

Cottonsnake Timber Sale

EA# OR118-03-006

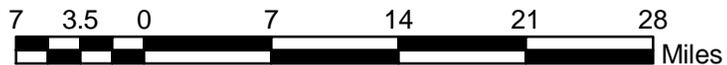
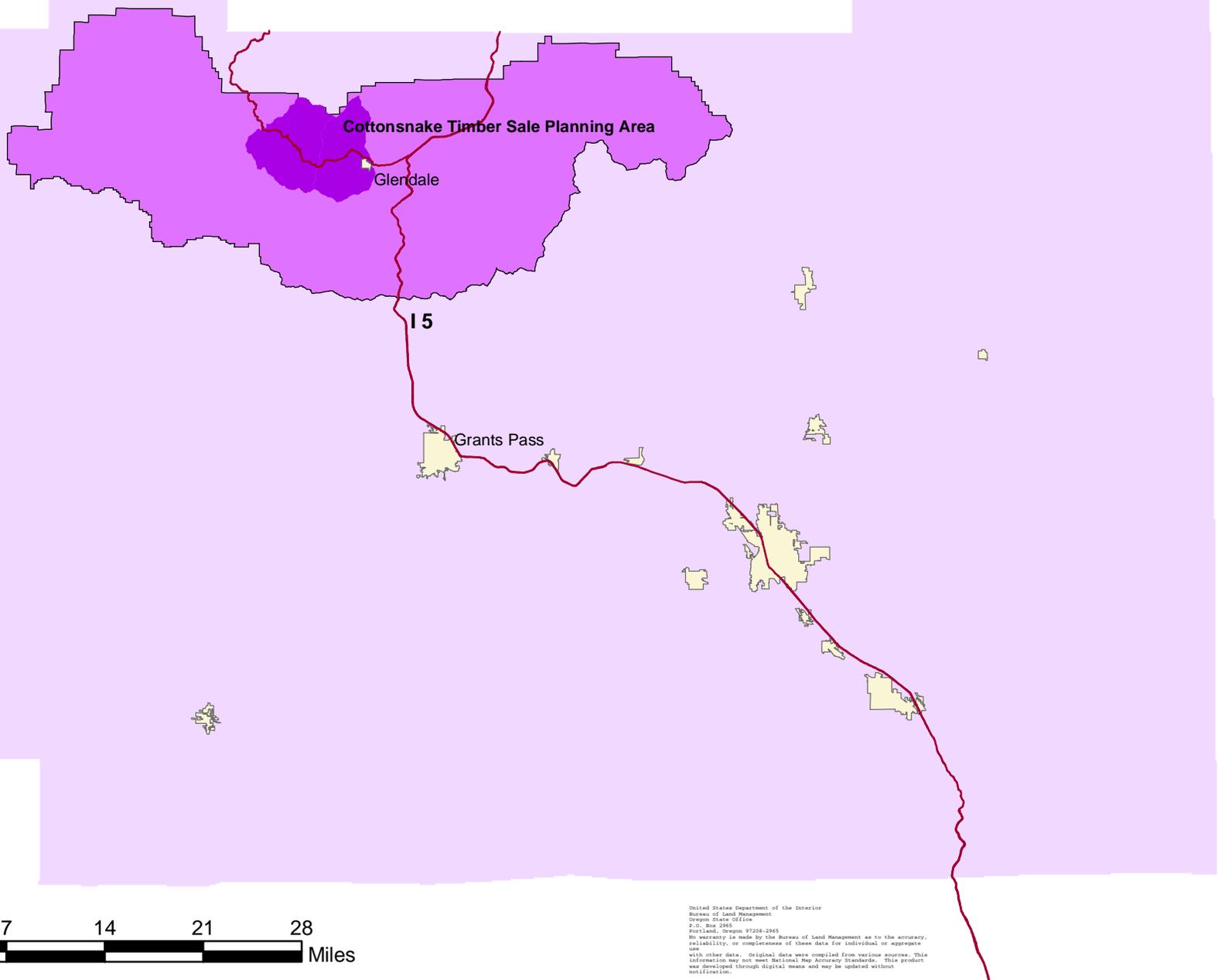
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Proposed agency actions: A series of projects proposed to assist in meeting the land use objectives identified in the Medford District BLM Resource Management Plan. The primary purpose for this proposal is to produce commercial timber.

Type of statement: Environmental Assessment

Lead agency: United States Department of the Interior
Bureau of Land Management
Medford District, Glendale Resource Area

Cottonsnake Timber Sale Vicinity Map



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Chapter 1 - Purpose and Need

1.0 Introduction

The Glendale Resource Area of the Medford Bureau of Land Management (BLM) proposes management activities within the Cottonsnake Planning Area. The Planning Area follows 6th field sub-watershed boundaries. The three major 6th field boundaries include Langdon, McCullough/Rattlesnake, and Windy which are within the larger Middle Cow Creek analytical watershed, also called a fifth field watershed. The exception is that two proposed units (units 1, and 5B) extend north into the 5th field Middle Creek watershed, a Tier 1 Key Watershed. Lands within the Planning Area resemble a checkerboard pattern of public and private lands, including the town of Glendale on the southwest edge. However, BLM planning decisions apply only to BLM-administered lands

A set of relevant issues for the proposed project was developed by the interdisciplinary team after considering input from the public and other agencies. This Environmental Assessment (EA) focuses on these relevant issues, both in terms of project design features (PDFs) and in describing environmental effects. This environmental assessment addresses activities up to the time when reforested stands are considered stocked and established.

1.1 Purpose and Need

The Glendale Resource Area proposes a timber sale to assist in meeting the land use needs identified in the Medford District BLM Resource Management Plan (RMP) dated April 14, 1995. The main purpose of this proposal is to produce commercial timber. Commercial harvesting would occur on lands identified in the RMP as being within northern general forest management area lands (northern GFMA) of the matrix land allocation. Northern GFMA lands contain specific guidelines for managing matrix lands north of Grants Pass. One of the primary stated objectives for northern GFMA lands is that “Suitable commercial forestland would be managed to assure a high level of sustained timber productivity. Emphasis would be placed on use of intensive forest management practices and investments to maintain a high level of sustainable resource production while maintaining long-term site productivity, biological legacies (retained green tree-trees, snags, and coarse woody debris), and a biologically diverse forest matrix” (RMP p. 187).

1.2 Plan Conformance

This Environmental Assessment (EA) tiers to and conforms to the *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (FSEIS, 1994 and ROD, 1994); the *Medford District Proposed Resource Management Plan/Environmental Impact Statement* and the *Medford District Record of Decision and Resource Management Plan*

(EIS, 1994 and RMP, 1995); and the *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (FSEIS, 2000 and S&M ROD, 2001) and amendments. Tiering refers to the coverage of general matters in broader environmental impact statements, such as those listed above.

The *Middle Cow Creek Watershed Analysis* and *Cow Creek Watershed Analysis* are incorporated by reference and are non NEPA documents.

1.3 Decisions to be Made

The Glendale Resource Area Field Manager will:

- 1) Select an alternative.
- 2) Determine if the selected alternative would have significant effects, and whether to prepare an environmental impact statement, or issue a Finding of No Significant Impact (FONSI)
- 3) Determine whether the selected alternative is consistent with the Medford Resource Management Plan and broader level plans.

1.4 Issues of Concern

The following relevant issues were identified in the project by the interdisciplinary team (IDT) as being potentially significant. This environmental assessment (EA) focuses on these issues, both in terms of project design features (PDFs) and in describing environmental effects.

1. Increased road density and harvest activities. Timber harvesting and road building could increase the risk of sedimentation into streams containing federally listed threatened fish species as well as other aquatic species.
2. Effects to wildlife from harvesting. Timber harvest could fragment and remove late-successional forest habitat, affecting several species associated with that habitat. Section 23 has been identified as being relatively intact.
3. Effects in Totten and Wood Creek drainages. Harvesting by private landowners on adjacent lands has increased effects, particularly in Totten Creek and Wood Creek sub-watersheds. Activities from this project could increase negative effects to these drainages.

4. Effects on the Rural Interface Area (RIA). Timber harvest could affect visual resources, domestic water supplies and other aspects related to people living and using the area as discussed in the RMP.

Chapter 2 – Alternatives

2.0 Introduction

This chapter describes the alternative proposals and compares their environmental impacts as specified in 40 CFR § 1502.14. Three action alternatives were developed by the interdisciplinary team after considering the relevant issues identified in chapter 1. Relevant issues also serve the purpose of sharply defining potential effects of each alternative. The “No Action” alternative was analyzed in addition to the three action alternatives. Descriptions focus on potential actions, outputs, and any related mitigation. Timber harvest volume estimates are provided for comparison purposes and are outputs of forest management. More accurate harvest volumes would be provided, depending on the alternative selected, after certified cruisers appraise each harvest unit prior to sale of timber.

2.1 Project Design Features

Project design features (PDFs) are specific measures included in the site specific design of the alternatives to minimize adverse impacts on the human environment. Many PDFs were developed by the ID team to limit impacts from either one or several alternatives. Where the PDF is limited to one or two alternatives it is so noted. Also, many PDFs are contained under Best Management Practices (BMP), Appendix D, in the Resource Management Plan (RMP). Some of those have been included here for ease of fully understanding the project.

Any changes to PDFs during project implementation would require approval by the Glendale Field Manager.

2.1.1 Fish/Streams/Riparian Habitat

All activities within riparian reserves would be consistent with the Aquatic Conservation Strategy of the Northwest Forest Plan.

In accordance with the Medford District RMP and the Northwest Forest Plan (NFP), riparian reserves would be established along all intermittent and perennial streams. Riparian reserve width on fish streams would be a minimum of two site potential tree heights. Riparian reserve widths would be 170 feet (one site potential tree) on each side of non-fishery intermittent and perennial streams. Though none have been located at this time, riparian reserve width on springs and seeps would be 100 feet.

No timber harvest would occur within riparian reserves. Trees within one tree length of the riparian reserve are to be directionally felled away from the edge so tree felling will not impact these reserves.

Trees in riparian reserves, owl core areas, and on timber production capability classification (TPCC) withdrawn land, that are accidentally knocked over during falling and yarding would be retained on-site for fish and wildlife habitat.

Landings would not be located in riparian reserves.

Helicopter refueling sites would not be located within riparian reserves.

Removal of rock at the Rattlesnake and Dads Creek quarries would be designed to avoid entering or damaging the adjacent riparian reserves.

2.1.2 Timber Harvesting

Partial suspension would be required on all cable units to minimize soil compaction.

The number of yarding corridors would be minimized to reduce soil compaction from cable yarding. Corridors would be located at least 150 feet apart at the tail end; lateral yarding would be required in all units.

Landings would be located in approved sites, designed with adequate drainage. Step landings would be re-contoured following use

The design of unit 5B would avoid timber cutting on steep head wall slopes and slopes over 65 percent (alternatives 1 and 2). In addition there would be no cutting on the rocky ridge in the center of the stand.

Helicopter landings would be constructed and used in the same season. The landings would be subsoiled (Davis 1990) following logging and planted with conifers. Exceptions would be where landings utilize existing road prisms, in which case the original roads would not be subsoiled. Dust abatement on landings would include rocking or lignin. Adequate drainage would be provided to minimize erosion.

Helicopter landings located on private lands shall comply with road use agreements and all applicable state and federal environmental laws, regulations and standards.

Helicopter landing sites, other than those identified in this EA, would be approved by the Glendale Field Manager and meet state and federal regulations.

In units 3 and 10, directional falling and hand piling would be done to protect existing regeneration. Multiple landings would be used under alternative 1.

For wildlife structural considerations the large trees along the ridgetop road in unit 8A would be retained, except where it is necessary to widen the road.

2.1.3 Transportation

The roads in the Totten Creek area would be renovated to reduce siltation.

Temporary roads and helicopter landings would be winterized with water bars, berms, dikes, dams, sediment basins, gravel, or mulched as needed. The term **Winterize** means to minimize the amount of erosion which takes place before the disturbed soil and new surfaces are stabilized.

Normal road maintenance, road renovation, and log hauling would be restricted to the seasons described below and also specified in Tables 2-2, 2-3, 2-5, 2-6 and 2-8.

Paved roads	-	All year
Rocked roads	-	April 5 to November 15
Natural surface roads	-	May 15 to October 15
New construction	-	May 15 to October 15

If the roads are deemed too wet (road surfaces are deforming and road damage or sediment production is likely) during a designated haul season, no hauling would be allowed unless approved by the Field Manager. If extended dry weather conditions exist during the restricted log hauling season, the Field Manager may approve a provisional off-season log hauling agreement. The purchaser would be required to request the off-season log haul from the Field Manager in writing.

New construction, decommissioning and road renovation would occur only between May 15 and October 15 of the same calendar year. Culvert replacement work on live streams would be restricted to the period within July 1 through September 15 in accordance with Oregon Department of Fish and Wildlife (ODFW) instream work period guidelines.

Surface area of erodible earth exposed at any one time by grubbing and excavation would not exceed **2** acre after September 15 to avoid excessive erosion during fall rains.

Excavated material would be end-hauled to designated locations where necessary to maintain site productivity, reduce ravel potential, or where side-casting would adversely affect riparian areas.

Dust abatement would be required during dry weather on roads used for hauling to prevent loss of fines in road surfacing.

Energy dissipators and down spouts would be installed at cross-drain and stream culverts where necessary to protect road fill slopes that are not adequately protected by natural materials.

Road cuts, fill slopes, borrow material and other bare ground disturbed by road construction activities would be mulched and seeded prior to autumn rains.

The existing section 24 jeep road (private) leading to unit 3 would be winterized after hauling to prevent erosion. A temporary spur would be constructed to minimum width off this jeep road for access to unit 3 and would be obliterated and planted with conifer species after logging (Alt 1).

Under alternative 1, new road construction (road 32-7-26.1) accessing unit 4A, 27 and 28 would be minimum width and out-sloped where possible. Fine textured soil areas would be spot rocked to reduce erosion. Road construction would avoid known locations of red tree vole populations, molluscs, Del Norte salamanders (*Plethodon elongates*) and special status plant populations on federal land. This road would be barricaded after harvest and site prepped at property line.

Renovation of road 32-7-26, accessing unit 8A, would include rocking the surface. The existing spur road on BLM lands in unit 8A would be discontinuously ripped, water-barred, mulched and planted with conifers.

Renovation of the existing road accessing unit 13 D would be winterized and barricaded just past the existing large helicopter landing.

Road 33-7-13.2 accessing unit 15 from the bottom would be decommissioned to the end of the quarry area.

2.1.4 Special Status Wildlife Species and their Habitat

The proposed sale is located in the Middle Cow Creek watershed as designated in the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion (1-7-01-F-032) issued October 12, 2001. Informal consultation with the National Marine Fisheries Service (NOAA fisheries) for listed fish species will occur prior to issuing the decision record.

For any potential timber hauling through the Roseburg District BLM administered lands (alternative 2), the terms and conditions in Biological Opinion (# 1-15-03-F-160) issued to the Roseburg District by the US Fish and Wildlife Service would be followed.

2.1.4.1 Spotted Owls (threatened)

No treatments would take place in the 100-acre northern spotted owl (*Strix occidentalis*) activity centers. Road construction and harvesting of unit 3 would be designed to avoid the 100 acre spotted owl core areas. Trees within the core area would not be used for guy trees.

Spotted owl surveys, though not required, would be conducted in the spring of the year timber sale units would be logged to ensure owls are not present. All activities will comply with the U.S. Fish and Wildlife Service's Terms and Conditions and Project Design Criteria (Biological Opinion 1-7-01-F-032). Delay of project activities will occur if hatching year (fledgling) spotted owls are known or suspected within or immediately adjacent to a unit. Work activities which have the potential to disturb nesting owls (such as tree falling, yarding, slashing, burning, road construction and renovation, and use of chain saws or other power equipment) would not take place within ¼ mile of known spotted owl sites between March 1 and June 30. This would affect the following units: 3, 4A, 4B, 5B, 8A, 10, 13A, 13B, 15, 27, 28, 34, 35A, 35B. There would also be a restricted zone of 1.0 mile for any unmuffled blasting, which might occur within the Rattlesnake and Dads Creek Quarries. The restrictions mentioned above could be waived in a particular year if the wildlife biologist determines that spotted owls are not nesting or that no young are present that year.

2.1.4.2 Marbled Murrelet (threatened)

Since the Planning Area is in Survey Area D (35 to 50 miles inland), no surveys for marbled murrelets are required, and no seasonal or daily restrictions apply on Medford District BLM lands. However, if hauling occurs north through the Roseburg District BLM (alternative 2) operations would adhere to daily operating restrictions (DOR) in the Roseburg BLM BO # 1-15-03-F-160. The DOR would limit operations to the time from two hours after sunrise to two hours before sunset from April 1 to August 5.

2.1.4.3 Northern Goshawk (BLM Sensitive)

Surveys indicate that there are no northern goshawks in the Planning Area. If a northern goshawk (*Accipiter gentilis*) nest is located, it would be protected with a 30-acre nest core area and no activity would be permitted within 1/4 mile of the nest between March 1-July 15, or until a biologist has determined that nesting is not occurring or that the juveniles have sufficiently dispersed.

2.1.4.4 Raptors

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

2.1.5 Survey and Manage Species

Protocols for species protection are evolving. Placement of buffers is current policy for BLM actions to maintain species viability. The actions proposed in this EA would be implemented in accordance with approved management recommendations and/or in accordance with approved policy and planning documents at the time of the action.

2.1.5.1 Great Gray Owl (Survey and Manage)

Surveys for great gray owls have been conducted in the Planning Area and this species has not been found. Current guidance requires that if a great gray owl nest site were to be detected, a 1/4 mile no-cut buffer would be established around the known nest site.

2.1.5.2 Red Tree Vole (Survey and Manage)

Known red tree vole (*Aborimus pumo*) sites would be protected with a 10 acre no-cut buffer of the best available habitat. Individual red tree vole nest trees, and adjacent trees, would be retained. Currently this affects unit 10, 38, and the new road construction to unit 4 and 27 (road 32-7-26.1). The Species Review Process for 2002 (as disclosed in BLM-Instruction Memorandum No. OR-2003-003 and as described in S&M ROD, p.8) changed the protection category of the red tree vole in this area from Category C to Category D. The difference between the two categories is that pre-disturbance surveys are no longer required.

2.1.5.3 Del Norte Salamander (Survey and Manage)

Only known Del Norte salamander sites would be protected, as disclosed in the S&M ROD. Protection of known sites includes:

1. a buffer of one site potential tree, or 100 foot horizontal distance, whichever is greater, surrounding the site
2. within the site and the surrounding buffer, at least 40 percent canopy closure would be retained, and no activities will be permitted which will disrupt the surface talus layer
3. partial harvest within the buffer may occur provided 40 percent canopy closure is maintained and harvest is implemented with helicopters or high-lead cable systems to avoid compaction or other disturbance to talus
4. talus areas will be protected from prescribed fire using all practicable means to minimize disturbance and loss of habitat for Del Norte salamanders.

2.1.5.4 Molluscs (Survey and Manage)

Only known survey and manage mollusc sites would be protected according to established protocol.

2.1.5.5 Plants

Populations of special status plants, including survey and manage species identified for protection in the S&M ROD and amendments, would be protected with a 100 foot no-cut buffer, or to approved protocol, if available. Prescribed burns would not be planned within these buffers.

Heavy equipment would be washed before moving into the Planning Area to remove soil and plant parts to prevent the spread of invasive and noxious weeds and disease.

2.1.6 Fuel Treatments

Piles would be burned in the fall to winter season after one or more inches of precipitation has occurred to reduce scorch and mortality to the residual trees and shrubs and to prevent soil damage. Underburning would be conducted under favorable fuel and weather conditions, typically from fall through late spring, while meeting resource objectives. Summer or early fall would be less common, but can be feasible when needed to meet resource objectives and when escape fire risk can be mitigated. The Field Manager will determine whether changes would be made to better meet fuels objectives if planned fuels treatments require specific adjustments.

2.1.7 Air Quality / Smoke Management

All prescribed burning would be managed in a manner consistent with the requirements of the Oregon Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. When burn units are adjacent to rural residential areas, burning would be timed to minimize the amount of residual smoke. This can be accomplished by burning when conditions for smoke dispersal are optimal such as during rainy days and periods when atmospheric instability is present.

Patrol and mop-up of burning piles would occur when needed to prevent burning areas from reburning or becoming an escaped fire.

2.1.8 Snags and Down Logs

All regeneration or overstory removal harvest units would be guided by the "Guidelines for Snag and Down Wood Prescriptions in Southwestern Oregon" (White). The ROD provided for specific coarse woody measures to be developed (C-40). Where existing sites are currently below standard levels, all non-hazardous snags would be retained in all harvest units. If it is necessary to fall snags for safety reasons, they would remain on site as down wood. All naturally occurring dead and down woody debris, greater than or equal to 16 inches diameter breast height (DBH) currently present in all units would remain on the site and would not be removed.

2.1.9 Rural Interface Area

Residents within 1/4 mile of helicopter units would be notified before helicopter activity begins in the area.

Public notice would be given before units 13A and 13B are burned.

Flaggers would be required along the Mt. Reuben road during falling and yarding. Traffic would not be stopped along this road for more than 15 minutes at a time.

Helicopters would not be allowed to carry logs over private residences in the northeast portion of T33S, R7W section 1.

2.2 Alternatives. This section describes each alternative and compares their environmental effects.

2.2.1 Alternative 1: Timber emphasis

Alternative 1 emphasizes timber harvesting as described under northern GFMA objectives in the Medford Resource Management Plan. However, specific project design features and the development and design of alternative 1 by the interdisciplinary team have reduced the full amount of timber harvest allowed under the RMP. Many stands were deferred for treatment under this project (see Appendix B). Alternative 1 would harvest 21 units covering approximately 341 acres. The estimated product from harvest is 5 - 9 million board feet (mmbf) of timber. A summary of the proposed harvest units and treatments is presented in Table 2-1. Locations of the units are shown on the attached maps (Appendix C).

For regeneration harvest units, the target number of trees to be retained would be 6-12 large conifers and 3 large hardwoods per acre, as well as snags and down logs to provide biological legacies and large structure. The actual number of trees retained would vary between units in order to provide additional coarse woody debris, where lacking, and additional shade on harsher sites. Units within connectivity/diversity blocks (units 1, 2A, 2B, 13A, 13B, 27 and 28) would retain at least 12-18 trees per acre (tpa) and 25-30 percent of late-successional forest habitat (RMP p. 40).

In Commercial Thin (CT) units, the existing stand would be thinned to release the residual trees. The Group Selection (GS) harvest (unit 1) would consist of small openings, approximately ½ to 1 acre arranged along yarding corridors. Approximately 2 of each strip along the corridor would be in openings while the other half would not be treated. The objectives of the selection harvest/commercial thin (Select/CT) method for units 3 and 10 are to harvest the large overstory Douglas-fir and incense-cedar leaving 3-5 trees per acre while also retaining 60-80 square feet basal area of overstory ponderosa pine. Harvesting would occur within a 50' radius of overstory ponderosa pine clumps to promote pine regeneration. In areas that are void of ponderosa pine, commercial thinning would be

applied with a 5-10 foot crown spacing. Approximately half of the total unit acres would be considered select harvest and the other half commercial thin in units 3 and 10.

The RH units would be burned where necessary to prepare the site for planting. An array of treatments is available to reduce hazardous fuels in sale units following harvest (Table 2-1). Each treatment would be based on existing and projected fuel loadings, existing vegetative conditions, slope and access.

Handpiling and burning treatments include slashing material that is at least 2' long and less than 6" diameter and then piling. Chainsaws could be utilized to reduce the size of the slash appropriate for hand piling. Ignition of piles would be with drip torches or other hand held devices. Burning would be done in the fall/winter season after significant rainfall has occurred. "Significant rainfall" means one inch in a 48 hour period, or a cumulative amount that wets the litter and duff layer and penetrates the mineral soil layer to ¼ inch or more. These conditions would typically prevent the spread of fire outside the burning pile and minimize the risk of escape. A prescribed burn plan would be prepared to address burning objectives and operational concerns. Prescribed burn plan include weather parameters and design features to diminish any potential of fire escape.

Underburning would help maintain lower fuel levels and fire hazard following the initial slashing and pile burning treatments. Future underburns would be analyzed to maintain stands in a more natural condition and prevent a future build-up of fuels. These underburns would occur 2-7 years following the initial treatments but would be dependent on the condition of the stand and regrowth of slashed vegetation.

Regeneration harvest units would be reforested using nursery stock. Additional treatments, such as shade-carding, mulching, providing browse protection and controlling competing vegetation would be evaluated following planting to ensure adequate seedling establishment.

Road work on existing roads would include renovating approximately 24 miles of roads, decommissioning 2.2 miles of roads, blocking 1.4 miles of roads and abandoning 0.8 miles of roads (Table 2-2). This alternative proposes approximately 2.4 miles of permanent road construction and 0.4 miles of temporary road construction. There would be a 0.2 mile net increase of roads. Temporary roads would be obliterated or decommissioned after harvest (Table 2-3). Hauling would occur over approximately 21 miles of existing rocked roads and 3.3 miles of natural surface roads. In addition, several miles of existing Douglas County paved roads would be utilized.

Table 2-1. Summary of Harvest Units for Alternative 1

Unit No.	Acres	Harvest/Treatment System (1)	Yarding System (2)	Fuels Mgmt./ Site Prep. (3)
1	25	GS	PS	P

Unit No.	Acres	Harvest/ Treatment System (1)	Yarding System (2)	Fuels Mgmt./ Site Prep. (3)
2A	13	RH 12-18 tpa	PS	Sl(B),P
2B	6	RH 12-18 tpa	PS	Sl(B),P
3	30	Select/CT	PS	Sl(B,C),P
4A	31	RH	PS	B
4B	6	RH	H	P
5B	7	CT	H	
8A	22	RH	PS	Sl(B),B/P
8B	2	RH	PS	B
10	47	Select/CT	H/PS	Sl(B,C),P
11	2	RH	H	P
13A	20	CT	PS	Sl(B),P
13B	12	CT	PS	Sl(B),P
13D	8	RH 6-12 tpa	TR	Sl(B),P
15	23	CT/RH 8-15 tpa	PS	Sl(B)
34	11	RH	PS	B
35A	22	CT	PS	Sl(B),P
35B	3	RH	PS	B
38	5	CT	PS	Sl(B),P
27	15	RH	PS	Sl(B),P
28	31	CT	PS	Sl(B),P
Totals	341			

(1) Harvest/Treatment Systems:

Regeneration Harvests

RH = Regeneration Harvest
OR = Overstory removal

Other Cuts

CT = Commercial thinning
GS = Group Select

Select = Selection Harvest

Regeneration harvest units would retain 6-12 trees per acre (tpa) unless noted.

