

**ENVIRONMENTAL ASSESSMENT**  
**for the**  
**Grave Creek West Project Area**

EA# OR 110-99- 09

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for the  
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# **ENVIRONMENTAL ASSESSMENT**

## **for the**

### **Grave Creek West Project Area**

EA# OR 110-99-09

#### **I. Introduction and Need for the Proposal**

The Medford District Resource Management Plan (RMP) identifies land management objectives based on a series of land use allocations. Included in the allocations are the General Forest Management Area (GFMA) and the Riparian Reserves (RR). One of the primary objectives for managing GFMA is to provide for a sustainable supply of commercial timber, consistent with other objectives. Objectives for the RR include contributing to meeting the objectives of the Aquatic Conservation Strategy. The Glendale Resource Area proposes a series of timber sales and other projects to assist in meeting land use objectives for the GFMA and Riparian Reserves as identified in the RMP dated April 14, 1995. These sales and projects may be sold or implemented in more than one fiscal year.

The Grave Creek West project area was delineated using watershed boundaries. The majority of the project area is located within the Grave Creek analytical watershed (also called a “fifth-field watershed”) which was described and analyzed in preliminary watershed analyses, completed in 1994. Areas proposed for treatment outside the fifth field watershed boundary in the Middle Cow Creek watershed (Umpqua River Basin) are included in this proposed action either because of access patterns or the area is similar to and contiguous with stands within the watershed proposed for treatment. The watershed analyses documented existing conditions within the Grave Creek watershed; analyzed important ecological functions and relationships; and identified key issues, inventory needs and monitoring needs. Site-specific objectives were developed and potential management actions were identified to meet those objectives.

The following Key Issues were identified for the Grave Creek watershed:

- A. Mining/Fish/Riparian Areas
- B. Timber/Riparian Areas/Fish
- C. Rural Interface Areas/VRM
- D. Local Public
- E. Ownership Patterns
- F. Special Status Species and their Habitats

The Grave Creek West project area is a smaller set of watersheds within the fifth-field watershed. An interdisciplinary (ID) team of resource specialists reviewed current conditions within the project area in light of the larger scale context provided by the Watershed Analysis. Public comments were solicited to identify important issues, concerns, and management needs during the watershed analysis phase. In general the question was, “What management actions are needed or desired within the project area?”

In order to help answer that question, and in accordance with the National Environmental Policy Act (NEPA), a set of Significant Issues for the project area was developed by the ID team with the benefit of input from the public and other agencies. This Environmental Assessment (EA) focuses on these Significant Issues, both in terms of project design features (PDFs) and in describing environmental effects.

Significant issues identified for the Grave Creek West project area are:

- A. Riparian Areas/Hydrology
  - Timber harvest may have an adverse effect on water quality and quantity and fish habitat.
  - Road conditions may need improvement to minimize sedimentation.
- B. Local Public and Rural Interface Area
  - Timber harvest may have undesirable effects on visual resources of local residents.
  - Local residents are concerned about effects of timber harvest on wells and surface water supplies.
- C. Timber Resources
  - Protection measures for wildlife species may greatly reduce available timber supply in the area and make reforestation more difficult.
- D. Special Status Species and their Habitats
  - Timber harvest may have adverse effects on spotted owls, marbled murrelets, coho salmon, Umpqua cutthroat trout, Klamath Province steelhead and species designated as Survey and Manage Species in the RMP.
- E. Late-successional forest habitat
  - Timber harvest may adversely affect late-successional forest habitat.

The proposed action analyzed in this EA deals with all of these issues.

## II. Affected Environment

The location of the Project Area is:

Analytical Watershed (fifth field):	Grave Creek, Middle Cow Creek
Project Area (sixth-field watershed):	Grave Creek West
County:	Josephine and Douglas

All of the proposed units occur on lands designated as General Forest Management Area (GFMA) or on adjacent Riparian Reserves. Some units involve designated critical habitat for spotted owls and there are spotted owls in the project area. The entire project area is located within 50 miles of the coast, so is considered within the range of marbled murrelets. The project area has intermingled BLM and private lands owned by timber companies, private individuals and Josephine County.

This watershed is dominated by the major plant grouping Douglas-fir/tanoak/madrone (Tanoak series), but also has areas of mixed conifer/interior valley/grass. The area has been extensively altered by timber harvest. Riparian areas as well as uplands have been affected.

There are several special status species and Survey and Manage species within the project area. Red tree voles, Del Norte Salamanders (*Plethodon elongatus*), blue grey tail-dropper slugs (*Prophysaon coeruleum*), papillose tail-dropper slugs (*Prophysaon dubium*), Crater Lake tightcoil snails (*Pristiloma arcticum*), sugarsticks (*Allotropa virgata*) and lady slippers (*Cypripedium fasciculatum*) have all been documented within the project area. Required surveys for these species have been conducted according to established protocol standards. The results and the impacts to these species are presented in the Environmental Effects section. There are no known locations of aquatic Survey and Manage molluscs in the Grave Creek fifth-field watershed.

## III. Alternatives considered but eliminated from further analysis

In developing the proposed action the interdisciplinary team began by looking at all the General Forest Management Area lands in the Grave Creek West project area. As part of this proposed action, the team recommended that harvest be deferred in most of the older stands in the western portion of the project area, generally in Reuben Creek, since this was identified as an ecologically important, large block of late-successional forest habitat that should be maintained in the short term. It was felt that harvesting some of the smaller, more fragmented blocks of older habitat in the other portions of the project area would have smaller effects on species associated with older

One of the reasons for which units were deferred from this proposed action was to minimize potential adverse cumulative effects on small, headwater basins. These units were deferred from this proposed action, with the expectation they would remain uncut until the surrounding stands recover and grow to the point where they have recovered from a hydrologic function perspective. In this area, hydrologic functions typically recover as stands reach 20-30 years of age.

Several units were identified which would benefit from thinning, underburning or other density management treatments, but which would not generally result in commercial products being removed. For funding and administrative purposes, these units will be considered in a separate assessment document.

#### **IV. The Proposed Action Alternatives**

##### **A. Objectives**

The ID team designed the proposed action to meet the following objectives:

- Produce commercial timber,
- Improve growth and vigor of residual trees to increase wood production in 40-100 year old stands,
- Protect special habitats,
- Maintain and upgrade roads, and reduce road densities, to reduce erosion, improve water quality, and reduce disturbance effects on wildlife.

##### **B. Overview of the Alternatives**

The location of the Proposed Action is:

T 33S, R 7W, sec. 9, 10, 11,13, 14, 17, 21, 23, 25, 26, 27, 33, 34, 35.

T 34S, R 7W, sec. 1, 3, 4, 5, 7, 9, 15, 17

A summary of the proposed treatments is presented in Table 1. Locations of the units are shown on the attached map.

The long-term desired future condition for harvest units is a scattered overstory of large “legacy” conifers (6-8 trees per acre) with a component of hardwoods, snags and coarse woody debris and a fully stocked second canopy of vigorous conifers. The desired future condition for the riparian reserves is a fully functioning, diverse conifer forest and riparian vegetation which closely resembles natural conditions, including a relatively closed canopy, large snags and large down logs.

In general, the Regeneration Harvest (RH) and Overstory Removal (OR) units would harvest timber, leaving at least 6-8 large conifers per acre and 2 large hardwoods per acre (where available) as well as snags and down logs. In some cases, additional trees would be retained to provide a source for coarse woody debris, to provide additional shade for seedlings, or to help retain moist conditions in talus habitat. In many cases, additional canopy, up to 40 percent or more, would be retained to maintain conditions for special status species. The RH units would be burned, if necessary, to prepare the site. These units would then be planted. In the OR units, the intent is to retain existing young conifer reproduction, with possible inter-planting, rather than rely solely on planting to establish the next stand. In commercial thin (CT) units, the existing stand would be thinned to release the residual trees. In the units proposed for selection cut (SC), individual trees would be removed from the stand to provide increased growing space for residual trees and established regeneration. In the units proposed for shelterwood harvest (SW), approximately 40 percent canopy closure would be retained to reduce visual effects. Shelterwood and selection cut harvest units would generally be hand-piled and burned. Unit 39 is located in a connectivity/diversity block. Regeneration harvest in this unit would retain 12-18 conifers per acre, as called for in the RMP, to harvest timber while contributing to connectivity across the landscape.

The Regeneration Harvest and Overstory Removal units would be reforested where necessary using nursery seedlings. Some planting may also occur in Select Cut harvest units. Additional treatments, such as shade-carding, mulching, providing browse protection and controlling competing vegetation may be required to ensure adequate establishment of the next forest stand. This EA addresses activities through the time when stands are considered stocked and established.

