir 4-9 inches dbh with an average stocking of 500 - 600 trees per acre. A girdling treatment for both G and H is proposed.

The low average tree diameter of these units enables the proposed treatment to reduce the relative densities to below 0.50 without girdling larger trees (> 8" dbh) and increasing the likelihood of bark beetle infestations. Due to the dense stocking of these stands, falling and removing trees would be difficult and potentially damage remaining conifers and hardwoods.

Conifers less than 8 inches dbh would be girdled to provide additional growing space for the selected leave and reserve trees. All conifers over 8 inches dbh would be reserved from treatment. Unit G has several Pacific madrone over 8 inches dbh. Girdling the surrounding conifers would release these hardwoods. The treatments proposed to units G and H would be implemented through a service contract and will be addressed in a Categorical Exclusion. No further discussion of this treatment will be addressed in this Environmental Assessment.

IV. Resources that Would Remain Unaffected by Either Alternative

The following resource would not be affected by either of the alternatives, because they are absent from the project area: Areas of Critical Environmental Concern (ACEC); prime or unique farmlands; floodplains; and Wild and Scenic Rivers.

No Native American religious concerns, environmental justice issues, cultural resources, or solid or hazardous waste concerns were identified. No effect on the introduction or rate of spread of noxious weeds would be anticipated, and discussed in Chapter 3 of this document. No energy facilities or resources are present which would be affected.

Chapter 3
AFFECTED ENVIRONMENT

This chapter summarizes the specific resources present or with the potential to be present within the project area, and that could be affected by the proposed action.

I. Vegetation/Habitat

As described and illustrated in the LSRA (pp. 14, 15 & 17), the areas proposed for treatments are located within the Western hemlock and cool/Douglas-fir/Hemlock zones. Douglas-fir is the dominant conifer species in all proposed treatment units. Other conifers include incense-cedar, western redcedar, western hemlock, and grand fir. The project area is outside the range of Port-Orford-cedar.

Previous silvicultural treatments applied to Units A-F and I-J were designed to optimize coniferous wood production. The treatments created nearly uniform stands, in which there has been a marked reduction in species diversity and spatial distribution of vegetation. Because of past management, hardwoods are few, consisting of Pacific madrone, golden chinkapin, red alder and bigleaf maple.

At present, canopy closure is approaching 80-100 percent in all units. As a consequence the remaining hardwoods are being overtopped and suppressed by conifers and dying out. In general, the crown ratios of conifers are still above 30 percent, a level important for maintaining or increasing stand health and vigor.

At a relative density above 0.55, competition among trees results in suppression mortality and a reduction in vigor (Drew and Flewelling 1979). Stand densities are presently near or above this level. Canopies are closed with little ground cover and little opportunity for development of a shrub layer or understory regeneration.

In all units, current downed wood and snag components do not meet the desired stand level criteria described in the LSRA (p. 50) for these vegetation zones. The amount of coarse woody material in the stands is estimated between 2 and 7 percent cover. The desired level for Coarse Woody Material (CWM) for the vegetation zones covering the project area would be 8 percent cover of down logs, including 4 pieces greater than 24 inches in diameter and 50 feet long.

Stand exams were conducted in units A-F and I-J. This information was modeled and used to describe current stand conditions. Organon version 6.0, for Southwest Oregon was used to model present stand conditions and project changes in stand structure and composition that would be expected to occur over time. Current stand conditions for units A-F and I-J are displayed in Table 4.

Table 4 – Summary of Current Stand Conditions

Unit	Stand Age	Hardwoods per Acre	Conifers per Acre	Stand Basal Area (sq. ft.)	QMD in inches	Percent Canopy Closure	Percent Live Crown	Relative Density Index
A	41	<1	268	156	10.3	73	36	0.53
B	39	<1	243	182	11.7	79	44	0.59
C	38	<1	317	172	10.0	80	42	0.60
D	36	<1	233	172	11.6	76	41	0.06
E	54	<1	315	257	12.2	100	36	0.82
F	55	40	134	188	14.1	77	42	0.57
I	55	4	234	212	12.9	86	36	0.66
J	39	<1	243	182	11.7	79	44	0.59

QMD – Quadratic Mean Diameter

For the purpose of visual modeling, Unit E was selected as generally representative of stand conditions. Stand exam data was modeled using Organon version 6.0, for Southwest Oregon and has been depicted (Figure 1) using Stand Visualization System version 3.31 (SVS).

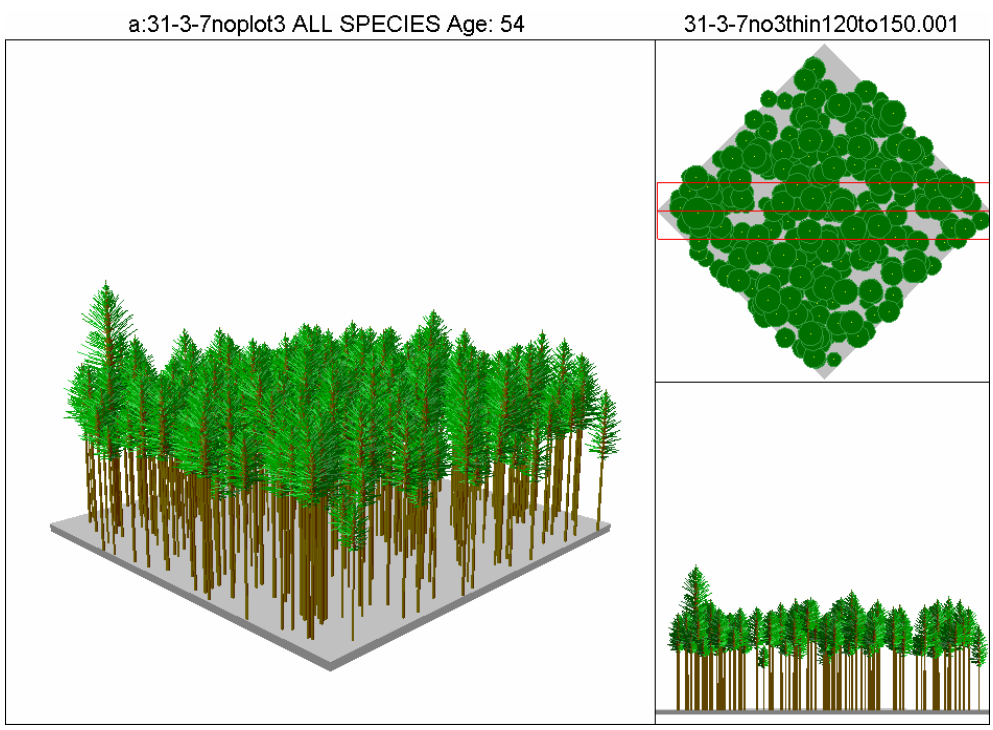


Figure 1 Representation of the existing conditions for units A-F

II. Wildlife

A. Special Status Species

Special status species are: listed as threatened or endangered under the Endangered Species Act of 1973, as amended; candidates or species proposed for listing under the Act; or designated as Bureau Sensitive or Bureau Assessment species. Bureau Sensitive species are eligible for Federal or state listing, or candidate status under BLM 6840 policy. Bureau Assessment species are designated under Oregon/Washington BLM 6840 policy. Assessment species are not presently eligible for listing or candidate status, but are of State concern and may require protection or mitigation in the application of BLM management activities.

1. Threatened and Endangered Species

The following species are known to inhabit lands managed by the Roseburg District: the Federally-threatened bald eagle (*Haliaeetus leucocephalus*), marbled murrelet (*Brachyramphus marmoratus*), and northern spotted owl (*Strix occidentalis caurina*).

Annual surveys from 1977 to present (Isaacs and Anthony 2002) have not located any nesting bald eagles within the South River Resource Area. Two bald eagle nest sites have been located in the Medford District, 1 mile or more from Unit D. Unit D is approximately 1 mile from the Galesville Reservoir, but does not contain trees suitable for nesting or roosting. Bald eagles would not be expected in the project areas, nor affected by the proposed density management treatments. As a consequence, no further discussion of the eagle is necessary in this analysis.

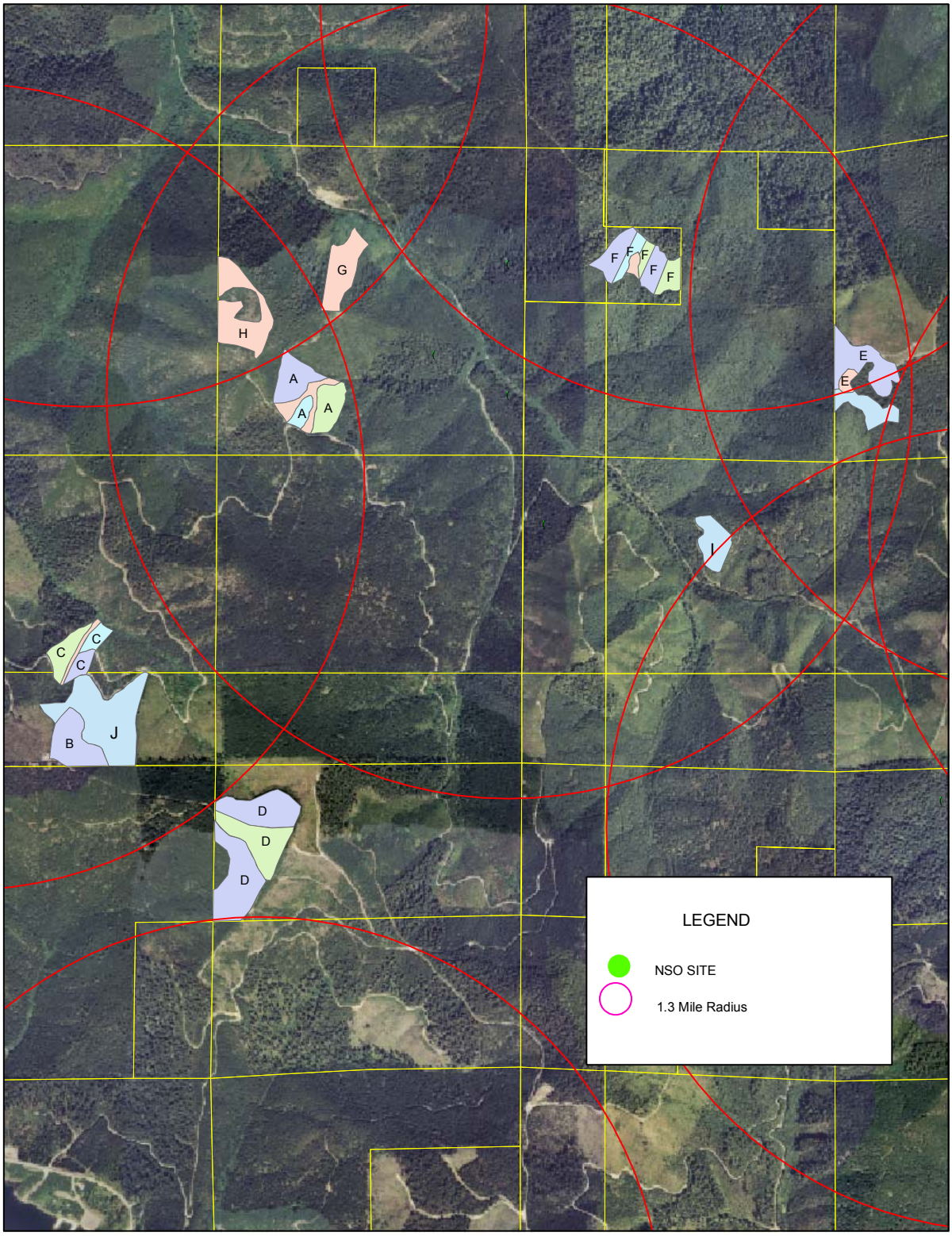
The Shively Creek Density Management project is located beyond the 35-50 mile Murrelet Management Zone. As a consequence, there will be no further discussion regarding the murrelet in this analysis.

<u>Northern Spotted Owl</u>

The median home range for the northern spotted owl in the Klamath Province is 3,340 acres (USDI, BLM 1990). This is generally represented by a circle, 1.3 miles in radius and centered on the nest site or activity center. There are 8 home ranges that overlap portions of the project areas. Seven of these sites are located within the Roseburg District and one within the Medford District. All eight of the home ranges were occupied during the 2002 and 2003 season

Map 1 illustrates the spatial arrangement of the home ranges and the project area.

MAP 1 - Shively Creek LSR Density Management Area



Suitable nesting, roosting and foraging habitat, also referred to as "habitat 1", is generally characterized by mature forest stands containing large conifers with broken and unbroken limbs of large diameter, bole or crown deformities, and large broken tops or cavities capable of providing nesting sites (Forsman 1984; Hershey 1995; Forsman and Giese 1997). On the Roseburg District, this type of habitat is typically represented by native forest stands greater than 120-years-old.

Habitat that provides for foraging and roosting, but few nesting opportunities is referred to as "suitable habitat 2". It is generally characterized by native forest 80-120 years old that has the potential to become "habitat 1" in the future.

"Habitat 3" is land capable of supporting forest that will become habitat 1 or 2 in the future but presently supports forest stands less than 80 years old. Within this category, lands supporting stands 40-80 years of age typically provide habitat for foraging and movement of spotted owls across the landscape. All of the units proposed for treatment are in this habitat category.