(2) Yarding Systems:

Cable

PS = Partial suspension

Ground System

TR = Tractor

Aerial

H = Helicopter

(3) Fuels Management/Site Preparation:

P = Hand pile and burn

B = Broadcast burn

Sl(B) = Slash brush

Sl(B,C) = Slash brush and conifers

Table 2-2. Alternative 1 Road Management for Existing Roads

Road Number	Miles	Existing Surface Type	Proposed Improvements	Control	Seasonal Restrictions
32-6-17.0	0.32	ASC	Renovate	State	1
32-6-17.1	0.72	ABC	Renovate	BLM	1
32-6-17.2	0.46	ASC	Renovate	BLM	1
32-6-17.4	0.96	ABC	Renovate	State	1
32-6-17.4	0.26	ABC	Renovate	BLM	1
32-6-19.0	1.35	ABC	Renovate	State	1
32-6-19.1A	1.50	ABC	Renovate	State	2
32-6-19.1B	0.62	ABC	Renovate	BLM	2
32-6-19.1C	0.29	ABC	Renovate	Superior	2
32-6-19.1D	0.41	ABC	Renovate	BLM	2
32-6-22.0L	0.30	GRR	Renovate	BLM	1
32-6-22.0M	0.30	GRR	Renovate	Silver Butte	1
32-6-22.0N	0.20	GRR	Renovate	Roseburg Res.	1
32-6-22.0O	0.50	GRR	Renovate	Roseburg Res	1
32-6-31.0 A	0.65	PRR	Renovate	Superior	1
32-6-31.0 B	0.51	PRR	Abandon	BLM	2
32-6-33.0	0.72	PRR	Renovate	Superior	1
32-6-5.0	0.27	GRR	Renovate	BLM	1
32-7-25.0	0.68	PRR	Renovate	BLM	2
32-7-25.2	0.47	GRR	Renovate	BLM	1
32-7-25.1	1.65	PRR	Renovate	BLM	1
32-7-25.3	0.21	PRR	Renovate	BLM	1
32-7-26.0	0.23	NAT	6" Rock	BLM	2
32-7-36.0	0.72	NAT	Renovate	Superior	2
32-7-36.0	2.38	PRR	Renovate	Superior	1

33-6-7.0 A,B	0.93	NAT	Barricade at A 6" Rock at B	BLM	1
33-7-13.0	0.90	GRR	Renovate	BLM	1
33-7-13.2	0.57	GRR	Renovate and Decommission 0.25 miles past quarry after harvest	BLM	2
33-7-13.6	0.32	ASC	Renovate	BLM	1
33-7-2.1	2.60	ASC	Renovate	BLM	1
33-7-2.2 AB	2.51	PRR	Renovate	BLM	1
33-6-7.0	0.98	NAT	Renovate/Rock Decommission 0.35 miles.	BLM	N/A
Spur between 33-6-7.0 and 33-7-2.2	0.32	NAT	Abandon	BLM	N/A
33-7-2.2 C	1.33	NAT	Decommission	BLM	1
Sec 24 jeep road	0.50	NAT	Block and waterbar after haul	Superior	2
Total	27.64				

Table 2-3. Alternative 1 Road Management for New Roads :

Road Number	Miles	Comments	Proposed Improvements	Control	Seasonal Restrictions
32-7-26.1 perm road	1.90	Access units 4A, 27, 28 Block at property line	NAT (conserve rock)	BLM	2
Unit 8A temp spur 32-7-26	0.02		NAT Decommission after harvest	BLM	2
33-6-7.0 C Perm	0.50		NAT	BLM	1
Unit 3 temp spur	0.34		NAT Obliterate after harvest	BLM	2
Unit 10 temp spur	0.04		NAT Decommission after harvest	BLM	2
Unit 15 temp spurs (2)	0.04		NAT Decommission after harvest	BLM	2
Total	2.84				

Definitions:

ABC Aggregate Base Course
 ASC Aggregate Surface Course
 GRR Grid Rolled Rock
 NAT Native Surface
 PRR Pit Run Rock

Seasonal Hauling Restrictions:

0 None
 1 April 15 through November 15
 2 May 15 through October 15

Quarry: Rattlesnake quarry S1/2 sec 13, T33S, R7W, Dads Creek Quarry

2.2.2 Alternative 2: Minimize risk of sedimentation.

This alternative is responsive to the relevant issues, listed in chapter 1, of limiting new road construction and minimizing negative effects in Totten Creek and Windy Creek sub-watersheds. Private lands in these two sub-watersheds have been extensively harvested. In addition to those units being helicopter yarded under alternative 1, units 3, 4A, 13A, 13B, 27 and 28 would also be helicopter yarded. The

increased use of helicopter yarding would limit soil disturbance and eliminate the need for new road construction. Units 2A and 2B in the Windy Creek sub-watershed would be deferred at this time to allow stands in adjacent private lands to become established. Alternative 2 would harvest 19 units covering approximately 322 acres with an estimated timber harvest product, similar to alternative 1, of 5-9 mmbf of timber. A summary of the proposed harvest units and treatments is presented in Table 2-4. Locations of the units are shown on the attached maps (Appendix C).

The silvicultural prescriptions and project design features would be similar to alternative 1. The increased usage of helicopter yarding would significantly increase operation costs. Also, by not constructing 1.9 miles of road 32-7-26.1 the costs for fuels treatment, reforestation efforts, vegetation treatments and other post-harvest treatments are expected to increase substantially, possibly double, due to walk-in costs.

Units 4A, 4B, 5B and 27 would be helicopter yarded north to a landing located on a reciprocal right-of-way private road (32-7-11.3) in T 32S, R 7W, sec. 1. Road work for existing roads is the same as alternative 1 but with an additional log haul route through Susan Creek (See Table 2-5). Road work on existing roads include renovating approximately 35 miles of roads, decommissioning 2.2 miles of roads, blocking 1.4 miles of roads and abandoning 0.8 miles of roads. Alternative 2 proposes no permanent road construction and 0.1 miles of temporary road construction. There would be a net decrease of approximately 2.2 miles of roads under this alternative. Temporary roads would be obliterated or decommissioned after harvest (Table 2-6). Hauling would occur over approximately 21 miles of existing rocky roads and 3.3 miles of natural surface roads. In addition, several miles of existing Douglas County paved roads would be utilized.

Table 2-4. Summary of Harvest Units for Alternative 2

Unit No.	Acres	Harvest/Treatment System (1)	Yarding System (2)	Fuels Mgmt./Site Prep. (3)
1	25	GS	PS	P
3	30	Select/CT	H	SI(B,C),P
4A	31	RH	H	P
4B	6	RH	H	P
5B	7	CT	H	
8A	22	RH	PS	SI(B),B/P
8B	2	RH	PS	B
10	47	Select/CT	H/PS	SI(B,C),P

Unit No.	Acres	Harvest/Treatment System (1)	Yarding System (2)	Fuels Mgmt./ Site Prep. (3)
11	2	RH	H	P
13A	20	CT	H	Sl(B),P
13B	12	CT	H	Sl(B),P
13D	8	RH 6-12 tpa	TR/PS	Sl(B),P
15	23	CT/RH 8-15 tpa	PS	Sl(B)
34	11	RH	PS	B
35A	22	CT	PS	Sl(B),P
35B	3	RH	PS	B
38	5	CT	PS	Sl(B),P
27	15	RH	H	Sl(B),P
28	31	CT	H	Sl(B),P
Totals	322			

(1) Harvest/Treatment Systems:

Regeneration Harvests

RH = Regeneration Harvest

OR = Overstory removal

Select = Selection Harvest

Other Cuts

CT = Commercial thinning

GS = Group Select

Regeneration harvest units would retain 6-12 trees per acre (tpa) unless noted.

(2) Yarding Systems:

Cable

PS = Partial suspension

Ground System

TR = Tractor

Aerial

H = Helicopter

(3) Fuels Management/Site Preparation:

P = Hand pile and burn

B = Broadcast burn

Sl(B) = Slash brush

Sl(B,C) = Slash brush and conifers

Table 2-5. Alternative 2 Management for Existing Roads. This is in addition to the list of roads provided under alternative 1, Table 2-2.

Road Number	Miles	Existing Surface Type	Proposed Improvements	Control	Seasonal Restrictions
32-7-20.1	4.7	ASC	Renovate	BLM	1
32-7-18A1	1.18	ABC	Renovate	BLM	1
32-7-18A2	0.98	GRR	Renovate	BLM	1
32-7-18B	0.79	GRR	Renovate	NWTA	1
31-7-33.4B	1.3	NAT	Renovate	Roseburg Res.	2
31-7-33.4C	0.28	NAT	Renovate	Roseburg Res.	2
31-7-33.4D	0.75	NAT	Renovate	Roseburg Res.	2
32-7-12.2	0.90	PRR	Renovate	BLM	2
32-7-11.2	0.30	PRR	Renovate	BLM	2
32-7-11.3	0.30	GRR	Renovate	Boise	2
Miles in Addition to Alt. 1 Road Miles	11.48				

Table 2-6. Alternative 2 Road Management for New Roads :

Road Number	Miles	Comments	Proposed Improvements	Control	Seasonal Restrictions
Unit 8A temp spur 32-7-26	0.02		NAT Decommission after harvest	BLM	2
Unit 15 32-7-13.2 temp spur	0.04		NAT Decommission after harvest	BLM	2
Totals	0.06				

Definitions:

Seasonal Hauling Restrictions:

ABC	Aggregate Base Course		
ASC	Aggregate Surface Course	0	None
GRR	Grid Rolled Rock	1	April 15 through November 15
NAT	Native Surface	2	May 15 through October 15
PRR	Pit Run Rock		

Quarry: Rattlesnake quarry S1/2 sec 13, T33S, R7W, Dads Creek Quarry

2.2.3 Alternative 3: Minimize effects to other resources.

This alternative is responsive to a combination of relevant issues regarding effects to other resources listed in chapter 1. Alternative 3 would limit road construction, minimize activities in Totten and Windy Creek sub-watersheds and minimize fragmentation and removal of late-successional forest habitat.

In comparison to alternatives 1 and 2, alternative 3 would defer harvest activities in section 23 (units 4A, 4B, 27, and 28) and 8A, 8B, 11 and 15 to minimize impacts to late successional habitat. Unit 5B would be deferred due to the costs of helicopter yarding this isolated unit. As in alternative 2, Alternative 3 would also defer harvesting units 2A and 2B. The use of helicopter yarding would be maximized as in alternative 2. Alternative 3 would harvest 8 units covering approximately 164 acres with an estimated harvest output of between 2 and 4 mmbf. The silvicultural prescriptions and project design features would be similar to alternatives 1 and 2. A summary of the proposed harvest units and treatments is presented in Table 2-7. Locations of the units are shown on the attached maps (Appendix C).

There would be no permanent or temporary road construction. Road work for existing roads would include approximately 22 miles of road renovation, 2.2 miles of road decommissioning and 0.8 miles of road abandonment (Table 2-8). There would be a net decrease of approximately 2.2 miles of roads under this alternative. Other aspects of alternative 3 would remain similar to those described in alternative 1.

Table 2-7. Summary of Harvest Units for Alternative 3

Unit No.	Acres	Harvest/Treatment System (1)	Yarding System (2)	Fuels Mgmt./Site Prep. (3)
1	25	GS	PS	P
3	30	Select/CT	H	Sl(B,C),P
10	47	Select/CT	H/PS	Sl(B,C),P
13A	20	CT	H	Sl(B),P
13B	12	CT	H	Sl(B),P
35A	22	CT	PS	Sl(B),P
35B	3	RH	PS	B
38	5	CT	PS	Sl(B),P
Totals	164			

(1) Harvest/Treatment Systems:

Regeneration Harvests

RH = Regeneration Harvest

OR = Overstory removal

Select = Selection Harvest

Other Cuts

CT = Commercial thinning

GS = Group Select

Regeneration harvest units would retain 6-12 trees per acre (tpa) unless noted.

(2) Yarding Systems:

Cable

PS = Partial suspension

Ground System

TR = Tractor

Aerial

H = Helicopter

(3) Fuels Management/Site Preparation:

P = Hand pile and burn

B = Broadcast burn

Sl(B) = Slash brush

Sl(B,C) = Slash brush and conifers

Table 2-8. Alternative 3 Road Management for Existing Roads

Road Number	Miles	Existing Road Type	Proposed Improvements	Control	Seasonal Restrictions
32-6-17.0	0.32	ASC	Renovate	State	1
32-6-17.1	0.72	ABC	Renovate	BLM	1
32-6-17.2	0.46	ASC	Renovate	BLM	1
32-6-17.4	0.96	ABC	Renovate	State	1

Road Number	Miles	Existing Road Type	Proposed Improvements	Control	Seasonal Restrictions
32-6-17.4	0.26	ABC	Renovate	BLM	1
32-6-19.0	1.35	ABC	Renovate	State	1
32-6-19.1A	1.50	ABC	Renovate	State	2
32-6-19.1B	0.62	ABC	Renovate	BLM	2
32-6-19.1C	0.29	ABC	Renovate	Superior	2
32-6-19.1D	0.41	ABC	Renovate	BLM	2
32-6-22.0L	0.30	GRR	Renovate	BLM	1
32-6-22.0M	0.30	GRR	Renovate	Silver Butte	1
32-6-22.0N	0.20	GRR	Renovate	Roseburg Res.	1
32-6-22.0O	0.50	GRR	Renovate	Roseburg Res	1
32-6-31.0 A	0.65	PRR	Renovate	Superior	1
32-6-31.0 B	0.51	PRR	Abandon	BLM	2
32-6-33.0	0.72	PRR	Renovate	Superior	1
32-6-5.0	0.27	GRR	Renovate	BLM	1
32-7-25.0	0.68	PRR	Renovate	BLM	2
32-7-36.0	0.72	NAT	Renovate	Superior	2
32-7-36.0	2.38	PRR	Renovate	Superior	1
33-6-7.0 A,B	0.93	NAT	Barricade at A 6" Rock at B	BLM	1
33-7-13.0	0.90	GRR	Renovate	BLM	1
33-7-13.2	0.25	GRR	Decommission past quarry	BLM	2
33-7-2.1	2.60	ASC	Renovate	BLM	1
33-7-2.2 AB	2.51	PRR	Renovate	BLM	1
33-6-7.0	0.98	NAT	Renovate/Rock	BLM	N/A
Spur between 33-6-7.0 and 33-7-2.2	0.32	NAT	Abandon	BLM	N/A
33-7-2.2 C	1.33	NAT	Decommission	BLM	1
Sec 24 jeep road	0.50	NAT	Block and waterbar after haul	Superior	2
Total	24.44				

Definitions:

ABC	Aggregate Base Course
ASC	Aggregate Surface Course
GRR	Grid Rolled Rock
NAT	Native Surface
PRR	Pit Run Rock

Seasonal Hauling Restrictions:

0	None
1	April 15 through November 15
2	May 15 through October 15

Quarry: Rattlesnake quarry S1/2 sec 13, T33S, R7W, Dads Creek Quarry

2.2.4 Alternative 4 - No Action Alternative

Under the No Action alternative, the management actions described under the action alternatives would not take place at this time. RMP related routine management actions would continue to occur, including fire suppression, road maintenance and plantation maintenance. However, the opportunity for timber harvest, fuels treatments and forest health treatments in this watershed would continue to be a viable option for future entries but analyzed through a separate environmental analysis.

2.2.5 Alternatives considered but eliminated from further analysis

In developing the proposed action the interdisciplinary team began by looking at all the northern GFMA lands in the Cottonsnake Planning Area. After preliminary analysis, several of the remaining potential units were deferred from the proposed action for a variety of reasons. The potential units are summarized in Appendix B.

2.2.6 Comparison of Alternatives

Table 2-9. Summary of Specific Harvest Features by Alternative

Specific Features	Alternatives			
	1	2	3	4
Timber Harvest Levels				
Units Treated	21	19	8	0
Acres Treated	341	322	164	0
Volume Harvestable (MMBF)	5-9 mmbf	5-9 mmbf	2-4 mmbf	0
Regeneration Harvest				
Units Treated	15	13	4	0
Acres Treated	205	186	66	0
Range in Unit Size (Acres)	2-31	2-31	3-15	0
Commercial Thinning:				
Units Treated	6	6	4	0
Acres Treated	136	136	98	0
Range in Unit Size (Acres)	7-31	7-31	5-22	0
Road Work:				
Perm(Miles)	2.4	0	0	0
Temp. Minimum Roads (Mi.)	0.4	0.1	0	0
Renovation (Miles)	24	35	22	0
Decomm	2.2	2.2	2.2	0
Blocking	1.4	1.4	0	0
Abandon	0.8	0.8	0.8	0
Harvest Methods (Acres)				
Ground-based logging	8	8		0
Aerial Cable	271	113	55	0
Helicopter	62	201	109	0

Table 2-10. Comparison of Timber harvest Units by Alternative

Units Analyzed	Alt. 1 Timber Emphasis	Alt. 2 Minimize effects in Totten and Wood Creek drainages	Alt. 3 Minimize impacts to wildlife	Alt. 4 No Action
Unit 1	GS,PS	GS,PS	GS,PS	
Unit 2A	RH, multi-span skyline	defer	defer	
Unit 2B	RH,PS	defer	defer	
Unit 3	Select/CT,PS	Select/CT helicopter	Select/CT helicopter	
Unit 4A	RH,PS	RH helicopter	defer	
Unit 4B	RH,helicopter	RH helicopter	defer	
Unit 5B	CT,helicopter	CT,helicopter	defer	
Unit 8A	RH,PS	RH,PS	defer	
Unit 8B	RH,PS	RH,PS	defer	
Unit 10	Select/CT helicopter (SE section)/PS.	Select/CT helicopter (SE section)/ Less PS than alt. 1	Select/CT helicopter (SE section)/Less PS than alt. 1	
Unit 11	RH, helicopter	RH, helicopter	defer	
Unit 13A	CT,PS	CT, helicopter	CT helicopter	
Unit 13B	CT,PS	CT, helicopter	CT helicopter	
Unit 13D	RH tractor/cable	RH tractor/cable	defer	
Unit 15	RH,PS	RH,PS	defer	
Unit 34	RH,PS	RH,PS	defer	
Unit 35A	CT,PS	CT, PS	CT,PS	
Unit 35B	RH,PS	RH,PS	RH,PS	
Unit 38	CT,PS	CT,PS	CT,PS	
Unit 27	RH,PS	RH, helicopter	defer	
Unit 28	CT,PS	CT, helicopter	defer	

Chapter 3 - Affected Environment

3.0 Introduction

This chapter describes the existing resource components within the proposed Cottonsnake Planning Area that might be affected by each of the alternatives. The information in this chapter would serve as a general baseline for determining the effects of the alternatives under the Environmental Consequences (Chapter 4) section of this document.

3.1 Location:

The location of the Proposed Action

Analytical Watershed (fifth field):	Middle Cow Creek, Middle Creek
Planning Area (sixth field watershed):	McCullough/Rattlesnake, Langdon, Windy, Lower Middle Creek, Upper Middle Creek
County:	Douglas
Legal Description:	T 32S., R 6W, sections 5, 19; T 32S., R 7W, sections 13, 23, 25; T 33S., R 6W, section 6; and T 33S., R 7W, sections 1, 9, 10, 11, 13

The Cottonsnake Planning Area follows 6th field sub-watershed boundaries. The three major 6th field boundaries include McCullough/Rattlesnake, Langdon, and Windy which are within the Middle Cow Creek 5th field watershed. BLM ownership in all of the HUC (Hydrologic Unit Condition) 6 sub-watersheds is less than 50%. Non-federal ownership is primarily composed of timber producing lands in a more or less checkerboard pattern. There are old terraces along the banks of Cow Creek in the vicinity of Glendale and down stream about two miles. These areas currently support rural residential parcels.

Some proposed units (Units 1 and 5B) extend north into the Middle Cow Creek watershed, which is a tributary of Cow Creek. A watershed analysis was prepared for Middle Creek by the Roseburg District, BLM (Cow Creek Watershed Analysis, revised September 5, 1997). The Middle Creek Watershed is listed as a Tier 1 Key Watershed under the NFP.

Table 3-1 Critical Elements by Alternative . The following elements of the human environment are subject to requirements specified in statute, regulation, or executive order and must be considered in all EAs (BLM NEPA Handbook [H-1790-1]).

Resource or Issue Affected by Alternative	Alternative (Y or N)				Resource Affected by Alternative	Alternative (Y or N)			
	1	2	3	4		1	2	3	4
Air Quality	Y	Y	Y	N	Threatened & Endangered Species	Y	Y	Y	N
Area of Critical Environmental Concern (ACEC)	N	N	N	N	Wastes, Hazardous/Solid	N	N	N	N
Cultural	N	N	N	N	Water Quality	Y	Y	Y	N
Farmlands, Prime/Unique	N	N	N	N	Riparian Zones	Y	Y	Y	N
Flood plains	N	N	N	N	Wild & Scenic Rivers	N	N	N	N
Native American Religious Concerns	N	N	N	N	Wilderness	N	N	N	N
Invasive Species	Y	Y	Y	Y	Environmental Justice	N	N	N	N
*Large Down Wood	Y	Y	Y	N	*Survey and Manage	Y	Y	Y	N
Energy	N	N	N	N					

(Y) = yes, the resource is present and affected. (N) = the resource is not present or affected

*Non-Critical Element

3.2 Water Quality

There are three streams listed by DEQ as being water quality limited for rearing of anadromous fish due to temperature exceeding 64 degree over a 7 day period. These streams are Dads Creek, Skull Creek and Cow Creek. Dads Creek and Skull Creek experience extremely low flow during some drought years (eye witness observations by fisheries biologist and hydrologist). Cow Creek which flows through the Planning Area is regulated by Galesville Dam several miles upstream.

3.3 Soils

Based on the analysis in the Middle Cow Creek Watershed Analysis, there are potential problems with high soil compaction from past logging activities and relatively high road densities. Since this analysis was done, additional logging and road construction has occurred in the watershed

Soils within the McCullough HUC 6 Planning Area are mapped as belonging to the Speaker/Josephine

complex and relatively productive on slopes less than 60 percent. The ridge tops surrounding the sub-watershed are composed of soils in the Beekman /Vermissa complex which tend to be somewhat shallow. These soils still support vigorous vegetation growth due to 50 to 60 inches of annual precipitation. Soils in the Langdon HUC 6 portion of the Planning Area are much the same with the exception of an inclusion of serpentine. Plant communities within the serpentine inclusion do not support merchantable conifers and no activities are planned within them.

Mass movement has not been detected within the Planning Area. Landforms suggest that erosion and mass wasting occurred historically. This would account for deep soils (30 to 60 inches) and relatively gentle slopes on the lower third to half of the slopes in each of the drainages.

Soils information was derived from Douglas County Soil surveys from the Natural Resource Conservation Service (NRCS) and confirmed by on ground inspection by the soil specialist and other ID team members.

3.4 Fisheries

Oregon coast coho salmon, steelhead and cutthroat trout are present in some streams in the Planning Area (McCullough, Skull, Totten and Rattlesnake). They are also present in Middle Creek and the main stem of Cow Creek. Other smaller creeks and Dads Creek support populations of resident trout and other aquatic species.

3.5 Wildlife

3.5.1 Late-Successional Habitat

The late-successional habitat in the Planning Area was likely more contiguous on the landscape prior to European settlement. The current condition of the late-successional habitat at the broader fifth-field watershed and the project level are best described as a scattered pattern of residual mature forests and young stands, primarily as a result of human logging practices both on public and private lands. In addition to extensive clearcuts on private and federal lands (prior to the NFP), there has been considerable partial cutting, especially on BLM lands. In some cases this has resulted in an open overstory with conifer establishment in the understory. However, in many areas this practice has resulted in dense brush and hardwood stands under the residual conifer overstory.

In 1999 it was estimated, due mainly to harvesting on private lands, 19 percent of the entire watershed was in late-successional habitat (USDI, 1999). Recent harvesting on private lands along Cow Creek has further reduced late successional habitat in the watershed. However, federal forest land has retained 49 percent late successional habitat. Late-successional stands are highly fragmented and generally occur in small, scattered patches.

3.5.2 Connectivity/Diversity Blocks

There are eight Connectivity/Diversity Blocks entirely or partially within the Planning Area. The Northwest Forest Plan and the RMP designated these sections to provide islands of late-successional habitat to improve connectivity between Late-Successional Reserves. All of these blocks currently meet the minimum management guidelines of 25-30 percent of late-successional condition.

3.5.3 Special Status and Survey and Manage Wildlife Species

3.5.3.1 Northern spotted owls (*Strix occidentalis caurina*) Status – Federal Threatened

There are approximately 26,000 acres of suitable northern spotted owl habitat in the Middle Cow Creek Watershed (USDI 1999). Suitable habitat generally consists of stands with trees greater than 21”dbh with 60 percent or greater canopy closure.

Within the Planning Area, there are a total of fourteen northern spotted owl activity centers, including five “official” northern spotted owl activity centers with designated 100-acre core areas. An activity center is considered viable if there is at least 40 percent of the area within a 1.3 mile radius (home range) in a suitable habitat condition. Of the fourteen activity centers, thirteen are below the minimum threshold of 40 percent suitable habitat, with the fourteenth just above the threshold. Therefore this area appears to be extremely marginal in its capability to support viable populations of nesting northern spotted owls. There is one previously identified spotted owl nest site, on private land, within 3/10 of a mile of the haul route (alternative 2) that goes through the Roseburg District BLM.

3.5.3.2 Northern Spotted Owl Critical Habitat

There are two northern spotted owl Critical Habitat Units (CHU’s) in the Planning Area, #OR-62 and #OR-64. The primary function of the CHU’s is to maintain the range-wide distribution of the northern spotted owl, since this area provides an integral portion of the link from the Klamath Mountains province to both the southern end of the Oregon Coast Ranges province and the Western Oregon Cascades Province.

3.5.3.3 Marbled Murrelet (*Brachyramphus marmoratus*) Status – Federal Threatened

Although the Middle Cow Creek watershed contains approximately 9,500 acres of suitable marbled murrelet habitat, surveys both in this watershed and the adjoining watershed to the west (closer to the Coast) have failed to document any murrelets using this area. Roseburg District BLM administered lands, where activities would be limited to timber hauling, have not completed marbled murrelet surveys.

3.5.3.4 Marbled Murrelet Critical Habitat

There is no marbled murrelet critical habitat designated within the Planning Area. Roseburg District BLM administered lands, in areas where timber hauling might occur, is considered marbled murrelet critical habitat.

3.5.3.5 Peregrine Falcon (*Falco peregrinus anatum*) Status – State Endangered

No suitable habitat for breeding, nesting, or feeding is present within the Planning Area. Peregrine falcons may fly over the region during migration, but they are not expected to utilize the area other than for an infrequent overnight use.

3.5.3.6 Bald Eagle (*Haliaeetus leucocephalus*) Status – Federal Threatened

There are no known bald eagle nesting territories or winter roost sites within or adjacent to the Planning Area. There is no suitable habitat for breeding, nesting, or feeding in the area. Suitable winter roost habitat does exist, but it is generally too far removed from suitable feeding habitat to be used. Bald eagles may fly over the region, but are not expected to utilize its habitat other than as infrequent overnight use.

3.5.3.7 Northern Goshawk (*Accipiter gentiles*) Status – BLM Sensitive

Northern goshawks have been documented in this watershed, including confirmed breeding in the McCullough Creek area in 1995 (Middle Cow WA p. 46). Surveys for the northern goshawk in 1999 and 2000 did not locate any birds.

3.5.3.8 Western Pond Turtle (*Clemmys marmorata*) Status-Bureau Sensitive, Species of Concern

Western pond turtles have not been observed using the watershed's small ponds, but could be occupying portions of Cow Creek

3.5.3.9 Molluscs Status-Survey and Manage

No Survey and Manage mollusc species have been documented in the Planning Area. No aquatic Survey and Manage mollusc species are believed to inhabit the watershed.

3.5.3.10 Del Norte Salamander (*Plethodon elongatus*) Status-Survey and Manage

Del Norte salamanders are relatively uncommon amphibians with a restricted geographic distribution. They are considered as associates of old-growth forest conditions, as well as with rocky substrates,

with enough canopy closure to retain sufficient moisture to avoid desiccation. This species has been documented in several locations in the Planning Area.

3.5.3.11 Red Tree Vole (*Phenacomys longicaudus*) Status-Survey and Manage

Surveys have documented red tree voles in most parts of the watershed. This arboreal species generally occurs in older forested stands, and it is thought they have a very limited dispersal capability. It is expected there are approximately 21,000 acres of suitable federal forest lands for this species in the Middle Cow Creek watershed.

3.5.3.12 Great Gray Owl (*Strix nebulosa*) Status-Survey and Manage

Great gray owls are an uncommon species associated with conifer forest adjacent to meadows. Meadow habitat is very limited in this watershed, with most of the suitable habitat located in the valleys where there are pastures. There have been no confirmed great gray owl sightings within the watershed.

3.6 Vegetation

Riparian vegetation over thirty years of age (BLM GIS information) accounts for 75% of the vegetation along streams in the McCullough/Rattlesnake sub-watershed and 80% of the vegetation along streams in the Langdon sub-watershed. These percentages reflect vegetation conditions only within federal lands and are not typical of non-federal lands. Private ownership of portions of upper Dads Creek and upper Totten Creek were tractor logged 15 to 20 years ago and shading has not completely recovered. There are still signs of erosion occurring in the upper sections due in part to tractor logging and lack of road maintenance. Recent tractor harvest activity on private lands has increased the potential for problems in the Totten Creek drainage as well as an un-named frontal basin to the main stem of Cow Creek.

In 1997 and 2002, the Cottonsnake Planning Area was surveyed for vascular plants. Nonvascular plant surveys occurred in 2002. There were no Threatened and Endangered or Survey and Manage species located during these surveys. The Planning Area is out of the range of *Fritillaria gentneri*, *Limnanthes floccosa ssp. grandiflora*, and *Lomatium cookii*. Two nonvascular Bureau Tracking species, *Tortula subulata* and *Fissidens grandifrons*, were located in unit 16 unit 34.