There are five areas considered for silvicultural treatment of Riparian Reserves. In general, the objective of these proposed treatments is to promote development of late-successional conifer forest habitat. The treatments involve site preparation (e.g. slashing, burning and hand-piling) as well as planting with tree seedlings.

In some cases, individual trees along roads in the sale area would be cut as salvage material, or where they pose potential safety problems to people using the road.

The proposed timber sale would directly affect existing paved roads, rocked roads and natural surface roads. There would be less than one mile (0.6 mi.) of new temporary road construction in all alternatives; these would be ripped and seeded following this use. Three of the proposed alternatives involve construction of 0.6 miles of permanent road on and near a ridge; one alternative would involve 0.4 mi. of road construction. All action alternatives include proposals to decommission existing roads and Jeep roads. And all action alternatives include proposals to “storm-proof” existing roads. This would involve installing shallow water dips below stream-crossing culverts with armored outfalls to provide drainage should the culvert become blocked. The intent is to prevent major road failure which results in erosion, as well as reducing future road maintenance needs. Details of road management actions are presented in Tables 2 and 3.

Renovation of existing roads would consist of roadside brushing, reshaping and restoring the surface where necessary, maintaining or improving drainage structures, and applying rock surfacing where needed.

Rock would be obtained from the following quarries if needed:

Rattlesnake	T 33S, R 7W, sec. 13
Angora	T 34S, R 7W, sec. 11
Quartz Creek	T 34S, R 7W, sec. 23
Lower Sugarloaf	T 33S, R 7W, sec. 25.

Some blasting may be necessary in these quarry locations. Under this proposal rock would be used for spot-rocking needs in specific problem areas and rocking the proposed new construction (road 33-7-17.3).

The interdisciplinary team developed five action alternatives to be analyzed. The alternatives focus on an array of approaches to manage habitat for Survey and Manage species in the proposed project area. The interdisciplinary team was able to resolve other issues. The alternatives are based on different approaches to address the need to manage known sites of Survey and Manage species on General Forest Management Area lands. In some cases, these species were found to be relatively abundant in some stands.

The objective of Alternative 1 is to provide maximum protection to stands with the highest diversity of Survey and Manage species. Stands with four or more species present would be deferred from any harvest action. Other stands would be harvested using normal GFMA prescription treatments, except that occupied talus would be managed using the protective measures called for to protect Del Norte salamander habitat (e.g. retaining 40 percent canopy

The objective of Alternative 2 is to provide maximum protection to stands with the greatest numbers, or density, of individuals of Survey and Manage species. Stands with one or more individuals per acre would be deferred from any harvest action. Other stands would be harvested using normal GFMA prescription treatments, except that occupied talus would be managed using the protective measures called for to protect Del Norte salamander habitat (e.g. retaining 40 percent canopy closure on the talus and the surrounding one site-tree buffer, prohibiting cable and tractor yarding within the talus, avoiding prescribed burning where possible, etc.).

The objective of Alternative 3 is to provide a high level of protection to individual sites for the more rare Survey and Manage species. This alternative would retain a one site-tree no-cut buffer around papillose tail dropper sites and Crater Lake tightcoil sites, ten acres around red tree vole populations, individual trees around isolated red tree vole nests. Del Norte salamander habitat would be protected as in the other alternatives.

The objective of Alternative 4 is to provide a high level of protection to individual sites for the more rare Survey and Manage species (i.e. Crater Lake tightcoil and papillose tail-dropper), and provide a moderate level of protection to blue-grey tail dropper sites. Under this alternative, the same protective measures would be implemented as in Alternative 3, and units with blue-grey tail droppers would retain at least 40 percent canopy closure.

After examining the first four alternatives, a Preferred Alternative (Alternative 5) was developed. One objective of the Preferred Alternative is to provide a moderate level of protection for most blue-gray tail-dropper sites. This species is so common in this project area that it was not thought to be necessary to protect every site. In most cases, at least 40 percent canopy closure would be retained in areas occupied by either blue-gray tail-droppers or papillose tail-droppers. The more rare Crater Lake tightcoil locations would be protected with a one site tree, no-cut buffer. At least 10-acres of suitable red tree vole habitat would be retained around populations, unless there are other populations within 1/4 mile as provided for in the interagency direction (BLM IM # OR-97-009). Talus areas occupied by Del Norte salamanders would be protected by retaining 40 percent canopy closure on the talus and the surrounding one site-tree buffer, prohibiting cable and tractor yarding within the talus, and avoiding prescribed burning where possible, etc.

A summary of the proposed action alternatives is presented in Table 1.

### **Alternative 6 - No Action Alternative**

Under this alternative, the management actions described under the Action Alternatives (1-5)

**Table 1. Summary of alternatives for the Grave Creek West Timber Sales.**

<b>Unit Number</b>	<b>Alternative 1 Protect Most Diverse Area</b>	<b>Alternative 2 Protect Most Dense Populations</b>	<b>Alternative 3 Protect Papillose, not Blue-Grays</b>	<b>Alternative 4 Retain 40% can; Protect tightcoil and papillose</b>	<b>Alternative 5 Preferred Alternative</b>
2	CT/OR H 30 ac. 240 MBF	CT/OR (60% can) H 30 ac. 240 MBF	CT/OR H 19 ac. 190 MBF	CT/OR H 19 ac. 190 MBF	CT/OR H 19 ac. 190 MBF
3	CT Cable 36 ac. 144 MBF	CT Cable 36 ac. 144 MBF	CT Cable 17 ac. 68 MBF	CT Cable 17 ac. 68 MBF	CT Cable 6 51 MBF
4	Regen Cable 13 ac. 220 MBF	Regen Cable 13 ac. 220 MBF	Regen Cable 6 ac. 180 MBF	Regen (40%can) Cable 6 ac. 180 MBF	Regen (40%can) Cable 6 ac. 96 MBF
5A	CT Cable 24 ac. 120 MBF	CT Cable 24 ac. 120 MBF	CT Cable 17 ac. 85 MBF	CT Cable 17 ac. 85 MBF	CT Cable 17 ac. 85 MBF
5B	Regen Cable 6 ac 120 MBF	Regen Cable 6 ac 120 MBF	Regen Cable 6 ac 120 MBF	Regen(40%) Cable 6 ac 100 MBF	Regen Cable 6 ac 210 MBF
7	CT Cable - multispans 41 ac 205 MBF	CT Cable - multispans 41 ac 205 MBF	CT Cable / Helicopter 27 ac 135 MBF	CT Cable - multispans 41 ac 205 MBF	CT Cable - multispans 40 ac 190 MBF
8	CT/OR Cable 11 ac. 50 MBF	CT/OR Cable 11 ac. 50 MBF	CT/OR Cable 11 ac. 50 MBF	CT/OR Cable 11 ac. 50 MBF	CT/OR Cable 5 ac. 25 MBF
9	Regen 40% H 7 --	Defer	Regen (40%) H 7 --	Defer	Defer Red Tree Voles

<b>Unit Number</b>	<b><u>Alternative 1</u> Protect Most Diverse Area</b>	<b><u>Alternative 2</u> Protect Most Dense Populations</b>	<b><u>Alternative 3</u> Protect Papillose, not Blue-Grays</b>	<b><u>Alternative 4</u> Retain 40% can; Protect tightcoil and papillose</b>	<b><u>Alternative 5</u> Preferred Alternative</b>
12	CT/OR Cable 6 ac. 24 MBF	CT/OR Cable 6 ac. 24 MBF	CT/OR Cable 2 ac. 16 MBF	CT/OR Cable 3 ac. 20 MBF	Defer Red Tree Voles, Molluscs, Uneconomical
13	Defer	CT/OR Cable/Helicopter 110 ac 1,100 MBF	CT/OR Cable/Helicopter 40 ac 400 MBF	CT/OR Cable/Helicopter 60 ac 600 MBF	CT/OR Cable (S) /Heli (N) 75 ac 600 MBF
14	Regen 40% H 26 ac. 180 MBF	Defer	Regen (40%) H 10 ac. 300 MBF	Defer	Regen (40% can) H 16 ac 320 MBF
15	Defer Survey and Manage Species	OR (Drop Talus) Cable 15 ac. 250 MBF	Defer	Defer	OR (40% can) Cable 24 ac 180 MBF
16	OR H 25 ac. 250 MBF	OR H 25 ac. 250 MBF	OR H 15 ac. 150 MBF	OR H 15 ac. 150 MBF	OR (40% can) H 15 ac 180 MBF
17	Defer - Red Tree Voles	Defer - Red Tree Voles	Defer - Red Tree Voles	Defer - Red Tree Voles	Defer Red Tree Voles
18	CT/OR H 15 ac. 70 MBF	Defer Blue-gray tail-dropper abundant	CT/OR H 14 ac. 126 MBF	CT/OR H 14 ac. 60% Can on Talus 40% Can on rest 40 MBF	CT/OR (40% can) H 7 ac 56 MBF
19	CT Cable 20 ac. 140 MBF	CT Cable 20 ac. 140 MBF	CT Cable 10 ac. 70 MBF	CT Cable 20 ac. 140 MBF	CT Cable 10 ac. 70 MBF
20	Select Cable	Select Cable	Select Cable	Select Cable	Select Cable