Across the northern side of the LSR is an area that has been identified as a particular concern because of its function as a connectivity corridor. With the exception of unit D, all of the proposed Shively Creek LSR Density Management units are located within this corridor.

A summary of the current condition of habitat on BLM-administered lands, for each of the eight owl sites is provided Table 5.

Table 5 - Habitat Summary for Spotted Owl Sites within 1.3 Mile Radius of Project Units

NSO Site	Habitat on BLM Lands Within a 1.3-Mile Home Range Radius				
	Acres of Habitat 1	Acres of Habitat 2	Total Acres of Habitat 1 & 2	Acres of Habitat 3	Total Acres of Habitat 1,2,& 3
Miller Mine	234	476	720	1155	1865
Poole Creek	830	457	1287	505	1792
Stouts Creek	421	605	1026	587	1613
West Stouts	680	249	929	679	1608
Shively Forks	345	260	605	1029	1634
Pinfeather	125	606	731	714	1448
Stouts 17	691	417	1108	485	1593
Glendale	438	153	591	1158	1749

2. Proposed or Candidate Species

There are no terrestrial species on the Roseburg District currently proposed for listing or designated as candidates for listing under the Endangered Species Act.

3. Bureau Sensitive Species

Four Bureau Sensitive Species have the potential of being present within one or more of the management units. See Table 6.

Table 6 - Bureau Sensitive Species Possible in Project Area

Scientific Name	Common Name	Habitat
Helminthoglypta hertleini	Oregon shoulderband snail	Rocky/Talus w/ forest canopy
Pristiloma arcticum crateris	Crater Lake tightcoil snail	Conifer Forest/ Wetland Vegetation
Corynorhinus townsendii	Townsend's big-eared bat	Roosts Sites caves, bridges, buildings
Accipiter gentilis	Northern goshawk	Large Patches Of Older Forest

The Oregon shoulderband snail was managed under the Standards and Guidelines for Survey and Manage, but in 2001, requirements for pre-disturbance surveys were removed for the portion of the species' range that includes the Roseburg District. Sites documented prior to September 30, 1999, are to be managed. No known sites are present, so the species will not be discussed further.

Townsend's big-eared bats have been documented on the Roseburg District. Roost sites are best described as key habitat features rather than vegetation types (Csuti, 1997), and include caves, buildings, mines, bridges or cavities in large, decadent trees. These habitat features are absent. While large, decadent trees may exist in adjacent areas, they would not be affected and Townsend's big-eared bats will not be discussed further in this analysis.

Suitable nesting habitat for the northern goshawk is best characterized by large stands of mature and late-successional forest. A study on the Klamath National Forest reported that stands 0-40 acres in size were occupied approximately 15 percent of the time. In stands from 41-80 acres in size, occupancy was noted approximately half of the time, with nearly full occupancy expected in stands greater than 160 acres in size (Fowler 1988).

Suitable nesting habitat for goshawks is not present within the proposed units. Mature forest habitat does exist near or adjacent to proposed units, but the scattered nature of these smaller stands, generally no more than 20-acres in size, reduces the probability of occupancy and the potential for disturbance. As no direct effects are considered likely, the goshawk will not be discussed further.

4. Bureau Assessment Species

No Bureau Assessment Species have been identified which would be considered likely to inhabit the project area.

B. SEIS Special Attention Species

Special Attention species are species designated for protection under Survey and Manage and/or Protection Buffer standards and guidelines in the Northwest Forest Plan as amended by the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl*, and incorporated into the Roseburg District ROD/RMP.

The Oregon red tree vole (*Arborimus longicaudus*) is an arboreal rodent that primarily occupies Douglas-fir. In the 2001 amendments to the Survey and Manage standards and guidelines, it was classified as a Category C species. In the 2001 Annual Species Review, it was reclassified as a Category D species in the central portion of its range which encompasses all of the Roseburg District. The requirement for pre-disturbance surveys was removed, but known sites would continue to be managed until a determination of high-priority sites was made. The 2003 Annual Species Review removed all management requirements for the red tree vole in the mesic portion of its range, which includes the Roseburg District. As a consequence, no further discussion of the red tree vole is required.

Great gray owls (*Strix nebulosa*) may be found in a variety of forest types that include ponderosa pine, Douglas-fir and grand fir. Current protocols require pre-disturbance surveys if the project area is located above 3,000 feet in elevation and within 1,000 feet of natural meadows larger than 10 acres in size. Great gray owls have not been observed in the project area, nor are the habitat elements present which would trigger the requirement for pre-disturbance surveys. As a consequence, the species will not be discussed further in this analysis.

Two species of mollusks, the Crater Lake tightcoil snail (*Pristoloma articum crateris*) and Chace sideband snail (*Monadenia chaceana*) may be potential occupants of the project area. The tightcoil snail occupies habitat that is associated with seeps and springs. The sideband snail occupies habitat similar to that described for the Oregon shoulderband snail.

Proposed treatment areas will be evaluated for suitable habitat. Where suitable habitat is present, surveys will be conducted. If mollusks of either species are located, the sites would be managed in accordance with existing management recommendations which are designed to remove concerns for persistence of the species in occupied habitat. As a consequence, no further discussion is necessary in this analysis.

III. Fish and Aquatic Habitat

A. Aquatic Habitat Conditions

Aquatic habitat surveys by the Oregon Department of Fish and Wildlife (ODFW (1995), the South Umpqua Watershed Analysis and Water Quality Restoration Plan (USDI, BLM 2001), and observations by BLM fisheries biologists were used to form the basis for describing the current aquatic habitat conditions at the 6th-field subwatershed and 7th-field drainage levels. A small portion of the project area would be located within the Upper Cow Creek 5th-field watershed. In addition, one of the primary haul routes would traverse a slope above McGinnis Creek down to the Galesville reservoir. Streams in the project are typically small and high gradient, capable of providing habitat for resident cutthroat trout, while anadromous habitat is generally more than a mile downslope and downstream of proposed unit locations.

- Stream **temperature** influences all life stages of salmonids and other aquatic animals. Warm temperatures can delay upstream migration of adult salmonids, impede spawning, retard embryo development and cause juvenile death. Elevated stream temperatures have most often resulted from the removal of streamside vegetation resulting in a loss of shading and subsequent exposure to higher levels of solar radiation. Shively Creek exceeds the Oregon Department of Environmental Quality (ODEQ) winter stream temperature standard during the spawning and egg incubation periods for salmonids.

- Quality **substrate** (e.g., spawning gravel) is important for successful salmonid (coho salmon, steelhead, and cutthroat trout) spawning and egg incubation (Bjornn and Reiser 1991). In addition, excess fine **sediment** (suspended sediment) and elevated turbidity can reduce respiratory function, displace individuals, and disturb feeding of juvenile salmonids (Waters 1995). In the Shively Creek 6th-field subwatershed, the condition of substrate is assessed as 'poor' (USDI 2001). Within the Shively Creek 7th field subwatershed, however, substrate conditions have been assessed as 'good'.

- **Large woody debris** (LWD) consists of downed trees and logs that provide cover, reduce stream velocities, promote meander and create off-channel habitat, collect and hold beneficial substrates (gravel), and provide long-term sources of organic materials and nutrients. It is considered deficient at the 6th-field subwatershed level.

  Riparian areas within proposed project units have been previously entered for salvage or timber harvest, or have been disturbed by recent fires. Shively Creek and the East Fork Shively Creek are considered deficient of LWD (ODFW 1995). Forest stands in the riparian areas of the proposed units are on a retarded trajectory that would not be expected to provide LWD for the long term.

- Stream **pools** provide habitat for juvenile anadromous and resident fish. Factors affecting the quality of pools include sediment, cover, pool size and depth, and

the availability of large wood. Pool quantity and quality were assessed as 'poor' at both the 6th-field subwatershed and 7th-field drainage scales (ODFW 1995).

- **Off-channel habitat** consists of areas adjacent to streams that may include beaver ponds, side channels, and backwaters. Juvenile salmonids, particularly coho salmon, seek refuge in these areas during winter storms and summer heat. This habitat factor is considered poor at both the 6th-field subwatershed and 7th-field drainage scales for reasons similar to those for LWD.

B. Special Status Species

Salmonid species known to utilize the streams in the project area include the Oregon Coast coho salmon (*Oncorhynchus kisutch*), Oregon Coast steelhead trout (*Oncorhynchus mykiss*), and Coastal cutthroat trout (*Oncorhynchus clarki clarki*).

The National Marine Fisheries Service designated the Oregon Coast coho salmon ESU as threatened (Federal Register. 1998a. Vol. 63, No. 153), and proposed the Oregon Coast steelhead ESU as a candidate for threatened species designation (Federal Register. 1998b Vol. 63, No. 53).

Habitat for the Oregon Coast coho salmon was defined, under the Endangered Species Act of 1973, as amended, as all river reaches accessible to listed stocks of coho salmon utilizing coastal streams south of the Columbia River and north of Cape Blanco, excluding areas below specific dams, none of which are located in the project area (Federal Register 2000 Vol. 65, No. 32). NOAA Fisheries approved a consent decree, withdrawing the Critical Habitat designation on May 7, 2002.

Status of the Coastal cutthroat trout, a Federal candidate species, is under review by the U.S. Fish and Wildlife Service. Cutthroat trout in the Umpqua River basin were previously considered a separate ESU and listed as endangered on September 13, 1996. They were delisted because they were not a unique ESU, but part of the Coastal cutthroat trout ESU which did not merit listing (Federal Register 1999 Vol. 64, No. 64).

Bureau Sensitive species present in the watershed, but not within the project area, include the Pacific lamprey (*Lampetra tridentata*) and Umpqua chub (*Oregonichthys alawatseti*).

C. Fish Distribution

Anadromous limits are based on documented and historical information as well as the presence of natural or man-made barriers. Presence or absence of resident fish above anadromous limits is based on fish surveys (BLM, ODFW) and observations and professional judgment of BLM fisheries biologists.

A long (700 feet), steep cascade (30 percent gradient) on the East Fork Shively Creek is a barrier to steelhead trout and coho salmon. Above this barrier the stream has a gentle gradient and habitat capable of supporting resident fish. A 1995 BLM survey did not

verify the presence of fish; however, in 2003, a BLM fisheries biologist observed a single fish in the reach above the barrier. For the purposes of this analysis, this stream reach is considered fish-bearing. The proximity of proposed units to waters occupied by anadromous and resident fish is summarized in Table 7 below.

Table 7 – Fish Distribution (Distances Approximate)

Timber Sale Unit	Distance to Resident Fish (miles)	Distance to coho salmon and steelhead (miles)	Distance to EFH (miles)
A	0.4	1.4	1.4
B	1.0	2.6	2.6
C	0.5	2.1	2.1
D	1.0	2.1	2.1
E	1.7	3.0	3.0
F	0.5	1.4	1.4
G	0.06	0.3	0.3
H	0.5	1.2	1.2
I	0.3	2.0	2.0
J	0.8	2.4	2.4

D. Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), in accordance with the Sustainable Fisheries Act of 1996 (Public Law 104-267) designated Essential Fish Habitat (EFH) for coho and chinook salmon (Federal Register 2002 Vol. 67 No. 12). EFH is defined as ". . . those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH for coho salmon is present in the Shively Creek 6th-field subwatershed and the Shively Creek 7th-field drainages below the barriers described above.

IV. Water Quality/Resources

Table 8 identifies individual thinning units with respect to the 6th field subwatershed and 7th field drainage in which they are located, and a perspective of the project areas in comparison to the drainage areas.

Table 8 - Location of Units by Watershed and as a Percentage of Drainage Area

Subwatershed (6th field)	Drainage (7th field)	Drainage Acres*	Units	Sale Acres†	Percent of Drainage
Shively Creek	East Shively	3,173	A, E, F,G, I, and J	126	4.0
	Upper Shively	2,654	B, C, part of D, and H	61	2.3
Upper Cow Creek/Galesville	McGinnis Creek	976	Part of D	33	3.4

†Approximate values based on GIS data

A. Stream Flows

The climate is characterized by cool, wet winters and warm, dry summers. Annual precipitation is estimated at 54-60 inches, occurring primarily as rain. On average, 85 percent of the precipitation occurs between October and April. Peak flows occur from November to March, and low stream flows occur from July to October. Small 1st and 2nd order headwater streams are intermittent with no surface flow during the dry season and perennial streams (3rd to 5th order) are small to medium in size.

B. Peak Flows

Potential increases in peak flows have been shown in association with timber harvest in the Transient Snow Zone (TSZ) (Harr and Coffin 1992) and the extension of the drainage network by roads. Higher flows can degrade stream function by eroding banks and scouring streambeds.

The TSZ in southwestern Oregon has been shown to occur at elevations greater than about 3,000 feet (Greenberg and Welch 1998). Timber harvest can create openings where above normal snow pack may accumulate. When subjected to rain-on-snow events, this snow pack can melt rapidly with the potential result of higher than normal stream flows.

The effect of past timber harvest on the current risk of peak flow enhancement was evaluated for each project drainage using a model from the Watershed Professionals Network (WPN 1999). This model estimates the risk of increased peak flow based on the amount of land area with less than 30 percent canopy closure. Analysis indicates that the majority of the lands in the TSZ, within the project drainages, have good canopy closure (greater than 89 percent recovered) and that current modifications (increase) of peak flows are not the result of levels of canopy closure.

TSZ effects have been shown to occur only when canopy closure is less than 30 per cent (WPN 1999), and all of the proposed units are expected to retain 30-50 percent canopy post-treatment. As a consequence, the proposed treatments would have a negligible effect on peak flows associated with rain-on-snow events and will not be discussed further in this analysis.