3.6.1 Seral Stage Patterns

The Middle Cow Creek watershed is dominated by the Douglas-fir/tanoak/madrone plant group. Major plant species include Douglas-fir, tanoak and several brush species. Some units have remnant ponderosa pine communities. Historically these stands were probably fairly open with large pines and a scattered understory consisting of conifers, hardwoods, brush and grass. However, decades of

extensive fire suppression have allowed dense understories of young Douglas-fir to develop in some of these stands. Large wild fires burned over parts of this area in the 1950s, creating extensive areas of young stands and brush in some areas.

Timber harvesting has also altered the landscape. Partial cutting in the 1970s removed 1/3 - 2/3 of the trees in many stands and post harvest treatments did not include planting of seedlings. For this reason, understories have become dominated by tanoak, brush and hardwoods, or a mixture of brush and conifer saplings. The overstories are relatively open because most of the trees harvested were large dominants and co-dominants. Partial cutting and clear cutting, considered acceptable at that time, extended down into riparian areas. Private lands in the watershed have been extensively cut, except for some older stands in the northern portion of the area. There has been recent clearcut logging on private lands near the sale area.

3.6.2 Noxious Weeds

There are many invasive species within the Planning Area, both on federal and non-federal lands. Notable species include Scotch broom, and meadow knapweed. Blackberries have overgrown many areas along Cow Creek and many of the roadways throughout the Planning Area. Efforts on the Glendale Resource Area have been undertaken to treat some of the trouble spots along the Cow Creek access road for containment of Scotch broom.

3.6.3 Port-Orford-Cedar

There are no known areas of Port-Orford-cedar (POC) within or adjacent to the Planning Area. The nearest known population of POC occurs in the West Fork Cow Creek several miles downstream of the Planning Area and near the headwaters of Middle Creek on the Roseburg District BLM. The confluence of Middle Creek and Cow Creek is located near the West Fork confluence several miles downstream of the Planning Area.

3.7 Fire

Fire is the most important agent of disturbance in the Klamath Province. Compared to the temperate northwest, southwest Oregon's Mediterranean climate interacts with several old geological provinces to provide a unique group of species and an unusual disturbance regime. Older stands average less than 250 years of age and have been burned at least four times. The primary disturbance regime has been underburning but fires can be extensive and severe (Southwest Oregon Ecosystem Assessment Team Report). The fire frequency for southern Oregon has been reported as from "less than 3 years" to "more than 50 years" and from 20 to 200 years" (Reforestation Practices).

3.8 Rural Interface Area

Virtually all of the public lands in this watershed are subject to reciprocal right-of-way agreements between BLM and non-federal owners. This allows each party to construct roads across the other's lands and gives rights to each party for use of those roads. These agreements limit the options for the BLM to barricade or decommission roads within the Planning Area. There are several small rural residential parcels that have pasturelands in the low elevation locations along Cow Creek.

Chapter 4 – Environmental Consequences

4.0 Introduction

This chapter forms the scientific and analytic basis for comparison of alternatives. Discussions include environmental impacts anticipated from implementation of the alternatives, both positive and negative. It also identifies and analyzes mitigation measures, if any, which might be taken to avoid or reduce projected impacts. Discussions of the environmental consequences are site specific and might not have been fully analyzed in the *Final Medford District Proposed Resource Management Plan/Environmental Impact Statement (RMP/EIS)* and amendments. In keeping with the directives of the National Environmental Policy Act (NEPA), the discussions focus on impacts considered potentially significant. The level of detail and depth of impact/analysis are generally limited to that needed to determine whether new significant environmental effects are anticipated.

Direct, indirect and cumulative effects were considered.

Direct effects are site-specific and result from the immediate action, such as the harvest of a timber sale unit or the construction of a particular road. Direct effects are confined to a specific area such as a timber sale unit, a particular elk range, or a spotted owl site, and can be short term or long term.

Indirect effects occur at a different place or time than the proposed action.

Cumulative effects are generally not site-specific and are not readily attributable to any one action. Cumulative effects are the result of past, immediate, and reasonably foreseeable actions on a larger area, such as a watershed, regardless of ownership.

4.1 Effects on Water Quality

Full riparian buffers would be implemented under all action alternatives. No logging or road construction is planned in riparian reserves for any of the alternatives. Dads Creek and Skull Creek are currently identified by the Oregon Department of Environmental Quality as being limited in water quality by high stream temperature. All alternatives would not increase water temperature since riparian reserves would continue to provide adequate shading.

Alternative 1 would construct approximately 2.4 miles of new permanent roads and decommission approximately 2.2 miles; a net increase of 0.2 miles of road. The construction of road 32-7-26.1 to access units 27, 28, and 4A under alternative 1 would be a very low impact road, located on a ridge

top. Several of the roads proposed for decommissioning are currently mid slope or valley bottom roads, and without this road work, have the potential for contributing much more sediment to streams. Construction of the 32-7-26.1 road on the ridge would provide access for private logging companies to use uphill cable systems on their lands, rather than using tractor logging which would increase erosion and reduce soil productivity. It would also provide an option to avoid less desirable road locations if other parties, such as miners, want to gain access to the area. There would be some increase in long term road maintenance costs, but this would be mitigated by winterizing the road surface and barricading the road.

Approximately 24 miles of existing roads would be renovated under alternatives 1, 35 miles under alternative 2 and 22 miles under alternative 3. Road renovation would restore the existing road to the original standard by surface grading, reshaping ditch lines, improving and installing additional drainage structures and replacing deteriorating culverts. Alternatives 2 and 3 would have a net decrease of existing roads after harvest and alternative 1 would have a slight increase of roads, 0.2 miles. The net impact of road construction and decommissioning would be a long term reduction in sedimentation. None of the proposed new roads under any alternative are within the Middle Creek watershed, which is a Tier 1 Key Watershed

Most of the harvesting would occur within McCullough/Rattlesnake and Langdon HUC 6 sub-watersheds. Twenty eight percent of the McCullough sub-watershed is controlled by BLM. Private ownership and the city of Glendale account for most of the high road density. McCullough has experienced a great amount of timber related action on private lands within the last decade. The combined percentage of lands currently under 30 years of age is 16 percent. Alternatives 1 and 2 would increase the figure to 17.1 percent and alternative 3 would increase it to 16.8 percent.

Units 1 and 5B are low impact select cut and commercial thin units within the Middle Creek watershed of the Roseburg District BLM. Unit 1 is proposed in all action alternatives and unit 5B is proposed only under alternatives 1 and 2. Little or no impact is anticipated since these units are on the ridge top and not close to any streams. With the exception of harvesting units 2A and 2B under alternative 1, there is no harvesting within the Windy Creek HUC 6 sub-watershed. The Windy Creek sub-watershed has been harvested heavily on private lands.

Table 4-1 Comparison of Effects by Alternative

	Alt 1		Alt 2		Alt 3		Alt 4 No Action		
Hydrologic Unit Code 6 Watershed	McCullough	Langdon	McCullough	Langdon	McCullough	Langdon	McCullough	Langdon	Comments
% Riparian Veg. greater than 30 yrs	75	80	75	80	75	80	75	80	on BLM lands only
% Veg. less than 30yrs	17.1	20.6	17.1	20.3	16.8	20	16	20	All acres and all ownerships
Additional roads to be constructed on BLM	1.65 perm .44 temp	.95 perm	0	0	0	0	0	0	1.9 miles perm road are shared on ridge between the watersheds of 05 and 06. All roads are ridge top.
Road density miles/sq mi.	5.4	4.4	5.4	4.4	5.4	4.4	5.4	4.4	Density change is very slight
Miles of roads decommission	2.2	0	2.2	0	2.2	0	N/A	N/A	
% TSZ in open condition	25	6.2	26	4.7	24.9	4.0	23.7	4.0	Lands above 2500 ft.
% of basin in TSZ	22.8	25	22.8	25	22.8	25	22.8	25	
% TSZ opening in basin	5.9	1.6	5.9	1.2	5.7	1.0	5.4	1.0	

N/A = not applicable

Table 4-2 Vegetation on BLM lands less than 30 years age

	Alt 1		Alt 2		Alt 3		Alt 4 No Action		
Hydrologic Unit Code 6 Watershed	McCullough	Langdon	McCullough	Langdon	McCullough	Langdon	McCullough	Langdon	Comments
% lands <30 yrs BLM	24.9	17.6	24.9	17.3	24.6	17	23.8	17	
% lands < 20yrs BLM	24.1	14.6	24.1	14.3	23.8	14	23	14	
% lands <10 yrs BLM	18.1	10.6	18.1	10.3	17.8	10	17	10	

Totten Creek drainage (HUC 7) within the McCullough Creek HUC 6 has been harvested heavily over the last 30 years. Stream banks on private lands have shown signs of erosion mainly through tractor harvesting, resulting in sediment accumulation in the stream channel. Roads used by both BLM and private timber interests are in need of repair, especially that portion of the road that parallels Totten Creek for over a mile. Alternatives 1 and 2 would result in a small amount of timber extraction (13 acres of regeneration and 47 acres of thinning and pine enhancement treatments) in Totten Creek. Alternative 3 would have 47 acres of thinning and pine enhancement.

Road renovation is proposed under all action alternatives to maintain this aging road system. However, alternative 3 would not provide for culvert replacement along Totten Creek. Proposed road activities along Totten Creek would likely result in a small amount of sediment movement into the creek during the first rains of the season. However, this would not likely adversely affect aquatic species since the sediment pulse would occur during the first flush and would not be distinguishable from natural sediment runoff. Project design features covering road maintenance on Totten Creek are covered under Chapter 2 of this EA.

Unit 10, which is a commercial thin with a two tree length riparian buffer, is not expected to impact Totten Creek as the skyline yarding would occur from a ridge above the unit. Riparian zone and instream conditions are expected to be maintained or enhanced along Totten Creek road maintenance under alternatives 1, 2 and 3.

No sediment from road construction proposed in alternative 1 is expected to enter streams, as virtually all activities would occur on ridge tops. There would be reduced road construction in alternatives 2 and 3. Sediment is not expected to migrate farther than 100 ft slope distance from the point of disturbance. Rocking and straw mulching all exposed areas would further reduce the chance of sedimentation and

erosion.

The increase in transient snow zone opening would not increase peak flows by any measurable factor. Basin wide, in all HUC 6s, openings within each subwatershed are well below any level for concern. See effects Table 4-1 above.

Units 2A and 2B (alternative 1) are situated in the transient snow zone of Wood Creek (HUC 7) within the Windy Creek HUC 6, a subbasin tributary to Cow Creek. During the last decade, there have been two fires with subsequent salvage of burned timber on private owned lands in Wood Creek. Timber harvesting of stands on the head of the watershed, by both private and federal, and additional road construction, have likely altered the hydrologic response of this HUC 7 drainage. Harvesting these two units (totaling 19 acres) could result in channel destabilization to 1st and 2nd order drainages immediately downstream of the units. However, it's expected that any increase in streamflow and sediment would be immeasurable in higher order streams, including the mainstem Wood Creek. Wood Creek has recently been added to water quality impaired (temperature) list of streams by the Department of Environmental Quality (303d list for 2002). Recently a fisheries enhancement project by private and Oregon Department of Fish and Wildlife was implemented in the downstream reaches of Wood Creek

Under alternative 4 (No Action) there would not be any short-term addition of sediment to streams because road work and hauling would not occur. However, the beneficial long-term effects of improving roads and ripping roads and skid trails would not occur as under the action alternatives. The net effect would be to allow the present levels of erosion and sedimentation to continue to occur and increase over time; an overall adverse effect on streams and fish habitat. No roads would be built or decommissioned. This would result in allowing road 32-7-25, which is contributing sediment to Totten Creek, to continue to degrade. The native surface portion of road 33-6-7 in the Mill Creek drainage (municipal water supply for the city of Glendale) would not be decommissioned. Under the No Action alternative, several failing culverts would not be removed along Totten Creek. Without the culvert removal, stream sedimentation would continue and increase the potential for major road failure and, consequently, a large input of sediment.

4.2 Soils

According to the soils resource specialist for the project, planned activities under alternative 1 would cause soil displacement and loss of productivity on about 10 acres of ground in the Planning Area associated with road building. Cable harvesting of regeneration units would result in about 6 percent of the units receiving mild to slight compaction. As mentioned in the PDFs, landings would be ripped and planted after harvest. Cable harvesting of commercial thin units would result in about 3% compaction. The productivity could be reduced by about 3 percent in the area in front of the yarder landing. Off site soil displacement is not expected to occur because there would be adequate filtration and settling in units after harvest activities. There would be minimal loss of productivity since nutrients would still be

available for regeneration. Reduction of road construction and the use of helicopter yarding in alternatives 2 and 3 would have very little effect on site productivity.

There would be a limited amount of compaction or displacement from skyline or helicopter logging. Piling and burning or broadcast burning would reduce the amount of litter and fines but seldom destroy the organic (decomposed and usually wet at the time of the burn) horizon. Therefore site productivity should not be harmed in the long term.

4.3 Effects on Fisheries

Although road maintenance, renovation, outsliping, water dipping and waterbarring, decommissioning and log hauling might result in a pulse of sediment entering streams, the amount of road-generated sediment would be minor and would rapidly dissipate during the first major rainstorm of the wet season.

Any adverse effects of increased streamflow and sediment on Oregon Coast coho salmon, OC steelhead and cutthroat trout eggs and fry in streams within the Planning Area would be insignificant because implementing appropriate PDFs would help ensure that any environmental changes generated by these actions would be short-term and indistinguishable from background levels at the project scale. Potential for adverse effects of stream sediment on species other than fish would be greatest immediately downstream of each road crossing, but they would diminish rapidly with increasing distance from the road.

Since temporary and permanent road locations are on or near ridgetops, on stable ground (alternatives 1 and 2) and are not near streams, road construction would not degrade water quality and stream habitat. There is no road construction under alternative 3 and the No Action alternative. Road renovation and decommissioning would reduce potential for erosion or failure of the road prism and resultant stream sedimentation in the long-term. Barricading roads would eliminate vehicle use and erosion of unsurfaced roads during winter.

Riparian reserves at least 340 feet wide (each side) of fish-bearing streams (unit 10) and a minimum of 170 feet wide on non-fishery streams in accordance with ACS objectives, would effectively prevent any loose soil that is generated by falling and log yarding activities from reaching streams.

4.4 Effects on Late-successional Habitat

Unit 5B is located adjacent to a large, late-successional reserve (LSR) on the Roseburg District, BLM.

Since this unit is only proposed for commercial thinning (alternatives 1 and 2) there would be little direct effect along the edge of the LSR boundary.

4.4.1 Spotted Owls

All units are currently considered within suitable nesting, roosting or foraging habitat for northern spotted owls. Alternatives 1, 2 and 3 would affect northern spotted owls, a federally threatened species. The removal of suitable owl habitat would result in incidental “take” under the Endangered Species Act of 1973, as amended. Alternative 1 would remove a total of approximately 205 acres of suitable habitat in the even aged treatment units (regeneration, selection and group selection treatments). Although the group selection harvest in Unit 1 would create ½ to 1 acre openings, the overall stand structure would improve over time as these openings regenerate, creating a multi-storied stand. The commercial thin units would degrade 136 acres of suitable habitat, providing dispersal habitat for owls after the proposed harvest. This degraded habitat would recover to suitable habitat in approximately 10-30 years following the proposed harvest. Alternative 2 is similar to alternative 1 affects, however, units 2A and 2B would be deferred and the negative effects of road construction on late-successional forest habitat and spotted owls would not occur. Under alternative 3, units 2A, 2B, 34, 4A, 4B, 8A, 8B, 15, 27 and 28 would be deferred. Approximately 66 acres of suitable habitat would be removed through regeneration treatments. About 98 acres would be downgraded to a dispersal condition through commercial thinning because at least 40% canopy would be retained.

There are fourteen northern spotted owl activity centers (a.c.), including four official sites with 100-acre core areas. There are no treatments proposed within the 100-acre cores. However, removing or downgrading suitable habitat within 1.3 miles of the activity sites (Table 4-1) would affect spotted owl home ranges. Units 10 and 15 are both immediately adjacent to activity centers, and therefore alternatives 1 and 2 may have more pronounced effects.

Under alternative 2, units 2A and 2B in the Wood Creek drainage would be deferred, resulting in 19 fewer acres of impact from proposed regeneration harvest within the Peavine Creek (#2096, Roseburg District, BLM) northern spotted owl activity center. As a result of not implementing road construction, there would be no northern spotted owl suitable habitat removal of the associated 7 acres within the home range of the Ping Gulch activity center (a.c.); 7 acres within Totten Bothered a.c. home range; 4 acres within W. McCullough Creek a.c. home range; 5 ac. within Baby Rattle a.c. home range; and 3 acres within Cooked Hog a.c. home range. While these acre removals are quite small, the activity center would be negatively impacted. Also, without road construction into units 10, 13A and 13B, there will be a small reduction in habitat fragmentation and subsequently less human disturbance to wildlife inhabiting the area

Under alternative 3 impacts from proposed treatments of suitable habitat in the home range of the Martin II activity center (a.c.) would result in a degradation of 12 acres; 59 acres degraded within the home range of the W. McCullough Creek a.c.; 77 acres degraded within the Totten Bothered a.c. home range; 32 acres degraded within the Baby Rattle a.c. home range; 32 acres degraded within the Reuben Rattle a.c. home range; 5 acres degraded within the Rattlesnake a.c. home range; 27 acres degraded within the Perkins Creek a.c. home range; 30 acres degraded within the Perkins Divide home range; and 30 acres degraded within the Poor Rube a.c. home range.

Under alternative 1, construction of the road into unit 3 would increase potential for wind damage and other fragmentation effects along one edge of the adjacent spotted owl activity center. Long term disturbance effects from use of the road would not occur, as this road would be obliterated after logging. Since unit 3 is adjacent to a spotted owl core area, alternative 2 and 3 (using helicopter), would avoid the disturbance to the owls from road construction activities and subsequent motor vehicle use of the road. It would also avoid the habitat fragmentation associated with the road. The elimination of proposed road construction in section 23 under alternatives 2 and 3 would avoid fragmenting a large, unroaded area of late-successional habitat, maintaining the only unroaded square mile of forested habitat in an area of about 80 square miles. Additional anticipated impacts from the road, including increased human disturbance, affecting micro-habitats by increasing light, heat and wind, and creating a barrier to movement by some less mobile species, would not occur.

There would be no adverse effects to the northern spotted owl under the No Action alternative. However, since the Planning Area is located on northern GFMA lands, it is assumed that similar timber harvests would eventually occur on these lands, so the effects on wildlife and plants would be deferred, but not eliminated. In the long term the effects would be similar to the action alternatives.

The US Fish and Wildlife Service determined that individual spotted owls may be impacted but the impact of harassment take is not likely to significantly reduce the reproductive potential or the survivability of the population within the action area. The incidental take of all spotted owls associated with the removal and downgrading of suitable spotted owl habitat for this timber sale was considered in their Biological Opinion (1-7-01-F-032).

Table 4-3. Pre-harvest and post-harvest amount of suitable habitat within 1.3 miles of known activity centers for spotted owls under alternative 1 .

Spotted Owl Site Name /Number	Acres of Suitable Habitat w/in 1.3 miles of Activity Site					Units Affecting Activity Site
	Pre-harvest Suitable (acres)	Suitable Removed (acres)	Degraded to Dispersal (acres)	Dispersal Removed (acres)	Post-harvest Suitable Remaining (acres)	
Ping Gulch (3271)	1,180	65+7 rd.con.= 72	31	0	1,077	Units 4A,4B,11,27,28, 8A(w1/2);7ac road con.]
West McCullough (2216)	646	62+4 rd.con =66	59	0	521	Units 3,4A,4B,5B,10,27;4ac road con.

Rattlesnake (0903)	928	12	16	0	900	Units 15, 38
Baby Rattle (4511)	352	0 + 5 61 rd.con.	40	0	307	Units 13A,13B,13D;5ac road con.
Reuben Rattle (4565)	690	0+5 rd.con =5	37	0	648	Units 13A,13B,38;5ac road con.
Totten Bothered (4534)	349	40+7 rd.con =47	108	0	194	Units 3,27,28,8A,10,11;7ac road con.
Cooked Hog (2212)	611	0+3 rd.con =3	16	0	592	Unit 28 (w1/2), 3ac road con.
Perkins Creek (0907)	918	14	27	0	877	Units 34, 35A, 35B, 38
Perkins Divide (0965)	1355	14	22	0	1319	Units 34, 35A, 35B
Tanked Wolf (4607)	910	12	11	0	887	Unit 15
Peavine Cr. (Roseburg Dist.) (2096)	884	35+3 rd.con= 38	0	0	849	Units 1,2A,2B, 3ac road con.
Martin II (Roseburg Dist.) (1913)	704	37	12	0	655	Units 4A,4B,5B
Poor Rube (4577)	1311	14	27	0	1270	Units 34,35A,35B,38
Farmer Ramsey (4578)	1147	12	11	0	1124	Unit 15

4.4.2 Northern Spotted Owl Critical Habitat

Under alternative 1, ten units are located within two designated spotted owl critical habitat units (CHU). Units 4A, 4B, 5B, 27, and 28 are located in CHU #OR-62; units 15, 34, 35A, 35B, and 38 are located in CHU #OR-64. The functions of CHU #OR-62 are to provide nesting, roosting, and foraging habitat and to provide a link from the Klamath Mountains province to the Coast Range provinces. This CHU establishes the link between those two provinces through the Rogue-Umpqua portion of the I-5 area of concern. The objectives of CHU #OR-64 are to maintain essential nesting, roosting, foraging and dispersal habitat and maintain clusters of active spotted owl nest sites. This CHU provides a stepping stone to help maintain and improve what little spotted owl habitat exists.

Approximately 52 acres of suitable habitat would be removed through regeneration harvest in OR-62 and commercial thinning treatments would downgrade an additional 38 acres from a suitable condition to dispersal condition. Harvest treatments proposed in OR-64 would remove 26 acres of suitable habitat and downgrade an additional 27 acres from a suitable condition to dispersal condition. An additional 12 acres would be lost in new road construction (7 acres in OR-62 and 5 acres in OR-64). The 32-7-26.1 road location (alternative 1) would also directly remove approximately seven acres of late-successional habitat. Construction would increase the fragmentation of spotted owl habitat, compared with helicopter logging. This may be particularly important since there is a pair of spotted owls in the vicinity. The impacts on late-successional habitat in matrix lands are particularly important because the Late-Successional Reserves (LSRs) in the area are not yet fully functioning and will not be for several decades.

The overall effects of alternative 1 and road construction on CHU #OR-62 and #OR-64 would not result in adverse modification of critical habitat since the functions of both CHU's would be retained. Sufficient habitat would still remain in OR-62, including immediately surrounding the proposed harvest units, to provide interprovincial links along the I-5 area of concern. While suitable habitat would be removed from OR-64, it is also expected to still maintain essential habitat functions and active spotted owl sites.

By not constructing roads under alternative 2, the seven acres of suitable northern spotted owl critical habitat removal would also not occur.

As a result of proposed deferrals under alternative 3, there will be 52 fewer acres removed from northern spotted owl critical habitat in #OR-62 and 23 fewer acres in #OR-64 than alternative 1. Since both of these critical habitat units lie within areas which have been heavily harvested, even a small reduction in acres removed will further assist in the critical habitat goals designed to recover northern spotted owl populations

4.4.3 Connectivity Blocks

Units 1, 2A and 2B – under alternative 1, 2 and 3 short term loss of habitat would occur within the openings in unit 1. It is expected this treatment would promote long-term structural diversity of the forest stand while maintaining connectivity in the remaining stand. The proposed harvest would benefit the development of old-growth habitat structure by retaining most large trees in the stand and creating about six small openings (≤ 1 acre) to promote regeneration and a multi-layered stand. Under alternative 1, units 2A and 2B would remove suitable habitat. Proposed harvest units were selected to retain a minimum of 30 percent of the section in late-successional habitat. Units 2A and 2B would not be harvested under alternatives 2, 3 and the No Action alternative.

Units 13A, B – Under alternatives 1, 2 and 3, it is expected that there will be retention of a minimum of

30 percent of lands in the block as late-successional/old growth habitat after harvest. Units were selected to minimize fragmentation of the large block of habitat in the section and to retain connectivity within the habitat. The proposed road construction will cut through the habitat and increase human disturbance to wildlife inhabiting the area under alternative 1. By not constructing the proposed road in section 1 (alternatives 2 and 3) and the No Action alternative habitat fragmentation and human disturbance effects would be reduced in the connectivity block

Units 27, 28, and proposed road construction

The most serious impact of constructing road 32-7-26.1 in alternative 1 would occur in late-successional habitat, especially since section 23 is a Connectivity/Diversity Block and designated critical habitat for spotted owls. The road construction would fragment a large, unroaded area of late-successional habitat, highlighted by the fact this is the only unroaded square mile of forested habitat in an area of about 80 square miles. The road would break up the habitat, affect micro-habitats by increasing light, heat and wind, and create a barrier to movement by some species. Virtually all of the potential riparian connections in the private land designated for connectivity have been interrupted at some point in their flow by clearcutting down to the water. This road would not be constructed under alternatives 2, 3 and 4.

4.5 Survey and Manage Species

4.5.1 Red Tree Voles

Red tree vole surveys are not required prior to harvesting, as determined in the Species Review Process for 2002 (as provided for in the S&M ROD p.8). However, existing known sites would be protected as noted in the PDFs. This species could be affected by the destruction of nest sites and removal of suitable habitat through harvesting. Unless incidental sightings of red tree vole nests occur during the planning and layout of this sale, no protective measures would be implemented for this species. If any red tree vole nests occur within the units and remain undetected, they would likely be destroyed, especially in the regeneration units. If nests are incidentally retained, the viability of the sites would still be substantially reduced or eliminated, since the nests would be exposed to weather and predators. Also, dispersal to and from the sites would be eliminated. The 136 acres in commercial thin treatments, under alternative 1, would have a short term adverse effect on voles by opening canopies, thereby restricting the voles' ability to move about the canopy. The canopy in these stands would recover in 10-20 years to the point where voles could move between trees again.

There are two known RTV sites along the proposed 32-7-26.1 road, under alternative 1, which would be buffered. There is a reduced likelihood of disturbing RTV habitat under alternatives 2 and 3 because there would be no construction of this road. Compared to alternative 1, alternative 3 proposes 139 less acres of regeneration harvesting, subsequently reducing potential effects to red tree voles by both destruction of nest sites and removal of suitable habitat in the units.

4.5.2 Del Norte Salamanders

Only known Del Norte salamander sites would be protected, as disclosed in the S&M ROD. Del Norte salamanders require high humidity and soil moisture and cooler surface temperatures during their activity periods to prevent desiccation. Proposed harvesting, particularly in regeneration harvest units, would negatively impact Del Norte salamander habitat by changing micro climatic conditions, creating hotter and drier conditions.

Retaining all trees over occupied talus habitat and retaining 40 percent canopy closure within the 170-foot protective zones would mitigate the effects somewhat, but the talus habitat would still dry out from increased exposure to solar radiation and drying winds. Because Del Norte salamanders primarily occur in stands with greater than 70 percent canopy cover, the S&M FSEIS disclosed that “Losses of salamanders at sites managed with this prescription may occur, with extirpation at these sites and a diminished distribution across its range”(Survey & Manage FSEIS p. 359).

Road building would not be permitted through occupied talus, so the direct effects from this proposed action would primarily occur in the harvest units. However, the fragmentation caused by these roads cutting through the forest stand would still result in microclimatic changes to Del Norte habitat in the adjacent stands.

The construction of road 32-7-26.1 under alternative 1 could affect Del Norte salamander habitat. Talus habitat along the proposed road location near the ridge, however, has a low likelihood of containing this species.

Under alternative 3 there are 139 acres less regeneration harvesting than alternative 1, subsequently minimizing adverse impacts on Del Norte salamanders

4.5.3 Mollusks

Since mollusk surveys have not found any Survey and Manage mollusk species in the Planning Area, it is considered unlikely that there would be any substantive impacts on survey and manage mollusks as a result of proposed treatments.

4.5.4 Great Gray Owls

No suitable habitat for great gray owls is known to occur in the Planning Area. Therefore, the proposed actions under all alternatives are expected to have no impact on this species.

4.6 Vegetation

According to the results of the vascular and nonvascular plant surveys, management actions are not expected to affect T&E, Survey and Manage, or Bureau Sensitive/Assessment plants. Two non-vascular Bureau Tracking species, *Tortula subulata* and *Fissidens grandifrons*, were located within units 16 and the buffer of 34. The botanist for the Cottonsnake project determined from the results of the vascular and nonvascular plant surveys, that management actions are not expected to affect T&E, Survey and Manage, or Bureau Sensitive/Assessment plants for all alternatives.