<b>Unit Number</b>	<b><u>Alternative 1</u> Protect Most Diverse Area</b>	<b><u>Alternative 2</u> Protect Most Dense Populations</b>	<b><u>Alternative 3</u> Protect Papillose, not Blue-Grays</b>	<b><u>Alternative 4</u> Retain 40% can; Protect tightcoil and papillose</b>	<b><u>Alternative 5</u> Preferred Alternative</b>
RR-21	Rehab 2 ac.	Rehab 2 ac.	Rehab 2 ac.	Defer	Rehab 2 ac.
22	Regen 6-8 tpa Cable 22 ac. 290 MBF	Regen 6-8 tpa Cable 22 ac. 290 MBF	Regen 6-8 tpa Cable 16 ac. 240 MBF	Regen - 40% Cable 22 ac. 110 MBF	Defer Molluscs, Uneconomical, Future planning
23	Regen 6-8 tpa Cable 24 ac. 360 MBF	Regen 6-8 tpa Cable 24 ac. 360 MBF	Regen 6-8 tpa H 20 ac. 300 MBF	Defer Uneconomical	Regen (40 % can) H 28 ac 196 MBF
RR-23	Defer Occupied Talus	Defer Occupied Talus	Defer Occupied Talus	Defer Occupied Talus	Defer Occupied Talus
24	Defer - RTVs	Defer - RTVs	Defer - RTVs	Defer - RTVs	Defer - RTVs
RR-24	Defer Uneconomical	Defer Uneconomical	Defer Uneconomical	Defer Uneconomical	Defer Uneconomical
25	Select Cable 20 ac. 360 MBF	Select Cable 20 ac. 360 MBF	Select Cable 20 ac. 360 MBF	Select Cable 20 ac. 360 MBF	Select Cable 29 ac 435 MBF
28	Defer Survey and Manage Diversity	Regen 6-8 tpa 40% on talus H RTV (10 acres) 40 ac. 600 MBF	Regen 6-8 tpa 40% on talus H RTV (10 acres) 40 ac. 600 MBF	Regen 6-8 tpa 40% on talus H RTV (10 acres) 40 ac. 600 MBF	Regen 6-8 tpa 40 % can around talus H 30 ac 360 MBF
RR-28	Defer - Del Norte	Defer - Del Norte	Defer - Del Norte	Defer - Del Norte	Defer - Del Norte
29	Shelterwood Cable 12 ac. 200 MBF	Shelterwood Cable 12 ac. 200 MBF	Shelterwood Cable 11 ac. 180 MBF	Shelterwood Cable 11 ac. 180 MBF	Shelterwood Cable 11 ac 165 MBF
31A	Regen 6-8 tpa Cable	Regen 6-8 tpa Cable	Regen 6-8 tpa Cable	Regen 6-8 tpa Cable	Regen 6-8 tpa Cable

<b>Unit Number</b>	<b><u>Alternative 1</u> Protect Most Diverse Area</b>	<b><u>Alternative 2</u> Protect Most Dense Populations</b>	<b><u>Alternative 3</u> Protect Papillose, not Blue-Grays</b>	<b><u>Alternative 4</u> Retain 40% can; Protect tightcoil and papillose</b>	<b><u>Alternative 5</u> Preferred Alternative</b>
32	DROP - Red Tree Voles -only 10 acres available for population				
33	CT Cable - multispans 21 ac. 120 MBF	CT Cable - multispans 21 ac. 120 MBF	CT Cable - multispans 19 ac. 105 MBF	CT Cable - multispans 19 ac. 105 MBF	CT Cable-multispans 18 ac 75 MBF
34A	CT Cable - downhill 6 ac. 30 MBF	CT Cable - downhill 6 ac. 30 MBF	CT (60% can) Cable - downhill 6 ac. 20 MBF	CT Cable - downhill 6 ac. 30 MBF	CT 40-50% can Cable - downhill 6 ac 12 MBF
34B	CT Cable downhill 11 ac. 55 MBF	CT Cable downhill 11 ac. 55 MBF	CT (60% can) Cable downhill 11 ac. 35 MBF	CT Cable downhill 11 ac. 55 MBF	CT 40-50% can Cable - downhill 10 ac 90 MBF
34C	CT Cable 34 ac. 170 MBF	CT Cable 34 ac. 170 MBF	CT (60% can) Cable 34 ac. 120 MBF	CT Cable 34 ac. 170 MBF	CT 40-50% can Cable 30 ac 150 MBF
34D	Defer - DM	Defer - DM	Defer - DM	Defer - DM	Defer - DM
38	Drop Owl Core Area	Drop Owl Core Area	Drop Owl Core Area	Drop Owl Core Area	Drop Owl Core Area
39	Defer Survey and Manage species	Regen 12-18 tpa Cable 52 ac. 208 MBF	Regen 6-8 tpa Cable 20 ac. 80 MBF	Defer Uneconomical	Regen Cable 18 tpa N half 12-18 tpa S half 52 ac 432 MBF
40A	Defer - Economics, Survey and Manage species, Threatened/Endangered Species				
40B	Drop - Cenoak Timber Sale - Grants Pass Resource Area timber sale				
41A	Defer- Red Tree Voles	Defer- Red Tree Voles	Defer- Red Tree Voles	Defer- Red Tree Voles	Defer- Red Tree Voles

<b>Unit Number</b>	<b><u>Alternative 1</u> Protect Most Diverse Area</b>	<b><u>Alternative 2</u> Protect Most Dense Populations</b>	<b><u>Alternative 3</u> Protect Papillose, not Blue-Grays</b>	<b><u>Alternative 4</u> Retain 40% can; Protect tightcoil and papillose</b>	<b><u>Alternative 5</u> Preferred Alternative</b>
42B	Regen 6-8 tpa Cable 12 ac. 90 MBF	Regen 6-8 tpa Cable 12 ac. 90 MBF	Defer	Defer	Regen 40% can Cable 10 ac 110 MBF
43A	OR Cable 8 ac. 50 MBF	OR Cable 8 ac. 50 MBF	OR Cable 5 ac. 42 MBF	OR Cable 5 ac. 42 MBF	OR Cable 5 ac 30 MBF
43B	CT Cable 14 ac. 42 MBF	CT Cable 14 ac. 42 MBF	CT-60% can Near Papillose TD Cable 14 ac. 32 MBF	CT-60% can Near Papillose TD Cable 14 ac. 32 MBF	CT Cable 15 ac 45 MBF
44A	OR Cable 7 ac. 105 MBF	OR Cable 7 ac. 105 MBF	Defer Uneconomical, Molluscs	Defer Uneconomical, Molluscs	OR - 40% can Cable 7 ac 42 MBF
44B	Defer - DM	Defer - DM	Defer - DM	Defer - DM	Defer - DM
45	Regen 6-8 tpa Cable 22 ac. 264 MBF	Regen 6-8 tpa Cable 22 ac. 264 MBF	Regen 6-8 tpa Cable 22 ac. 180 MBF	Regen 6-8 tpa Cable 22 ac. 180 MBF	Regen - 40% can Cable 22 ac 110 MBF
RR 45	Rehab - 2 ac	Rehab - 2 ac	Rehab - 2 ac	Defer - occupied talus	Defer - occupied talus
46	Regen 6-8 tpa H 29 ac. 320 MBF	Regen 6-8 tpa H 29 ac. 320 MBF	Regen 6-8 tpa H 22 ac. 290 MBF	Regen 40 % can H 22 ac. 200 MBF	Regen - 40% can H 22 ac 220 MBF
47	Regen 6-8 tpa Cable 8 ac. 120 MBF	Regen 6-8 tpa Cable 8 ac. 120 MBF	Regen 6-8 tpa Cable 8 ac. 120 MBF	Regen 6-8 tpa H 8 ac. 80 MBF	Regen 6-8 tpa Cable 7 ac 119 MBF