Roads may also increase peak flows by extending the stream channel network, effectively concentrating run-off and delivering flow directly to the stream network (Beschta 1978, Wemple et al. 1996).

C. Water Quality

Both Shively Creek and East Fork Shively Creek exceed water temperature standards (ODEQ 2002). As described above, elevated stream temperatures can result from a lack of stream shading because reduced shade increases the amount of solar radiation reaching

the stream surface (Moore and Miner 1997). Streams in the project areas are well shaded, however, and not considered contributors to elevated water temperatures.

There are no streams in any of the project areas listed as impaired by fine sediment. Stream embeddedness and macro-invertebrate data collected by BLM personnel suggest, however, that Shively Creek is 'slightly impaired' (USDI, BLM 2001).

D. Road Conditions and Timber Hauling

Road densities in the potentially affected drainages are generally high with many of the principal roads in the Shively Creek and Stouts Creek 6th-field subwatersheds concentrated near streams (USDI, BLM 2001).

Roads can have impacts on sediment regimes (Furniss et al. 1991). Sediment may be generated by downcutting of ditch lines and surface erosion on unsurfaced roads. Slope failures can also occur when road drainage is concentrated on unstable fill slopes.

Three haul routes would be utilized in association with the proposed action. Their proximity to streams and the number of stream crossings are described below. These factors are considered important in terms of the potential for sediment during wet season operations or during periods of rain during the dry season.

The Stouts Creek haul route, to be utilized for Unit E, is immediately adjacent to approximately 1.2 miles of fish-bearing stream. The route crosses 18 tributary streams, five of them considered to be major. Hauling would be restricted to the dry season.

The Shively Creek haul route, for Unit F, is adjacent to approximately one-half mile of fish-bearing stream. There are 33 stream crossings, three considered to be major. Hauling would be restricted to the dry season.

The Galesville haul route would be utilized for Units A, B, C and D. There are 15 stream crossings, none of them considered major. Hauling for Units B and D would be restricted to the dry season, but harvest and hauling operations for Units A and C would not be.

V. Soils

Soil resource information was obtained from the Soil Survey of Douglas County Area, Oregon, 1994. This survey was conducted by the Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA). Detailed soil series descriptions, soil mapping unit descriptions and soil interpretation sheets are available at the BLM and NRCS offices in Roseburg and on the NRCS web site.

The primary soil series in the project area are Kanid, Atring, Acker and Norling. There are also lesser amounts of Dumont and Sweetbriar soils. These soils are predominantly deep and moderately deep well drained loams on steep to very steep slopes.

VI. Vascular and Non-Vascular Plants

A. Special Status Species

The criteria for designating plants as Special Status Species are identical to those described above, for wildlife. Based upon available habitat, surveys would be conducted for the following species which might be expected to occur in the project areas.

Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*), a Federally-threatened species, is known to occur in the South River Resource Area. A geographic range has been identified by the U. S. Fish and Wildlife Service that is considered potential habitat. The project area falls within this range.

Other special status plants listed as Bureau Sensitive which may be present include:

Aster vialis *
Bensoniella oregona
Cimicifuga elata
Cypripedium fasciculatum *
Cypripedium montanum *

*Also SEIS Special Attention Species

B. SEIS Special Attention Species

Based upon habitat conditions found in the project area, the following species may be present:

Vascular Plants
Botrychium minganense
Botrychium montanum

Bryophytes
Schistostega pennata
Tetraphis geniculata

Lichens
Hypogymnia duplicate
Leptogium cyanescens
Lobaria linita
Pseudocyphellaria rainierensis
Ramalina thraust

Surveys for Special Status and Special Attention species would be conducted. In the event of "no action" there would be no direct effects. In the event a decision was made to implement the proposed action, species located during surveys would be protected in accordance with management recommendations designed to maintain habitat conditions favorable for persistence of the population(s), such that no direct effects would accrue. As a consequence, no further discussion is necessary in this analysis.

VII Cultural/Historical Resources

Three prehistoric sites are located from one to three miles from the proposed units. Two sites are located on terraces along the South Umpqua River and the other site is on a stream terrace along Cow Creek.

A review of catalogued sites did not identify any known historic or prehistoric sites located within any of the proposed units. Field inventories were conducted but located no cultural resources found in the project area. As a consequence, there would be no effect to prehistoric or historic resources, and on further discussion is necessary in this analysis.

VIII Recreation/Visual Resources

There are no recreational developments in any of the project areas. Recreational use is of a dispersed nature, involving activities such as hunting, sightseeing, wildlife observation, and gathering of forest greenery and wild foods.

Lands in the project areas are VRM Class IV. The proposed project is consistent with the VRM objectives which allow high levels of change to the visual landscape, and which may attract the attention of the casual observer.

IX. Noxious Weeds

An inventory of noxious weed species is ongoing on the Roseburg District. Twenty-two species have been positively identified on BLM-managed lands in the South River Resource Area, with approximately forty other species suspected based on their presence on adjacent lands.

Implementation of the *Roseburg District Integrated Weed Control Plan and Environmental Assessment* (USDI, BLM 1995b) is an ongoing effort to prevent or reduce spread of weed populations, and control or contain existing infestations. This includes inventorying weed infestations, assessing the risk for spread, and control of target species in areas in which management activities are planned. Efforts may include release of biological control agents, mowing, hand-pulling, and application of approved herbicides.

Approximately half of the roadsides in the project area have been inventoried for noxious weeds, with five species documented. No active control measures are being applied in the project area with respect to St. Johnswort and bull thistle because these species are being contained with biological control agents.

Himalayan blackberry is the most common weed reported, and occurs along roadsides in the project area. Canada thistle and rush skeletonweed are also present along roadsides in the project area.

Management practices aimed at reducing the potential for spread or establishing conditions favorable for weed germination would be implemented. This would include required steam cleaning or pressure washing of heavy equipment used in logging and road construction to remove soils and other materials that could transport weed seed or root fragments. Other measures could include seeding and mulching soil with native seed or revegetating with indigenous plant species in areas where natural regeneration is unlikely to prevent weed establishment.

Additional measures that could be employed would include the treatment of noxious weeds prior to project implementation under the provisions of the *Integrated Weed Control Plan*, and the scheduling of projects so that work is conducted in uninfested areas prior to initiating work in infested areas. As a consequence, negligible changes in noxious weed populations are anticipated regardless of the alternative selected, and no further discussion of noxious weeds is necessary in this analysis.

Chapter 4
ENVIRONMENTAL CONSEQUENCES

This chapter discusses how the specific resources identified in the previous chapter would or would not be affected in the short term and long term, by implementation of the alternatives contained in this analysis. The discussion also identifies potential impacts or consequences that would be expected.

I. Alternative 1 – No Action†

The "no action" alternative is analyzed as a comparison to the proposed alternative, in order to provide a basis for determining if there are any effects beyond those analyzed in the Roseburg District PRMP/EIS.

Under this alternative, no density management would be applied to the proposed units described in this analysis. This would not meet the need for action as described in Chapter 1 (pp. 2-3) of this environmental assessment, because it would not meet the objective of hastening the development of late-successional forest habitat characteristics.

A. Vegetation/Habitat

This alternative would not lead to attainment of the Desired Future Conditions described in Table 8 of the LSRA (p. 50), nor meet landscape objectives of maintaining and enhancing connectivity across the landscape. The stands would continue to develop as even-aged, single-storied, conifer-dominated stands. Over time, if protected from natural disturbances such as fire, the stands would lack many structural characteristics associated with old-growth forests, including canopy gaps and multiple-layered canopies.

Species diversity would decrease. Hardwoods would not be a measurable component in many of the stands. Douglas-fir would make up close to 100 percent of the stand basal area. The remaining hardwoods would continue to be overtopped and suppressed by conifers, and eventually eliminated. As an example, Douglas-fir constitutes 92 percent of the basal area in Unit F and is projected to increase to 99 percent by 150 years of age.

Live crown ratios of overstory trees would recede to approximately 20 percent from present levels of 35-44 percent resulting in reduced tree vigor and a diminished ability to respond to a future release from competition with other trees. Photosynthetic capacity in closely spaced trees would be reduced, leading to reduced tree vigor. This would be manifested by reduced radial growth and increases in diameter. It would also reduce the capacity of trees to adapt to disturbance, and diminish resistance to attack by insects and disease. Trees would become more susceptible to wind damage because increases in height with little corresponding increase in diameter they become unstable and at a higher risk for stem buckling or tipping (Oliver and Larson, 1996).

Table 9 summarizes Organon Modeling projections of the expected stand conditions at approximately 150 years, assuming no intervening disturbances.

Table 9 – Summary of Untreated Stand Conditions At Approximately 150 Year of Age

Unit	Hardwoods per Acre	Conifers per Acre	Stand Basal Area (sq. ft.)	QMD in inches	Percent Canopy Closure	Percent Live Crown	Relative Density Index
A	0	92	353	26.5	92	23	0.83
B	0	113	392	25.2	91	21	0.94
C	0	99	345	25.2	87	22	0.83
D	0	99	345	26.2	89	21	0.82
E	0	122	348	22.9	92	21	0.86
F	2-3	99	396	26.8	93	24	0.93
I	<1	113	370	24.5	93	19	0.90
J	0	113	392	25.2	91	21	0.94

QMD – Quadratic Mean Diameter

Figure 2 represents approximate stand conditions at age 150 years if no reduction in stand density were to occur, either through active management or natural disturbance.

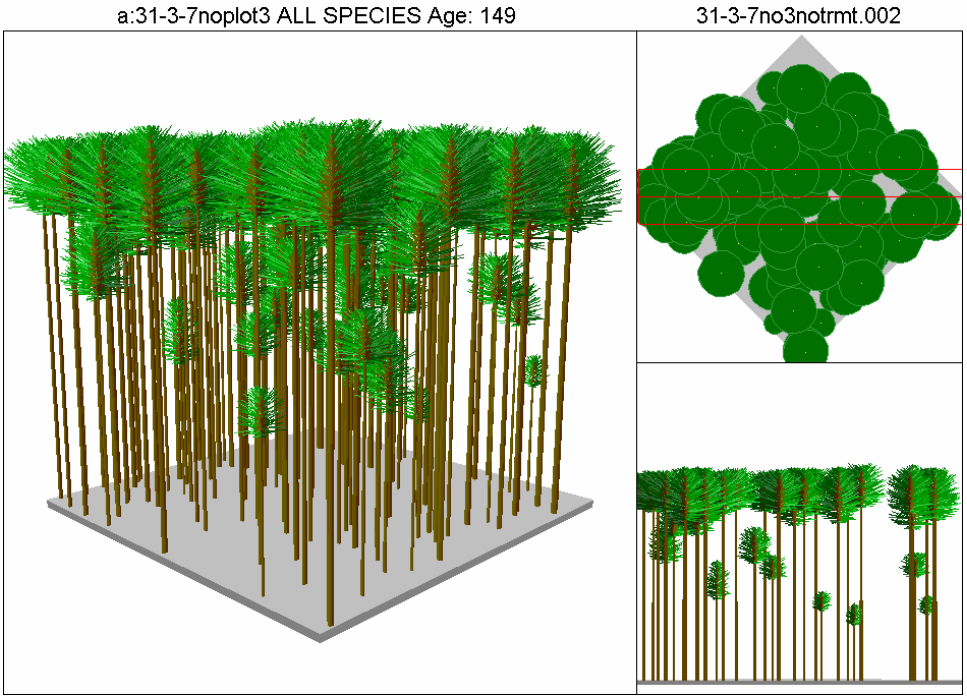


Figure 2 - Future Stand Conditions at Approximate Age 150 years if Left Untreated

Continued conditions of closed canopy would not allow understory establishment or the development of multilayered canopies. This stand uniformity would result in reduced

structural diversity within stands and limited habitat suitability for species dependent on the diversity of late-successional forest habitat.

Development of snags and down wood would continue through the process of suppression mortality, but would be mostly limited to trees in smaller diameter classes. At approximately 105 years of age, Organon modeling projects an average of four snags per acre greater than 20 inches dbh. These snags would eventually fall and contribute additional down wood. The objectives of four snags per acre and down wood greater than 24 inches in diameter would not be met until 140 years of age. Numerical objectives for down wood would be met earlier, but the material would be in smaller diameter classes than desired and would not persist in the stands over the long term.

Table 10 illustrates the approximate age when each of the proposed units would be expected to meet the LSRA objectives for numbers of trees greater than 32 inches dbh.

Table 10 –Age when Stands Achieve LSRA Objectives for Large Trees

Unit	Age	Trees >32" dbh
A	121	9
B	100	8
C	115	9
D	121	9
E	139	9
F	105	9

By age 150, LSRA objectives for numbers of large trees would be met, but diameter distribution of the stands would not meet desired future conditions illustrated by Figure 3.