4.7 Fire

The proposed underburns, mechanical fuels treatments, and slashing, hand-piling, and burning would reduce the vertical fuel ladders and overstocked conditions in upper elevations of the watershed where risk of catastrophic fire is especially high due to lightning strikes. This would subsequently reduce the risk of loss to both late-successional habitat and important connectivity areas in the creeks. The underburning proposals would reduce ground and small-diameter ladder fuels, but because these burns would occur in spring when there is high moisture content, material larger than 3-6" would not be lost, and therefore there would be minimal effects on late-successional habitat. Mechanical fuels treatments would maintain dominant and co-dominant trees, and therefore there would be only minor impacts to canopy closure through removal of intermediate and suppressed trees.

When possible, hand piles would be burned as early in the fall as possible to avoid adverse effects on plants, or animals that may hibernate or nest in them. Broadcast burns and under burns could possibly take place in spring or fall, under slightly moist conditions, if possible, and would be designed to

- minimize the risk of control problems.
- avoid adverse impacts to nesting and hibernating/aestivating wildlife species.
- minimize consumption of soil organic matter and surface duff
- meet silvicultural objectives to prepare the site and reduce competition with conifer seedlings
- minimize the loss of large down wood and snags

The slash/pile/burning treatments would target small-diameter material, and it is therefore expected late-successional habitat would not be substantially affected. Assuming a high average of 60 piles per acre with each pile covering 28 ft², burned piles would cover less than 6% of the ground surface. Assuming that most of the burned piles would result in a substantial reduction of organic matter the reduction of soil productivity of the individual spots, the overall reduction of soil productivity would be minimal. Erosion/sedimentation should not be a factor as the spots would be islands surrounded by a matrix of vegetation and litter cover.

There would be small risks from both underburning and slash/pile/burning of escapement. Commercial

thinning would assist in reducing the risk of stand-replacement fire by reduction in the number of small stems per acre, the most combustible material (Agee). In addition, vegetation would quickly recover in treated areas, requiring continuous treatments over several entries for the approach to be successful in reducing catastrophic fire risk to late-successional habitat.

4.8 Air Quality

All action alternatives would affect air quality by the addition of certain pollutants (Particulate Matter (PM10) and Particulate Matter (PM2.5)). In comparison, the difference among alternatives is very small. At these levels and following prescribed fire management guidelines in the Oregon Smoke Management Plan there would be negligible direct or indirect effects on air quality under all action alternatives.

Prescribed burning would be scheduled primarily during the period starting in January and ending in June. This treatment period minimizes the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content, which reduces the amount of material actually burned. Broadcast burning, handpile burning, and underburning would also be planned during the winter and spring months to reduce damage to the site from high intensity burning and to facilitate control of the units being burned. The greatest potential for smoke intrusions into the non-attainment areas would come from underburning activities. Current avoidance strategies for prescribed fire assume that smoke can be lifted from the project site and dispersed and diluted by transport winds. However, underburning requires a low intensity burn that would not have the energy to lift the smoke away from the project site. Smoke retained on site could be transported into portions of non-attainment areas if it is not dispersed and diluted by anticipated weather conditions. Localized concentration of smoke in rural areas away from nonattainment areas may continue to occur during prescribed burning operations.

4.9 Effects on Rural Interface Area

Closing and decommissioning the roads under the proposed action would have both positive and negative effects on local residents. Travel and hunting opportunities would be reduced, but most major road systems would remain open. Some people value closed roads for walk-in hunting areas.

Two residents who live near unit 13D in section 1 expressed concern about their water supply, which comes from streams flowing out of BLM land. After an examination of their water sources, in relation to the proposed units, the hydrologist concluded there would be no impact on the water supplies from these streams. The units are located high on the ridge and would not result in sediments reaching the streams, would not increase the potential for land slides and would not cause substantial changes in water quantities produced at the base of the slope.

All lands within the scope of this proposed action are classified as VRM Class 4 under the Medford District Resource Management Plan. Unit 13A was of concern since it would be visible from the lower Cow Creek Road which part of the Powers to Glendale Bicycle Route and a back country byway. The commercial thin treatment proposed for all action alternatives would reduce the visual effect for the lower Cow Creek road.

There would be some disturbance from noise and dust from logging and hauling activities. This would be especially apparent to residents of the Stevens Creek/Rattlesnake Creek area and along the Mt. Reuben road. The dust would be mitigated by the use of dust abatement measures in dry conditions. Falling and hauling may disrupt traffic for short time periods. Helicopter yarding in units 13 A, B and D in section 1 has the greatest potential for noise disturbance to nearby residents. This is expected to last 2-3 weeks. While the helicopter landing for units 13A, B and D is designated on the ridge top, away from houses, there is the possibility the purchaser would want to use an alternate landing at the bottom of the slope, near the Mt. Reuben road. In that case, the noise disturbance would be considerably greater.

Not constructing the 32-7-26.1 road under alternatives 2, 3 and the No Action alternative would not increase road density in the area. This effect would be fairly small, since most of the road would be low impact, ridge-top road and would be barricaded. However, it would avoid improving access to an unroaded area which may eliminate the potential for additional disturbance (mining, harvesting special forest products, hunting, salvage logging, and other activities).

4.10 Cumulative Effects

The following federal actions have taken place in the Middle Cow Creek HUC 5 watershed in the recent past:

Langdon Timber sale 1988
High Five-Timber Sale 1995
Fizzelout Timber Sale 1988
Power Hungry Timber Sale 1990
McLawson Timber Sale 1996
Fir Point Timber Sale 1988
Reuben Overlook Timber Sale 1990
Papa Cow Timber Sale 2002
Soukow Timber Sale 2001
Lost Fortune Branch Timber Sale 1988
Quines Creek Timber Sale 1988

Other federal Actions:

Dads Creek restoration (riparian road renovation and 3 culvert replacements) 2002
Skull Creek road renovation (culverts and water dips) 2001
Skull Creek Culvert replacement with fish friendly structure 1996
Skull Creek channel restoration (boulder placement) 2002
Skull Creek private bridge crossing contracted 2002
Fortune Branch #2 culvert replacements (three culverts with fish friendly culverts) 1997
Fortune Branch #3 & #4 culvert replacements (two culverts with fish friendly culverts) 1996
Rattlesnake Creek road upper culverts 1999
Fortune Branch Creek Culvert, Douglas County Road contracted 2002
Rattlesnake Creek Culvert, Douglas County Road contracted 2002
Quines Creek Fish habitat enhancement (log wiers) 1986, 1990

Water Quality

Cumulative effects of the action alternatives appear to be minimal and undetectable at the HUC 5 level. Galesville Reservoir upstream of Middle Cow Creek has a major impact on flood control within the basin. Cumulative effects to endangered or resident fish species, within or outside of the basin, would be minimal.

The extent and location of road construction on private and state lands is not available. Construction of ridge top roads would have little or no direct or cumulative effect on streams. Decommissioning of several mid-slope roads and stream adjacent roads would benefit the area in the long term, helping to reduce sedimentation. Replacement of several failing culverts and rocking of current native surface roads would provide aquatic organism passage and reduce levels of sediment in streams. Since the proposed cutting units are not concentrated in one sub-watershed, hydrologic effects would be dispersed across the Middle Cow Creek and Middle Creek watersheds. It would be virtually impossible to detect any changes that may result from this action on a watershed scale. Any hydrologic effect would diminish annually as vegetation recovers at sites. The other action alternatives within the scope of this document would have similar but reduced effects on the human environment.

No new road construction is proposed in the Tier 1 (Key) Middle Cow Creek watershed under any of the action alternatives. Accounting for decommissioned roads, there would be a net reduction in road mileage in alternative 2 and 3 and a slight 0.2 mile increase under alternative 1. There has been little new construction in the Middle Cow Creek watershed in the last several BLM timber sales. Accounting for decommissioned roads, there would be a net reduction of roads mileage in the watershed even with the implementation of the alternative 1 under Cottonsnake (see Table 4-4)

Table 4-4. Road construction and decommissioning on BLM timber sales in the Middle Cow Creek watershed.

Timber Sale	Temp Roads (miles)	Permanent Roads (miles)	Roads Decommissioned (miles)	Net gain or loss of roads (miles)
Lost Fortune	0.4	0	0	0
Pointless Fir	0.3	0.6	0	+0.6
High 5	0.2	0	0	0
Low 5	0	0.3	0	+0.3
McCollum Cr.	0.2	0	0	0
Bonnie and Slyde	0.2	0	0	0
Cottonsnake*	0.4	2.4	2.2	+0.2
Papa Cow	0			0
Soukow	0.5	0.5	0.5	0
Road Decomm. 1999			0.7	-0.7
Road Decomm. 2000			1.4	-1.4
Totals	2.2	3.8	4.8	-1.0

Logging and other ground disturbing activity continue at a rapid rate on private lands in and around the Planning Area. Much of the logging occurs with tractors during all seasons of the year. As a result, sediment is generated from tractor yarding and log hauling during wet weather. There are several large farms where tillage contributes to the bare ground and subsequent runoff of sediments. Glendale sewage treatment plant and numerous septic tanks contribute pollutants to main stem Cow Creek and larger tributaries. Most of the riparian zones along the low lying valleys are controlled by private land owners and do not support the vegetation that is needed for stream and riparian integrity as described in the Northwest Forest Plan. It is expected that ground disturbance and pollution will continue from private lands, but may be reduced to some extent as lands are logged over for the second time and vegetation becomes established.

Soils

Little or no long term effects to soils are anticipated on units proposed by any of these alternatives on federal lands. Implementation of the Best Management practices (BMPs) in Chapter F (RMP EIS) should prevent unacceptable degradation of the soil resource (RMP EIS Volume 1 page 4-12).

Wildlife

The greatest effects on wildlife associated with late-successional habitat would occur with implementing alternative 1. This would involve constructing all proposed new roads.

The other timber sales in Cow Creek and the private logging have already had serious impacts on spotted owl habitat in this area.

Following this sale, there would be approximately 21,000 acres of late-successional habitat on federal lands in the Middle Cow Creek watershed. This represents 48 percent of the federal forest lands, still above the 15 percent called for in the RMP.

The patchy distribution and low dispersal capability of species such as Del Norte salamanders (Survey and Manage Amphibian Subgroup 1995), red tree voles (Huff et al. 1992) and molluscs within forest habitats leave these low-mobility species vulnerable to cumulative effects of timber harvest within a watershed. The cumulative effects of timber harvest on both public and private lands within the Middle Fork Cow Creek watershed may lead to substantially reduced or locally extirpated populations within the watershed.

Fire

Untreated areas in all alternatives would perpetuate current conditions and in many mature stands growth and deterioration would increase fuel loading. These conditions over time would increase the potential for a stand replacement fire within and/or adjacent to the Cottonsnake Planning Area. All action alternatives propose treatments to reduce fire hazard and decrease long-term adverse cumulative effects. This opportunity to reduce fire hazard would not occur under the No Action alternative.

4.11 Monitoring

This timber sale would be subject to the standard monitoring called for in the RMP. In addition, the following specific monitoring actions would be taken: The openings around the pines in units 3 and 10 would be monitored over the first 5 years following harvest to determine the effect on achieving pine regeneration and in maintaining the large pines.

Chapter 5 – List of Preparers

5.0 Agencies and Persons Consulted

A legal advertisement will be placed in local newspapers to announce to the public that the Glendale Resource Area is requesting public comments on the proposed management action. The EA will also be available for review at the BLM Medford District Office, the Medford District’s web site (www.or.blm.gov/Medford/planning) or by request. In addition, notification of this proposal will be sent to the Oregon Department of Fish and Wildlife, the Oregon Dept. of Forestry, county commissioners for the affected county, several environmental groups, and representatives of the timber industry to request their comments. These announcements will be made following completion of this environmental assessment and before a decision is made.

A 30 day comment period will begin after public notification in the local newspapers. Comments, including names and street addresses of respondents, will be available for public review. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection on their entirety.

5.1 List of Interdisciplinary Preparers

<u>Name</u>	<u>Title</u>	<u>Primary Responsibility</u>
Michael Bornstein	Wildlife Biologist	Wildlife, T/E Animals, Survey & Manage
Jim Brimble	Forester	Silviculture
David Caulfield	Forester	Logging systems
Martin Lew	Ecosystem Planner	NEPA
Deston Russell	Engineer	Roads, quarries
Natalie Simrell	Fuels Technician	Fuels
Rachel Showalter	Botanist	Botany
Doug Stewart	Forester	Silviculture
Loren Wittenberg	Hydrologist	Soils, Watershed, Riparian, Fisheries

Reviewed By:

Glendale RA Ecosystem Planner
Reviewed for format and adequacy

Date

Lynda Boody
Area Manager, Glendale Resource Area
Medford District, BLM

Date

ACRONYMS AND GLOSSARY

Abbreviations:

ACS	Aquatic Conservation Strategy
BLM	Bureau of Land Management
BMP(s)	Best Management practices
CT	Commercial Thinning
DBH	Diameter at breast height
EA	Environmental Assessment
ESA	Endangered Species Act
GFMA	General Forest Management Area
GIS	Geographic Information System
IDT	Interdisciplinary planning team
LSR	Late Successional Reserve
MBF	Thousand Board Feet
MMBF	Million Board Feet
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
ODFW	Oregon Department of Fish and Wildlife
OR	Overstory Removal
Special Status	Endangered, Threatened and Sensitive
RT	Restoration Thinning
S&M	Survey and Manage
SMZ	Snowmelt Zone
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USF&WS	United States Fish and Wildlife Service
VRM	Visual Resource Management

Affected Environment. The natural, physical, and human-related environment that is sensitive to changes due to proposed actions.

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

Alternative. One of several policies, plans or projects proposed for decision-making.

Anadromous Fish. Fish that are born and reared in freshwater, move to the ocean to grow and

mature, and return to freshwater to reproduce. Salmon and steelhead are examples.

Best Management Practices (BMP). Practices determined by the resource professional to be the most effective and practicable means of preventing or reducing the amount of water pollution generated by non-point sources; used to meet water quality goals (See Appendix D in RMP (USDI BLM 1995)).

Biodiversity or Diversity. The relative distribution and abundance of different plant and animal communities and species within an area.

Broadcast Burning. Allowing a prescribed fire to burn over a designated area within well defined boundaries for reduction of fuel hazards or as a silvicultural treatment, or both.

Candidate Species. Those plants and animals included in Federal Register “Notice of Review” that are being considered by the U.S. Fish and Wildlife Service for listing as threatened or endangered.

Canopy. The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand.

Coarse Woody Debris. Portion of trees that have fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

Commercial Thinning. The removal of merchantable trees from most often an even-aged stand to encourage growth of the remaining trees.

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

Connectivity. A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Core Area. That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young.

Cover. Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

Critical Habitat. Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that might require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

Cultural Resources. The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) that have scientific, prehistoric or social values.

Cumulative Effect. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can also result from individually minor, but collectively significant actions taking place over a period of time.

Diameter at Breast Height (dbh). The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Ecosystem. The complete biological and abiotic system formed by the interaction of a group of organisms and their environment.

Edge. Where different plant communities meet, or where variations in successional stage or vegetation conditions within the plant community come together.

Effects (or Impacts). Environmental consequences as a result of a proposed action. Effects provide the scientific and analytical basis for comparison of alternatives. Effects might be either direct (caused by the action and occur at the same time and place) or indirect (occurring later in time or at a different location, but are reasonably foreseeable or cumulative results of the action).

Effects and impacts as used in this EA are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or healthy effects, whether direct, indirect, or cumulative. Effects might also include those resulting from actions that might have both beneficial and detrimental effects, even if on the balance it appears that the effects would be beneficial.

Emissions. Substances discharged into the air, such as from tractors and trucks..

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

Environmental Assessment (EA). A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of NEPA and is released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the project proposal.

Erosion. Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is more rapid than normal, natural, or geologic erosion, primarily resulting from the activities of people, animals, or natural catastrophes.

Essential Habitat. Areas with essentially the same characteristics as critical habitat but not declared as such. These habitats are provided to meet recovery objectives for endangered, threatened, and proposed wildlife species.

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

Forest Health. The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human caused stresses such as drought, insect attack, disease, climatic change, flood, resource management practices and resource demands.

Forb. Any herb other than grass.

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

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

General Forest Management Area (GFMA). Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

Habitat Fragmentation. The breaking up of habitat into discrete islands through modification or

conversion of habitat by management activities.

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

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

Hydrologic. Pertains to the quantity, quality and timing of water yield from forested lands.

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

Indirect Effects. Secondary effects which occur in locations other than the initial action or significantly later in time.

Intermittent Stream. Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Issue. A point, matter, or question of public discussion or interest, to be addressed or resolved through the planning process.

Land Use Allocation. Allocations of a land area which defines allowable uses/activities, restricted uses/activities, and prohibited uses/activities. Each allocation is associated with a specific management objective.

Landscape. A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout.

Management Prescription. A set of land and resource management policies that, as expressed through Standards and Guidelines, creates a Desired Future Condition over time.

Mass Movement. The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not include surface erosion.

Matrix Lands. Federal lands outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mature Stand. A mappable stand of trees for which the annual net rate of growth has peaked. Stands are generally greater than 80-100 years old and less than 180-200 years old. Stand age, diameter of dominant trees, and stand structure at maturity vary by forest cover types and local site conditions. Mature stands generally contain trees within a small average diameter, less age class variation, and less structural complexity than old-growth stands of the same forest type. Mature stages of some forest types are suitable habitat for spotted owls. However, mature forest are not always spotted owl habitat, and spotted owl habitat is not always mature forest.

Mitigation. Mitigation includes (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (5) compensating for the impact by replacing or providing substitute resources or environments.

Monitoring. The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Multi-aged Stand. A forest stand which has more than one distinct age class arising from specific disturbance and regeneration events at various times. These stands normally will have multi-layered structure.

Multi-layered Canopy. Forest stands with two or more distinct tree layers in the canopy; also called multi-layered stands.

National Ambient Air Quality Standards (NAAQS). Standards designed to protect public health and welfare, allowing an adequate margin of safety. For particulate matter less than ten microns in size (PM10), 50 micrograms per cubic meter annual average and 150 micrograms per cubic meter, 24-hour average; not to be exceeded more than once per year.

National Environmental Policy Act of 1969. This law requires the preparation of environmental impact statements for every major Federal Action which causes a significant effect on the quality of the human environment.

National Environmental Policy Act (NEPA) Process. An interdisciplinary process, which concentrates decision making around issues, concerns, alternatives, and the effects of alternatives on the environment.

Natural Regeneration. Renewal of a tree crop by natural means using natural seed fall and/or tree

regeneration existing before stand harvest.

No-Action Alternative. The No-Action alternative is required by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The No-Action alternative provides a baseline for estimating the effects of other alternatives. When a proposed activity is being evaluated, the No-Action alternative discusses conditions under which current management direction would continue unchanged.

Non-attainment. Failure of a geographical area to attain or maintain compliance with ambient air quality standards.

Noxious Weeds. Rapidly spreading plants that can cause a variety of major ecological or economic impacts to both agriculture and wildland.

Old-growth. A forest stand usually at least 180-220 years old with moderately high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground (coarse woody debris).

Overstory. That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

Overstory Removal. The final stage of cutting where the remaining overstory trees are removed to allow the understory to grow. Overstory removal is generally accomplished three to five years after reforestation and when adequate stocking has been achieved.

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

Perennial Streams. Streams that flow continuously throughout the year.

Planning Area. For the purposes of this EA, it is the area to be analyzed for potential forest management activities that implement the Medford Resource Management Plan. Geographic features, such as watershed boundaries, are generally used. BLM planning decisions apply only to BLM-administered lands

Plant Community. An association of plants of various species found growing together in different areas with similar site characteristics.

Prescribed Burning. The intentional application of fire to wildland fuels in either their natural or altered

state. Burning is conducted under such conditions as to allow the fire to be confined to a predetermined area and to produce an intensity of heat and rate of spread required to meet planned objectives (e.g., silvicultural, wildlife management, reduction of fuel hazard, etc.).

Prescribed Fire. A preplanned wildland fire burning under specified conditions to accomplish specific planned objectives. It could result from either a planned or unplanned ignition.

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

Range of Alternatives. A range of alternatives provides a set of different ways for managing public lands, offering many different levels of goods and services. Each alternative is one way of managing the Federal Forest, expressed as management emphasis leading to a unique set of goods and services being available to the public.

Raptors. Predatory birds, such as falcons, hawks, eagles, or owls.

Reforestation. The natural or artificial restocking of a forest area with trees--includes measures to obtain natural regeneration, as well as tree planting and seeding. Reforestation is used to produce timber and other forest products, protect watershed functioning, prevent erosion, and improve other social and economic values of the forest, such as wildlife, recreation, and natural beauty.

Regeneration. The renewal of a tree crop, whether by natural or artificial means. This term might also refer to the crop itself(seedlings, saplings).

Regeneration Harvest. A silvicultural system using stand regeneration methods that include modified versions of the seed tree, shelterwood and overstory removal harvest methods. Stands remaining after regeneration harvest will generally resemble reserve seed tree cuts.

Renovation – Roads. Restoration of the road to the original standard by surface grading, reshaping ditch lines, improving and installing additional drainage structures and replacement of deteriorating culverts. Renovation also includes converting road prisms from ditched to out-sloped roadbeds with waterdips, which reduces long-term maintenance costs and properly drains roads during storm events.

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

Riparian Areas/Habitats. Areas of land that are directly affected by water, usually having visible

vegetation or physical characteristics reflecting the influence of water. Streamsides, lake edges, or marshes are typical riparian areas.

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

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

Road Maintenance. The upkeep of the entire road system including surface and shoulders, parking and side areas, structures, and traffic-control devices necessary for its safe and efficient utilization.

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

Seed Tree. A tree selected as a natural seed source within a shelterwood or seedtree harvest cut. Sometimes, these trees are also reserved for seed collection.

Seedlings and Saplings. Non-commercial-size young trees, generally occurring in plantations.

Seral Stages. The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. Generally there are five stages recognized: early-seral, mid-seral, late-seral, mature-seral, and old-growth.

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

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

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

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

Special Status Species. Includes proposed species, listed species, and candidate species under the

ESA; State-listed species; and BLM State Director –designated sensitive species.

Stand. A community of trees or other vegetation uniform in composition, physiognomy, spatial arrangement, or condition to be distinguishable from adjacent communities.

Structural Diversity. Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. In aquatic habitats, the presence of a variety of structural features such as logs and boulders that create a variety of habitat.

Succession. A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax. An example is the development of series of plant communities called seral stages following a major disturbance.

Successional Stage. A stage or recognizable condition of a plant community which occurs during its development from bare ground to some climax plant community.

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

Threatened Species. Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and which has been designated in the Federal Register as such. In addition, some states have declared certain species in their jurisdiction as threatened or endangered.

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

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

Viable Population. A wildlife or plant population that contains an adequate number of reproductive individuals to appropriately ensure the long-term existence of the species.

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

Water Yield. The quantity of water derived from a unit area of watershed forming streamflow.

Watershed. Entire area that contributes water to a drainage system or stream.

Wildfire. Any wildfire not designated and managed as a prescribed fire with an approved prescription.

Wildlife Diversity. The relative abundance of wildlife species, plant species, communities, habitats or habitat features per unit area.

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

Appendix A. Summary of seasonal operating restrictions . These are the time periods when activities are allowed. The dark shaded cells indicate restrictions to activities. For details, see the appropriate Project Design Feature.

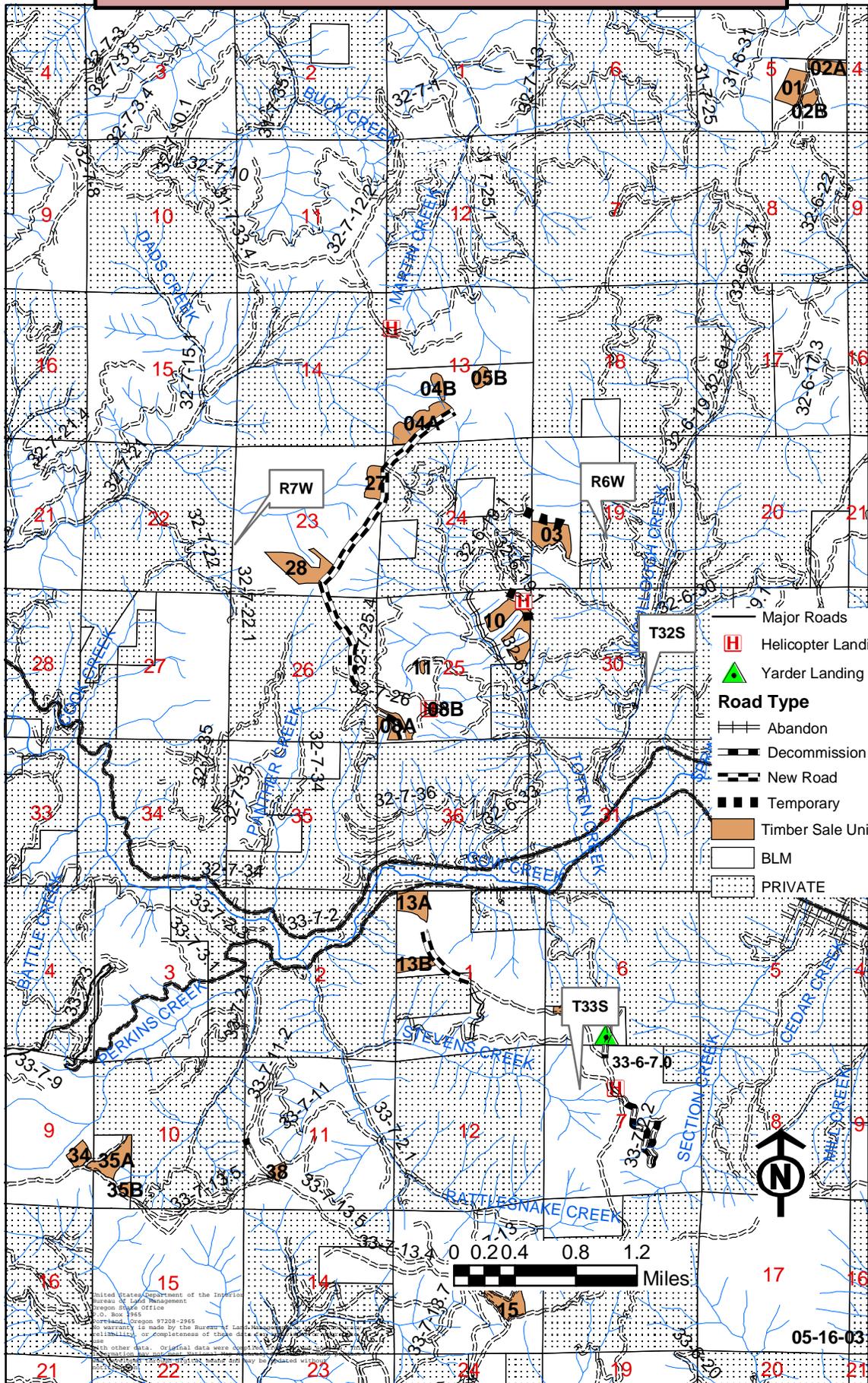
RESTRICTIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Log hauling - paved roads												
Log hauling - gravel roads												
Log hauling - natural surface roads												
Road Construction/Decommissioning												
Quarry activities in Riparian Reserves												
Culvert Replacement												
Logging and road work within 1/4 mile of spotted owl sites												
Blasting without restrictions												
Falling and yarding in occupied talus												
Marbled Murrelet (Roseburg District)												
Special Status Raptors												

This table is intended as an aid in summarizing seasonal restrictions. If there is a conflict between the table and the text, the text should be considered correct.

Appendix B. Areas considered for analysis in the Cottonsnake Planning Area.

Area	TS No	Acres	Original analysis and comments.
32-6-5-1	1		Connectivity Block, part of section is Roseburg BLM, can cut about 110 ac.
32-6-5-2	2		Connectivity Block, part of section is Roseburg BLM
32-6-17-1			Defer – conifers are well spaced already. Hardwoods are not competing.
32-6-18-1			Withdraw from the timber base. Too rocky.
32-6-19-1	3		Potential for emphasizing pine, adjacent to owl core area
32-6-19-2			Deferred – Uneconomical; only small area left outside RRs
32-6-29-1			Defer – extensive recent regeneration harvests: Pointless Fir and private land
32-6-29-2			Defer – extensive recent regeneration harvests: Pointless Fir and private land
32-7-13-1	4		Probably not CT
32-7-13-2	5		Possible CT 5B. Defer 5A (unit is within South Coast/North Klamath LSR).
32-7-13-3			Defer – no commercial timber available
32-7-13-4	6		Only small portion is left after withdrawn lands
32-7-23-1			Defer – too young and well spaced
32-7-24-1	7		Difficult logging and stand is at desired stocking levels.