<b>Unit Number</b>	<b><u>Alternative 1</u> Protect Most Diverse Area</b>	<b><u>Alternative 2</u> Protect Most Dense Populations</b>	<b><u>Alternative 3</u> Protect Papillose, not Blue-Grays</b>	<b><u>Alternative 4</u> Retain 40% can; Protect tightcoil and papillose</b>	<b><u>Alternative 5</u> Preferred Alternative</b>
Totals					
Number of units	35 timber harvest 2 Riparian Reserves	37 timber harvest 2 Riparian Reserves	37 timber harvest 2 Riparian Reserves	31 timber harvest 1 Riparian Reserve	36 timber harvest 2 Riparian Reserves
Acres of regeneration and overstory removal harvest	289	408	291	236	342
Acres of commercial thinning	269	364	241	312	258
Acres of select cut and shelterwood harvest	48	48	39	39	56
Total acres of timber harvest	606	820	571	587	656
Timber Volume (MBF)	5,615	7,658	5,872	4,350	5,887
Average Volume per acre (MBF/Ac)	9.3	9.3	10.3	7.4	9.0

Pap = Papillose tail dropper  
DM = Density Management  
tpa = trees per acre

BGT = Blue-grey tail dropper  
can = Canopy Closure

RTV = Red Tree Vole  
MBF = Thousand Board Feet

Harvest/Treatment Systems:  
Regeneration Harvest

Other Cuts

**Table 2. Road management in the Proposed Action and Alternatives, Grave Creek West timber sales.**

Road Number	Road Name	Length, mi	Surface type	Proposed Action					Haul Season
				Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	
<b>Storm-proofing</b>									
33-7-9.1	Lazy Rattle	0.32	nat	SP	SP	SP	SP	SP	6/1-10/1
33-7-13.2	Upper Rattlesnake Spur	0.57	grr	SP	SP	SP	SP	SP	4/1-11/1
33-7-13.3	Rattle Pour	0.56	nat	None	SP	SP	SP	SP	<b>6/1-10/1</b>
*33-7-13.5 spur, near unit 2	Jeep 2	0.50	nat	SP	SP	SP	SP	SP	6/1-10/1
**33-7-13.6A	Goosehead	0.89	asc	SP	None	SP	None	SP	4/1-11/1
33-7-13.6B	Goosehead	0.55	nat	SP	None	SP	None	SP	6/1-10/1
**33-7-13.7	Joe Count	3.87	grr	SP	SP	SP	SP	SP	4/1-11/1
33-7-17.2	Helipond Rock Spur	0.33	grr	SP	SP	SP	None	SP	4/1-11/1
33-7-21A	Switch Rock	1.78	grr	SP (0.25 mi)	SP	SP	SP	SP	4/1-11/1
33-7-21.1	Poor Rock Spur	0.29	grr	SP	SP	SP	SP	SP	
33-7-21.3	Switch Rock	0.09	grr	SP	SP	SP	SP	SP	4/1-11/1
33-7-26	Dry Poorman	0.48	pr	SP	SP	SP	SP	SP	4/1-11/1
*33-7-35.1A	Dry Poorman	2.28	pr	SP	SP	SP	SP	SP	6/1-10/1
33-7-35.1B	Dry Poorman	1.03	abc	SP	SP	SP	SP	SP	6/1-10/1
*34-7-1	Angora A	1.55	pr	SP	SP	SP	SP	SP	4/1-11/1
*34-7-3.2	Archer Mine	3.27	grr	SP (2.75 mi)	SP	SP	SP	SP	4/1-11/1
34-7-36N	Old Hog Creek Ridge	0.57	nat	None	SP	SP	None	None	6/1-10/1

Road Number	Road Name	Length, mi	Surface type	Proposed Action					Haul Season
				Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	
<b>Road Decommissioning</b>									
33-7-17.3 (existing rd to unit 20)	Jeep 20	0.10	nat	DEC	DEC	DEC	DEC	DEC	6/1-10/1
33-7-17.2 existing spur; unit 21/23	Jeep 21/23	1.00	nat	DEC	DEC	DEC	None	DEC	6/1-10/1
33-7-13.5 existing spur, unit 8	Jeep 8	1.00	nat	DEC	DEC	DEC	DEC	DEC	6/1-10/1
34-7-1.1	Angora A1	0.10	6" prr (ripped)	REN/DEC	REN/DEC	REN/DEC	REN/DEC	REN/DEC	6/1-10/1
34-7-13.5 existing spur, unit 13	Jeep 13	0.20	nat	None	DEC	DEC	DEC	DEC	6/1-10/1
<b>New Road Construction</b>									
33-7-17.3 new road, Unit 21/23	Hungry Rock	0.60	4" asc	CONSTR/SP/Barricade	CONSTR/SP/Barricade	CONSTR/SP/Barricade	None	CONSTRUCT to top of ridge only (0.4 mi); SP/Barricade	4/1-11/1
<b>Temporary Road Construction</b>									
33-7-9.1 temp spur, Unit 5	Temp 5A	0.06	nat	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	6/1-10/1
33-7-9.1 temp spur, Unit 5	Temp 5B	0.10	nat	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	6/1-10/1

Road Number	Road Name	Length, mi	Surface type	Proposed Action					Haul Season
				Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	
33-7-13.7 temp spur, Unit 19	Temp 19	0.15	nat	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	6/1-10/1
33-7-17.2 temp spur, Unit 20	Temp 20	0.06	nat	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	6/1-10/1
33-7-19 temp spur, Unit 22	Temp 22	0.08	nat	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	None	6/1-10/1
33-7-21 temp spur Unit 25	Temp 25	0.06	nat	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	6/1-10/1
34-7-3.2 temp spur Unit 42A#	Temp 42A	0.10	nat	None	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	CONSTR/DEC	6/1-10/1

\* High Priority for Storm-proofing

\*\* Highest priority for Storm-proofing

**Definitions:**

abc	Aggregate Base Course	SP	Storm-Proof (see text)
asc	Aggregate Surface Course	CONST	Construct
grr	Grid Rolled Rock	TEMP	Temporary
pr	Pit Run Rock	DEC	Decommission
nat	Native Surface	REN	Renovate

The following roads have been identified as high priority for storm-proofing:

- Spur off 33-7-13.5 near unit 2 (Jeep Road): Has rutting/erosion on steep sections; gets high use.
- Road 33-7-13.6A: Has debris fan (restrained by road fill) that needs drainage.
- Road 33-7-13.7: Has numerous slumps, erosion, instability.
- Road 34-7-1: Has numerous slumps through a landslide area.
- Road 34-7-3.2: Is steep, has numerous water problems.

**Table 3. Summary of road management, Grave Creek West timber sale.**

<b>Action</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>	<b>Alt 5</b>
Temporary road construction (miles)	0.5	0.6	0.6	0.6	0.5
Permanent road construction (miles)	0.6	0.6	0.6	0.0	0.4
Road decommissioning (miles)	2.2	2.4	2.4	1.4	2.4
Storm-proofing (miles)	15.7	17.5	18.9	16.6	18.4

## **C. Project Design Features**

Project design features (PDFs) are specific measures included in the design of the proposed action to minimize adverse impacts on the human environment. Project design features for the proposed action are organized based on the Significant Issues identified by the ID team and described in the introduction of this EA. The reader should also be aware that there are many mandatory and discretionary management directions and Best Management Practices in the RMP that may not be repeated in this EA.

A summary of seasonal restrictions is presented in Appendix A.

If changes to the PDFs are needed during project implementation, they would be reviewed by the ID team and the Area Manager, and an amended EA would be prepared before the change is implemented.

The following project design features are common to all action alternatives.

### **1. Riparian Areas/Fish/Hydrology**

Road renovation, maintenance and log hauling (except roadside brushing) would be restricted to the seasons described in Table 2. If the roads are deemed too wet by the Authorized Officer during a designated haul season, no hauling would be allowed.

Some roads would be storm-proofed under each Alternative (see Table 2). Storm-proofing would involve any or all of the following as needed:

- outsloping, correcting ditch line drainage,
- replacing aging culverts,
- installing additional culverts, and
- constructing water dips, especially at stream crossings, to provide drainage should the culvert become blocked.

The intent is to prevent major road failure and erosion, as well as reduce future road maintenance needs.

The 0.4- 0.6 miles of new road construction that is intended to be permanent (to units 21 and 23) would occur between April 15 and October 15, when soil conditions can support the equipment and are not too wet to result in excessive erosion. The road work would be completed before October 15 of the same year construction is begun. This road would be constructed as an outsloped, rocked road and would be barricaded after harvest.