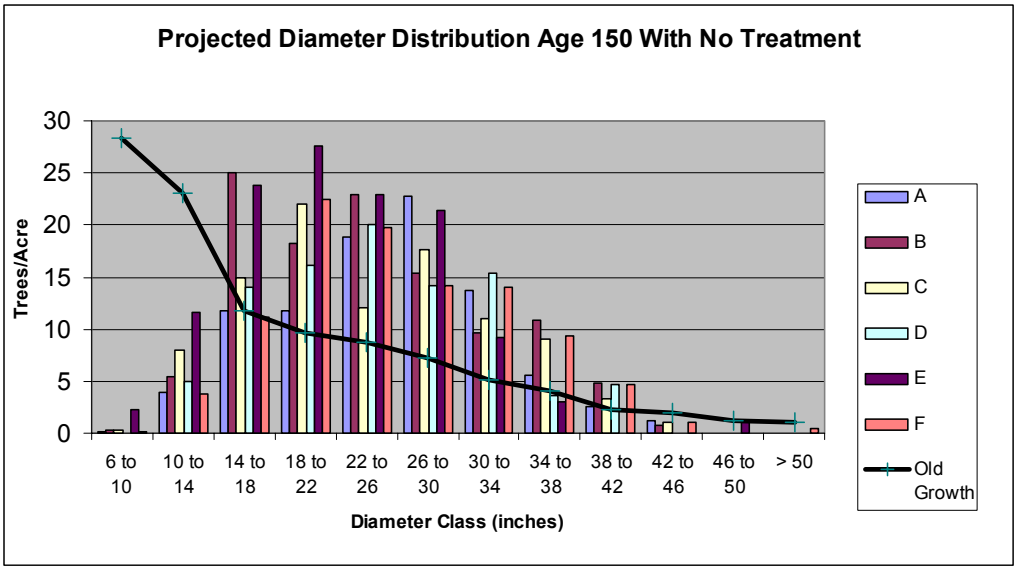


Figure 3 - Diameter distribution of stands A-F at around age 150

B. Wildlife

Northern Spotted Owl

Under this alternative there would be no direct effects to the northern spotted owl. Stand conditions would remain relatively unchanged and continue to provide limited foraging opportunities as well as dispersal habitat.

In the absence of density management or a future disturbance, foraging quality would decline because hardwoods and other understory vegetation that provide cover and forage for prey species would die under closed canopies. This would reduce the utility of the stands for foraging. Growth and development of late-successional forest habitat such as large trees and snags would be delayed by many decades. The combination of these factors would reduce the future utility as roosting and nesting habitat

C. Fish and Aquatic Habitat

Absent any management activities, there would be no direct effect to anadromous fish or Essential Fish Habitat. Fish populations and habitat would continue to be cumulatively affected by current watershed conditions.

Without density management in riparian areas, the growth rate of trees most likely to contribute large wood to stream channels (FEMAT 1993) would stagnate. Without some other form of disturbance, the stands would remain relatively uniform in age and species composition, inconsistent with the objective of developing old-growth forest characteristics. This would also result in simplified size and age class distributions, and stands dominated by smaller trees in the areas most likely to contribute future sources of large wood.

In the short and long term, there would be insufficient amounts of large wood for stream structure, natural retention of sediment, and a supply of organic nutrients. Suppression mortality would occur primarily in smaller trees providing smaller diameter material which would not persist over time. The growth of large diameter trees for future recruitment would be delayed by decades.

D. Water Quality/Resources

1. Peak Flows

As described in Chapter 3 (p. 22), the risk of peak flow increases associated with rain-on-snow events is considered so low as to be negligible. Absent any new road construction, there would be no potential extension of the stream network. Taken together, there would be little or no likelihood of affecting the timing and magnitude of stream flows.

2. Water Quality

Stream Temperature

There would be no effect on stream temperatures because streamside shade would not be directly affected. Tree growth would continue along a trajectory that would lead to unfavorable height to diameter ratios, with an increased the risk of blow down or stem buckling (Smith 1962). In the event that trees blew down, streams could be exposed to direct solar heating. In the absence of thinning and density management, the establishment and growth of understory trees and shrubs would be delayed. Understory canopy would not be present to provide shade in the event that some or all of the overstory was lost in a catastrophic event (Levno and Rothacher 1969 cited in Adams and Ringer 1994).

Sediment

There would be no potential for localized soil disturbance and sedimentation associated with felling and yarding, or road construction.

E. Soils

In the absence of any management actions, there would be no direct effect on soils as the potential for surface displacement, compaction, and puddling would not exist.

Amelioration of compaction from previous ground-based entries would not be undertaken. In the absence of road renovation, ongoing erosion would continue unless addressed by other means.

II. Alternative 2 – Proposed Action

This alternative would meet the need for active management of the LSRs to accelerate the development of forest conditions that would provide habitat and structure more comparable to late-successional and old-growth conditions. It would help achieve LSRA objectives that include:

- Maintaining a diversity of both hardwood and conifer tree species
- Creating of canopy gaps that allow germination and establishment of an understory growth of shrubs and multiple canopy layers in the overstory.
- Accelerating the growth of larger trees that will provide nesting and roosting opportunities for the northern spotted owl.
- Creating snags and an accumulation of at least 8 percent coverage of coarse wood on the forest floor.

A. Vegetation/Habitat

Old-growth stands appear to have developed under conditions of low density with little competition between individual trees. It appears unlikely that the stands developed under conditions of high densities that characterize managed stands and that densities were later reduced by a disturbance which left only larger trees (Tappenier et. al. 1997).

Research on old-growth stands indicates that average tree diameter at age 50 years was much greater than what is typical in young, managed stands with high tree densities, and that rapid growth rates persisted well beyond age 50 years (Tappeiner, et.al., 1997). The slower growth rates in young, managed stands are the direct result of higher tree densities. Disturbances sufficient to promote Douglas-fir regeneration in naturally occurring stands are generally absent in young, managed stands.

Relative density is used to describe stand stocking levels relative to a theoretical maximum. At a relative density above 0.55, competition and suppression mortality occurs (Drew and Flewelling 1979). Thinning to a relative density of 0.25 or less would promote understory development and vertical diversity (Hayes 1997).

The proposed density management would reduce relative density to an average of 0.34 for light treatments, 0.27 for moderate treatments and 0.21 for heavy treatments. The heavy treatments, and possibly the moderate treatments, would create conditions suitable for establishment, growth and survival of an understory component. Table 11 summarizes the anticipated stand conditions following the proposed treatments.

Table 11 – Stand Summary after Treatments

Unit	Acres	Treatment	Trees per acre	QMD in inches	Percent Canopy Closure	Relative Density Index
A	8	Light	109	13	47	0.31
	10	Moderate	78	13.7	38	0.24
	3	Heavy	53	14.4	28	0.18
B	13	Moderate	66	14.9	32	0.24
C	6	Light	111	12.8	46	0.31
	3	Moderate	81	13.4	37	0.25
	3	Heavy	55	14.1	29	0.18
D	14	Light	92	14.1	44	0.30
	34	Moderate	70	14.5	35	0.24
E	22	Moderate	71	16.1	41	0.29
F	6	Light	96	16.7	60	0.42
	12	Moderate	77	17.4	52	0.35
	3	Heavy	54	18.2	40	0.27

In the long term, in order to achieve the desired future stand conditions, additional treatments would likely be necessary, particularly in the units proposed for light and moderate.

Proposed Treatments

Light thinning

This treatment would reduce relative density to approximately 0.30 to 0.41 and about 90 to 100 trees per acre, comparable to a traditional commercial thinning. By contrast though, leave trees would be marked in a manner that would create variable density across the stands. Rather than spacing retention trees evenly, clumps of trees would be retained and gaps and openings would be created. Trees removed would generally come from the intermediate and suppressed crown classes. Figure 4 illustrates approximate conditions immediately following treatment, while Figure 5 represents conditions at approximately 150 years of age.

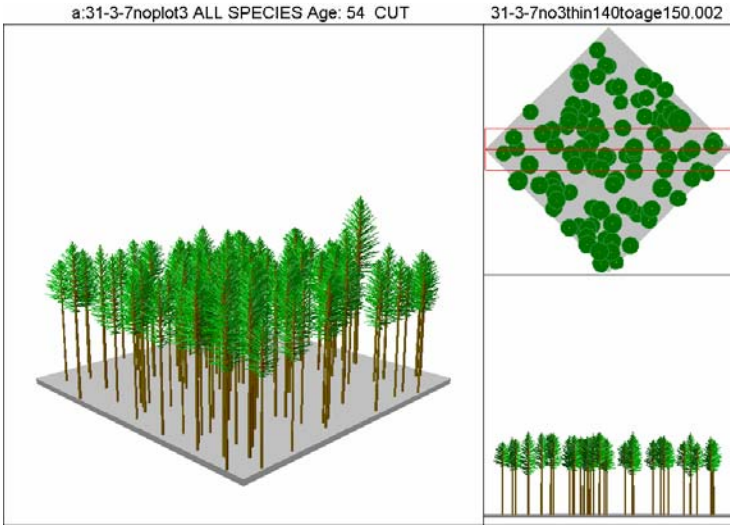


Figure 4 – Post-Treatment Conditions Light Thinning

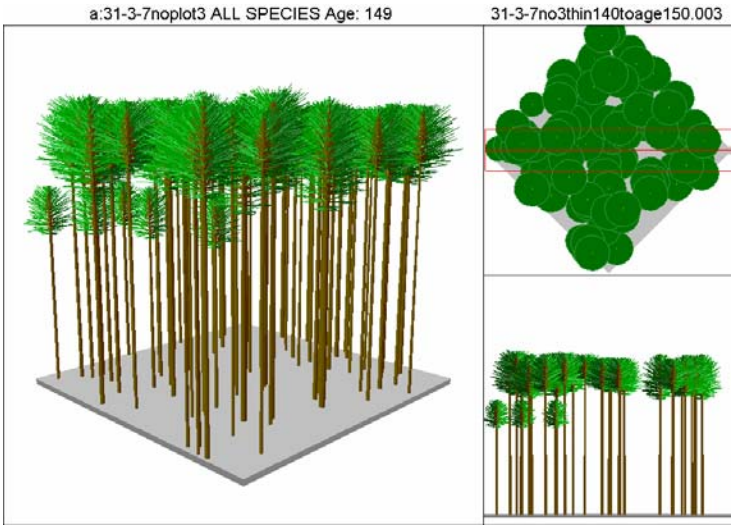


Figure 5 – Light Thinning Grown to Approximate Age 150 Years

Moderate thinning

This treatment would reduce relative density to approximately 0.24 to 0.35 by reducing the number of stems per acre to between 60 and 80. As with the light thinning, trees would be primarily removed from the intermediate and suppressed crown classes, while the co-dominant and dominant trees would be favored for retention. The creation of canopy gaps would allow sufficient sunlight to reach the forest floor to encourage germination and establishment of understory vegetation and development of both horizontal and vertical structure. Gaps would be planted with a mixture of Douglas-fir, incense-cedar, and western hemlock to promote development of a secondary canopy. Figures 6 and 7 illustrate the anticipated post-treatment conditions and conditions at an approximate age of 150 years.

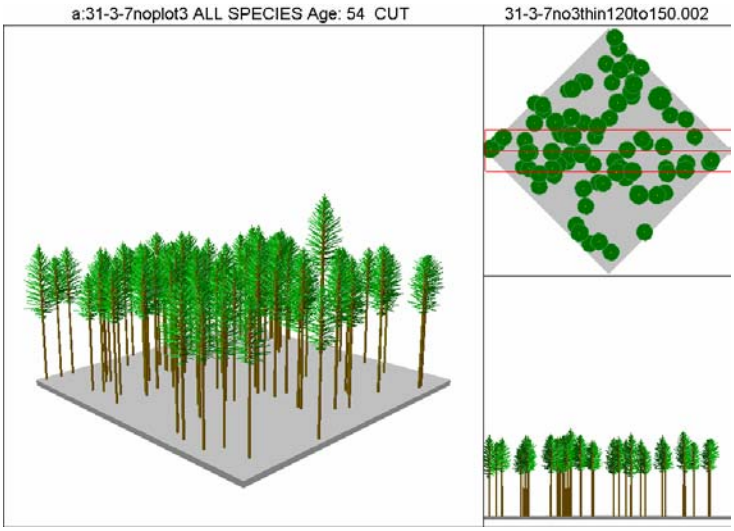


Figure 6 – Post-Treatment Conditions Moderate Thinning

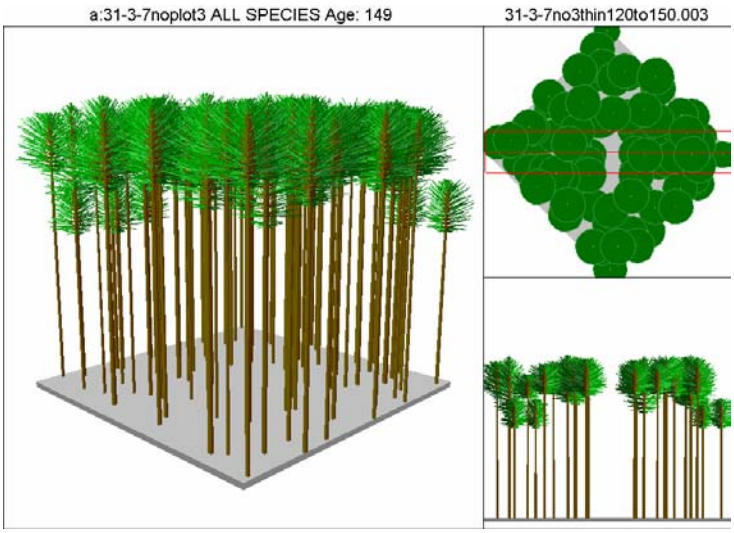


Figure 7 - Moderate Thinning Grown to Approximate Age 150 Years

Heavy Thinning

Reducing the stocking in these areas to approximately 50 trees per acre would reduce the average relative density to 0.18 to 0.26. This treatment would create canopy gaps as described above, allowing understory development. Underplanting with a mixture of Douglas-fir, incense-cedar, and western hemlock would promote establishment of a secondary canopy. Figures 8 and 9 provide visual representations of the anticipated results of the treatment.