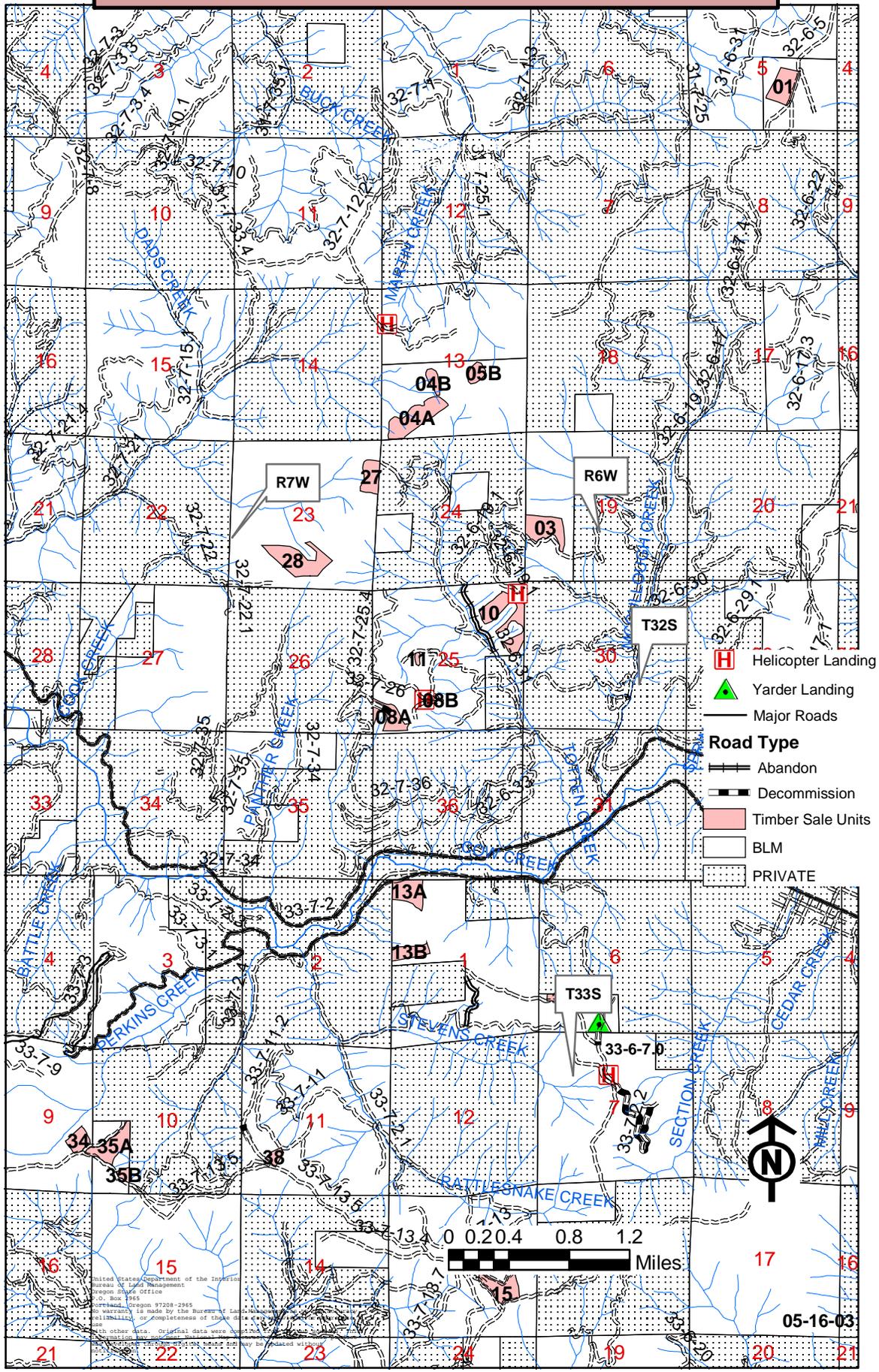
Cottonsnake Alternative 1



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Bureau of Land Management
Oregon State Office
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Salem, Oregon 97208-2965
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or other data. Original data were obtained from the
Bureau of Land Management.

05-16-03

Cottonsnake Alternative 2



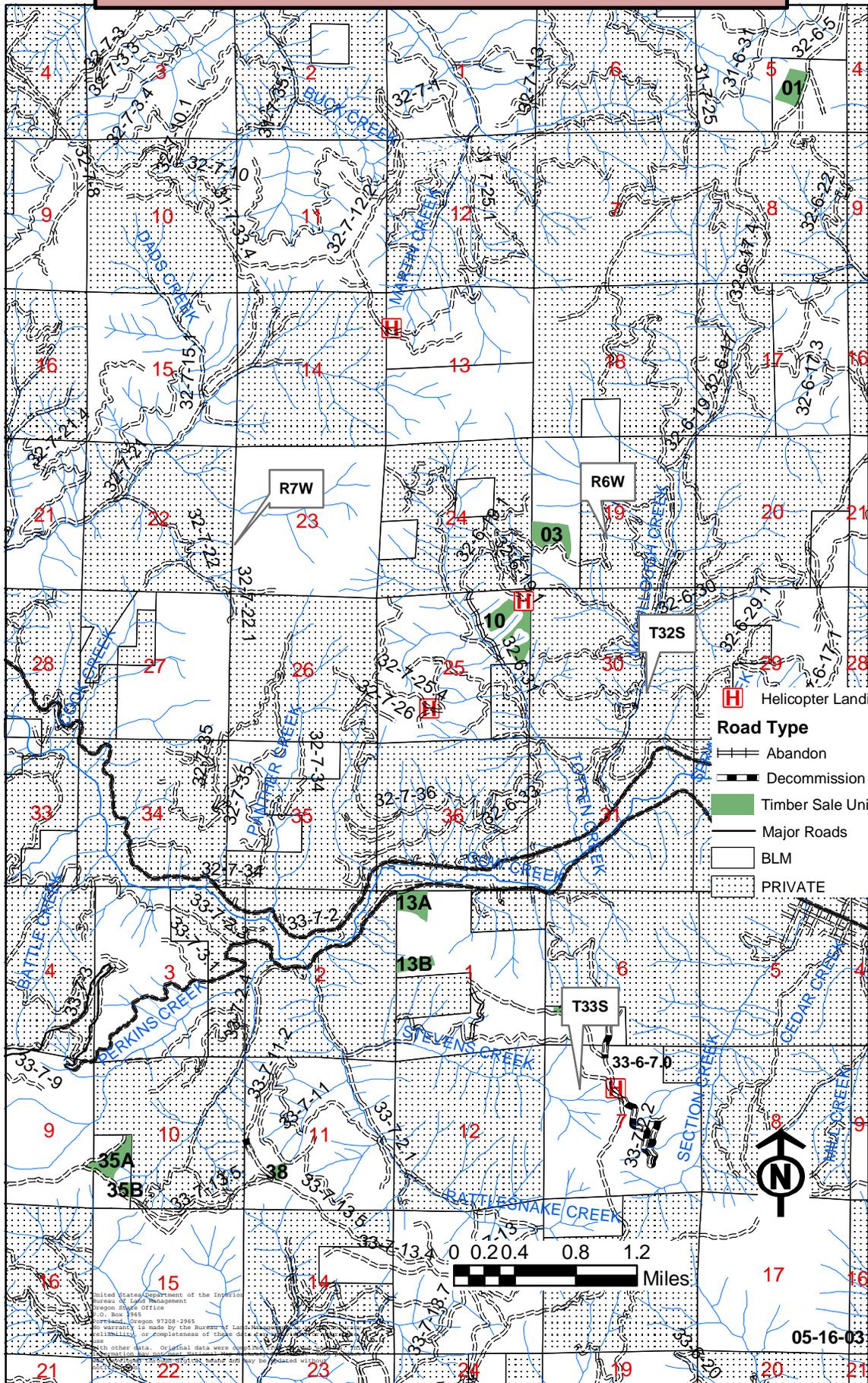
- H Helicopter Landing
- ▲ Yarder Landing
- Major Roads
- Road Type**
- Abandon
- Decommission
- Timber Sale Units
- BLM
- PRIVATE



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Oregon State Office
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05-16-03

Cottonsnake Alternative 3



- H Helicopter Landing
- Road Type**
- Abandon
- Decommission
- Timber Sale Units
- Major Roads
- BLM
- PRIVATE

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05-16-03

Area	TS No	Acres	Original analysis and comments.
32-7-25-1A			Defer – Overstory trees are well spaced now, understory coming up.
32-7-25-1B			Defer – Overstory trees are well spaced now, understory coming up.
32-7-25-2	8		
32-7-25-3	9		Defer-stand has already been entered and is already at target conditions.
32-7-25-5	10		
32-7-25-11			Defer – Overstory trees are well spaced now, understory coming up.
32-7-25-18	11		
32-7-25-19	12		Defer-stand has already been entered and is already at target conditions
33-6-6	13D		
33-6-7-1			Defer for now – Cumulative effects and municipal watershed
33-6-7-2			Defer for now – Cumulative effects and municipal watershed
33-6-7-3			Defer for now – Cumulative effects and municipal watershed
33-7-1-1	13		Connectivity Block, water rights with adjacent land owners. Defer 13 C (Del Norte salamander).
33-7-9	34		Originally unit 4 of Grave Creek West Project
33-7-10	35		Originally unit 5 of Grave Creek West Project

Area	TS No	Acres	Original analysis and comments.
33-7-11	38		Originally unit 8 of Grave Creek West Project
33-7-11-9			Defer – Unit considered under the Grave Creek West Project Area in 1997.
33-7-11-10			Defer – Unit considered under the Grave Creek West Project Area in 1997.
33-7-11-17			Defer – Unit considered under the Grave Creek West Project Area in 1997.
33-7-13-2	14		Defer. Logging problems
33-7-13-3	15		
33-7-13-11	16		Logging problems, RR extends above road

***In this table, Adeferred@ means deferred from proposed alternatives.**

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COTTONSNAKE TIMBER SALE

Silvicultural Prescription for the proposed action For units 34, 35A, 35B, 38, 27 and 28

OBJECTIVES

Units to be harvested under the proposed action have as general objectives those of Matrix lands. These objectives include:

- production of a sustainable supply of timber and other forest commodities,
- providing connectivity (along with other allocations such as riparian reserves) between late-successional reserves
- providing habitat for a variety of organisms associated with both late-successional and younger forests,
- providing for important ecological functions, and
- providing early successional habitat.

UNIT SPECIFIC OBJECTIVES

Regeneration Harvests (units #34, 35B, 27, and 28): The objective of regeneration harvests would be to replace existing mature, declining and/or partially stocked stands with young, vigorous conifer stands to allow a relatively high level of timber harvest while retaining biological legacies, a hardwood component, and coarse woody debris.

Commercial Thinnings (unit #35A): The objective of commercial thinning within this stand would be to increase growth and vigor of selected leave trees.

Commercial Thinnings/Overstory Removals (units #38): The objective of this treatment would be the release of desired existing conifers through harvest while retaining biological legacies, a hardwood component, and coarse woody debris. This unit is of mixed sizes and ages. In areas that were of predominantly pole size conifers, the objective would be release (increased growth and vigor) of selected conifers. In areas of larger size and older age classes, the objective would be release of regeneration through the removal of selected overstory trees.

STAND DESCRIPTION / ANALYSIS / RECOMMENDED TREATMENT

UNIT 34 T.33S., R.7W., section 9

I. Stand Description: Unit #34 is a mature stand of Douglas-fir with occasional sugar pine. Diameters generally range from 16-36" with a few trees being larger. Stand is starting to show signs of decline. There are flat-topped trees, larger snags, and openings created where trees have fallen. The understory consists of dense tanoak brush 6-10' tall. Other hardwoods present include tree-form chinquapin, madrone, and dogwood. There is very limited conifer regeneration within the stand.

II. Analysis: This area is designated Matrix. Stand meets RMP guidelines for regeneration harvest. Existing trees are mature. Some mortality is occurring. Very little conifer regeneration exists.

Desired Future Condition: The desired future condition resulting from this action would, in the short-term, be a stand with two canopy layers. The upper canopy layer would consist of mature Douglas-fir and sugar pine. Trees within this canopy layer would provide larger structural elements such as snags and coarse woody debris. The understory canopy layer would consist of young conifers that became established within a few years following harvest, treatment of activity fuels, and other site preparation. In the long-term the stand would retain a two storied structure. The stand would contain 3-5 larger hardwoods per acre.

Prevention/Avoidance Strategies: Timely site preparation and reforestation following harvest would allow conifer seedlings the benefit of occupying the site before competitive species such as tanoak. Once conifer seedlings are established, maintenance of understory conifer canopy cover and subsequent treatments such as fertilization to increase this canopy cover and density would slow/prevent the establishment and growth of competitive vegetation.

III. Recommended Treatment: A Modified Even-aged Silvicultural System with stand regeneration through a Regeneration Harvest (RH) that maintains forty percent (40%) canopy cover across the unit is recommended for unit 34. Harvest merchantable conifers greater than six inches dbh. Retain 7 conifers across the range of diameters over 20" dbh per acre. Retained conifers should approximate species composition of present stand and should be dispersed throughout the unit. Retained conifers should consist of both sound and cull trees. Retain three additional conifers greater than 16" dbh for future snags and coarse woody debris. Retain 3-5 larger hardwoods per acre where present. If 40% canopy cover is not met, retain addition conifers, advanced regeneration, and hardwoods to meet that target. Three quarters or more of the retained canopy is to be composed of large conifers or advanced conifer regeneration. One quarter of the retained canopy may be composed of hardwoods.

At some point in the future, large overstory trees in excess of the number required for regeneration harvest in Matrix would be removed. The time required before the removal of these overstory trees would be dependant upon the development of understory conditions that meet current management recommendations for Survey and Manage species. Once these conditions are met by the understory and a limited overstory, harvest of retained large conifers in excess of the number called for in the RMP would occur.

Cable yard. Slash brush and damaged conifer regeneration. Broadcast burn.

Plant with a mixture of 80% Douglas-fir and 20% minor species, principally rust resistant sugar pine. Conduct follow-up maintenance treatments through stand establishment. Follow-up treatments may include treatments such as handpiling and burning of piles to reduce activity fuels.

Silvicultural Options Considered: A regeneration harvest that retained 6-8 trees per acre was considered but was rejected because of Survey and Manage Species.

UNIT 35A T.33S., R.7W., sections 9, 10

I. Stand Description: Unit 35A is a ridgetop and upper slope stand. The southern aspect is a stand of pole-size Douglas-fir that originated from a past fire event. Diameters generally range from 14-24". Some light commercial thinning has occurred in this area. The remainder of the stand is mature and almost mature Douglas-fir generally 16-20" dbh with some sugar and ponderosa pine of the same size. The understory consists of light tanoak brush 6-10' tall mixed with an occasional tree form tanoak, chinquapin, and madrone. Hardwoods are dying out of the stand. Along the ridge, larger and older Douglas-fir can be found.

II. Analysis: This area is designated Matrix. Conifers within the stand are of a condition where they would meaningfully respond to release. The majority of the stand does not exhibit signs of decadence.

Desired Future Condition: The desired future condition resulting from this action would in the short-term be a single storied stand of vigorously growing windfirm conifers with occasional larger, mature and older Douglas-fir and pine. In the long-term the stand would consist of two canopy layers. The dominant canopy layer would consist of widely spaced large conifers. Species of this layer would primarily be Douglas-fir with minor amounts of sugar pine and ponderosa pine. Trees within this canopy layer would provide larger structural elements such as snags and coarse woody debris. The second canopy layer would be comprised of predominantly mature Douglas fir with some sugar and ponderosa pine. The stand would contain 3-5 larger hardwoods per acre.

Prevention/Avoidance Strategies: Maintenance of canopy cover and subsequent treatments such as fertilization to increase canopy cover and density would slow/prevent the establishment and growth of competitive vegetation such as ceanothus. Controlling competitive vegetation through maintenance of canopy cover would also not substantially add to any existing seedbank in the soil. While shrubs such as ceanothus would not be a major competitor within the existing stand, control or lack of it could be a factor in the establishment of young conifers following a future regeneration harvest.

III. Recommended Treatment: Commercial thin is the recommended treatment for unit 35A. The thinning should be from below with the emphasis on maintaining a minimum canopy cover of 40% across the unit. Generally, this should correspond to an approximate 25'X 25' to 30' X 30' spacing on this unit. Cable yard. Handpile slash. Burn piles.

Silvicultural Options Considered: Portions of the unit could receive a regeneration harvest at this time. This treatment was rejected as the areas do not make "logical units".

UNIT 35B T.33S., R.7W., section 10

I. Stand Description: Unit 35B is a stand of mature and older Douglas-fir with scattered sugar pine. Diameters generally range from 20-40". Decay is evident in many of the trees. Hardwoods consist of madrone, chinquapin, tanoak, and limited numbers of canyon live oak. Tanoak brush is thick in places. Some advanced Douglas-fir regeneration exists.

II. Analysis: This area is designated Matrix. Stand meets RMP guidelines for regeneration harvest. Existing trees are mature. Very little conifer regeneration exists. No survey and manage species were found in the unit as it was finally delineated.

Desired Future Condition: The desired future condition resulting from this action would be a stand with two canopy layers. The upper canopy layer would consist of mature Douglas-fir and sugar pine. Trees within this canopy layer would provide larger structural elements such as snags and coarse woody debris. In the short-term, the understory canopy layer would consist of young conifers that became established within a few years following harvest, treatment of activity fuels, and other site preparation. In the long-term, a two-storied structure would be retained. The stand would contain 3-5 large hardwoods per acre.

Prevention/Avoidance Strategies: Timely site preparation and reforestation following harvest would allow conifer seedlings the benefit of occupying the site before competitive species such as ceanothus, tanoak, and chinquapin.

III. Recommended Treatment: Modified Even-aged Silvicultural System with stand regeneration through a Regeneration Harvest (RH) is recommended for unit 35B. Harvest merchantable conifers greater than six inches dbh. Retain 7 conifers across the range of diameters over 20" dbh per acre. Retained conifers should approximate species composition of present stand and should be dispersed throughout the unit. Retained conifers should consist of both sound and cull trees. Retain three additional conifers greater than 16" dbh for future snags and coarse woody debris. Retain 3-5 large hardwoods per acre where present.

Cable yard. Slash brush and damaged conifers. Broadcast burn.

Plant unit with a mixture of 80% Douglas-fir and 20% minor species, principally rust resistant sugar pine. Conduct follow-up maintenance treatments through stand establishment. Follow-up treatments may include treatments such as handpiling and burning of piles to reduce activity fuels.

Silvicultural Options Considered: Treatment of unit with 35A was considered but was rejected due to differing stand conditions and an area to be left untreated between the two units.

UNIT 38 T.33S., R.7W., section 11

I. Stand Description: Unit 38 is comprised of two stand types. The southeastern portion consists of pole size Douglas-fir 8-20 inches dbh. Most trees are in the 12-14" dbh. The understory is generally open and has limited amounts of madrone and chinquapin. The northwestern part of the unit consists of mature and older Douglas-fir 20-36+" dbh over Douglas-fir poles. These canopy layers are over thick tanoak brush that is 3-10' tall.

II. Analysis: This area is designated Matrix. While the unit contains two distinct stand types, the total area is small (approximately 6 acres for both). Stand conditions within the two stand types fit the RMP general prescriptions for commercial thin and overstory removal. Entire unit is considered occupied by Del Norte salamanders.

Desired Future Condition: The desired future condition resulting from this action would, in the short-term, be two small contiguous stands that retain many of the characteristics they currently have. The southeastern portion of the unit would still be primarily a single storied stand of pole-size Douglas-fir. Some conifer regeneration may establish itself in disturbed areas. The northwestern portion of the unit would consist of scattered, larger mature Douglas-fir over Douglas-fir poles and conifer regeneration. It would be a stand with three canopy layers. The upper canopy layer would provide larger structural elements such as snags and coarse woody debris. A middle canopy layer would consist of pole-size Douglas-fir. The lowest canopy layer would consist of young conifers that became established within a few years following harvest, treatment of activity fuels, and other site preparation. Across the unit a minimum of 40% canopy cover would be retained to meet management recommendations for Del Norte salamanders. In the long-term, the stand would develop into a stand of two main canopy layers. At some point in the future the number of large conifers in the upper canopy layer would be reduced to six to eight trees per acre. The stand would contain 3-5 larger hardwoods per acre.

Prevention/Avoidance Strategies: none identified

III. Recommended Treatment: Overstory Removal/Commercial thin that maintains forty percent (40%) canopy cover across the unit is recommended for unit 38. Forty percent canopy cover is prescribed to meet management recommendations for Del Norte salamanders.

In areas where there exists a canopy layer of super-dominant Douglas-fir or pine, an overstory removal that maintains forty percent (40%) canopy cover is recommended. Harvest merchantable conifers greater than six inches dbh. Retain conifers across the range of diameters over 20" dbh. These retained conifers should approximate 75'x75' spacing and should consist of species present in the overstory layer, especially pine. Retained trees should be dispersed throughout the unit (where currently present) and should consist of both sound and cull trees. Retain 3-5 larger hardwoods per acre where present. Understory conifers may be counted towards canopy retention goals. Hardwoods may be counted for up to one quarter of the 40% canopy cover target.

In areas of pole size conifers, commercial thin is recommended treatment. The thinning should be from below with an emphasis on maintaining a minimum canopy cover of 40% across the unit.

Helicopter yard. Slash brush and damaged conifers. Handpile. Burn piles that

are not on talus.

Evaluate after harvest. If understocked areas exist, interplant with a mixture of 80% Douglas-fir and 20%, minor species, principally rust resistant sugar pin. Conduct follow-up maintenance treatments through stand establishment.

Silvicultural Options Considered: A regeneration harvest that retained 6-8 trees per acre followed by slashing of brush species and broadcast burning the entire unit was considered but was rejected.

UNIT 27 T.32S., R.7W., section 23

I. Stand Description: Unit 27 is an unentered two-storied stand. The overstory consists of mature and older Douglas-fir generally 20-32"+ dbh. Some pole size Douglas-fir is present. The understory consists of light tanoak brush mixed with salal and canyon live oak. A limited amount of treeform chinquapin is present. A limited amount of Douglas-fir and incense cedar regeneration is also present.

II. Analysis: This area is designated Matrix-Connectivity/Diversity Block. Stand conditions fit RMP regeneration harvest prescription. Conifer regeneration is limited.

Desired Future Condition: The desired future condition resulting from this action would, in the short-term, be a stand with two canopy layers. The upper canopy layer would consist of large Douglas-fir. Trees within this canopy layer would provide larger structural elements such as snags and coarse woody debris. The understory canopy layer would consist of young conifers that became established within a few years following harvest, treatment of activity fuels, and other site preparation. In the long-term the stand would retain a two storied structure. The stand would contain 3-5 larger hardwoods per acre.

Prevention/Avoidance Strategies: Timely site preparation and reforestation following harvest would allow conifer seedlings the benefit of occupying the site before competitive species such as tanoak.

III. Recommended Treatment: A Modified Even-aged Silvicultural System with stand regeneration through a Regeneration Harvest (RH) is recommended for unit 27. Harvest merchantable conifers greater than six inches dbh. Retain 16 conifers greater than 20" dbh per acre. These retained conifers should be from across the range of diameters over 20" dbh. Retained conifers should approximate species composition of present stand and should be dispersed throughout the unit. Retained conifers should consist of both sound and cull trees. Retain 3-5 larger hardwoods per acre where present. Future snags and coarse woody debris will come from retained trees.

Cable yard. Slash brush and damaged conifer regeneration. Space nonmerchantable conifers. Handpile slash and burn piles. Plant with a mixture of Douglas-fir and rust resistant sugar pine. Conduct follow-up maintenance, protection treatments such as brushing and tubing through establishment.

Silvicultural Options Considered: Helicopter yarding in Alternative 2 and no harvest at this time in Alternative 3 was considered.

UNIT 28 T.32S., R.7W., section 23

I. Stand Description: Unit 28 is an unentered mixed stand. The stand contains areas of large mature and older conifers, principally Douglas-fir 28-40"+ dbh. Evidence of past wind/snow damage and decay (conk) is present. There are areas of pole and sawtimber size Douglas-fir. Understories consist of open areas with little or no brush, patches of salal, areas of suppressed Douglas-fir regeneration mixed with canyon live oak and tanoak, areas of advanced Douglas-fir regeneration. Treeform canyon live oak, tanoak, and chinquapin are present. A limited amount of madrone exists in the unit. There are some areas of rock and talus.

II. Analysis: This area is designated Matrix-Connectivity/Diversity Block. Stand meets RMP guidelines for regeneration harvest. Stand is in a state of decline as evidenced by thinning tops and presence of conk. There are areas of pole-size conifers. Unit contains Del Norte salamanders.

Desired Future Condition: The desired future condition resulting from this action would, in the short-term, be a stand that meets management recommendations for Del Norte salamanders after harvest. Forty percent canopy cover would be retained across the unit. Overall, the unit would contain considerable diversity. Where there is currently a canopy layer of super-dominant conifers mixed with pole size Douglas-fir, Douglas-fir regeneration and other vegetation, a stand that consists of three canopy layers would be retained. The upper canopy layer would consist of larger, older conifers. Trees within this canopy layer would provide larger structural elements such as snags and coarse woody debris. A middle canopy layer would consist of mature conifers principally Douglas-fir. The lowest canopy layer would consist of conifer regeneration, hardwoods, and brush. In areas that are currently pole size conifers, stand densities would be reduced. These areas would still retain many of the characteristics they currently have. There would be an overstory of pole size conifers over existing advanced regeneration and tanoak. Canopy gaps would exist where disturbed by logging operations.

In the long-term areas would retain or develop (where disturbance created canopy gaps and there was no understory canopy layer) into a stand of three canopy layers. There would be super-dominant conifers and mature Douglas-fir. These two canopy layers would be over conifer regeneration and areas of tanoak brush. The stand would contain 3-5 larger hardwoods per acre.

Prevention/Avoidance Strategies: Timely site preparation and reforestation following harvest would allow conifer seedlings the benefit of occupying the site before competitive species such as tanoak.

III. Recommended Treatment: A Modified Even-aged Silvicultural System with stand regeneration through a Regeneration Harvest (RH) that maintains forty percent (40%) canopy cover across the unit is recommended for unit 28. Harvest merchantable conifers greater than six inches dbh. Retain 40% percent canopy cover for Del Norte salamanders. To reach the forty percent canopy cover, retain 16 conifers greater than 20" dbh per acre. These retained conifers should be from across the range of diameters over 20" dbh. Retained conifers should approximate species composition of present stand and should be dispersed throughout the unit. Retained conifers should consist of both sound and cull trees. If forty percent canopy cover is not achieved with the 16 large conifers per acre, retain additional conifers, hardwoods, and advanced conifer regeneration so 40% canopy is retained across the unit. Retain 3-5 larger

hardwoods per acre where present. Hardwoods may be counted for up to one quarter of the 40% canopy cover.

At some point in the future, large overstory trees in excess of the number required for regeneration harvest in Connectivity/Diversity blocks would be removed. The time required before the removal of these overstory trees would be dependant upon the development of understory conditions that meet current management recommendations for microclimate for the salamanders. Once these conditions are met by the understory and a limited overstory, harvest of retained large conifers in excess of the number called for in the RMP would occur.

Cable yard. Slash brush and damaged conifer regeneration. Space nonmerchantable conifers. Handpile slash and burn piles. Plant with a mixture of Douglas-fir and rust resistant sugar pine. Conduct follow-up maintenance, protection treatments such as brushing and tubing through stand establishment.

Silvicultural Options Considered: Helicopter yarding in Alternative 2 and no harvest at this time in Alternative 3 was considered.

Marking considerations for RH units

Conifers >20 inches dbh

- Retain conifers across the range of diameters
- Retain conifers to represent species present before harvest
- Disperse through unit where possible (ex. 7 tpa corresponds to an approximate spacing of 75' X 75')
- Retain both sound and cull trees
- Retain if falling would do unacceptable damage to or destroy regeneration
- Retain to form buffer of uncut trees around desired snags

Additional Conifers >16 inches dbh (to meet interim CWD guidelines)

- Retain well-formed, vigorous trees
- Retain a mix of species

Hardwoods

- Retain larger (> 10 inches dbh) trees
- Retain a mix of species
- On an acre by acre basis, not an average over the unit (3 tpa corresponds to an approximate spacing of 120' X 120')

Snags- retain except when they are a safety hazard

COMMERCIAL THIN

CT Unit

35A

Thin from below- Mark so that the trees to be removed are suppressed and intermediates where possible. Mark to take selected codominants and dominants when they are clumped. Retain 40% canopy cover.