Temporary spur roads to units 5, 19, 20, 22, 25 and 42 would be built, discontinuously ripped with winged rippers, mulched and water-barred in the same season, between April 15 and October 15. All decommissioned temporary roads would be seeded with certified weed-free grass and legume seed and planted with conifers. Native species would be used if available. Hauling would be limited to between June 1 and October 1 (Table 2).

Some existing system roads are proposed for full decommissioning in Table 2. This would involve discontinuous ripping with winged rippers, mulching, pulling culverts, water-barring and barricading, seeding and planting with conifers.

The jeep road near unit 2 would be storm-proofed to prevent future erosion.

Jeep roads 8, 13, 20, and 21/23 would be discontinuously ripped with winged rippers, water-barred, mulched and seeded with certified weed-free grass and legume seeds to reduce erosion and provide forage for elk and deer.

Road 33-7-27 has been ripped in the past. This road would be reconstructed, used for logging, and decommissioned. This road length is not included in the totals for decommissioning.

Road decommissioning and ripping would only be done July 1 to October 1.

Excess excavated material would be end-hauled to designated stable locations, where necessary to maintain site productivity, reduce potential for ravel and landslide, 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 dissipaters and downspouts would be installed at cross-drain and stream culverts where necessary to protect road fill slopes that are not adequately protected by natural materials.

Landings would be located in approved sites, designed with adequate drainage.

Step landings would be recontoured following use.

The helicopter landings would be constructed and used in the same season. The landings would be ripped following logging, and planted. The helicopter landings would only be rocked if it is necessary to prevent erosion and sedimentation into the streams. Adequate drainage would be provided to minimize erosion.

Helicopter refueling sites would not be located near streams.

Sediment-generating activities in quarries that are located in Riparian Reserves would be prohibited between October 1 and June 1 (the wet season).

Tractor yarding would only be allowed between June 1 and October 1 (soil moisture permitting) of the same year to minimize the amount of soil disturbance and compaction. If the Authorized Officer determines that soils are too wet within this season, tractor yarding would not be allowed until approved by him/her. If soils are sufficiently dry outside this season, tractor yarding may be allowed if approved by the Area Manager. Water bar spacing on tractor skid trails would be based on existing guidelines considering slope and soil series.

Yarding tractors would not exceed eight feet in width and would be equipped with an integral arch to minimize soils disturbance and compaction.

Where tractors are used for yarding, existing skid roads would be used if present. Skid roads used in this timber sale would be discontinuously ripped and water-barred to reduce erosion. This work would be restricted to between June 1 and October 1. Water bars would be installed at the same time as ripping. Ripped skid roads would be planted with conifers. Grass seeding, mulching or hay bale placement would be done where needed to minimize surface erosion.

In order to minimize soil disturbance, tractor blades would not be used to excavate tractor trails.

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.

Riparian Reserves would be established along all intermittent and perennial streams in accordance with the Medford District RMP and ROD. Reserve widths in units 2 - 19 would be 180 feet on each side of non-fishery intermittent and perennial streams, 170 feet on the other units. Riparian Reserve widths on springs and seeps would be 100 feet (units 21, 25, 41B, 42, 44, 52). Riparian reserve width on fish habitat would be a minimum of two site potential tree heights (340 feet in units 28, 29, 45, 47; 360 feet in unit 4). Riparian Reserves were examined in the field and it was determined that, other than in units 18 and 42A, larger reserve widths were not necessary to protect fragile soils, unstable slopes and other situations discussed in the Northwest Forest Plan.

The southern boundary of unit 42A would be located at least 100 feet up hill from the edge of the alluvial bench that parallels Grave Creek. This would be done to protect important riparian habitat for fish and wildlife. In unit 18, the Riparian Reserve would be extended approximately 200 feet up beyond the normal reserve width to avoid cutting trees on a potentially unstable headwall.

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

Some Riparian Reserves are dominated by brush and hardwoods; large overstory conifers and conifer regeneration are scarce or absent. Hardwoods and brush would be slashed, hand piled and burned (RR45) and slashed and broadcast burned (RR21). The treatments would come no closer than 30 feet from stream channels. The Riparian Reserve would then be planted with a mixture of native conifer seedlings appropriate for site conditions in an attempt to reestablish a more diverse vegetative community. There would be no site prep within a site potential tree distance of streams if surveys for Survey and Manage species, conducted according to protocol, reveal these species are present.

Landings would not be located in Riparian Reserves

Yarding across Riparian Reserves would not be allowed.

Trees in Riparian Reserves that are accidentally knocked over during falling and yarding would be retained on-site for fish and wildlife habitat.

Directional falling away from streams and wet areas would be required within one tree length of these areas.

Fire lines would be designed to avoid soil disturbance and sedimentation into the streams.

Active landslides would be avoided in harvesting timber and road construction.

## **2. Local Public and Rural Interface Area**

Residents near helicopter units would be notified before helicopter activity begins in the area. Residents would also be notified where logging activities or road work would affect access to their homes. Work would be managed so that people using those roads would not experience more than 30 minute delays. This would affect unit 34 with residences in T 33S, R 7W, sec 35.

In the units proposed for shelterwood harvest (SW), approximately 40 percent canopy closure would be retained to reduce visual effects and to mitigate concerns of local residents about water sources.

### **3. Timber Resources**

Tractor and cable yarding on all commercial thin units would not be allowed between March 1 and June 1 to prevent bark slippage on residual trees. This restriction is not necessary in helicopter units.

In overstory removal units, trees would be felled away from residual reproduction. Multiple landings would be used. These measures would be designed to prevent damage to residual regeneration.

Designated skid trails in overstory removal units would be located to minimize damage to existing regeneration. Existing skid trails would be used where regeneration in skid trails is sparse or in poor condition.

### **4. Late-successional habitat and Special Status Species and their Habitats**

Prescribed burning in the harvest units would be conducted to minimize damage to the reserve trees, duff and soil, and to avoid loss of large, coarse woody debris. Burning would be done to prepare the site for planting, control competing vegetation and reduce fire hazard.

#### **Spotted Owls and other Raptors**

Harvest activities and road construction would not be allowed within 1/4 mile of the nest site or activity center of all known pairs and resident singles (or further if necessary to avoid disturbance to nesting owl pairs) between March 1 and June 15. This affects unit 16, 19, 29, 30, 31, 33 and 39. Blasting would not be allowed at the Rattlesnake quarry site between March 1 and June 15. This term and condition may be waived in a particular year if nesting or reproductive surveys reveal that spotted owls are not nesting or that no young are present that year.

Road construction and harvest units would avoid the 100 acre spotted owl core areas. Trees within the core area may be used for tail trees if necessary, but would be protected with collars to avoid damage to the trees.

At least 50 percent canopy closure would be retained around active goshawk sites.

Goshawk surveys would be conducted near active sites in the year logging is planned to locate active nest goshawk nests. Logging, hauling and road work would not be allowed within 0.25 mile of the active nest site between February 1 and July 15. This restriction may be waived in a particular year if surveys reveal that goshawks are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year.

Peregrine falcon surveys would be conducted in suitable habitat before timber harvest begins. If any peregrine nest sites are found, consultation with the US Fish and Wildlife Service would be initiated and seasonal restrictions would be required for any activity within ½ mile of the nest which may disturb nesting falcons between January 1 and July 15 of each year.

### **Marbled Murrelets**

Any blasting within 1/4 mile of marbled murrelet habitat would be restricted to two hours after sunrise through two hours before sunset between April 1-September 15.

### **Snags and Down Logs**

All currently down logs would be retained for coarse woody debris habitat.

All non-hazardous snags would be retained in all harvest units and Riparian Reserves. If it is necessary to fall snags for safety reasons, they would be left on the site to provide down wood in excess of the 120 feet requirement described in the RMP.

Large down wood (16" diameter and greater) already on the ground would be retained and protected "to the greatest extent possible from disturbance during treatment" (RMP, p. 47). Also, a minimum of 120 linear feet of logs per acre of decay classes 1 and 2 (the early stages of decay) would be left. Large down wood survey transects were run through the upper, middle and lower portion) in each unit. None of the stands proposed as regeneration or overstory removal units, had adequate large wood. Most (units 9, 14, 21, 22, 23, 31B, 39, 45, 47, 52 and 59) had *no* large, woody material of classes 1 and 2. Retention and protection of green trees, snags and large down logs would be emphasized during layout, marking, timber harvest and site prep. In the units where 6-8 green trees per acre are to be retained additional trees would be marked for retention to allow for logging damage, coarse woody debris and loss during burning.