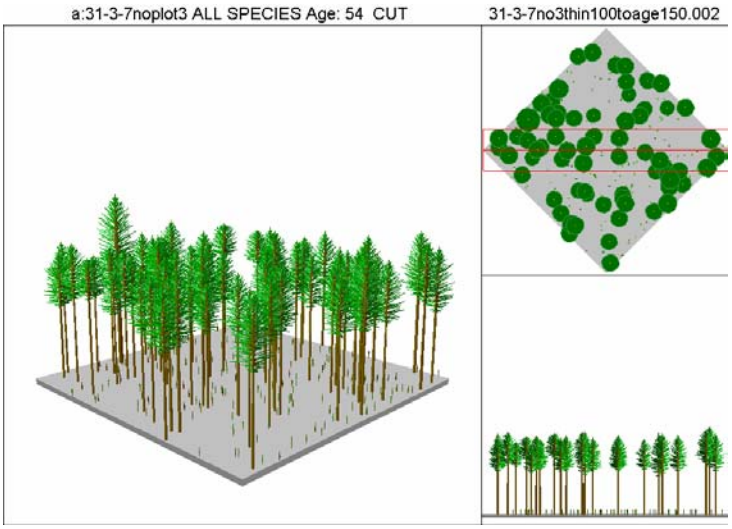


Figure 8 – Post-Treatment Conditions Heavy Thinning

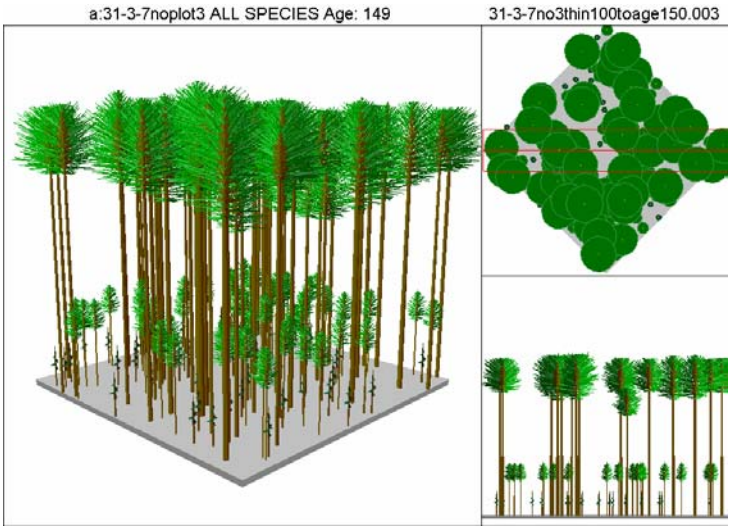


Figure 9 – Heavy Thinning Grown to Approximate Age 150 with Underplanting

The reduction in tree densities and competition following the proposed treatments would accelerate individual tree growth. Accelerated growth would shorten the period of time needed to attain the objective of eight or more Douglas-fir 32 inches or greater in dbh.

Organon modeling represented in Table 12 illustrates how this objective can be achieved 10 - 30 years sooner by applying variable density management as compared to the time taken under an alternative of "no action" (see Table 10, p. 29).

Table 12 – Number of Trees per Acre 32 inches or Greater dbh for Each Proposed Treatment at 100 Years and 150 Years of Age

		Light Thinning		Moderate Thinning		Heavy Thinning	
Unit	**At Present Age**	**At 100 Years of Age**	**At 150 Years of Age**	**At 100 Years of Age**	**At 150 Years of Age**	**At 100 Years of Age**	**At 150 Years of Age**
A	0	7	27	9	32	11	37
B	0	n/a	n/a	18	22	n/a	n/a
C	0	9	27	11	29	16	33
D	0	8	29	10	30	n/a	n/a
E	1	n/a	n/a	3	23	n/a	n/a
F	0	9	30	11	31	17	35

B. Wildlife

Northern Spotted Owl

The proposed treatment areas are within the home range (1.3 mile radius) of 8 spotted owl sites. The stands selected for density management only provide dispersal habitat, and limited foraging opportunities at present. No suitable nesting and roosting habitat would be removed or modified.

There are no proposed treatment units within ¼-mile of documented owl activity centers, so the potential for disturbance during the nesting season would be remote and not a concern.

The proposed treatments would achieve a balance between conservation of existing habitat and function in conjunction with the long-term development of additional old-growth habitat features within the stands, resulting in an overall improvement in habitat quality.

In the first 10-20 years after treatments, those units within a provincial territory, particularly those closest to activity centers, could potentially see a decline in utilization by owls for foraging as a consequence of more open stand and canopy conditions. The level of impact to owl sites would be moderated by the dispersed location of the units, small number of acres treated, and location of units outside of core owl habitat areas.

After canopy closure approached pre-thinning levels, use of the stands for dispersal and foraging would increase. Introduction of horizontal and vertical structure into the stands, release and retention of hardwoods as stand components, and an increase in understory growth and development would improve roosting and foraging conditions in the near term. Over time stand conditions would develop that would provide additional nesting structure and habitat.

C. Fish and Aquatic Habitat

1. Aquatic Habitat Conditions

The principle factors that could potentially be affected would be stream temperature as related to stream shading, substrate quality as related to fine sediment delivery, and LWD as related to tree growth and subsequent instream recruitment.

- Although removal of trees in riparian areas has the potential to increase **stream temperature** by creating canopy openings that reduce shade, the "no-harvest" buffers would maintain canopy closure and shade immediately adjacent to intermittent and perennial stream channels. Post-treatment canopy closure in areas adjacent to the "no harvest" buffers would exceed 30 percent and return to near pre-treatment levels within 7-10 years for the light and moderate thinnings, and 15-18 years for the heavy thinnings. A portion of Unit C, designated for heavy thinning, is adjacent to 300 feet of perennial stream on the upper reaches of Shively Creek. Canopy closure would be reduced to about 30 percent but because of the aspect and the short length of stream that would be affected, any changes in water temperature would be negligible.

  Thinning adjacent to intermittent streams would not affect temperatures because these streams do not run water at the time of year when heating of perennial streams would be of concern.

  Thinning near streams would foster the establishment of an understory of shrubs and trees. This multi-layered canopy would provide shade in the event that a natural disturbance removed overstory shade (Levno and Rothacher 1969 as cited in Adams and Ringer 1994).

- There would be no direct or indirect effects of the proposed thinning on **substrate** quality or **sediment** delivery in streams. The "no-harvest" buffers would intercept and precipitate any sediment borne by overland run-off within the units. Directional felling of trees away from the "no-harvest" buffers would prevent disturbance and erosion of stream banks and channels. Contract provisions would prohibit yarding in the "no-harvest" buffers, eliminating them as potential sources of sediment.

The discussion of the effects of road construction, road renovation, and log hauling on the generation of fine sediment to streams is included in the Road Conditions section of Water Quality/Resources. The only potential source of fine-sediment delivery to streams would be associated with hauling timber from Units A and C on the Galesville haul route during the wet season.

Potential offsite movement of sediment from haul routes near streams would be contained by installation of silt fences or sediment entrapping blankets, or by placement of straw bales during the wet season hauling. These measures would allow the free passage of water without detention or plugging.

Section 25, "Watershed protection: water quality, erosion control, and soil damage" of Bureau of Land Management Timber Sale Contracts (USDI, BLM 1990) also provides that the contract administrator may suspend contract operations when weather and soil moisture conditions may cause excessive environmental damage. Such conditions may include damage to soils, degradation of water quality and excess degradation to the road bed, particularly near stream crossings.

With the application of the project design features described above, increases in sediment delivery to streams, and potential subsequent degradation of stream substrates (spawning gravels), would be negligible.

- There would be direct and indirect effects on **large woody material** in riparian areas and streams. The direct effect of thinning would be the removal of small diameter (<20 inches dbh) trees from upslope and riparian areas.

  Treatments in the unit closest to fish-bearing waters (Unit G) would consist of girdling. The trees girdled may eventually fall downslope and reach East Fork Shively Creek.

  Thinning in dense, young-growth stands with more that 200 trees per acre (Tappeiner et al. 1997) can encourage the development of old-growth forest characteristics. This would include the growth of larger trees that would provide abundant quantities of large diameter wood to streams. This additional LWD, in either the short or long term, would be beneficial to stream habitat and listed fish species.

- There would not be any direct or indirect effects from timber harvest, road construction/renovation, or hauling that would reduce the numbers or quality and depth of **pools**. However, pool quantity and quality may be affected indirectly through the potential for LWD recruitment over the long-term. If additional or larger diameter woody material were to reach the stream as a result of the proposed action, more pools and deeper pools would be created and improve stream habitat for listed fish species.

- Off-channel habitats would not be affected in most streams adjacent to the proposed units because this habitat type is absent from those high-gradient streams. However, for reasons described above, potential additions of LWD over the long-term could improve or even create new off-channel habitats. The condition of such refuge habitat would be improved over the long-term to provide juvenile cover, feeding habitat, and abundance of prey species.

2. Special Status Species

Based on the preceding discussion, it is considered highly unlikely that the proposed action would have any negative effects on Oregon Coast coho salmon, Oregon Coast steelhead trout, and Coastal cutthroat trout.

The only potential effects to the listed fish species would be increased fine sediment yield and deposition in stream habitats. Such effects to the listed fish species are highly unlikely because the "no-harvest" buffers and post-treatment levels of canopy closure would provide adequate shade to maintain stream temperatures.

Road construction would not contribute sediment to streams because temporary roads would be located along ridges away from streams. Utilization of appropriate Best Management Practices for road construction and renovation, and the application of sediment control measures during wet season hauling would eliminate the risk for delivery of road-derived sediments to streams and fish-bearing waters.

3. Essential Fish Habitat

The proposed action alternative would not have an adverse effect on Essential Fish Habitat downstream from proposed thinning units. It is not anticipated that sediment would be generated and delivered downstream by density management operations, and sediment from road construction, renovation and road use would be negligible.

D. Water Quality/Resources

1. Stream Flows

No measurable change in flows would be expected because the project involves only partial removal of vegetation in roughly five percent or less of any affected drainage. In an overview of several studies, Satterlund and Adams (1992) found that "Lesser or nonsignificant responses occur [to water yield] . . . where partial cutting systems remove only a small portion of the cover at any one time." Where individual trees or small groups of trees are harvested, the remaining trees will generally use any increased soil moisture that becomes available following timber harvest.

2. Peak Flows

As addressed in Chapter 3 (p. 22), no increases in peak flows would be anticipated in association with the proposed density management.

Road construction would be limited to temporary roads on ridge top locations where they which would not intercept any subsurface flow or streams. The roads would be outsloped for drainage and would not extend the drainage network. As a consequence, road construction related to the project would not enhance peak flows.

3. Water Quality

Stream Temperature

Shade from trees near stream channels is important in reducing direct solar radiation. The "no-harvest" buffers and light thinning in areas susceptible to solar heating would ensure that any increases in stream temperature would be negligible.

Sediment

Directionally felling of trees away from streams and prohibition of equipment operation within "no-harvest" buffers would minimize the risk of soil displacement and potential surface erosion that could transport sediment into streams. Yarding corridors would not cross streams further minimizing the potential for soil disturbance.

Nonetheless, felling and yarding operations in riparian areas, outside of the "no-harvest" buffers could result in localized soil disturbance and the short-term potential for sediment. However, the "no-harvest" buffers would protect stream bank stability and eliminate potential bank and channel erosion.

The majority of root strength responsible for maintaining stream bank integrity exists within a distance of approximately one-half the crown diameter of existing vegetation (FEMAT 1993, p. V-26), which is 15-30 feet in the project stands.

In conjunction with the "no-harvest" buffers, seasonal operating restrictions and Best Management Practices would be implemented to minimize soil disturbance and potential erosion. Non-compacted forest soils in the Pacific Northwest have very high infiltration capacities and are not effective in transporting sediment by rain splash or sheet erosion (Dietrich et. al. 1982). As a result, sediment delivery from adjacent density management operations would not be anticipated. In the long term, recruitment of additional large wood to stream channels, as a result of density management, would reduce suspended sediments by creating additional capacity for sediment storage.

4. Road Conditions and Timber Hauling

Temporary road construction would be limited in scope, less than one mile. Roads would be located in stable locations and constructed using Best Management Practices (ROD/RMP, pp. 131-136) as described above. Best Management Practices are designed to minimize the potential for erosion and sediment transport. This would include minimizing excavation and endhauling waste material to approved disposal sites rather than sidecasting. Road surfaces would be shaped and drainage dips and rolling dips installed so that run-off is distributed across the landscape rather than concentrated. As a result there would be negligible potential for sediment delivery.

Temporary roads would be hydrologically disconnected from the natural stream network. Construction features similar to those for permanent road construction would be applied. As noted in Chapter 2 (p. 8), the intent would be to construct, use and decommission these roads in a single dry season. If not possible, these roads would be winterized and decommissioned after use the following year. In either event, because these roads would not be accessible to vehicular use during the wet season and they are located along ridges, they would not pose a risk for sediment delivery.