Pole and smaller sawtimber (<20" dbh) size trees

- Retain larger, well-formed trees without wind, snow, or other damage (generally dominants and codominants)
- Retain trees with full, vigorous, long crowns
- OK to vary spacing some to retain "best" trees
- OK to retain some broken top/damaged trees on grid (for stand diversity and wildlife)

Species preference

- Retain conifers that represent species mix of stand
- Retain releaseable pine over other species. Mark so that pines are spaced a little more open than Douglas-fir or white fir.
- Retain Douglas-fir over white fir.

Occasional Remnant Mature/Old Growth Conifers within unit

- Retain 8-10 per acre where present as leave trees
- Where present space approximately 65'X 65'
- Favor pines that are likely to remain in stand for awhile
- Open canopy slightly more than where there are smaller trees

Amendment 1

Amendment to Marking Guide and Silviculture Prescription

Units 13a, 13b:

These units were originally planned to receive a Regeneration Harvest on the areas containing older overstory conifers and Commercial Thin in the areas containing conifers less than 120 years old. These units have extensive areas of talus containing known Del Norte Salamander habitat. These units need to have a minimum of 40% canopy retention. Commercial thin both units to 100-120 sqft/ac of residual basal area maintaining a minimum of 40% canopy retention over the entire units. Leave trees should be the dominant, fast-growing conifers with healthy crowns, generally 30% or greater crown ratios.

Unit 13d:

This unit was originally planned as a Regeneration Harvest. The unit has extensive areas of talus containing known Del Norte Salamander habitat in the east portion of the unit. This portion of the unit would be dropped from sale and the west portion remaining would be marked and treated as described in the marking guide and silviculture prescription.

Unit 15:

This unit was originally planned as a Regeneration Harvest. A portion of the unit has talus with known Del Norte Salamander sites. These areas need to have a minimum 40% canopy closure retained. The portions of the unit that do not have identified talus would be marked as a Regeneration Harvest as originally described in the marking guide and silviculture prescription.

COTTON SNAKE TIMBER SALE

SILVICULTURAL PRESCRIPTION

I. INTRODUCTION

The Cotton Snake timber sale is located in T.32S., R.06W., Sections 5, 19; T.32S., R.07W., Sections 13, 25; T.33S., R.06W., Sections 6, 18; T.33S., R.07W., Sections 1, 13. This sale is in the Middle Cow Creek Ecosystem Analysis Area, a fifth field watershed as designated in the Medford District RMP, and it encompasses portions of 5 seventh field watersheds. All of the sections in this area are part of the Matrix land allocation as designated in the Medford District Resource Management Plan (RMP).

II. OBJECTIVES

The overall objectives for Matrix land allocation in the Medford RMP include:

- produce sustainable supply of timber and forest commodities,
- produce connectivity between late successional reserves,
- provide for organisms associated with both late-successional and younger forests and their dispersal,
- provide early-successional habitat.

Specific objectives designed through the ID team for this timber sale include:

- Harvest timber while protecting other resources.
- Renovate road systems.
- Minimize sedimentation into fish streams
- Minimize impacts to habitat connectivity, primarily for wide-ranging, mobile species.
- Promote pine communities on sites suited for pine.
- Assure any new roads consider long term transportation plan.
- Regenerate stand to conifers in regeneration harvest units.
- Promote growth and release of existing young conifer stands.

III. STAND DESCRIPTION, ANALYSIS, RECOMMENDED TREATMENT

Unit 1

	Unit 1
Location	32S-06W-05
Huc 7	
Acres	12
Aspect	Northwest
Slope	55%-65%
Elevation	3200'-3600'
Ann. Prec.	44"-46"
TPCC	RTR, RSR/RTR
Site Index	130
Soils	505F- Acker-Norling; Moderately deep to deep, well-drained, gravelly to very gravelly loam.

Existing Stand

Overstory - Primarily DF 28"-44" DBH, 50-65 trees per acre (TPA), 3-5 snags per acre, 80-90% crown closure, 180+ years old.

Mid-canopy - Very light with very few scattered suppressed DF and occasional madrone and chinquapin.

Understory - Very little conifer regeneration under the heavy overstory except in the few scattered canopy openings of 40' or greater. Primarily DF up to 20' tall in the openings. Very scattered madrone and chinquapin, up to 50' in height. Salal with occasional Oregon grape is the primary shrub layer, 60-95% ground cover, but generally only 1-3' in height.

Stand History/Analysis

The main part of this stand has had no past harvest and is generally one-storied without a varied vertical structure. The canopy closure is high with the unit

supporting a dense stand. The north and south edges of the unit have openings in the overstory from some past disturbance, and openings of 30' or greater have filled in with conifer regeneration. There are scattered hardwoods, primarily madrone and chinquapin, in the unit and they are most abundant on the edges of the openings.

Desired Future Conditions

This unit is in a "connectivity block" as designated by the Medford District RMP/ROD with a primary objective of maintaining late seral vegetation on a minimum of 30% of the section. An overstory of large conifers with ½ to 2 acre openings having a variety of age and size classes of conifers from seedlings to pole size with a component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as

mortality occurs.

Recommended treatment

Group Selection - Harvest all of the trees within small openings of ½ to 1 acre. These openings can be in a line beginning at the top of the area by road 32-6-5.0. This would facilitate a single yarding corridor down the hillside with the openings to be harvested along this corridor. There should be areas between these openings that are not harvested except for the width of the single yarding corridor that connects the openings that are created. These openings and the non-harvested areas between them will be posted as a long narrow single unit. The reserve trees in between the openings will count towards the 12 to 18 conifer leave trees per acre required for “connectivity block” regeneration harvest areas. These trees are not to be harvested in a future sale as they are part of the green tree retention strategy, defined in the Medford R.O.D. The objective is to create vertical structure and imitate small openings often created in unentered mature stands when small root rot pockets occur or windthrow creates small openings. Harvest of the tree boles is the activity that is not consistent with the natural disturbances. Hardwood and snag retention will occur in the reserve portions of the total unit. Snags within the harvest area can be left if they are not a safety hazard. There should be room to put in 3 corridors (3 groups of openings). The corridors should be 200' apart. At least 2 of them should be completely within the dense portion of the stand and the third corridor may have to be placed within part of the more open, structurally diverse portion of the stand.

Logging slash within the harvest openings and in the corridors connecting the openings should be handpiled and the piles burned. The units and corridor should be planted primarily with DF (80%) and 10-20% a combination of IC and SP.

Units 2A, 2B

	Unit 2A	Unit 2B
Location	32S-06W-05	32S-06W-05
HUC 7	CMO418 - Wood Ck.	CMO418 - Wood Ck.
Acres	13	6
Aspect	East	East
Slope	50%-65%	25%-60%
Elevation	3100'-3600'	3400'-3600'
Ann. Precip.	44"-46"	44"-46"
TPCC	RMR	RMR
Site Index	130	130
Soils	239G - Atring- Vermisa; Shallow to moderately deep, well-excessively drained, gravelly to very gravelly loam.	239G - Atring- Vermisa; Shallow to moderately deep, well-excessively drained, gravelly to very gravelly loam.

Existing Stand

Overstory - Primarily DF with occasional SP, 28"-50" DBH, 15-35 TPA, 50-90% canopy closure, generally 200+ years old. Unit 2B has patchier distribution of the overstory and larger openings.

Mid-canopy - A combination of tanoak, chinquapin, suppressed DF, occasional tree-form canyon live oak (CLO), and vigorous "second growth" DF. Distribution is patchy with the healthiest DF occurring in the openings under the overstory. Unit 2B has larger openings with more dense patches of advanced DF regeneration up to 40' in height. Unit 2A has the mid-canopy more scattered but fewer numbers of tanoak, chinquapin, and CLO.

Understory - Varied distribution with the most dense patches occurring in unit 2B under the openings in the overstory. Primarily DF with occasional IC, however distribution is uneven, density is generally light and the majority are suppressed. A small percentage of the conifer understory are releasable. Tanoak, chinquapin, salal, Oregon grape, and CLO are the main shrub species with ground cover varying from 60-90%. Unit 2B has the majority of the CLO and unit 2A has the most salal as it is has a more northerly aspect.

Stand History/Analysis

These units have had very light past harvest, likely it was salvage of individual dead and dying

overstory conifers which created small openings in the overstory which filled in with conifer regeneration or shrubs. The understory and mid-canopy is generally suppressed except where the openings in the overstory were large enough, approximately 20' or greater, to allow enough light in for DF growth. The majority of the stand is 150+ years old with a range of canopy closures from 50-90%.

Desired Future Conditions

This unit is in a “connectivity block” as designated by the Medford District RMP/ROD with a primary objective of maintaining late seral vegetation on a minimum of 30% of the section. Scattered overstory of large “legacy” conifers (12-18TPA) with well-stocked understory of vigorous conifers, and component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs.

Recommended treatment

Regeneration Harvest - Harvest the merchantable conifers leaving 12 to 18 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. Leave trees should generally be spaced throughout the unit rather than in large clumps unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). This unit is rocky in places and has somewhat droughty conditions due to the east-southeast aspect. Healthy, vigorous conifers that are 20" DBH and less should be reserved from harvest. Areas where these young conifers are in dense groups, can be thinned to 80-100 sqft/ac basal area. Snags and tree-form hardwoods should be reserved unless they are considered a safety hazard.

Shrubs and hardwoods 1" to 5" diameter at 1' above the ground should be slashed and piled with the logging slash and the piles burned, avoiding healthy conifer regeneration with the placement of the hand piles. Units can be planted with DF and up to 30% IC, and SP.

Units 4A & 4B

	Unit 4A	Unit 4B
Location	32S-07W-13	32S-07W-13
HUC 7	CMO618 - Dads Ck.	CMO618 - Dads Ck.
Acres	31	6
Aspect	Northwest	West
Slope	50%-65%	50%-70%
Elevation	3100'-3400'	3200'-3400'
Ann. Precip.	44"-46"	44"-46"
TPCC	RSR/RMR, RSR/RTR	RSR/RTR
Site Index	130	130
Soils	2286G, 1288G (south) - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.	2286G, 1288G(south) - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.

Existing Stand

Overstory - Primarily DF with occasional SP, IC; 28"-56" DBH, 25-45 TPA, 60-80% canopy closure, 150+ years old.

Mid-canopy - Light density of conifers in unit, mostly suppressed DF. Depending on where the boundary is placed for the unit, there could be pockets of DF that are dense and vigorous in the mid-canopy level. Some chinquapin, tanoak, and madrone are also present up to 50' in height but not a dense layer.

Understory - Scattered DF, some IC but not very extensive. Most prevalent in the overstory gaps but overall conifer regeneration is very light. Shrubs present are primarily salal, tanoak, chinquapin, Oregon grape, and CLO. Varied density of ground cover from 40-90%.

Stand History/Analysis

There is no evidence of previous harvest in these units. Depending on where the lower boundary of the unit is placed, there is not a lot of vertical structural variety in the unit. The overstory is fairly dense with crown closures 60-80% and is 150+ years old. There are young stands at the lower portions of the unit which could be partially included in the unit, and these areas have DF 10"-20" DBH with canopy closures 60-90% but are below the canopy level of the mature stands.

Desired Future Conditions

Scattered overstory of large “legacy” conifers (7 -12TPA) with well-stocked understory of vigorous conifers, and component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs.

Recommended treatment

Regeneration Harvest - Harvest the merchantable conifers leaving 7 to 10 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. The leave trees should be spaced throughout the unit rather than clumped, unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). Leave up to 10 conifers per acre where the soils are rocky, and small rock outcrops are present. Healthy, vigorous conifers 18" DBH and under should be reserved from harvest or commercially thinned to 100 sqft./ac. of basal area if they are present in densities greater than 100sqft./ac. Snags and tree-form hardwoods should be reserved unless they are considered a safety hazard.

Unit 4A should be broadcast burned, provided the alternative is chosen through the EA process that includes building the road to the top of the unit. If the road is not built, then the unit should have the logging slash handpiled and burned. If the broadcast burn is part of the chosen alternative, then logging slash should be pulled back for a 5' radius around the leave trees.

Unit 4B should have the logging slash piled and burned in either alternative. Both units should be planted with DF and up to 20% of the stocking with SP and IC.

Units 5A & 5B

	Unit 5A	Unit 5B
Location	32S-07W-13	32S-07W-13
HUC 7	CMO524 - Totten Ck.	CMO524 - Totten Ck.
Acres	5	7
Aspect	North	North, NE
Slope	50%-65%	50%-65%
Elevation	3500'-3600'	3600'-3800'
Ann. Precip.	44"-46"	44"-46"
TPCC	FGR/RMR, RMR	RMR
Site Index	130	130
Soils	2286G - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.	2286G - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.

Existing Stand

Overstory - Primarily DF with scattered patches of chinquapin, 12"-20" DBH, 70-90 years old, 180-260 sqft./ac. basal area, 70-90% canopy closures. Very scattered older conifers, 150+ years and 30" DBH and greater, are present in the overstory.

Mid-canopy - Primarily scattered suppressed DF, 6"-10" DBH, and small patches of chinquapin up to 10" DBH.

Understory - Very few conifers present due primarily to the heavy canopy closure. Some scattered suppressed DF with a low shrub component of salal, tanoak, and Oregon grape at 40-60% ground cover.

Stand History/Analysis

These stands are likely the result of a disturbance that killed the previous overstory, probably a fire that burned hot in this area and spared some of the surrounding stands. This stand is averaging about 70-90 years old and is generally one-storied with an occasional large residual conifer that survived the disturbance, scattered around the unit.

Desired Future Conditions

A vigorous stand of “second growth” exhibiting good tree growth, 80%+ canopy closure, scattered large “legacy” conifers, and a component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the residual conifers left after thinning.

Recommended treatment

Commercial Thin - Commercial thin these units to a basal area of 100 - 110 sq.ft / ac. Thin from below removing the smaller less vigorous conifers. Leave trees should be the dominant, fast-growing conifers with healthy crowns, generally 30% or greater crown ratios. Tree condition should be considered as priority for leave over even spacing. Areas in the stand that do not have at least 100 sq ft./ac of **conifer** basal area should be left alone. Hardwoods should not be harvested in these units as they are to be helicopter yarded. The occasional old growth conifers in the stand should be retained for structural variety but can be counted as part of the leave basal area. If they are suppressed and similar in size to the younger main stand component, they should be removed as part of the harvest basal area. The analysis of this unit showed that a range of leave tree basal area is feasible, but the leave basal area chosen, 100-110 sq ft/ac, gives a good combination of long term stand growth and economically viable thinning at this time. Post harvest or site preparation work is not anticipated but should be evaluated after harvest.

Units 8A, 8B, 11

	Unit 8A	Unit 8B	Unit 11
Location	32S-07W-25	32S-07W-25	32S-07W-25
HUC 7	CMO527, CMO524 - Totten Ck.	CMO524 - Totten Ck.	CMO524 - Totten Ck.
Acres	22	2	2
Aspect	South, SW, NE	East	North
Slope	20%-55%	55%-65%	30%-50%
Elevation	2500'-2800'	2300'-2400'	2200'-2300'
Ann. Precip.	40"-42"	40"-42"	40"-42"
TPCC	RTR, RMR	RMR	RMR
Site Index	120-130	120-130	120-130
Soils	520E - Dumont gravelly loam; Deep, well-drained, gravelly loam. 1182F - Josephine-Speaker; Moderately deep to deep, well-drained, gravelly loam.	505F - Acker-Norling ; Moderately deep to deep, well-drained, gravelly to very gravelly loam. 520E - Dumont gravelly loam; Deep, well-drained, gravelly loam.	520F - Dumont gravelly loam; Deep, well-drained, gravelly loam.

Existing Stand

Overstory - Primarily DF with occasional SP, 150+ years old, canopy closures 50-80%; **Unit 8A**- 15-25 TPA, 32"-48" DBH, **Unit 8B**- 20-25 TPA, 20"-36" DBH, **Unit 11**- 20-30 TPA, 18"-28" DBH.

Mid-Canopy - **Units 8A&B** have a mix of suppressed DF, chinquapin, and madrone, 6"-10" DBH, 30'-60' in height. **Unit 8A** also has some healthy, vigorous DF, 8"-16" DBH. This mid-canopy is patchy in distribution, primarily occurring in overstory canopy openings, with the suppressed DF primarily in the small openings and under the canopy. **Unit 11** has scattered, suppressed DF up to 12" DBH with occasional madrone and chinquapin, however it is lighter than units 8A&B.

Understory - **Unit 8A** has a patchy distribution of DF, IC, and SP from 3' to 20' in height, partially stocked with these conifers. The heaviest patches are suppressed but there is enough healthy regeneration that these areas should be saved. **Units 8B & 11** have very scattered conifer regeneration and generally in poor condition. Tanoak, chinquapin, madrone, salal,

Oregon grape are primary shrub species.

Stand History/Analysis

All three of these units have received past partial harvest of the overstory. Unit 8A has the greatest amount of multi storied canopy with an uneven past harvest creating larger holes in the overstory. Units 8B and 11 do not have quite as much variability in canopy structure, particularly unit 11, however both units have had past harvest. The overstories in all 3 units are 150+ years old and have a light component of madrone, chinquapin, and tanoak with unit 8A having the most hardwoods. Tree-form hardwoods are not a reforestation problem in any of the units, however the shrub form will need treatment to establish conifer seedlings.

Desired Future Conditions

Scattered overstory of large “legacy” conifers (6 -10TPA) with well-stocked understory of vigorous conifers, and component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs.

Recommended treatment

Regeneration Harvest - Harvest the merchantable conifers leaving 6 to 10 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. The leave trees should be spaced throughout the unit rather than clumped, unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). Leave up to 10 conifers per acre where the soils are rocky. The clearcuts in close proximity to these units have received 2 plantings to attain desired stocking, hinting that site modification from overstory trees should be beneficial. Vigorous, healthy conifers 16" DBH and under should be reserved from harvest, unless their density is greater than 100 sqft/ac. basal area, in which case they should be thinned to 80-100 sqft/ac. In **unit 8A**, hardwoods should be thinned to 40 sqft/ac. where densities allow. Snags and tree-form hardwoods should be reserved, except where hardwoods are thinned in 8A, unless they are considered a safety hazard.

In **unit 8A**, shrubs and hardwoods 1"to 5" diameter at 1' above the ground should be slashed and piled with the logging slash and the piles burned, avoiding healthy conifer regeneration with the placement of the hand piles. **Unit 11** should have the logging slash piled and the piles burned. **Unit 8B** should be broadcast burned and logging slash should be pulled back for a 5' radius around the leave trees. An incomplete burn is preferred over a hot, high-consumptive burn. All

of the units should be planted with DF and up to 20% IC and SP.

Units 3 & 10

	Unit 3	Unit 10
Location	32S-06W-19	32S-07W-25
HUC 7	CMO518 - McCullough Ck.	CMO524 - McCullough Ck.
Acres	30	47
Aspect	South, SE, SW	South, SW, West
Slope	40%-60%	50%-65%
Elevation	2300'-2500'	1800'-2400'
Ann. Precip.	40"-44"	40"-44"
TPCC	RTR	RTR
Site Index	DF - 120; PP - 120-130	DF - 120; PP - 120-130
Soils	1182F - Josephine-Speaker; Moderately deep to deep, well- drained, gravelly loam.	1182F - Josephine-Speaker; Moderately deep to deep, well- drained, gravelly loam.

Existing Stand

Overstory - Mix of PP, DF, IC with PP the dominant species present, 28"-48" DBH, 10-25 TPA, 150+ years old, crown closures 30%-60%.

Mid-Canopy - Mix of DF, IC, PP, SP with DF the primary component, 10"-18" DBH, 80-220 sqft./ac basal area, 60-90 years old. This stand is patchy in distribution with canopy closures of 70-90% where it is the most dense and scattered individuals where the large overstory is the heaviest. There is also a component of madrone with some chinquapin, up to 80 sqft./ac basal area, 8"-20" DBH mixed in with the conifers.

Understory - Variable size, condition, and distribution with DF and IC the primary species. Some of the patches of conifers are dense with many of the trees suppressed. There is also conifer regeneration from 2' to 30' in height, DF, IC, with few PP, that is in good condition, primarily where the overstory is most scattered. Stocking levels are not consistent throughout the unit, but much of the unit has multiple "levels".

Stand History/Analysis

Both of these units have had past harvest, primarily a light entry that took mortality salvage and selected overstory trees. The dominant overstory trees are PP with minor amounts of DF, IC and SP. The mid-canopy and understory however, are primarily DF with IC heavy in patches. Due to the shaded conditions under the overstory canopy, DF regeneration has a competitive advantage over PP. The exclusion of fire has allowed the mid-canopy and overstory to increase in density further inhibiting PP regeneration, even though many of the large overstory trees are PP. The IC out competes both the DF and PP where the site conditions are on the fringes for optimum growth for either DF and PP. Both of these units are on South to Southwest aspects, and the site index for PP is as good or better than DF.

Desired Future Conditions

An overstory of large PP, variable canopy closures, with scattered large DF, IC and a mid-canopy that is a combination of vigorous DF up to 120 years old and openings of widely spaced young PP that will eventually replace the older overstory PP. A minor component of hardwoods along with snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs.

Recommended treatment

Selection Harvest/Commercial Thin - Harvest the large overstory DF & IC, over 20" DBH, leaving 3-5 per acre. Harvest the overstory PP leaving 60-80 sqft/ac. In areas without PP, leave a minimum of 7-9 tpa, over 20" DBH, in the overstory. In some areas the overstory PP are clumped together (boles within 25' or branches interconnected), and there is less than 80 sqft/ac. basal area. In these areas where there are clumps of 3-4 PP, remove 1-2 of the overstory PP, where the clumps are more than 4 trees, remove ½ of the overstory PP from the clump, provided the tree crowns are interconnected. Around these clumps of overstory PP, harvest all merchantable trees for a 50' radius (except for any large overstory DF and IC planned for leave). This is to provide for PP regeneration. Around the individual large overstory PP, if the mid-canopy is vigorous DF, 10"-18"DBH, thin these trees to 5'-10' crown spacing (openings between crowns). If the mid-canopy/understory is hardwoods or stagnant conifers, harvest all merchantable trees for a 50' radius similar to the PP clumps. In areas that are void of overstory PP, but have stands of conifers 10"-20" DBH that are growing well, commercial thin these stands to 5'-10' crown spacing.

In **unit 3** and **cable logging portions of unit 10**, hardwoods within the 50' radius of overstory PP should be removed and they should also be harvested in the crown spacing commercial thin areas if their crowns are within 10' of conifer crowns.

In both units, slash shrubs and hardwoods 1" to 5" diameter at 1' above the ground, handpile with

logging slash, and burn piles. In the 50' radius areas that were harvested around the overstory PP, all of the shrubs and DF & IC less than 6" DBH that remain, should be slashed, piled and burned with the logging slash. The other areas of dense conifers under 6" DBH that remain after harvest, should be thinned to 12'X12' spacing, and the severed saplings lopped to the ground.

The openings that were cleared around the overstory PP should be planted with PP seedlings and the rest of the unit should be reviewed after harvest to determine if any areas away from the PP were opened up enough that they should be planted.

Units 13A, 13B, 13C, 13D

	Unit 13A	Unit 13B	Unit 13C	Unit 13D
Location	33S-07W-1	33S-07W-1	33S-07W-1	33S-06W-6
HUC 7	CMO527 - Totten Ck.	CMO527 - Totten Ck.	CMO527 - Totten Ck.	CMO527 - Totten Ck.
Acres	20	12	24	16
Aspect	North	North, NW	North	North, NW
Slope	55%-70%	50%-60%	45%-65%	55%-70%
Elevation	1400'-1900'	2000'-2300'	2300'-2600'	2600'-3000'
Ann. Precip.	38"-40"	38"-40"	38"-40"	38"-40"
TPCC	RTR, RMR	RMR, RTR	RMR, RTR	RMR
Site Index	130	120-130	130	130
Soils	505F- Acker-Norling; Moderately deep to deep, well-drained, gravelly to very gravelly loam.	2286G - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.	505F- Acker-Norling; Moderately deep to deep, well-drained, gravelly to very gravelly loam.	2286G - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.

Existing Stand

Overstory - All Units - Primarily DF with scattered SP and IC, 24"-48" DBH, 60%-80% canopy closure, 150+ years old; **Unit 13a** - 20-40 TPA, more scattered at top of unit; **Unit 13b** - 25-45 TPA with part of the unit, primarily the west ½ having smaller overstory trees 16"-28" DBH, 80-150 years old; **Units 13c & d** - 18-30 TPA.

Mid-canopy - **Unit 13a** - light with mostly suppressed DF & WF. The southern portion of the unit at the top has more scattered overstory and mid-canopy is heavier with mix of chinquapin, madrone, and DF; 8"-16" DBH up to 80% canopy closure. **Unit 13b** - Patches of DF, chinquapin, tanoak, madrone: 8"-18" DBH, mostly suppressed under the overstory canopy, except in the west portion where these trees comprise the overstory. **Unit 13c & d** - Light with suppressed DF the primary conifer with occasional healthy individuals 8"-16" DBH in overstory openings; tanoak and chinquapin up to 30' in height are heavy where the overstory is scattered. *Understory* - Very little conifer regeneration in any of the units. There are areas of advanced conifer regeneration from 2'-15' in height mixed in with the mid-canopy, particularly in units 13 a & b, but overall the natural conifer regeneration is light.

Stand History/Analysis

Units 13A & B have no obvious signs of past entry for harvest. The upper portion of 13A and the west ½ of 13B have had past “natural” disturbance, likely a fire, and those portions of the units are younger, 80-120 years old. The upper portion of 13A also has a greater amount of hardwoods than the rest of the units. Units 13C & D have had some past light harvest, most likely a mortality salvage, and the southeast corner of 13C had a recent fire that killed the overstory in a 4-5 acre area. The overstory in all of the units apparently did not develop in very dense conditions as the overstory trees are generally large and branchy and the overstory canopy closures tend to be below 80%. The areas of past disturbance (13A & B) have younger stands where the mid-canopy has developed and has canopy closures up to 90%.

Desired Future Conditions

Units 13 A,B,C are in a “Connectivity Block” as designated by the Medford RMP/ROD. After harvest, a minimum of 12 to 18 green conifer trees would be retained and overall at least 25-30% of the block would be maintained in late-successional forest. The overstory of large “legacy” conifers (12-18 TPA) would have a well-stocked understory of vigorous conifers, and component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs. Unit 13 D is not in a connectivity block and future conditions would be similar except that 7 -10 large green conifers per acre would be retained.

Recommended treatment

Regeneration Harvest - In **units 13A, 13B, and 13C**, harvest the merchantable conifers leaving 12 to 18 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford

RODS/MFP, 1995)". The leave trees should be spaced throughout the unit rather than clumped unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). **Unit 13D** should receive the same treatment except that 7-10 large conifers should be retained as this unit is not in a connectivity block.

Units 13A & 13B have portions of the stand that are younger, with vigorous conifers up to 20" DBH, particularly in the west ½ of 13B and the top of 13A. In these areas, reserve these conifers from harvest, unless their density is greater than 100 sqft/ac. basal area, in which case they should be thinned to 80-100 sqft/ac. Snags and tree-form hardwoods should be reserved under the helicopter logging alternative, unless they are considered a safety hazard. If the cable harvest option is chosen, the areas of hardwood concentrations should be reduced to 40 sqft/ ac. when thinning the young conifer areas.

In all units, slash shrubs and hardwoods 1"to 5" diameter at 1' above the ground, handpile with logging slash, and burn piles. In the **alternative to the proposed action** that includes building the road into section 1, **units 13A, 13B, and 13C** should be broadcast burned instead of piled and burned. If the broadcast burn alternative is chosen, then logging slash should be pulled back for a 5' radius around the leave trees.

These units should be planted primarily with DF and up to 20% IC, and SP.

In unit 13A, there are 2 patches, approximately 1 acre in size, that appear to be root rot pockets. These areas can be identified by the void in the overstory, some advanced regeneration in those areas, and the snags that are present. This will be less discernable after harvest. These areas should be planted with IC and SP rather than DF.