## **Survey and Manage Species**

### **Red Tree Voles**

A red tree vole population is designated when two or more nests (colonies) are within 100 m of each other. Ten acres of suitable habitat would be retained around each population, unless another population exists within 1/4 mile (BLM IB #OR-97-009). Individual nest trees would be retained along with adjacent trees with intermingled crowns.

### **Bats**

Harvest would be prohibited within 250 feet of sites containing bat roosts. Large wolf trees would be retained where possible to provide suitable roosting habitat for bats.

### **Del Norte Salamanders**

All occupied talus would be protected as follows:

- a one-tree length protection buffer would be designated around each talus site,
- within the talus and buffer, at least 40 percent canopy closure would be retained,
- in helicopter units, falling and yarding within the talus sites would be allowed only between June 1 and September 30 to reduce impacts to Del Norte populations,
- in units with cable or tractor yarding, no falling or yarding would be allowed within the talus sites to avoid disturbing the talus, and
- any other activities that would directly disrupt the talus layer (e.g., lateral yarding over talus, yarding corridors through talus, tractor yarding and road building) would not be allowed.

These talus sites and associated buffers would be designated as managed late-successional areas (MLSAs) as described in the Northwest Forest Plan SEIS ROD. Leave trees required to be reserved in the sale units (for example, 6-8 trees per acre) would not be counted in the Del Norte salamander sites and buffers.

### **Plants**

Populations of Brownie lady-slipper (*Cypripedium fasciculatum*) would be protected with a 100-foot no-cut buffer, or the unit would be altered to exclude them. Prescribed burns would not be planned for these buffers. Plant populations have been located in units 17, 28, and 31B.

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

### **Special Habitat Features**

A 50-100 foot buffer would be placed around meadows and natural openings in units 46 and 48. No trees would be cut within these buffers.

## **Project Design Features For Each Alternative**

The following project design features would be implemented in some of the alternatives.

### **Alternative 1.**

There are no PDFs in this alternative different than the common PDFs.

### **Alternative 2.**

There are no PDFs in this alternative different than the common PDFs.

### **Alternative 3.**

Under this alternative, the locations where papillose tail dropper and Crater Lake tightcoil molluscs have been found would be protected with a 180-foot no-cut buffer. Falling, yarding and slashing would not be allowed within these buffers. The sites would be protected from prescribed burning to the extent practicable.

### **Alternative 4.**

Under this alternative, the locations where papillose tail dropper and Crater Lake tightcoil molluscs have been found would be protected with a 180-foot no-cut buffer. Falling, yarding and slashing would not be allowed within these buffers. The sites would be protected from prescribed burning to the extent practicable.

In addition, under this alternative, units with blue-gray tail droppers would retain at least 40 percent canopy closure in the overstory following harvest and site preparation. Broadcast and underburning would be designed to minimize the effects of drying the soil and destruction of the moss and duff layer.

### **Alternative 5 - Preferred Alternative.**

Under this alternative, locations where Crater Lake tightcoil molluscs have been found would be protected with a 180-foot no-cut buffer (units 15 and 39). Most papillose tail-dropper locations would be protected by retaining at least 40 percent canopy closure. Detailed protective measures for molluscs and other survey and manage species is presented in Table 5.

## **V. Environmental Impacts**

This section presents discussions of the environmental consequences which are site specific, or are not adequately addressed in the Final Resource Management Plan/Environmental Impact Statement BLM, dated April, 1994 (RMP/EIS) which would result from implementation of the proposed action. 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.

### **A. Direct and Indirect Effects of the Proposed Action Alternatives**

Impacts of the action alternatives on key stream and watershed factors on the sixth-field and seventh-field watershed scales are presented in Table 4. A discussion of the proposed action as it specifically relates to the Aquatic Conservation Strategy Objectives of the Northwest Forest Plan is presented in Appendix C.

#### **1. Watershed Functioning**

##### **Soils**

Timber harvest under the proposed action has the potential for raising ground water levels and activating future landslides. There are some ancient landslide areas within some of the units. However, slopes in proposed units are generally stable and landslide hazard is considered low to moderate. All units were field inspected for indications of actual or potential slope instability. Units with problems were deleted from further consideration or the unstable area was included in a Riparian Reserve (e.g. Unit 18). Based on the location of the units and the probable size of landslides, the potential for substantial adverse impacts on water quality and fish habitat would be low. Units that could appreciably add to an already high level of local disturbance from recent timber harvest were also dropped from further consideration (Appendix B).

Soil compaction resulting from timber felling and yarding would reduce percolation of precipitation into the soil and increase potential for erosion and movement of sediment into streams. However, ripping skid trails, landings and temporary spurs would tend to compensate for these effects. Cable yarding and tractor logging would compact soil on about 7 percent and 25 percent respectively of those units. Ripping with winged rippers in tractor units would reduce compaction of these areas by about 80 percent and restore most site productivity. Ripping would reduce long-term erosion by increasing infiltration and increasing the amount of land available to grow conifers and other vegetation. Helicopter yarding would result in far less site disturbance and compaction and soil movement than in cable and tractor yarding units.

Hand piling, without burning, would minimize disturbance to talus areas and would not reduce site productivity to the same degree as broadcast burning. Bare soil exposed from prescribed burning would not exceed guidelines in the Monitoring Handbook. While broadcast burning is proposed to be done under cool, moist conditions, there is a possibility that the fire could be more intense than desired. If so, there would be a short term loss of soil productivity. Prescribed burning would improve planting access.

The potential for adversely affecting slope stability, soil compaction and soil productivity does not appreciably differ among alternatives. Possible adverse effects of the proposed action on these factors have been adequately mitigated through application of Standards and Guidelines, and through implementation of appropriate PDFs and BMPs.

## **Water Quality**

Improperly designed and maintained roads usually contribute large amounts of sediment to streams. The Project Area has been noticeably affected by roads, with an existing road density on public and private lands of about 5 miles per square mile, far above the National Marine Fisheries Service recommendation of no more than 2 miles per square mile. The sediment indicator in Table 4 is marked as a “degrade” but only for the short term (less than one year). About 60 miles of road renovation, maintenance and storm-proofing, as well as log hauling could cause short-term increases in stream sedimentation during the first major rainstorms of the wet season. Adverse effects would be localized, probably extending no more than several hundred feet downstream of road crossings and lasting no more than one year before sediment is dispersed downstream. Implementation of Best Management Practices (BMPs) and PDFs should minimize these increases. Road renovation, maintenance and storm-proofing is intended to reduce actual and potential erosion, potential failure of the road prism and subsequent significant stream sedimentation that would extend far from the project area into fish habitat. Stream sedimentation would either decrease (improve) after sediment is dispersed downstream or be maintained (depending on existing condition of specific streams and roads). But the extent of stream sedimentation would probably be maintained in degraded condition at a seventh field watershed scale in the short- (<10 years) and long-term (>10 years) because not all roads in 7<sup>th</sup> field watersheds provide access to timber sale units included in proposed action alternatives and many roads in the project area are not under BLM control.

There would be a short-term increase in soil movement along temporary spurs, skid trails and on cable yarding corridors before areas of disturbed soil stabilize. However, locating temporary roads on or near ridges, decommissioning temporary roads, ripping, mulching and water barring skid trails before the wet season and establishing Riparian Reserves would reduce or prevent sediment from these activities from entering streams.

Construction of 0.6 miles of permanent road under Alternatives 1, 2, and 3, or 0.4 miles under alternative 5, and about 0.6 miles of temporary road under the action alternatives would not result in stream sedimentation because none of the spurs would cross stream channels and all are on stable ground. There would be no permanent road construction under Alternative 4. Slightly more than 2 miles of road would be decommissioned under Alternatives 1, 2, 3 and 5 and about 1.4 miles under Alternative 4. None of these roads is currently contributing sediment to streams.

Decommissioning roads would have minimal effect on administrative and recreational access since these roads are generally short, dead end spurs which are no longer needed for management activities.

Implementing Soil and Water Best Management Practices (BMPs), using yarding systems that minimize the exposure of bare mineral soil and avoiding harvest and road construction in Riparian Reserves under all action alternatives, would result in a negligible to very low indirect adverse effects on water quality.

Although compaction and road density in the project area would be reduced by ripping and planting selected existing roads and skid trails, the level of activity would be insufficient to measurably improve current conditions at the project scale (i.e. sixth- or seventh-field watershed). Reciprocal road use agreements between BLM and commercial forest landowners often limits options for BLM to decommission roads that are not needed to manage BLM lands. It will take a concerted effort of all landowners reducing impacts of roads and tractor logging under their jurisdiction to measurably decrease stream sedimentation, road density and compaction at the 7<sup>th</sup>-field watershed scale.