Road construction and renovation would not be located in proximity to riparian areas. Any sediment from road development would filter out as water passes overland, so that no sediment would be expected to reach live streams. The proposed renovations to the road system would occur along the ridge and would not measurably affect the amount of road-derived sediment currently being delivered to streams.

Hauling timber during the dry season on surfaced or unsurfaced roads would not generate or deliver fine sediments to streams. Timber hauling on any unsurfaced roads would be restricted to the dry season when mobilization of sediment would be improbable. Wet-season hauling along the Galesville reservoir route (aggregate surface) would require some surface maintenance prior to hauling.

E. Soils

To minimize impacts to soils and maintain or improve long-term soil productivity, one or more of the following project design features and Best Management Practices would be incorporated into restoration layout and contract provisions:

- Existing skid trails would be used to the greatest degree practicable. Main skid trails, landings and pile area would cumulatively affect less than ten percent of the restoration area.

- Ground-based operations would be limited to slopes of less than 35 percent.

- Ground-based operations would be seasonally restricted as described in Chapter 2 (pp. 6-7) to the part of the year when soil moisture content is at its lowest, and soils are most resistant to compaction.

- Main skid trails, including those from previous entries and other compacted areas would be selectively tilled, mulched and seeded, or treated in other manners to retard erosion and increase soil productivity. Main skid trails and other compacted areas not treated during this proposed entry would be inventoried so that treatment could be accomplished at a future time.

- Cable yarding could result in soil displacement and potential erosion. To reduce potential impacts, the following project design features would be implemented:

- Yarding would be restricted to the use of equipment capable of maintaining a minimum of one-end log suspension to reduce surface disturbance.

- The yarder would have a minimum of 100 feet of lateral yarding capacity to reduce the percentage of the surface area subject to potential surface disturbance.

III. Other Planned or Recently Completed Federal Activities in the South Umpqua River and Upper Cow creek Watersheds

Timber Management – South Umpqua River

Commercial Thinning/Density Management

In the past three years, five commercial thinning and/or density management projects have been authorized in the South Umpqua River watershed. These projects represent 422 acres out of approximately 9,150 acres, or 4.6 percent of the mid-seral stands (30-80 years old) in the watershed. Thinning may reduce the suitability of these stands for foraging and dispersal for the Federally-threatened northern spotted owl for a period of 10-15 years.

The Hurricane Ruby Commercial Thinning (CT) timber sale treated 34 acres of General Forest Management Area in the Coffee Creek 6th-field subwatershed and was completed in 2002. There were no entries into Riparian Reserves, and no permanent road construction associated with the project. Approximately 0.2 miles of permanent road was renovated.

Bigfoot Density Management (DM) is located in the Saint John Creek 6th-field subwatershed. This project will be implemented in 2004 or 2005. It will treat 68 acres allocated as Connectivity/Diversity Block and 13 acres allocated as Riparian Reserves. There is no permanent road construction associated with the project. Approximately 0.66 miles of permanent road will be improved and approximately 0.75 miles of natural surface roads decommissioned and blocked to traffic.

The Bland Days and Wasted Days CT timber sales are located in the Days Creek 6th-field subwatershed. These two projects will treat 166 acres allocated as of General Forest Management Area and Connectivity/Diversity Block, and 23 acres allocated as Riparian Reserves. There is no permanent road construction associated with either project. Renovation and improvements will be made to approximately 6.3 miles of permanent roads.

Slimewater Creek DM was located in the Shively Creek 6th-field subwatershed. This project, completed in the summer of 2003, treated 118 acres allocated as Late-Successional Reserve. There was no permanent road construction. Approximately two miles of natural surface roads were decommissioned and blocked upon project completion.

Regeneration Harvest

Analyses for regeneration harvest in the watershed are being conducted, involving four proposed sales (Major Glasco, Myrtle Morgan, Screen Pass and Hi-Yo Silver) totaling approximately 640 acres, representing 3.8 percent of the 16,784 acres allocated to the Matrix. The proposed harvest would remove approximately two percent of 32,663 acres of suitable nesting, roosting and foraging habitat for the Federally-threatened northern spotted owl that is available in the watershed.

In association with these projects, approximately 3.5 miles of new permanent construction is proposed in conjunction with 31 miles of road renovation and 7.5 miles of decommissioning. The net reduction in miles of BLM-administered roads, if all decommissioning were implemented, would represent less than 0.4 percent of the total miles of road in the watershed.

Restoration Projects – South Umpqua River

In the past two years, projects implemented in the watershed to improve aquatic habitat and water quality, and to restore access to aquatic habitat have included approximately three miles, renovation of approximately 9.5 miles of road, and replacement of two stream crossing culverts. The replacement of the culverts restored accessibility to approximately three miles of habitat for anadromous fish and 11 miles of habitat for resident fish.

An additional three culvert replacement projects are planned for implementation in the next one to two years. These projects on St. John Creek and East Fork Shively Creek would restore access to four to five miles of habitat for anadromous and resident fish.

Timber Management - Upper Cow Creek

Commercial Thinning/Density Management

In conjunction with 34 acres of density management from the Roseburg District Shively Creek Density Management Project, the Glendale Field Office, Medford District has 286 acres of LSR density management planned in association with the Galesville Valley

Project. Taken together, the two project would modify 320 acres of spotted owl dispersal habitat, representing approximately 3.7 percent of the total available dispersal habitat provided by Federal lands in the watershed.

The Slim Jim Project, anticipated for implementation by the Glendale Field Office in fiscal year 2005, would commercially thin an estimated 400 acres of Matrix lands and apply density management to approximately 950 acres of LSR. The LSR project would be a combination of commercial and pre-commercial sized treatments.

Regeneration Harvest
None is planned in the foreseeable future.

Restoration Projects – Upper Cow Creek

Replacement of stream crossing culverts was begun in fiscal year 2003 and will into fiscal year 2005. The projects, which include Whitehorse and Fizzleout Creeks, will restore access to approximately five miles of fish-bearing stream, representing seven percent of the 71.7 miles of fish-bearing stream identified in the watershed.

IV. Monitoring

Monitoring would be done in accordance with the ROD/RMP, Appendix I (p.84, 190-192, & 194-199). Monitoring efforts would be targeted at the following resources: Late-Successional Reserves; Water and Soils; Wildlife Habitat; Fish Habitat; and Special Status and SEIS Special Attention Species Habitat.

Chapter 5
LIST OF AGENCIES/PERSONS CONTACTED, PREPARERS AND LITERATURE CITED

This project was included in the Roseburg BLM Project Planning Update (Date?). A notice of decision would be published in the Roseburg *News-Review* if the decision is made to implement the project.

I. Agencies and Persons Contacted:

Adjacent Landowners
Registered Down-Stream Water Users
Cow Creek Band of Umpqua Tribe of Indians

II. Preparers and Contributors:

Paul Ausbeck	NEPA Coordinator
Bill Adams	Fuels Management
Kevin Carson	Silviculture
Matt Fairchild	Fisheries Biologist
Dennis Hutchison	Soil Scientist
David Harman	Engineering
Chris McAlear	Management Representative
Frank Oliver	Project Leader/Wildlife Biologist
Don Scheleen	Archaeologist/Cultural Resources
Alisa Spafford	EA Writer
Larry Standley	Hydrologist
Dawn White	Botanist

III. Agencies, Organizations, and Individuals to be notified of the Availability of the EA and "Draft" FONSI:

Doug Heiken, Oregon Natural Resources Council
Francis Eatherington, Umpqua Watersheds, Inc.
NOAA Fisheries
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Robert Ragon, Executive Director Douglas Timber Operators
Ronald Yockin, Legal Counsel for the Douglas County Commissioners
U.S. Fish and Wildlife Service
Roseburg District Resource Advisory Committee

LITERATURE CITED AND REFERENCES:

Adams, P.W. and J.O. Ringer. 1994. The Effects of Timber Harvesting & Forest Roads on Water Quantity & Quality in the Pacific Northwest: Summary & Annotated Bibliography. Forest Engineering. Department., Oregon State University. 147 pp.

Beschta, R.L. 1978. Long-term Patterns of Sediment Production Following Road Construction and Logging in the Oregon Coast Range. Water Resources Research 14-6: pp 1011-1016.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83 – 138 *in* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats, W.R. Meehan, editor. American Fisheries Society Special Publication No. 19, Bethesda, MD.

Csuti,B. A., J. Kimerling, T.A. O'Neil, M.M. Shaughnessy, E.P. Gaines, M.M.P. Huso. 1997 Atlas of Oregon Wildlife: Distribution, Habitat, and Natural History.

Dietrich, W.E., T. Dunne, N.F. Humphrey, and L.M. Reid. 1982. Construction of Sediment Budgets for Drainage Basins in Sediment Budgets and Routing in Forested Drainage Basins. USFS General Technical Report PNW-141.

Drew, T.J. and J. Flewelling. 1979. Stand Density Management: an Alternative Approach and Its Application to Douglas-fir Plantations. Forest Science, Vol. 25, No. 3, pp. 518-522.

Federal Register. 1998a. Endangered and Threatened Species; Threatened Status for the Oregon Coast Evolutionary Significant Unit of Coho Salmon. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. August 10, 1998 (Vol. 63, Number 153).

Federal Register. 1998b. Endangered and Threatened Species; Threatened Status of Two ESUs of Steelhead in Washington, Oregon, and California. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. March 19, 1998 (Vol. 63, Number 53).

Federal Register. 1999. Endangered and Threatened Species; Threatened Status for Southwestern Washington/Columbia River Coastal Cutthroat Trout in Washington and Oregon, and Delisting of Umpqua River Cutthroat Trout in Oregon. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. April 5, 1999 (Vol.64, Number 64/Proposed Rules).

Federal Register. 2000. Endangered and Threatened Species; Designated Critical Habitat: Habitat for 19 Evolutionary Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. February 16, 2000 (Vol. 65, Number 32).

Federal Register. 2002. Endangered and Threatened Species; Magnuson-Stevens Act Provisions; Essential Fish Habitat (EFH). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. January 17, 2002 (Vol. 67, Number 12).

(FEMAT) USDA Forest Service, USDC National Oceanic and Atmospheric Administration, USDC National Marine Fisheries Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, Environmental Protection Agency. 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Team.

Fire Program Solutions/Acacia Services, 2003. FMAPlus: Fuels Management Analysis Suite: CrownMass.

Fowler, C. 1988. Habitat Capability Model for the Northern Goshawk. Region 5, USDA Forest Service, Tahoe National Forest.

Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1991. Road Construction and Maintenance. Pages 297-323 in William R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonid Fisheries and Their Habitats. American Fisheries Society. Special Publication 19.

Greenberg, J. and K.F. Welch. 1998. Hydrologic Process Identification for Western Oregon. Prepared for Boise Cascade Corporation and the Oregon Watershed Enhancement Board, Salem, Oregon.

Goheen, D. 1996. "The 95/96 Winter Storms: Bark Beetles and Blowdown." Southwest Oregon Forest Insect and Disease Technical Center Notes.

Goheen, D. 2001. Personal Communication with Kevin Carson, Silviculturist, South River Field Office, Roseburg District BLM.

Harr, R. D. and B. A. Coffin. 1992. Influence of Timber Harvest on Rain-On-Snow Runoff: A Mechanism for Cumulative Watershed Effects. American Institute of Hydrology. pp. 455-469

Hayes, J.P., S. Chan, W. Emmingham, J. Tappeiner, L. Kellogg, and J. Bailey. 1997. Wildlife Response to Thinning Young Forests in the Pacific Northwest. Journal of Forestry. 95(8):28-33.

Hann, D.W., A.S. Hester, and C.L. Olsen. 1999. Organon, Edition 6.0. Department of Forest Resources. Oregon State University. Corvallis, Oregon.

Isaacs, F., and B. Anthony. 2003. Bald eagle nest locations and history of use in Oregon and the Washington portion of the Columbia River Recovery Zone, 1971 through 2003. Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University, Corvallis. 21 pp, 6 tables, 3 figures, 1 appendix. 34 pp.

Moore, J.A. and J.R. Miner. 1997. Stream temperatures, some basic considerations. Oregon State University Extension Service. Corvallis, Oregon.

Oregon Department of Fish & Wildlife. 1995. Aquatic Inventory Project: Physical Habitat and Fish Surveys. South Umpqua River Tributaries, Vol. 4.

Oregon Department of Environmental Quality. 2002. Oregon's Final 2002 Water Quality Limited Streams – 303(d) List.

Satterlund, D.R., and P.W. Adams. 1992. Wildland Watershed Management, second edition. John Wiley & Sons, Inc. New York.

Tappeiner, J.C., D. Huffman, D. Marshall, T. Spies, and J. Bailey. 1997. Density, ages, and growth rates in old-growth and young-growth forests in coastal Oregon. Canadian Journal of Forest Research. 27(5):638-648.

USDA, United States Forest Service and USDI, Bureau of Land Management (BLM). 1994a. 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, United States Forest Service and USDI, BLM. 1994b. Record of Decision and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.

USDA, United States Forest Service, Tiller Ranger District and USDI, BLM, Roseburg and Medford Districts. 1999. South Umpqua River/Galesville Late-Successional Reserve Assessment.

USDA, United States Forest Service and USDI, BLM. 2001. Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl.

USDI, BLM. Roseburg District. 1994. Roseburg District Proposed Resource Management Plan and Environmental Impact Statement.

USDI, BLM. Roseburg District. 1995a. Record of Decision and Resource Management Plan.