Unit 15

	Unit 15
Location	33S-07W-13
Huc 7	CMO530 - Rattlesnake Ck.
Acres	23
Aspect	North - Northwest
Slope	55%-65%
Elevation	2500'-3000'
Ann. Prec.	38"-42"
TPCC	RTR, RMR
Site Index	130
Soils	2286G - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.

Existing Stand

Overstory - Primarily large DF with occasional SP and IC, 32"-60" DBH, 25-45 TPA, 50-80% crown closure, 200+ years old.

Mid-canopy - Mostly suppressed DF and patches of tanoak and chinquapin, with occasional tree-form CLO, particularly on the northeast rocky portion of the unit. Overall, the mid-canopy is light and present in the overstory openings.

Understory - Uneven distribution of conifer regeneration, with canopy openings having the majority of the regeneration. Understory conifer stocking overall is low. There is a heavy shrub component with dense salal and Oregon grape in the south middle portion of the unit, and tanoak and CLO on the ridges and the north portions of the unit.

Stand History/Analysis

This unit has had very little past harvest and

has variable site conditions within the unit. The center of the unit has deeper soils and has a moderate environment, while the east and west parts of the unit are rockier with dryer conditions as evidenced by the abundance of CLO. The overstory trees are very large, up to 60" DBH, in the central part of the unit and are much smaller, 24"-36" DBH on the ridges along the east and west boundaries of the unit. The shrubs in the central part of the unit will be the biggest interference to conifer regeneration, while on the ridges the rocky, droughty conditions will interfere most with conifer regeneration.

Desired Future Conditions

Scattered overstory of large "legacy" conifers (7 -12TPA) with well-stocked understory of vigorous conifers, and component of hardwoods, snags, and residual coarse woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs.

Recommended treatment

Regeneration Harvest - Harvest the merchantable conifers leaving 7 to 12 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. The leave trees should be spaced throughout the unit rather than clumped, unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). The central part of the unit that includes the swale in the middle of the unit should have 7 TPA retained. The portions of the unit that have rocky soils, heavy CLO in the understory, and are generally located on or near the ridges along the east and west unit boundaries should have up to 12 TPA retained for site modification, due to the harsh conditions. Snags and tree-form hardwoods should be reserved unless they are considered a safety hazard.

Slash shrubs and hardwoods 1" to 5" diameter at 1' above the ground. Pile the cut shrubs in concentrations and burn these concentrations along with logging slash allowing for some creep of the fire. This “swamper” burn should be done under moderate conditions that would avoid a hot burn and complete broadcast, but allow the fire to burn out the concentrations of logging slash and cut shrubs. The shallow soils along the east and west portions of the unit are the most important areas to avoid a hot burn. This unit should be planted with DF seedlings and up to 20% IC and SP.

Units 14 & 16

	Unit 14	Unit 16
Location	33S-07W-13	33S-07W-13
HUC 7	CMO530 - Rattlesnake Ck.	CMO530 - Rattlesnake Ck.
Acres	19	28
Aspect	West, Northwest	South, Southwest
Slope	30%-60%	45%-60%
Elevation	2000'-2300'	1900'-2300'
Ann. Precip.	38"-42"	38"-42"
TPCC	RMR, RTR	RTR
Site Index	120-130	120-130
Soils	2286G - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.	1288G (south) - Kanid-Atring; Moderately deep to deep, well-drained, gravelly to very-gravelly loam.

Existing Stand

Overstory - Very scattered, mostly DF with IC, SP, and PP, **unit 16** having up to 20% PP. Sizes range from 28" to 40" DBH, 2 to 20 TPA with the distribution very patchy and overall less than 10 TPA throughout both units. Canopy closures from large overstory trees are 10% up to 60% in the scattered dense patches, but overall the canopy closures from large overstory trees are less than 30%. Age of overstory trees are generally over 150 years.

Mid-canopy - Generally a dense stand with a combination of young healthy conifers, suppressed conifers, and variety of hardwoods. Primarily DF, 6"-18" DBH, along with IC comprising up to 25% of conifer stand, and tanoak, madrone, and chinquapin are present in varying amounts and sizes from 6" DBH to 24" DBH, with madrone being the primary larger hardwood. In some areas the majority of the mid-canopy is hardwood, either dense patches of small madrone or tanoak, 6"-10" DBH with intermixed larger madrone, chinquapin, or tanoak scattered throughout the unit.

Understory - Variable in distribution, density, size, and species. Conifers are predominantly DF with up to 30% IC and occasional SP, PP. Scattered throughout both units are vigorous seedlings and saplings 2'-20' in height. There are also dense patches that are suppressed or beginning to show results of heavy competition, particularly where the overstory is lightest. Madrone, tanoak, chinquapin, and CLO are present as saplings, both as scattered individuals and

in dense patches, up to 20' in height. CLO, tanoak, Oregon grape, ocean spray, and poison oak are the primary shrub species and the densities vary from 20% to 60% ground cover.

Stand History/Analysis

Both of these units have had past harvest, but the light overstory stocking appears due primarily to past disturbance, likely fire, especially in unit 16, with unit 14 receiving the heavier past harvest. In both units, there are areas of mid-canopy hardwoods mixed in with fast-growing conifers, primarily DF, but there are also areas where these conifers are dense and their growth is slow and individual condition is spindly with a large height to diameter ratio. Some of these areas can be pre-commercially thinned, and some of them are suppressed to the point where the hardwood competition needs to be reduced and conifers re-initiated. There are also patches of healthy conifer seedlings that can be left to grow where hardwood competition is light, or released in areas of heavy hardwood competition.

Desired Future Conditions

Scattered overstory of large “legacy” conifers (6 -12TPA) with a stocked understory of conifers at a density that allows for good stand health, and a component of hardwoods, snags, and residual course woody debris (CWD). New snag and CWD recruitment will come from residual legacy trees and the next stand of conifers will act as a replacement source for the legacy overstory trees as mortality occurs.

Recommended treatment

Density Management - These 2 units have a very scattered overstory which is at the minimum level for overstory retention required by the Medford RMP/ROD. Harvest from either of these units is not a likely possibility due to the low number of overstory trees. Stand density management and control of species composition are the primary treatments recommended for these stands. Both of the units have areas of young conifers that are very dense. These should be thinned to a 12' spacing, provided they are in good enough condition to be released. These areas will have to be flagged on the ground by BLM personnel before operations take place. There are also areas that have dense hardwoods, primarily CLO, but also areas of madrone and tanoak with few conifer seedlings or saplings. Where the hardwoods are dense and below 6" DBH, they should be slashed, piled, and the area planted to PP, DF, IC, and SP seedlings. Hardwoods larger than 6" DBH should be left unless their density reaches 60 sqft./ac. In these areas, the density of hardwoods should be reduced below 60 sqft./ac by girdling the excess hardwoods. These areas should also be planted with conifers if there are few existing. These planting areas will also have to be flagged on the ground prior to treatment.

Cotton Snake Treatment Summary			
Unit	Harvest treatment	Site Prep	CWD
1	Group Selection - Harvest merchantable trees in openings up to 1 acre, reserve all trees between openings with 3 openings in each unit	Handpile logging slash and burn piles. Plant unit with DF, minor component of SP, IC.	
2A, 2B, 13A, 13B, 13C	Regeneration Harvest - Harvest the merchantable conifers leaving 12 to 18 of the large conifers per acre. Thin stands of young conifers under 20"DBH to 80-100 sqft. /ac. These units are in “ connectivity blocks ”. Thin hardwoods to 40 sqft/ac in units 13A,B,C under road alternative.	Slash shrubs and hardwoods 1" to 5" diameter at 1' above ground. Handpile cut shrubs and logging slash and burn piles. In road alternative, Units 13A,B,C are to be broadcast burned. Pull back logging slash for 5' around leave trees	Unit 2A - below minimum ROD standards for CWD.
4A, 4B, 13D, 15	Regeneration Harvest - Harvest the merchantable conifers leaving 7 to 10 of the large conifers per acre. Leave up to 10 TPA in rocky areas. Unit 15 - leave up to 12 TPA along ridges by east and west boundaries.	Units 4A,B - handpile logging slash and burn piles. Units 13D, 15 - Slash shrubs and hardwoods 1" to 5" diameter at 1' above ground. Unit 13D - Handpile shrubs and slash and burn piles. Unit 15 - “Swamper” burn concentrations. In the road alternative, unit 4A should be broadcast burned with logging slash pull-back for 5' around leave trees.	Units 13D & 15 - below minimum ROD standards for CWD.

Cotton Snake Treatment Summary

Unit	Harvest treatment	Site Prep	CWD
5A, 5B	<p>Commercial Thin - Commercial thin these units to a basal area of 100 - 110 sq.ft / ac. Thin from below removing the less vigorous conifers. Do not harvest hardwoods.</p>	-	
8A, 8B, 11	<p>Regeneration Harvest -Harvest the merchantable conifers leaving 6 to 10 of the large conifers per acre. Thin hardwoods to 40 sqft/ac in unit 8A.</p>	<p>Unit 8A, slash shrubs and hardwoods 1"to 5" diameter at 1' above the ground, and handpile with logging slash. Unit 11 handpile logging slash. Burn piles in both units. Unit 8B - broadcast burn, pull back logging slash for 5' around leave trees.</p>	<p>Unit 11 - below minimum ROD standards for CWD.</p>
3, 10	<p>Selection Harvest/Commercial Thin - Remove overstory DF,IC to 3-5/ac. Leave 60-80 sqft.ac PP in overstory. If no PP are present, leave a minimum of 7-9 tpa in overstory. In areas of PP clumps, remove up to ½ of overstory PP. Harvest all merchantable trees for 50' around overstory leave tree PP. Thin young DF patches to 5'-10' crown spacing.</p>	<p>Slash shrubs and hardwoods 1" to 5" diameter at 1' above ground, handpile with slash and burn piles. In the 50' radius areas under the large PP, slash all hardwoods and conifers under 6" DBH, handpile and burn. In areas of dense conifers, under 6" DBH, thin to 12' spacing.</p>	

Cotton Snake Treatment Summary			
Unit	Harvest treatment	Site Prep	CWD
14,16	Density Management - No planned commercial harvest in these units.	Density Management - Pre-commercial thin areas of dense conifers, slash and pile hardwood shrubs and plant conifers, and girdle hardwoods in overly dense hardwood areas and plant conifers.	Unit 14 - below minimum ROD standards for CWD.

COTTON SNAKE MARKING GUIDE		
UNIT	HARVEST TREATMENT	
1	<p>Group Selection: Harvest all of the trees within small openings of ½ to 1 acre. There should be areas between these openings that are not harvested except for the width of the single yarding corridor that connects the openings that are created. These openings and the non-harvested areas between them will be posted as a long narrow single unit. The reserve trees in between the openings will count towards the 12 to 18 conifer leave trees per acre required for a connectivity block. Hardwood and snag retention will occur in the reserve portions of the total unit. Snags within the harvest area can be left if they are not a safety hazard.</p>	

COTTON SNAKE MARKING GUIDE

UNIT	HARVEST TREATMENT	
2A 2B 13A 13B 13C	<p>Regeneration Harvest - Harvest the merchantable conifers leaving 12 to 18 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. The leave trees should be spaced throughout the unit rather than clumped unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. In portions of the stands that are younger, with vigorous conifers up to 20" DBH, (particularly in the west ½ of 13B and the top of 13A) reserve these conifers from harvest, unless their density is greater than 100 sqft/ac. basal area, in which case they should be thinned to 80-100 sqft/ac. In units 2A, 2B snags and tree-form hardwoods should be reserved, unless they are considered a safety hazard. In units 13A, 13B, 13C, if the cable harvest option is chosen, the areas of hardwood concentrations should be reduced to 40 sqft/ ac. when thinning the young conifer areas. If the helicopter alternative is chosen, hardwoods should be reserved. Reserve snags in all units unless they are considered a safety hazard.</p>	

COTTON SNAKE MARKING GUIDE

UNIT	HARVEST TREATMENT	
4A 4B 13D 15	<p>Regeneration Harvest - Harvest the merchantable conifers leaving 7 to 10 (7-12 TPA in unit 15) of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. The leave trees should be spaced throughout the unit rather than clumped, unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). Snags and tree-form hardwoods should be reserved unless they are considered a safety hazard. In units 4a & 4B leave up to 10 conifers per acre where the soils are rocky, and small rock outcrops are present. Healthy, vigorous conifers 18" DBH and under should be reserved from harvest or commercially thinned to 100 sqft./ac. of basal area if they are present in densities greater than 100sqft./ac. In unit 15, the middle of the unit should have 7 TPA retained. The portions of the unit that have rocky soils, heavy CLO in the understory, and are generally located on or near the ridges along the east and west unit boundaries should have up to 12 TPA retained for site modification, due to the harsh conditions.</p>	

COTTON SNAKE MARKING GUIDE

UNIT	HARVEST TREATMENT	
5A 5B	<p>Commercial Thin - Commercial thin these units to a basal area of 100 - 110 sq.ft / ac. Thin from below removing the smaller less vigorous conifers. Leave trees should be the dominant, fast-growing conifers with healthy crowns, generally 30% or greater crown ratios. Tree condition should be considered as priority for leave over even spacing. Areas in the stand that do not have at least 100 sq ft./ac of conifer basal area should be left alone. Hardwoods should not be harvested in these units as they are to be helicopter yarded. The occasional old growth conifers in the stand should be retained for structural variety but can be counted as part of the leave basal area. If they are suppressed and similar in size to the younger main stand component, they should be removed as part of the harvest basal area.</p>	

COTTON SNAKE MARKING GUIDE

UNIT	HARVEST TREATMENT	
8A 8B 11	<p>Regeneration Harvest - Harvest the merchantable conifers leaving 6 to 10 of the large conifers per acre “proportionally representing the total range of tree size classes greater than 20 inches DBH and representing all conifer species present (Medford RODS/MFP, 1995)”. The leave trees should be spaced throughout the unit rather than clumped, unless it is determined they need to be clumped for habitat retention for a wildlife species of concern after wildlife surveys are completed. A minimum of 1/3 of the leave trees should be without obvious defect (conk, insects, etc.). Leave up to 10 conifers per acre where the soils are rocky. Vigorous, healthy conifers 16" DBH and under should be reserved from harvest, unless their density is greater than 100 sqft/ac. basal area, in which case they should be thinned to 80-100 sqft/ac. In unit 8A, hardwoods should be thinned to 40 sqft/ac. where densities exceed that amount. Snags and tree-form hardwoods should be reserved, except where hardwoods are thinned in 8A, unless they are considered a safety hazard</p>	

COTTON SNAKE MARKING GUIDE

UNIT	HARVEST TREATMENT	
3 10	<p><i>Selection Harvest/Commercial Thin</i> - Harvest the large overstory DF & IC, over 20" DBH, leaving 3-5 per acre. Harvest the overstory PP leaving 60-80 sqft/ac. In areas without PP, leave a minimum of 7-9 tpa, over 20" DBH, in the overstory. In some areas the overstory PP are clumped together (boles within 25' or branches interconnected), and there is less than 80 sqft/ac. basal area. In these areas where there are clumps of 3-4 PP, remove 1-2 of the overstory PP, where the clumps are more than 4 trees, remove ½ of the overstory PP from the clump, provided the tree crowns are interconnected. Around these clumps of overstory PP, harvest all merchantable trees for a 50' radius (except for any large overstory DF and IC planned for leave). This is to provide for PP regeneration. Around the individual large overstory PP, if the mid-canopy is vigorous DF, 10"-18"DBH, thin these trees to 5'-10' crown spacing (openings between crowns). If the mid-canopy/understory is hardwoods or stagnant conifers, harvest all merchantable trees for a 50' radius similar to around the PP clumps. In areas that are void of overstory PP, but have stands of conifers 10"-20" DBH that are growing well, commercial thin these stands to 5'-10' crown spacing. In unit 3 and cable logging portions of unit 10, hardwoods within the 50' radius of overstory PP should be removed and they should also be harvested in the crown spacing commercial thin areas if their crowns are within 10' of conifer crowns.</p>	

Aquatic Conservation Strategy Consistency Analysis

I. Project Information

A. General

Project Name:	Cottonsnake Timber Sale
BLM District and Resource Area:	Medford District, Glendale R.A.
Project Location (HUC Watershed)	South Umpqua River 4 th field HUC Middle Cow Creek 5 th field Langdon (Dads/Skull) Creek 6 th field McCullough/Rattlesnake Lower Cow Creek 5 th field Upper Middle Creek 6 th Lower Middle Creek 6 th
Watershed Analysis Name and Date Completed:	- Middle Cow Creek - Medford BLM, October 1999 - Cow Creek - Roseburg BLM, September 5, 1997
NEPA Document ID Number:	EA #OR118-03-006
ESA Determination: Not Likely To Adversely Affect OC coho (threatened) and OC steelhead (candidate)	

B. Background

Documentation is needed to clearly demonstrate project consistency , logic tracking and links of the project with Watershed Analysis (WA), the Aquatic Conservation Strategy (ACS) objectives, and the March 18, 1997 NMFS LRMP/RMP Biological Opinion.

There are a number of fish-bearing streams in the 3 HUC 6 watersheds that are within the project area (Table 1). Skull Creek, although in one of the sixth field HUCs, is not in the immediate timber sale

area.. A 9' waterfall about 100 yards from the mouth of Dads Creek is a barrier to anadromous fish migration. Refer to the Environmental Assessment for the Cottonsnake timber sale for a detailed description of the proposed action and resources potentially affected.

This analysis focuses on the actions in the Middle Cow Creek watershed because virtually all (290 of 333 acres, 87%) proposed timber harvest activity would occur there.

Table 1. Fish occurrence (miles) in the project area.

Stream	5 th Field Watershed	Coho	Steelhead	Cutthroat
Dads	Middle Cow Creek	0.1	0.1	5.5
Skull	Middle Cow Creek	1.5	1.5	2.7
Totten	Middle Cow Creek	1.7	1.7	2.9
McCullough	Middle Cow Creek	2.0	2.0	5.3
Rattlesnake	Middle Cow Creek	1.5	2.4	2.8
Martin	Lower Cow Creek	2.4	2.4	2.4
Peavine	Lower Cow Creek	1.3	2.3	2.3

II. Consistency Evaluation

A. Evaluation of Consistency with the Northwest Forest Plan Standards and Guidelines

This project is located on lands classified as Matrix (General Forest Management Area); therefore the S&G-s for this Land Use Allocations would apply. The following S&G-s, which are required by the NFP, (USDA, USDI 1994) particularly apply to this action.

1). Riparian Reserves are specified for five categories of streams or waterbodies (C-30). Riparian Widths were established based on the height of an average site potential tree (NFP, C-31; Cottonsnake EA- 7).

2). S&G RF-2a (C-32) states that ACS objectives are to be met by Aminimizing road and landing locations in Riparian Reserves.@ No new roads or landings in Riparian Reserves are planned

under this timber sale.

3) S&G RF-2e (C-32) states that ACS objectives for roads are to be met by **A**minimizing disruption of hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow. All new road construction (permanent and temporary) would be on or near ridges and would not affect streamflow.

4) S&G RF-5 (C-33) states that ACS objectives are to be met by minimizing delivery of sediment from roads to streams by whatever site specific techniques may be appropriate. Refer to EA-9,10 for road-related PDFs. Log hauling would be restricted to the dry season.

5) S&G RF-7 (C-33) states that a Road Management Plan should be developed and implemented that will meet ACS objectives. The plan is in progress.

B. Evaluation of Consistency with Aquatic Conservation Strategy Objective Components

Four components of the ACS are integral in both NFP and RMP to assist the BLM in developing and implementing projects that are consistent with ACS objectives. These four components are: 1. **Riparian Reserves**; 2. **Key Watersheds**; 3. **Watershed Analysis**; and 4. **Watershed Restoration**. The following narrative addresses how each of these components relates to both the proposed action and the fifth field watershed.

1. RIPARIAN RESERVES

The Middle Cow Creek Watershed Analysis and the Environmental Assessment for the Cottonsnake Timber Sale used the interim Riparian Reserve widths established in the NFP. Page 7 of the EA identified Riparian Reserve distances as minimum 170 feet (slope distance) on all non-fish-bearing streams. Totten Creek is the only fish-bearing stream that is adjacent to a harvest unit (#10); Riparian Reserve width on fish habitat is a minimum 360 feet each side.

2. KEY WATERSHEDS

Three harvest units (37 acres) are located in the Middle Creek Tier 1 Key Watershed.

3. WATERSHED ANALYSIS

Condition of the Middle Cow Creek HUC 5 and for Lower Cow Creek HUC 5 are discussed in respective watershed analyses (December 1999 - Medford BLM and September 5, 1997 -

Roseburg BLM).

4. WATERSHED RESTORATION

Restoration opportunities are identified in the watershed analysis on pp. 65-70 for 5th field Middle Cow Creek and on p.118 for 5th field Cow Creek and tribs within the boundaries of the Roseburg BLM District.

Short Term Active Restoration In The Middle Cow Creek 5th field watershed (completed 1995 to present) or to be completed in the future)

Table 2.

Road Decommissioning	3.0
Road renovation/maintenance	54 miles plus annual BLM road crew maintenance
Stream crossings to improve fish passage/ 100 year flow capacity on non-fish streams	13/6
Future restoration work in FY 2003 and beyond	Additional road decommissioning, storm-proofing and renovation. Replacing aging and defective culverts. Miles and locations have not been determined

Long Term Natural Restoration in the Middle Cow Creek watershed (10 to 50 years)

Accurately predicting streamflow changes that could result from timber harvest and other vegetation manipulation activity is difficult, if not impossible, because numerous factors, many of them with a high natural variability, affect the hydrologic regime. Changes in vegetation age class distribution discussed in this document are therefore used only as a guideline or indicator of a watershed's response to timber harvest.

Research suggests that prior to the 1850s, 43 to 71 % of the landscape in Western Oregon

was in late seral condition (Ripple 1994). Currently about 51% (58,324 acres) of the acreage across all ownerships in Middle Cow Creek is greater than 40 years of age; about 73% of federal lands are greater than 40 years of age. Discounting the effect of timber harvest on public and private lands within the next decade, an estimated 81,003 acres (71%) of all acres in the watershed would be greater than 30 years of age (WA- 36). It is not possible to predict the amount and rate of harvest on non-federal lands within the watershed over the next decade (Note: WA data for acres of early seral vegetation has been compiled as <40 years for private lands but at 10 year intervals for BLM lands. A consistent approach for all ownerships will be used for the next WA iteration).

The reserve system on federal lands was established in the National Forest Plan (NFP) and Medford District Resource Management Plan (RMP) to allow natural restoration to occur as forest stands grow. Riparian Reserves in particular are meant to provide functions that are vital to aquatic species that are dependent on forests that exhibit late successional characteristics (live old-growth trees, standing dead trees, fallen trees or logs on the forest floor, and large wood in streams). These characteristics begin to appear in forest stands at approximately 80 years of age (USDA, USDI 1994 pg. B-2). Currently about 11,600 acres (54%) of federal Riparian Reserves in the Middle Cow Creek watershed are over 80 years of age. Within the next decade this would increase to 58% and to about 78% in the next 50 years.

C. Evaluation of Consistency with NEPA Documentation

Three action alternatives were considered. The EA did not identify any direct or indirect effects to the fisheries resource that could not be minimized or prevented by implementing Standards and Guidelines of the NFP and Best Management Practices that have been identified in the RMP and EA. The EA (p.35-40) identified a minor short term addition of sediment to streams as the primary potential adverse effect on streams through road renovation. However this activity would result in long-term benefits to aquatic habitat by reducing erosion and potential road prism failure. There would also be no vegetation manipulation in Riparian Reserves. Any changes in streamflow would be minimal and highly localized. Any adverse effects of the action on aquatic resources would not be detectable at the project (HUC 6) scale.

D. Evaluation of Consistency with NMFS= March 18, 1997 Plan-level BO

Conservation Recommendations

The Watershed Analysis for Middle Cow Creek includes an assessment of the aquatic ecosystem which, by nature, addresses salmonid conservation. This is consistent with the LRMP BO Conservation Recommendation 3, page 47. The completed WA also includes recommendations for restoration projects, including projects that promote long-term recovery such as road decommissioning. This is

consistent with the LRMP BO Conservation Recommendations 5 and 6. While a formal Transportation Management Plan has not been completed for the watershed, priority roads were identified for restoration opportunities during the WA process. While not fully satisfying Conservation Recommendation 11, efforts have been made to begin this process; 2.2 miles of road would be decommissioned under Alternative 1. Based on the analysis of consistency with ACS Objective 5 (Appendix 1, this document), Conservation Recommendation 13 is also met. No other Conservation Recommendations specifically apply to this proposed action.

Reasonable and Prudent Measures

During watershed analysis and the timber sale design processes the interdisciplinary team used applicable criteria in the Northwest Forest Plan ROD (USDA, USDI 1994) to ensure the proposed actions are fully consistent with applicable standards and guidelines and ACS objectives (Appendix 1). This is consistent with Reasonable and Prudent Measure 1. The proposed project has been reviewed by the Level 1 Team. This is consistent with Reasonable and Prudent Measure 2. Based on the Aquatic Conservation Strategy Evaluation contained in this document, the proposed actions associated with the timber sale may affect localized stream reaches in the short-term, with the project ultimately providing some measure of long-term ecosystem recovery. This is consistent with Reasonable and Prudent Measure 4. All road-related work would be completed during the dry season and would utilize Best Management Practices. This is consistent with Reasonable and Prudent Measures 5 and 6. The EA analyzed the short and long term direct, indirect and cumulative effects of the proposed actions at the 6th and 5th watershed scales to ensure that they are appropriate and timely. This is consistent with Reasonable and Prudent Measure 7. All new road construction under this action would be limited to stable areas or ridgetops to minimize adverse effects. This is consistent with Reasonable and Prudent Measure 8.

No other Conservation Recommendations specifically apply to this proposed action.

Terms and Conditions

No Terms and Conditions specifically apply to this proposed action.

E. Evaluation of NMFS Factors and Indicators In Relation To ACS Objectives

In the following discussion, factors and indicators from the NMFS Matrix of Pathways and Indicators

are evaluated individually. Each factor and indicator relate to various ACS objectives (Appendix 1). By including ACS objectives in the discussion of factors and indicators, a common link and logic track is developed between ACS consistency and the effects determination of the proposed project on federally listed or candidate fish species.

When discussing effects in the individual analyses of ACS objectives, "long term" is used in the context of ACS, meaning a period of time defined as "...decades, possibly more than a century" (USDA, USDI 1994 p. B-9), unless otherwise described.

Water Quality

Temperature (ACS 2,4,8,9). No activity except roadside brushing for safety reasons would remove vegetation near streams. The amount cut at stream crossings would be minimal and have no effect on stream temperature, even at the local/site scale. There is no commercial or precommercial thinning and no fuels treatment near streams under the proposed action.

Baseline: Wood Creek, Dads Creek and Cow Creek are State of Oregon 303(d) water quality limited for temperature. Windy Creek is listed for maximum summer water temperature and habitat modification.

Sediment/Turbidity and Substrate (ACS 3, 4,5,6,8,9). Road renovation could contribute a pulse of sediment to streams. Three stream culverts (100 yards to 1.3 miles from fish habitat) would be replaced during road renovation and another one (2.4 miles from fish habitat) would be removed during decommissioning. The culvert closest to a fish-bearing stream is near Totten Creek, which supports coho, steelhead and resident trout. Sediment would not reach fish habitat because the small stream flows onto and percolates into a riparian terrace next to Totten Creek. Aquatic life immediately downstream of culvert cleaning, replacement or removal could be adversely affected during summer months. But the amount of loose soil that is generated from these activities would be minimal, highly localized and would dissipate rapidly with increasing distance downstream of the road crossing during the first major winter storm. Stream sediment generated by this project and would not impede recovery of the streams= historic sediment regimes because implementing Best Management Practices (Medford District RMP) and Project Design Features (EA –7 to 10) would minimize these increases. Many PDFs for actions in the Medford District are included as Best Management Practices (Appendix D of the RMP) and are therefore not repeated in the EA. Any sediment that reaches streams would be inconsequential and have insignificant effects on OC coho salmon, its habitat and on other aquatic life. Road renovation during summer could contribute a pulse of sediment to streams the first winter but it would reduce long-term, ongoing sedimentation from the road system and reduce the likelihood of catastrophic road failure because of plugged or undersize culverts and other reasons for poor road drainage during storm events.

Baseline: Aquatic macroinvertebrate monitoring (Aquatic Biology Associates; on file; Glendale RA)) indicates that substrate gravels are moderately to highly embedded and that the habitat factor is functioning at risk throughout these HUC 6 subwatersheds, primarily due to erosion from

roads.