Degradation of channel stability is highly unlikely under any of the proposed alternatives as stream flow would not be measurably affected, there would be no harvest in Riparian Reserves and a minimum 30 foot wide no-treatment buffer would be retained in riparian restoration units.

In summary, the potential for short term sedimentation due to road construction, decommissioning and storm-proofing or logging is about equal under all alternatives (Table 4). Effects would be local and probably not exceed one year. No activities are proposed in Riparian Reserves in any alternative that would increase stream temperature. Thus, there would be no effect on stream temperature under any alternative.

**Table 4. Effects of Proposed Action by Alternatives on Key Stream and Watershed Factors and Indicators At The Project Scale (6<sup>th</sup> and 7<sup>th</sup> field watersheds).**

WATER RESOURCE FACTOR	INDICATOR	RISK BY ALTERNATIVE				
		1	2	3	4	5
Water Quality	Temperature (7-day max. Average)	Maintain	Maintain	Maintain	Maintain	Maintain
	Hazardous Materials	Maintain	Maintain	Maintain	Maintain	Maintain
Habitat Access	Physical Barriers	Maintain	Maintain	Maintain	Maintain	Maintain
Habitat Elements	Sediment	Degrade(ST) Maintain(LT)	Degrade (ST) Maintain(LT)	Degrade(ST) Maintain(LT)	Degrade(ST) Maintain(LT)	Degrade(ST) Maintain(LT)
	Large Wood Material	Maintain	Maintain	Maintain	Maintain	Maintain
	Pool Character and Quality	Maintain	Maintain	Maintain	Maintain	Maintain
Channel Conditions and Dynamics	Off-Channel Habitat	Maintain	Maintain	Maintain	Maintain	Maintain
	Width Depth Ratio	Maintain	Maintain	Maintain	Maintain	Maintain
	Stream bank Condition	Maintain	Maintain	Maintain	Maintain	Maintain
	Flood plain Connectivity	Maintain	Maintain	Maintain	Maintain	Maintain
Flow/Hydrology	Changes in Peak Flow	Maintain	Maintain	Maintain	Maintain	Maintain
Watershed Conditions	Road Density and Location	Maintain	Maintain	Maintain	Maintain	Maintain
	Human Disturbance	Maintain	Maintain	Maintain	Maintain	Maintain
	Riparian Reserves	Maintain	Maintain	Maintain	Maintain	Maintain
	Landslide and Erosion Rates	Maintain	Maintain	Maintain	Maintain	Maintain

Ratings: Maintain: The proposed action would not change the factor/indicator from its current baseline condition (i.e. properly functioning, functioning at risk, not properly functioning). Degrade: The proposed action is expected to move the factor/indicator from “Functioning At Risk” toward “Not Properly Functioning” but would not cause it to measurably change baseline conditions. Short Term (ST): less than ten years ( less than one year for stream sedimentation); Long Term (LT): More than 10 years

About 60 miles of road would be renovated, storm-proofed and decommissioned under all action alternatives, thereby causing stream sedimentation in localized areas in the short term (degrade) , but reducing the potential for impacts from existing roads in the long term. However, the magnitude of maintenance, renovation and storm-proofing is probably inadequate to improve stream sedimentation in more than local areas; planned road work would therefore maintain the condition at the 7<sup>th</sup>-field watershed level.

## **Water Quantity**

Peak flows would remain within the range of natural variability under all alternatives because road density would decrease and harvest units would be distributed to ensure that potential for increases in peak flows would be minimized. Summer stream flows are not expected to increase as a result of timber harvest because it is likely that Riparian Reserves on streams would utilize excess groundwater from up-slope areas following vegetation removal.

## **Riparian**

Site preparation in Riparian Reserves would encourage development and growth of a more diverse plant community than currently exists. Treatment is expected to accelerate growth of residual conifers and reduce the amount of time it would take them to reach a size that can contribute large wood to streams and to the forest floor. It would also lead to development of a multi-storied forest canopy and allow the forest to attain late seral characteristics in a shorter time period than without the action. Short-term adverse changes in microclimate could occur but it would return to pre-harvest conditions as the canopy closes. Broadcast burning vegetation in Riparian Reserve 21 could kill some conifers and cause a temporary increase in stream nutrients but setting back growth of dense brush and hardwoods should encourage growth of conifers and development of a more diverse riparian plant community.

Riparian Reserves would adequately protect habitat along streams and seeps and potentially unstable areas during timber harvest under all action alternatives.

In summary no aquatic habitat or watershed indicator in the National Marine Fisheries Service Matrix Checklist (Table 4) would be degraded in the long term at the subwatershed scale under any alternative.

## **2. Local Publics and Rural Interface Area**

People who live in the sale area would be exposed to noise from chain saws, logging equipment, log trucks and helicopters. Generally noise in any one location would last for a matter of 2-3 weeks at a time.

There is a potential that log hauling would create dust which would affect local land owners and drivers. This would be managed through normal contract administration procedures and requiring the purchaser to apply water or other dust palliatives to the road surface to reduce dust.

Unit 29 was altered in response to adjacent land owners' concerns. Additional leave trees would be retained to reduce effects on visual resources by maintaining more of a forest condition.

Some people in the area have suggested that past logging has lowered their wells and reduced stream flows. This was considered in the design of the proposed action; several units were deferred from harvest to reduce effects on small watersheds (e.g Poorman Creek) and other reasons, only 0.6 miles of new road construction is proposed and this is high on the ridge top, other existing roads would be decommissioned, most of the units would retain at least 40 percent canopy closure and Riparian Reserves would be retained. Based on these factors, and the discussion in the Water Quantity section, there is no reason to believe that the level of activity under the proposed action would substantially reduce water tables or well levels in the project area.

### **3. Timber Resources**

Commercial thinning in units 3, 5A, 7, 8, 19, 33, 34A, 34B, 34C, and 43B would remove some of the trees and allow the remaining trees to grow faster. Over time this would result in larger piece sizes at the time of next commercial entry. Stand vigor would improve as there would be greater amounts of nutrients, water and light for the remaining trees. While it is not the intent to create a second canopy layer of hardwoods and conifer regeneration, in areas where the resultant spacing is wide or in areas where small gaps are created in the canopy a second canopy layer would form. A second canopy layer would also develop in areas of these units where conifer spacing is currently wide and hardwoods are present. Fuel loadings in these stands would increase under the proposed action and alternative for the short-term but since the fuels created would be of smaller size classes, any increase in fire danger would also be short-term.

Overstory removal in units 15, 16, 43A, 44A, and 59 would remove a portion of the competing overstory and would result in the release and increased growth of existing regeneration. Slashing of competing shrub species (and in unit 43A, other selected competing conifers) would further release existing regeneration. Although fuel treatments are proposed for these units, fuel loadings would be higher following logging.

Commercial thinning/Overstory removal in units 2, 12, 13, and 18 would result in stands with multiple canopy layers and multiple ages. Fuel ladders within these stands would remain. Select cutting in units 20, 25 and 54 would have similar effects.

Regeneration harvest in units 4, 5B, 14, 21, 22, 23, 28, 31A, 31B, 39, 42B, 45, 46, 47, and 52 would result in stands that are currently understocked with conifers (relative to their potential) or stocked with larger, older more slowly growing conifers being replaced with faster growing stands of conifers. Much of the space currently occupied by hardwoods and shrub species would, in the future, be occupied by conifers. While these stands do not contain the amount of regeneration to warrant an overstory removal, there is established regeneration within many of these stands which would be released by the regeneration harvest. Potentially some of this regeneration would be lost during burning, especially in broadcast burn units.

Overstory removal/regeneration harvest in unit 48 would produce results similar to regeneration harvests. However, portions of the units would contain established regeneration.

Shelterwood harvest in unit 29 would result in stands with retained canopies. Natural regeneration and the development of a second canopy layer is expected where an understory doesn't already exist. The retained overstory may make effective site preparation more difficult as there would not be the disturbance done to brush by yarding. Some reduction in growth rates of the regeneration is expected.

Prescriptions developed to retain desired habitat elements for the Del Norte salamander may have negative effects on future timber availability. Hand piling and burning would reduce the effectiveness of site preparation treatments and would increase the need and cost of treatments to control competing vegetation compared with broadcast burning. Helicopter yarding in place of cable yarding would reduce disturbance to existing competing vegetation. As a result of this, site preparation by manual means (i.e. hand-piling) would be more difficult. Control of competing vegetation would be more difficult and expensive. Retention of 40% or more canopy over talus and adjacent areas may reduce the growth of planted and natural regeneration. Reduction in the number of conifer stems (regeneration) per acre and the reduction of growth on these stems may result in reduced amounts of wood to harvest in the future.