USDI, BLM. Roseburg District. 1995b. Roseburg District Integrated Weed Control Plan and Environmental Assessment.

USDI. 2001. BLM, Roseburg District, South River Resource Area. South Umpqua Watershed Analysis and Water Quality Restoration Plan.

Watershed Professionals Network (WPN). 1999. Oregon Watershed Assessment Manual. Prepared for the Governor's Watershed Enhancement Board, Salem, Oregon.

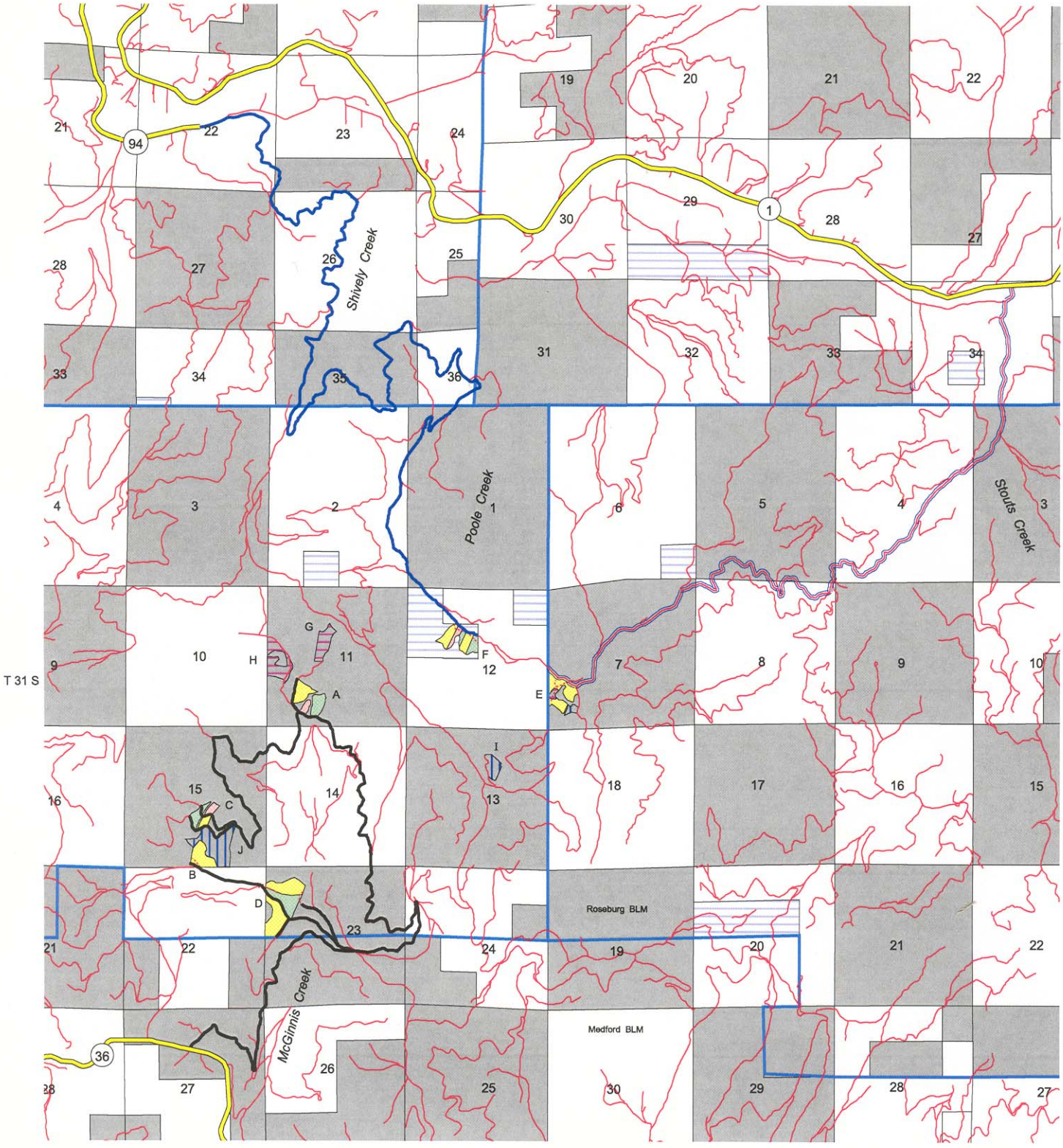
Waters, T.F. 1995. Sediment in Streams: Sources, Biological Effects, and Control. American Fisheries Society Monograph No. 7.

Wemple, B.C., J.A. Jones, and G.E. Grant, 1996. Channel Network Extension by Logging Roads in Two Basins, Western Cascades, Oregon. Water Resources Bulletin, Vol. 32, No. 6.

APPENDIX A

Project Area and Proposed Unit Maps

SHIVELY CREEK LSR DENSITY MANAGEMENT



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T31S, R3,4W

Willamette Meridian, Douglas Co., OR.

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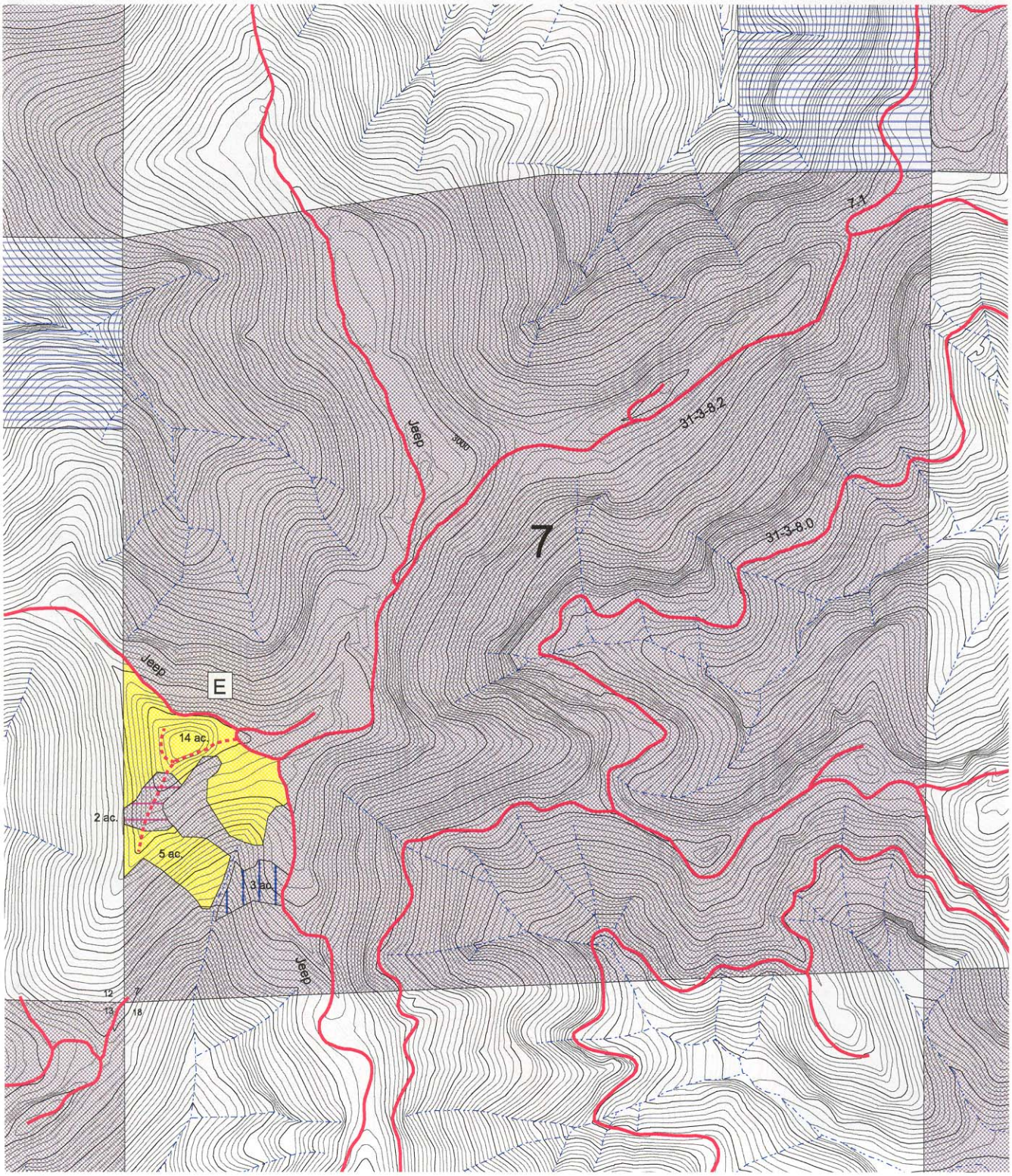
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

Temporary Road
Existing Road
County Highway

Heavy Thinning Area
Moderate Thinning Area
Light Thinning Area
Tree Girdling Area
Snag/Down Wood Creation
BLM (O&C) Land
BLM (PD) Land
Private Land

11-3-2003

SHIVELY CREEK LSR DENSITY MANAGEMENT



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1"=1000'

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

Existing Road
Construct, Decommission
Stream
100' Contour
20' Contour

Moderate Thinning Area
Tree Girdling Area
Snag/Down Wood Creation
O&C Land
PD Land
Private Land

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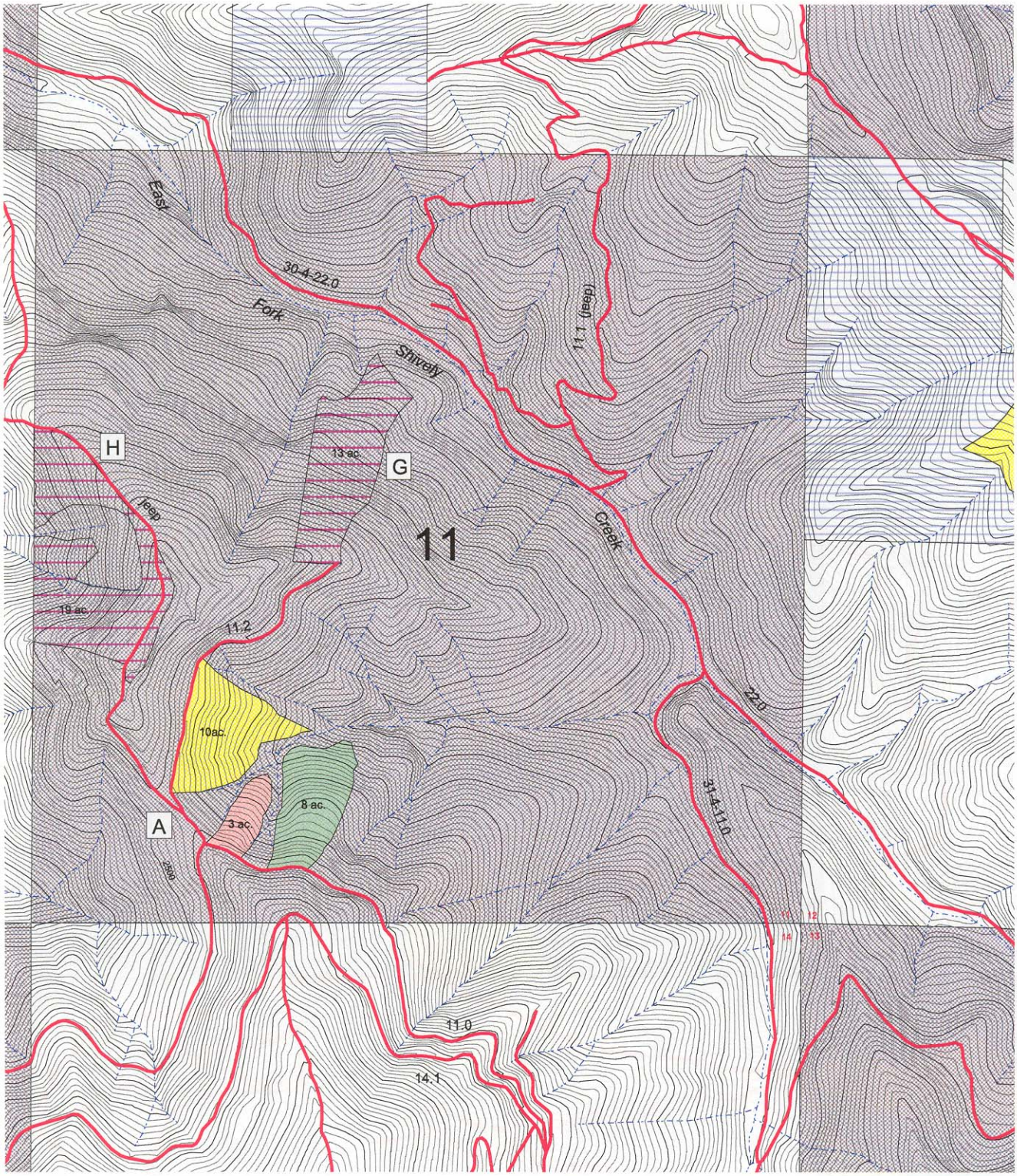
SHIVELY CREEK LSR DENSITY MANAGEMENT