Chemical Contamination/Nutrients (ACS 2,4,8,9). The greatest risk of chemical contamination that would result from the proposed action would be a fuel spill. Contract provisions for proposed activities would require that all hazardous materials (particularly petroleum products) would be stored in durable containers and located so that any accidental spill would be contained and not drain into riparian areas or stream channels. The contractor would be required to comply with all applicable State and Federal laws and regulations pertaining to water quality in connection with this operation. It is expected that contamination of a stream channel with hazardous materials is highly unlikely. If a hazardous materials spill did occur, mechanisms would be in place per Oregon DEQ requirements to respond quickly to the incident and minimize the likelihood of contamination of a waterway.

Baseline: No data are available for this habitat factor in the project area. However, it is suspected that this parameter may be improperly functioning in Windy Creek because much of the land along Windy Creek is homesites and agricultural land, including livestock grazing. There are few rural residences in the Rattlesnake/McCullough Creek HUC6 but none in the 2 Middle Creek HUC 6s, nor in the Langdon HUC6. Streams in the latter 6th field subwatersheds are probably properly functioning because of the low density of rural homesites. There do not appear to be any significant potential sources of chemical contamination other than logging operations.

Habitat Access

Physical Barriers (ACS 2,6,9). A vertical 9 foot waterfall on Dads Creek less than 1/4 mile downstream of the Cow Creek Road prevents anadromous fish from accessing upper Dads Creek in the vicinity of the timber sale area. None of the culverts that block or restrict fish passage in the project area would be replaced under any of the EA alternatives.

Baseline: Several culverts that were barriers to movement of fish and other aquatic species in Dads Creek and a major tributary were replaced during summer 2002. The Rattlesnake Creek culvert on a county road will be replaced during summer 2003. However, many other culverts would remain partial or total barriers to fish passage.

Habitat Elements

Substrate (ACS 3,5,8,9). Refer to Water Quality above.

Large Woody Debris (ACS 3,6,8,9). Roadside vegetation that is slashed at road stream crossings to improve visibility would not be large enough to qualify as large wood. There would be no net change in the amount of LWD in stream channels as a result of the proposed actions because no vegetation treatment (other than roadside brushing) is planned in any riparian reserve in this 6th field watershed. None of the brushing would take place adjacent to coho habitat.

Baseline: LWD is virtually absent from all fish-bearing streams in this HUC6. All fish habitat is NPF.

Pool Frequency (ACS 3,8,9). The project would not affect this indicator. Refer to discussions for Riparian Reserves and Peak/Base Flows.

Pool Quality (ACS 3,5,6,9). The project would not affect this indicator. Refer to discussions for Riparian Reserves and Peak/Base Flows.

Off-Channel Habitat (ACS 1,2,3,6,8,9). The project would not affect this indicator. Refer to discussions for Riparian Reserves and Peak/Base Flows.

Refugia (ACS 1,2,9). The project would not affect this indicator

Channel Condition and Dynamics

Width/Depth Ratio (ACS 3,8,9). The project would not affect this indicator. Refer to discussions for Riparian Reserves and Peak/Base Flows.

Streambank Condition (ACS 3,8,9). The project would not affect this indicator. Refer to discussions for Riparian Reserves and Peak/Base Flows.

Floodplain Connectivity (ACS 1,2,3,6,7,8,9). The project would not affect this indicator because there is no road construction or other disturbance in Riparian Reserves.

Flow/Hydrology

Change in Peak/Base Flow (ACS 5,6,7). Any change in peak streamflow caused by the proposed action would be small and well within the range of natural variation (Appendix 2). 80 to 84% of the forested acres in the Langdon and Rattlesnake/McCullough 6th field subwatersheds are hydrologically recovered and functioning properly (Middle Cow Creek Watershed Analysis, Appendix G). Harvest activities under the Preferred Alternative would lower this percentage by 1%. Transient snow zone openings would increase 1 to 2% in these two HUC 6 watersheds and would not change in the three other HUC6 watersheds because of the small acreage that would be treated. There would be no tractor yarding to increase compacted area. All new road construction would be on or near ridges and not cross any streams and therefore would not affect streamflow. Soil depth is adequate in harvest units to allow precipitation during storm events to percolate into soil where it would be gradually released.

Base flow is not expected to decrease as a result of timber harvest because no vegetation treatments are planned that could encourage growth of riparian hardwood vegetation. However, it may increase somewhat for several years adjacent to regeneration harvest units because the amount of vegetation left on-site following harvest would have considerably less demand for subsurface water than the existing forest. Commercial thin would have less potential for altering streamflow than regen harvest because considerably less vegetation would be removed from the site than during regeneration harvest. Groundwater moving subsurface that is excess to demands of vegetation that reoccupies harvested acreage would eventually reach stream channels and increase flow for several years until vegetation again fully occupies harvested units. Any increases in base flow would not be measurable at a 7th or 6th field watershed scale and therefore would have no effect on Oregon Coast (OC) coho salmon.

About 224 of the 333 acres that are proposed for harvest throughout the project area are in the TSZ (roughly above 2500 ft elevation); 119 (53%) of the 224 acres are RH. Rain-on-snow events on these timber harvest units is not expected to increase peak flow in fish habitat or to affect migration timing and survival of any life stage because any increase in streamflow in 1st and 2nd order streams in the vicinity of harvest units would most likely not be measurable very far downstream, nor at the HUC 6 scale (Beschta, et al, 1995). (Refer to the project map for spatial relationship between harvest units and coho/steelhead habitat.) Additionally, harvest units, especially regeneration harvest, are dispersed throughout several subwatersheds in each HUC 6, thereby minimizing potential for altering stream discharge. Cursory field observations and BLM proper functioning condition surveys of small streams (on file, Glendale Resource Area, Medford BLM) provide no evidence that the existing level of vegetation opening in the TSZ is causing streambank destabilization or downcutting. Increasing the percent open area in TSZ by 1% (table 7) would not change existing condition. Also, existing stream channel capacity, which reflects peak flow conditions under historic wildfire regimes, would easily

accommodate any increase in peak flows without erosion. It is expected that canopy condition in SC and CT units would return to baseline (pre-harvest) conditions within 5-10 years and within 30 years in RH and GS units. About 40% of all harvest acreage under Alternative 1 is regeneration harvest.

Baseline: Peak flows and timing within project area streams may be somewhat different now than prior to the onset of intensive timber harvest in the 1970s, primarily because of high road density associated with timber harvest (over 4 miles/sq mile) and the estimated 25% increase in drainage density due to ditchlines. However, ODFW stream surveys have not found streambank instability problems other than what has obviously been caused by road encroachment and past tractor logging. In addition, percent gravel in low gradient riffles of key stream habitat reference reaches (refer to Biological Assessment Matrix of Pathway Indicator tables), a potentially important indicator of excessive water velocity and scour, ranges from good to moderately low but still within the acceptable range (ODFW 1997).

Current base flows may be lower than prior to the onset of intensive timber harvest because logging next to many streams, especially on private lands, has created more favorable conditions for growth of riparian hardwoods, which consume a large amount of water. Homesite development and water withdrawal for ag use, especially along Windy Creek, depletes summer stream flows.

Even though peak and base flows in the subwatershed may have changed in response to timber harvest and human settlement, they are probably still within the range of natural variation (Appendix 2A and 2B).

Increase in Drainage Network (ACS 2,5,6,7). This indicator would not increase because all new road construction (permanent and temporary) would be out-sloped and be located on or near ridges, far from any streams. Some roads would be decommissioned but the mileage would be minor and would not appreciably change overall road density at the sixth field scale.

Baseline: This factor is not properly functioning in these 6th field subwatersheds because of extensive road networks that exceeds 4 miles per square mile.

Road Density and Location (ACS 1,3,5). As discussed in Drainage Network, the project would not affect this indicator.

Baseline: This factor is not properly functioning because of an extensive road network. Major portions of the Cow Creek, Dads Creek, Totten Creek and Rattlesnake Creek roads closely parallel streams.

Disturbance History (ACS 1,5) - refers to major factors such as canopy opening (e.g. clearcutting, residential and municipal development) and compacted area. The project would not measurably affect this indicator.

Baseline: Refer to Peak/Base flows and Appendix 2, Range of Natural Variability

Riparian Reserves (ACS 1,2,3,4,5,7,8,9). The project would have no effect on Riparian Reserves since the proposed action does not include any commercial harvest, precommercial thinning, slashing or burning near streams.

Baseline: This indicator is not properly functioning in the project area because there are extensive riparian corridors with vegetation less than 80 years of age across all ownerships, especially on private lands. 67% and 40% of all Riparian Reserve acreage (on BLM) in the Langdon and McCullough Creek/Rattlesnake Creek 6th field watersheds, respectively, is > 80 year of age, considered by the Forest Plan as the minimum age for late successional forest habitat. This percentage will increase over the longterm as RR vegetation on BLM matures. However, riparian habitat connectivity across all ownerships will never function properly because about 70% of all stream miles in the Middle Cow Creek HUC 5 is private where riparian vegetation is managed to State of Oregon Forest Practices Act standards.

F. Evaluation of Consistency With Aquatic Conservation Strategy Objectives.

This project is consistent with ACS Objectives because it maintains water quality, stream habitat elements for native aquatic species, peak flows, and riparian condition. Although the action does not move them toward properly functioning condition, it maintains existing condition and does not prevent attainment of ACS objectives through future actions. The distribution, diversity and complexity of watershed and landscape-scale features (e.g. late successional riparian corridors) would be maintained in degraded condition at the watershed scale, where ACS objectives are determined. Canopy openings created by timber harvest would remain within the range of natural variation (refer to Appendix 2). Spatial and temporal connectivity for aquatic and riparian-dependent species within the project area and within the 5th field watershed would not be compromised (ACS objectives 1 and 2). Physical integrity of the aquatic system would be maintained (ACS objective 3) by not disturbing streambanks through timber harvest or road construction. Current water quality would be maintained in the short and long-term because the disturbance to stream channels at road crossings would be minimized through use of Project Design Features. Any sediment moving off the road to streams during the first major storm of the wet season would be minimal and considerably less than if road maintenance was ignored. Water quality and the existing sediment regime would therefore be maintained (ACS objectives 4 and 5). The project would not appreciably affect instream flows (ACS objective 6), the timing, variability and duration of floodplain inundation or water table (ACS objective 7) or alter species composition and structural diversity of riparian plant communities (ACS objective 8). The proposed action would not alter peak flows, degrade water quality, riparian habitat and physical characteristics of aquatic habitat and therefore would contribute toward maintaining the current distribution of native plants, invertebrates and vertebrate riparian-dependent species (ACS objective 9).

Conclusion

Based on the above review, I find the proposed project is consistent with Aquatic Conservation Strategy objectives at the 5th field watershed scale over the long-term (>10 years). It therefore would not hinder or prevent the watershed from attaining properly functioning condition in the future. The proposed action would not cause any stream habitat or watershed factor to deviate beyond the natural range of variation or to exacerbate any condition that is already outside the natural range of variation. In addition, I find the proposed project is consistent with Watershed Analysis recommendations and findings, applicable Northwest Forest Plan Standards and Guidelines, NEPA Documentation, and applicable aspects of NMFS= March 18, 1997 Biological Opinion. The proposed project is not likely to adversely affect Oregon Coast coho salmon or its habitat, nor would there be any significant effect on OC steelhead.

Essential Fish Habitat

Activities associated with this project would have less than an adverse effect on EFH for Oregon Coast coho salmon and chinook salmon. The effect would be minor sediment deposition resulting from excavation activities associated with road renovation. A discussion of mechanisms and effects appears on page 14 of the Biological Assessment. Peak flows in salmon habitat would be unaffected by the proposed action.

The less than adverse effects would be short term and minimized by implementing appropriate BMPs and PDFs in accordance with the Northwest Forest Plan and the Medford District RMP ROD (EA-35 to 40). Long term beneficial effects of road renovation and decommissioning outweigh any short term effects. Long term beneficial effects from proposed road work would result in minor improvements to salmon spawning success, aquatic insect production and gravel permeability.

Further mitigation is not necessary to reduce impacts to EFH or associated species.

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Field Manager, Glendale Resource Area

K. Other Relevant Federal Actions in Watershed

The following table shows all federal actions within the Middle Cow Creek 5th field watershed from FY 1997 through 2002.

Table 3 ACTIVITIES ON FEDERAL LANDS IN Middle Cow Creek 1995 to 2002

Restoration Projects (eg. JITW), Reciprocal Road Use Agreement Road Const., or Timber Sales	Type of Project	Area Treated (Acres or Miles)	Riparian Restoration (Acres)	Culvert Replacements		Natural Surface Roads Storm-proofed and Blocked (miles)	Road Construction		Full Decommission of Existing Roads (miles)	Existing Roads: Renovation, Maintenance (miles)	
				Fish Passage	100 Yr flood on non-fish streams*		Temp (miles)	Perm (miles)			
High Five	RH OR* GS STS	21 21 21 345			1		0.2			12.1	
Pointless Fir	RH CH CH/CT ITM	102 14 12 1					0.3	0.8	0.9	13.5	
Lost Fortune	OR*	91				0.8	0.44			4.5	
McCollum	OR/ITR ITR	16 26					0.24			5.8	
McLawson	CT RH	217 5					0.15	0.55		7.5	
Soukow	CT RH OR/CT CT/DM	66 72 24 138							0.32	10.3	
Woodford Creek road repair	1999				1					0.1	
Reuben Road repair	1995									2.0	
Fortune Branch Creek Culvert #4	1996				1						
Fortune Branch Creek Culvert #3	1996				1						
Riffle Creek Road washout repair	1996									0.1	
Bonnie Creek road repair	1996									2.0	
Skull Creek culvert	1996				1						
Fortune Branch Creek culvert #2	1997				4**						
Bonnie Creek culvert	1997				1						
Perkins Creek road reconstruction	1998									0.1	
Road decommissioning	1999								5		
BLM Road Maintenance Operations @ about 120 mi/yr										960	
SUB-TOTAL											
OVERALL TOTAL					8	2	0.8	1.3	1.4	6.2	1019

DM = Density Management (no harvest), CT = Commercial Thinning, RH = Regeneration Harvest (6-8 tpa), CH = Connectivity Harvest (12-18 tpa); GS = Group selection ITM or STS = Individual (Single) tree selection ITR = Individual tree retention (6-8 tpa)

Temporary Roads are decommissioned the same season that they're built.

* It is estimated that about one half of acres planned for OR have a well-established understory of shrubs, hardwoods and young conifers. OR with a well-developed understory responds hydrologically more like a CT rather than RH following removal of overstory trees

** Two culverts were replaced with four

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Appendix 1. Aquatic Conservation Strategy Objectives

Forest Service and BLM-administered lands within the range of the northern spotted owl will be managed to:

1. Maintain and restore the distribution, diversity and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks and bottom configurations.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate and character of sediment input, storage and transport.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high and low flows must be protected.
7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Source: USDA Forest Service and USDI BLM. 1994. page B-11

Appendix 2A. Range of Natural Variability

Paleoclimatological evidence from fossil and pollen data taken from lake and ocean sediments throughout the Northwest indicates that since 20,000 years before present (BP) up to present, climate and vegetation have changed (Whitlock 1992). Climate change associated with the recession of glacial ice sheets resulted in plant associations shifting on the landscape as a result of the environmental conditions. No 1,000-year period in the last 20,000 years was the same in climate or vegetation. Vegetative communities changed with changing environmental conditions, such as extended periods of cold dry to periods of warm wet. Present day vegetative communities did not become established until approximately 3,000 years ago and have continued to shift in location and range even during this time period.

Reneau and Dietrich (1990) describes studies of colluvial deposits of hill slopes and discovered that landslides tended to occur during dry periods, presumably due to more frequent fires and or intense rainstorms. These events were dated to 10,000 years BP up to 4,000 years BP. This suggests mass movement activity has shaped present day topography and continues to be a change agent. Volcanic activity, earthquakes, landslides and floods have, and will, change the present day landscape.

Tree ring data dating from the 1600s to present day indicated periods of wet and dry conditions. Drought periods lasting up to 25 years have occurred during this time frame. Fire frequency was high during the periods of drought. Data from Graumlich (1987) indicates that the period of 1910 to 1935 was a drought period which corresponds to the age of many of the natural stands that are now between 50 and 80 years of age. This suggests that fire is an important agent of vegetative landscape change in the Klamath Province.

Human activities described by Boyd (1986) indicate that present day landscapes are not the same as they were 200 to 300 years ago. Native Americans in the valley regions used fire and other agricultural practices to control their environment for hunting and food gathering. Low lands and traditional hunting sites along ridges were burned repeatedly resulting in open understory conditions that favored vegetation adapted to frequent ground fires such as pine and oak. During European settlement of the western valleys in the mid-1800s, burning stopped and vegetative communities began to change. Fire frequency has declined since the period of active fire suppression (Taylor and Skinner 1994). Current day fire suppression activities continue to be a cause of plant community change across the landscape.

Wills and Stuart (1994) noted that pre-settlement landscapes on Douglas fir/hardwood forest in Northern California were a matrix of various aged forests. The Klamath Province, in which their study was done, includes all of the Rogue Basin and the Cow Creek basin of the Umpqua River, areas that are much more like Northern California than the regions to the north. This suggests that the region did not have continuous forests of old growth. Other studies indicate that late seral forests comprised 43 to 71 percent of the landscape (Ripple 1994).

The Glendale Resource Area queried Forest Operations Inventory data to obtain the extent of naturally generated stands between the age of 46 and 86 years, which corresponded to a 25 year drought period that lasted from 1910-1935. Forests of this age class, which are thought to be of fire origin, comprised about 10

percent of the forest on federal land. It was assumed that non-federal land had approximately the same percentage. Openings within the forest included valley bottoms, accounting for 10 percent of the RA, and rock outcrop, natural meadows and serpentine effect areas, which accounted for another 5 percent. Postulating unequal distribution, openings within the forest canopy would have ranged between 15 and 25 percent at any given time. Entire seventh field watersheds (60 to 600 acres) would have been in completely open condition as a result of fire, as evidenced by fires in 1987 and 1995. The denudation of the landscape by miners and earlier by Native Americans could have resulted in more than 25 percent of the area being in an open condition in the early part of this century.

The distribution and abundance of aquatic species and characteristics of stream habitat in the Rogue and Umpqua River basins have responded to changing climate for millennia. The extent that climate changes in the Rogue and South Umpqua basins have affected habitat and aquatic species has probably varied considerably depending on each species habitat and life history requirements. Spencer (1991) provides a model for how climate has affected streams, aquatic species and indigenous peoples in the Rogue basin and Klamath Province over the last 13,000 years.

During recent geologic times, climate in the Klamath Province has shifted between mesic and xeric eight times over the last 13,000 years (Spencer 1991). Approximately 13,000 to 10,000 years ago when permanent glaciers and snow fields were in retreat, major floods caused by meltwater resulted in large scale mass wasting, unstable stream channels and extreme stream sedimentation. Depositional material may have created partial or total barriers to fish migration. This rapid shift to a drier climate after mesic conditions that had existed for at least the previous 60,000 years undoubtedly had dramatic consequences for fluvial ecology of the Rogue and Umpqua River basins. Many streams changed from perennial to intermittent. Stream flow decreased, as did the amount and extent of riparian vegetation. Water temperatures increased in response to lower flow and less stream shading.

As climate continued to warm and permanent snow field disappeared, summer peak flow from annual snow melt was replaced by a winter-spring peak originating primarily from rainfall. Salmon stocks migrating and spawning in the winter were enhanced; stocks dependent on a spring-summer peak, if they existed, were depressed or extirpated as the region entered a very xeric period 7000 years ago. Dramatic shifts in character of aquatic habitat during this time undoubtedly caused major changes in abundance, distribution and composition of aquatic communities.

Shifting of climate from xeric to mesic conditions about 4000 years ago resulted in an expanded network of perennial streams, higher stream flow, more riparian vegetation and cooler water temperatures and better spawning and rearing conditions for salmonids. Aquatic and riparian systems have continued to fluctuate and to affect suitability for various aquatic and riparian plant and animal species in response to climate change.

Animal species and populations have probably changed in response to environmental variation during the last 20,000 years. In addition, hunting pressure and habitat modification has most likely caused local shifts in species abundance and distribution. For instance early trappers found beaver to be abundant in local streams in the early 1800s (Boyd 1987). But it did not take long for the beaver to be trapped out. Without beaver dams, low gradient stream channels and associated riparian zones experienced major and rapid changes which resulted in conditions that are typical today in some streams (e.g. vertical streambanks, disconnecting the stream from its

flood plain). Ground water levels would have dropped and resulted in lower summer flow and presumably higher water temperatures.

The frequency of fire and its effects on stream and riparian habitat also changed as climate fluctuated. The amount of large wood in streams was probably higher during mesic than during xeric periods because trees were larger and higher stream flows undercut stream banks; saturated soils may have increased the potential for large trees to fall into streams through windthrow. Conversely, fire probably consumed sources of large wood for stream channels during xeric periods. But increased incidence of landslides following stand replacement fires (Reneau and Dietrich 1990) during xeric times may have delivered large quantities of wood and sediment to streams. Water temperatures probably increased in response to loss of riparian canopy.

Considering the dynamic nature of climate and its complex effects on streams and riparian habitat, it is questionable whether aquatic systems have ever been in **Apristine@**condition.

Table 22 summarizes some of the important watershed elements in comparison with a range of natural variability (RNV). The precise relationships are often very uncertain because we have so little data on pre-historic conditions. Most of the relationships are based on professional judgment and on observed ecological processes.

Appendix 2B. RANGE OF NATURAL VARIABILITY COMPARISON
Middle Cow Creek Watershed

Comparison of present conditions to the range of natural variability (RNV) thought to exist during the period of 3,000 years ago to 200 years ago. (Pre-European)

ELEMENTS, PARAMETERS, or INDICATORS	less than	within RNV	greater than	COMMENTS
WATER QUALITY				
Temperature		X		Xeric periods in the past may have resulted in higher water temperatures due to extreme low flow periods. Riparian vegetation on many streams has a higher hardwood component than prior to European settlement due to timber harvest and agricultural and residential land clearing. Hardwoods are thought to be less effective at shading streams than conifers. Lack of riparian vegetation on lowland streams due to land clearing. Historic no or very low flow in segments of Cow Creek have been reported. Cow Creek streamflow is regulated by releases from Galesville Reservoir. Relatively shallow soils throughout the watershed have low water holding capacity, so streamflow responds quickly to storm events. Low ground water input to streams during summer, contributes to heating during low flow months.
Sediment/substrate		X	X	Within: Episodic events of mass failure Greater than: More chronic source of sediment is roads in vicinity of streams.
HABITAT ACCESS				
Physical Barriers			X	Galesville Dam; many culverts restrict movement of aquatic species.
HABITAT ELEMENTS				
Large woody debris	X	X		Lower than ODFW Standards for Adesirable conditions [®] , Wildfire and Native American burning may have reduced LWD and potential LWD but fire suppression over the last 40 years is probably contributing to more LWD. Timber harvest and placer mining have reduced both standing and down LWD. Broad valley bottom, as along Cow Creek between Glendale and Galesville may have been maintained in pine/oak savanna by Native Americans, so LWD was probably never abundant in this area. In addition pool formation in Cow Creek is dependent more on morphologic features than on LWD due to its size and hydrologic character.
Pool frequency	X	X		Logging and salvage of LWD from streams has reduced

ELEMENTS, PARAMETERS, or INDICATORS	less than	within RNV	greater than	COMMENTS
				the amount for pool formation. Existing condition is highly variable between streams. Placer mining and road construction have channelized most of the major streams; less LWD for pool scour.
Pool quality	X			Less LWD for pool complexity and depth
Off-channel habitat	X	X		On lower gradient streams that were placer mined, braided channels and beaver dams are absent. Less LWD for formation of side channels, alcoves and backwater areas on all streams. But higher gradient streams have always had fewer of these features than lower gradient streams.
Refugia	X			No subwatersheds in the basin that have not been modified by human activities.
CHANNEL CONDITION AND DYNAMICS				
Width/depth ratio	X	X		Lower gradient streams in broad valley bottoms are considered outside RNV due to placer mining and channelization; higher gradient streams are generally within RNV.
Streambank	X	X		Same as above.
Floodplain connectivity	X			Due to channelization historic floodplains are now disconnected, especially in broad valley bottoms (e.g. Cow Creek Glendale to Galesville).
FLOW/HYDROLOGY				
Peak/base flows		X		Low flows may be affected by domestic agricultural and urban usage of water. Galesville Reservoir now regulates surface flow in mainstem Cow Creek during all times of the year. Peak flows in all streams may be affected to some degree by roads (timing) but streambank stability and riffle substrate does not currently indicate that peak flows have increased to a level that is causing adverse effects to aquatic habitat.
Drainage network increase			X	Roading of the watershed has created many more miles of streams resulting from road ditches. Miles of diversion ditches historically delivered water for hydraulic mining.
WATERSHED CONDITIONS				
Riparian reserves	X			Timber harvest on both federal and non-federal lands has reduced riparian structural diversity. Agricultural activities have also reduced quality of riparian habitat.

ELEMENTS, PARAMETERS, or INDICATORS	less than	within RNV	greater than	COMMENTS
BIOLOGICAL				
Fish	X			Affected by factors in and outside the watershed
Beaver	X			Historically beaver were abundant. Dams probably created fish habitat in low gradient streams, channels were kept complex and connected to floodplains.
Deer	X			
Elk	X			
VEGETATION				
Old growth	X			
Pine savannah	X			
Forest canopy		X		
PHYSICAL				
Soil Compaction			X	

Middle Cow Creek Watershed Characterizations

	Whole Area	BLM Owned Only
MORPHOLOGY		
Elevation Range	1,029' @ Middle Creek to 5,103' @ Green Mt.	
Drainage Pattern	Dendritic	
Orientation	east to west (Galesville to Reuben) south to north (Reuben to Middle Creek)	
Drainage Density	7.78 mi/mi ²	
Total Stream Miles	1,339	498 (37%)
Total Fish Stream Miles	154	45 (29%)
Watershed Size	110,000 acres	45,642 (40%)
Geographic Province	Klamath Mountains	
METEOROLOGY		
Annual Precipitation	30-60 inches; Highest amounts occur in extreme western portion of watershed	
Timing	90% of annual precipitation falls between October and May	
Temperature Range	0-110° F	
SURFACE WATER		
Minimum Flow	Tributary streams are historically dry in some segments; Galesville Reservoir controls flows in mainstem Cow Creek.	
Maximum Peak Daily Flow	10,600 cfs in Cow Cr. at Azalea in Jan. 1974	
Reservoirs	2 Public water supply reservoirs for city of Glendale, Galesville Reservoir and numerous private ponds and small reservoirs.	
Water Quality Limited Stream Miles	94.6 (303d listed for temperatures above 64°; Windy Creek and Whitehorse Creek listed for habitat modification)	20.8 (22%)
GROUND WATER		
Aquifers	None	
Springs	Numerous springs (not mapped)	
Domestic Water Rights	Many rural residences-some on BLM	

	Whole Area	BLM Owned Only
Agricultural Water Rights	Several along major tributaries	
GEOLOGY		
Formation	Galice Formation consisting of both Sedimentary and Ultramafic metamorphic rocks.	
Soils	Varying depth and complexes generally shallow to very shallow, low water holding capacity.	
VEGETATION	Primarily mixed conifer and hardwood. Vegetative communities differ by slope, aspect, elevation, and soils.	
HUMAN INFLUENCE		
Roads	811 miles	
Roads within One Tree Length of Streams	707 miles	236 (33%)
Roads within One Tree Length of Fish Stream	120 miles	31 (26%)
Road Density	4.6 mi/mi ²	
Timber Production		
Agriculture	Mostly grazing of low elevations along major tributaries with developed flood plains.	
Mining	Placer mining in Marion, Quines, Whitehorse, and Starvout Creek drainages.	
Utility Corridors	Natural gas line, electric power, railroad, fiber optic phone.	
Communication Sites	Tunnel Ridge; Grayback Mountain	
Communities	Glendale, Azalea, Quines Creek, numerous residences	
BIOLOGICAL		
Candidate, Threatened, or Endangered Species	Spotted owl (___ sites) LSR (20,366 acres east of I-5) Marbled murrelet (none found) Oregon Coast Steekhead Oregon Coast Coho Salmon Umpqua River Cutthroat Trout Chinook salmon	
Survey & Manage Species	Del Norte salamanders Mollusks Red tree voles Fungi Brophytes Lichens	

	Whole Area	BLM Owned Only
Special Status Plants	Numerous species and locations	