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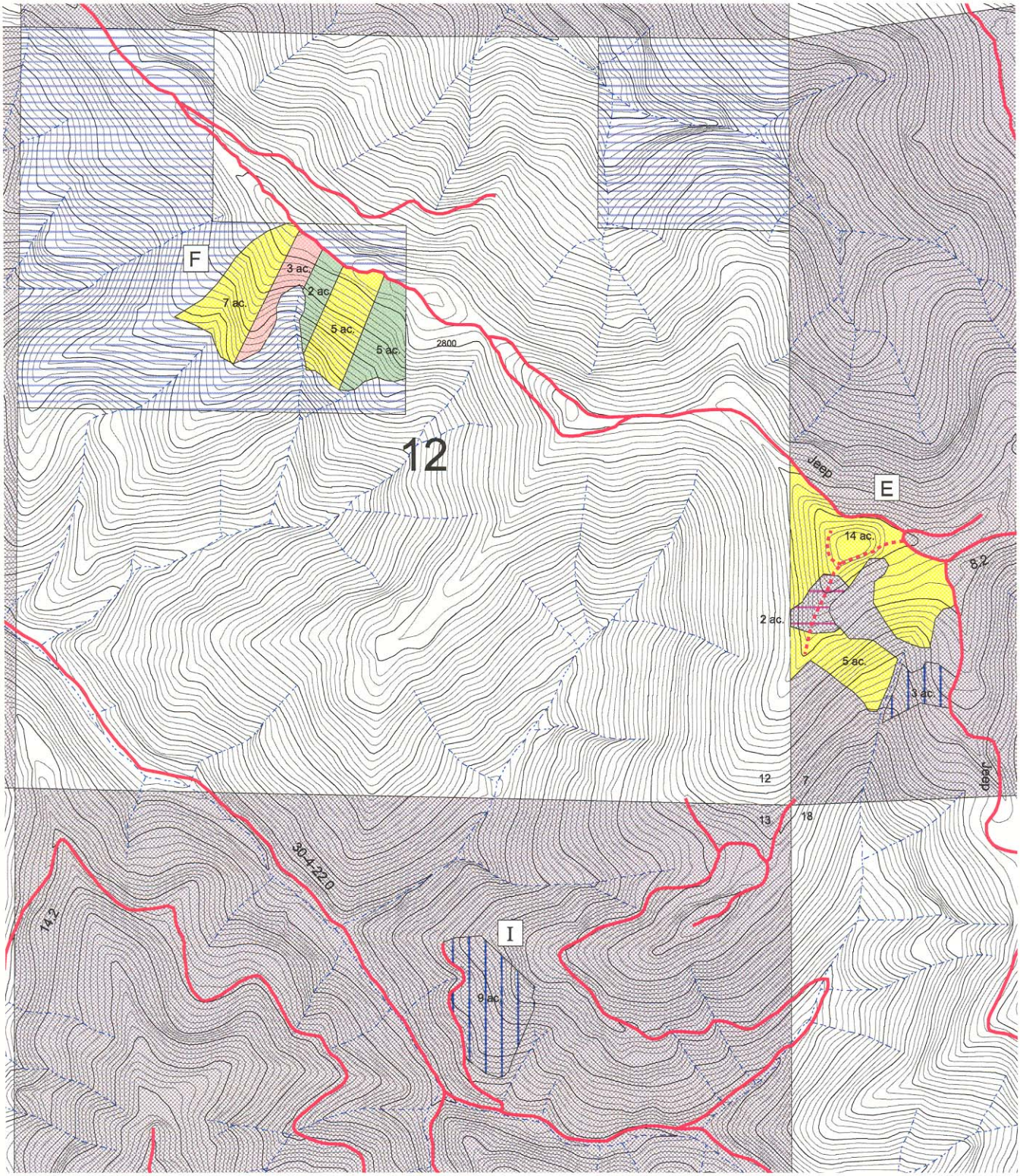
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

Existing Road
Stream
100' Contour
20' Contour

Heavy Thinning Area
Moderate Thinning Area
Light Thinning Area
Tree Girdling Area
O&C Land
PD Land
Private Land

11-3-2003

SHIVELY CREEK LSR DENSITY MANAGEMENT



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Willamette Meridian, Douglas Co., OR.

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1"=1000'

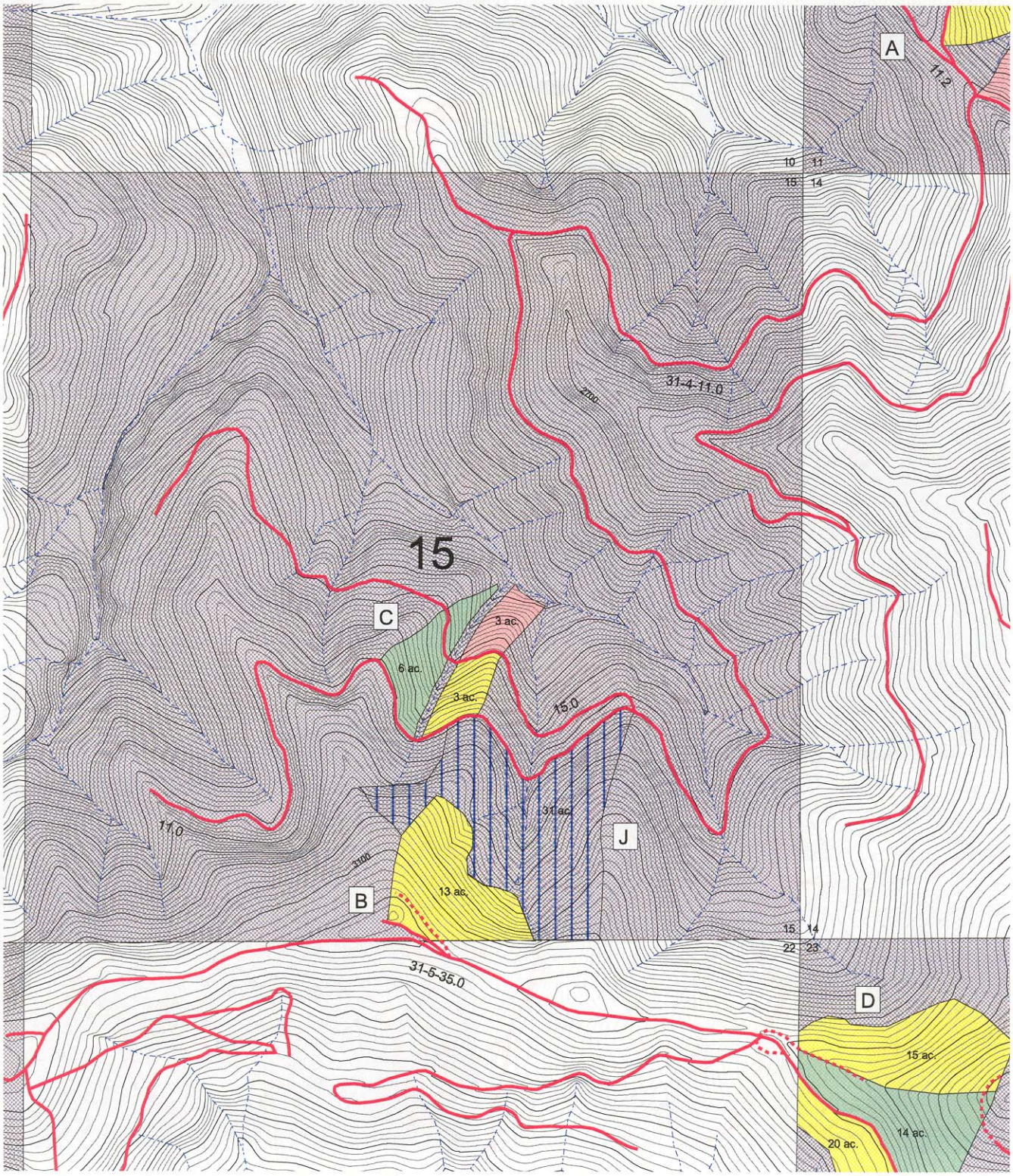
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

Existing Road
Construct, Decommission
Stream
100' Contour
20' Contour

Heavy Thinning Area
Moderate Thinning Area
Light Thinning Area
Tree Girdling Area
Snag/Down Wood Creation
O&C Land
PD Land
Private Land

11-3-2003

SHIVELY CREEK LSR DENSITY MANAGEMENT



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T31S, R4W
Willamette Meridian, Douglas Co., OR.

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1"=1000'

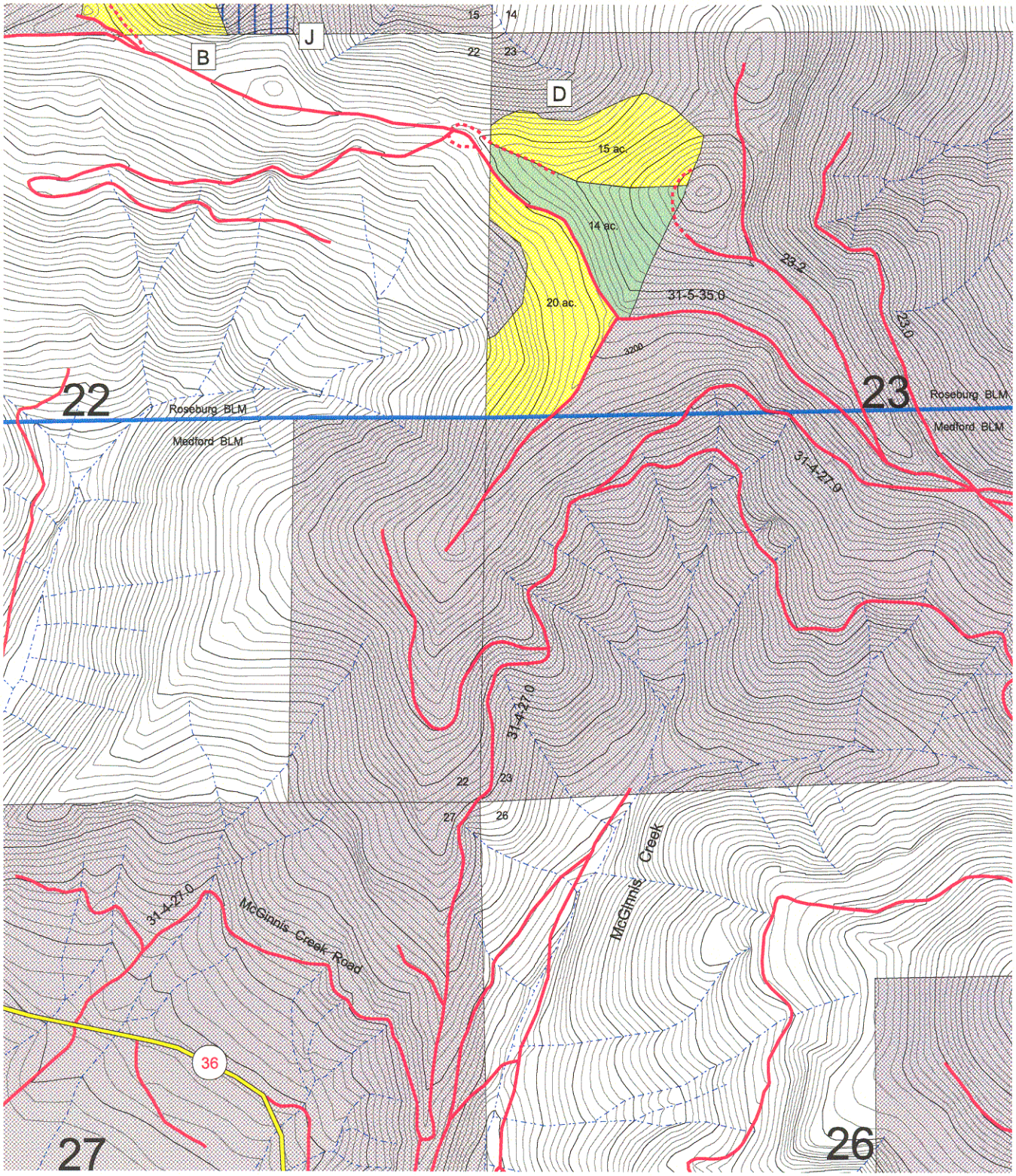
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

Existing Road
Construct, Decommission
Stream
100' Contour
20' Contour

Heavy Thinning Area
Moderate Thinning Area
Light Thinning Area
Snag/Down Wood Creation
O&C Land
Private Land

11-3-2003

SHIVELY CREEK LSR DENSITY MANAGEMENT



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T31S, R4W
Willamette Meridian, Douglas Co., OR.

1000 0 1000 Feet

1"=1000'

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

County Highway
Existing Road
Construct, Decommission
Stream
100' Contour
20' Contour

Moderate Thinning Area
Light Thinning Area
Snag/Down Wood Creation
O&C Land
Private Land

11-3-2003

APPENDIX B

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

The following elements of the human environment are subject to requirements specified in statute, regulation, or executive order.

These resources or values are either **not present** or **would not be affected by the proposed actions or alternative**, unless otherwise described in this EA. This negative declaration is documented below by individuals who assisted in the preparation of this analysis.

ELEMENT	NOT PRESENT	NOT AFFECTED	IN TEXT
Air Quality		X	X
Areas of Critical Environmental Concern	X		
Cultural Resources		X	X
Environmental Justice		X	
Farm Lands (prime or unique)	X		
Floodplains	X		
Invasive, Non-native Species		X	X
Native American Religious Concerns	X		
Threatened or Endangered Wildlife Species			X
Threatened or Endangered Plant Species		X	X
Wastes, Hazardous or Solid	X		
Water Quality, Drinking/Ground		X	X
Wetlands/Riparian Zones		X	
Wild & Scenic Rivers	X		
Wilderness	X		
Visual Resource Management		X	X