#### **4. Special Status Species and their Habitats; and Late-Successional Habitat**

##### **Fish**

For purposes of formal consultation with the National Marine Fisheries Service (NMFS), the proposed action is likely to adversely affect Northern California/Southern Oregon coho salmon, Oregon Coast coho salmon, Southern Oregon/California Coastal chinook salmon, Oregon Coast steelhead trout, Klamath Province steelhead, Umpqua River cutthroat trout and sea run cutthroat trout (Rogue Basin) as defined by the Endangered Species Act. However, potential adverse effects of the proposed action on these species would be minimal because:

- a) the timber sale is consistent with standards and guidelines of the LRMP/RMP Biological Opinion (March 18, 1997), the Biological Opinion dated January 21, 1999 and with Aquatic Conservation Strategy objectives, and
- b) all appropriate Best Management Practices have been incorporated into the proposed action

The National Marine Fisheries Service (NMFS) concluded in its Biological Opinion of January 21, 1999 that the effects of this timber sale (along with other specific USFS and BLM actions), “together with the cumulative effects of the environmental baseline within the Rogue/South Coast basins, are not likely to jeopardize the continued existence of the Southern Oregon/Northern California coho salmon, Southern Oregon/Coastal California chinook salmon, Klamath Mountain Province steelhead, or sea-run cutthroat. NMFS concurs that implementation of these actions will not result in the destruction or adverse modification of proposed critical habitat for either SONC coho or SOCC chinook”.

##### **Terrestrial Wildlife**

Effects of the alternatives on wildlife habitat for Survey and Manage and Threatened and Endangered species is summarized in Table 5. The following sections provide details of the effects on these species and wildlife habitat.

**Table 5. Summary of effects of the alternatives on wildlife habitat and species.**

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
2	Overstory: Sparse, mature. Understory: dense poles (part)	15 all	0907 0965	-	-	bl-grey pap.	23 1	12	-	In action alts. habitat degraded for nesting spotted owls, Del Nortes & may be, to some degree, for molluscs; pap. site deferred from unit. Canopy closure reduced to 40% (understory), except in alt. 4: Del Norte habitat maintained/canopy closure $\geq$ 60%. Heli yding.
3	Poles/std. previously entered. <b>Ed: Ck for revised unit boundary.</b>	all	0965	-	-	bl-grey	13	-	1	Pap. sites & red tree vole area deferred. In action alts. habitat degraded for spotted owls (nesting) & may be to some degree for molluscs: canopy closure reduced to 40%.
4	Mature, occasional Old Growth. Little regeneration. Chinkapin, dogwood, madrone. Some snags.	all all	0907 0965	-	-	bl-grey	6	-	-	In action alts. habitat degraded for spotted owls & may be, to some degree, for molluscs. Canopy closure reduced to 40%.
5A	S ½: Continuation of 3. N ½: Mature/almost mature.	all all	0907 0965	-	-	bl-grey	8	-	-	Action alts: Habitat degraded for spotted owls & may be, to some degree, for molluscs; canopy closure 40%. Alt. 5: Unit reduced to buffer pap. site in 5B (no entry in buffer).

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
5B	Mature & old growth & saplings. Tan oak, chinkapin, madrone.	all all	0907 0965	-	-	bl-grey	1	-	-	Pap. & bl-grey sites protected (no entry). Action alts: habitat degraded for spotted owls (nesting); canopy closure 40%.
7	Poles, occasional mature trees. 5 ac. of old growth.	all 20 8	0907 0903 0965	-	-	bl-grey pap	4 4	-	6	In action alts. habitat degraded for spotted owls (nesting) & may be to some degree for molluscs, red tree vole nests & adjacent trees maintained. Alt. 4: canopy closure 40%. Alt. 5: Pap. site deferred from unit.
8	Part: Poles, open understory. Part: Mature & pole canopies, tanoak brush.	all 3	0907 0903	-	-	bl-grey pap.	2 1	-	1	Protected pap. site & red tree vole nest & adjacent trees. In action alts. habitat degraded for spotted owls (nesting) & may be to some degree for other molluscs: canopy closure reduced to 40% (understory).
9	Mature/old growth.	all all	0903 0907	-	-	bl-grey	2	all	1	Del Norte & red tree vole and mollusk habitat protected: entire unit deferred.
10	Part: OG remnant w/ mature. Part: OG remnant. Both w/ sm. madrone, thick tan oak brush. Some lg. snags.	all	0903	-	-	bl-grey pap.	4 1	8	2	Habitat for molluscs, Del Nortees, spotted owls & red tree voles protected: Unit deferred.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
12	Part: 6 - 20"dbh. Part: Regen to large size.	all	0903	-	-	bl-grey pap.	2 1	-	1	In alts. 1-4 red tree vole nest & adjacent trees protected, but habitat degraded for spotted owls (nesting) & may be to some degree for molluscs: canopy closure reduced to 40%. In alt. 5 spotted owl, mollusc & red tree vole habitat protected: unit deferred.
13	N: Mature & 2nd growth over hdwoods. S: OG over poles & hardwoods..	55 all	2274 0903	ALVI2	2	bl-grey pap.	40 27	-	14	Deferred in alt. 1. In alt. 5, two 10-acre reserves (no entry) for red tree voles. In alts. 2-4 & remainder of unit in alt. 5 habitat degraded for spotted owls (nesting) & may be to some degree for molluscs: canopy closure reduced to 40%.
14	Mature w/ some 6 - 20"dbh, sm. to lg. hardwoods.	all all	2274 0903	-	-	-	-	18	6	Deferred in alt. 2 & 4. In other action alts. habitat degraded for Del Norters, spotted owls & may be, to some degree, for molluscs: canopy closure reduced to 40% except for two 10-acre reserves for red tree voles.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
15	Mature. Open understory w/ "doghair" patches of regen & some lg. regen. Hardwoods.	all 7 7	2274 0903 8026	ALBOM	1	bl-grey pap. tightcoil	7 2 2	3	11	Deferred in alts. 1, 3 & 4. Alt. 2 & 5 protect tightcoil, Del Norte & some pap. sites by deferring S end of unit. Red tree vole nests & adjacent trees protected. In action alts. habitat degraded for spotted owls (nesting) & may be, to some degree, for other molluscs. In alt. 5 canopy closure 40%.
16	Mature. Ridgetop: W/ advanced regen. Off ridge: Brush, sm. poles.	all all	2274 8026	-	-	bl-grey pap.	6 1	-	7	In action alts. habitat degraded for spotted owls (nesting) & may be, to some degree, for molluscs. Within 2 tree lengths of pap. site understory canopy closure 40%. Alternative site (area of unit 17) protected for red tree voles. Heli yding.
17	[Same as unit 16.]	all all	2274 8026	CYFA	1 1	bl-grey pap.	14 1	18	1	Sensitive plants, molluscs, spotted owl & red tree vole habitat protected (no entry): unit deferred.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
18	Mature. Scattered OG in 90 y/o std. Advanced regen. Lg., suppressed black oaks	all all	2274 8026	-	-	bl-grey papill.	25 1	-	13	Unit deferred in alt. 2. In other action alts. red tree vole nest & adjacent trees protected, but habitat degraded for spotted owls (nesting) & may be, to some degree, for molluscs & Del Norters: canopy closure reduced to 40% (understory), except in alt. 4 maintained at 60% (understory) on occupied talus & Del Norte habitat would be maintained. Part heli yding.
19	Multi-aged: 60, 100 & 200 yr. Patches of regen. Black oak.	all	2274 8026	-	-	bl-grey papill.	5 2	-	1	In action alts. red tree vole colony protected, but habitat degraded for spotted owls (nesting) & may be to some degree for molluscs: canopy closure reduced to 40%.
20	Mature.	-	-	-	-	bl-grey papill.	1 13	1	3	Action alts. maintain 60% canopy closure. Alts. 3 & 4 avoid talus. Alt. 4 protect pap. site with 1 tree length no-cut buffer.
21	Old Growth.	-	-	-	-	bl-grey papill.	10 2	2	-	Deferred in alt. 4: molluscs, Del Norters & red tree vole protected. Alt. 5 has 1 tree-length no-cut buffer around pap. site & all but 1 bl-grey site 40% canopy closure. Other action alts. degrade habitat for molluscs & Del Norters.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
22	Part Old Growth, part poles.	-	-	ALVI2	2	bl-grey papill.	12 8	2	-	Alt. 4: Pap. w/ 1 tree-length no-cut buffer & 40% canopy closure overall. Alt. 5 protects plants, mollusc & Del Norte habitat: unit deferred. All other action alts. degrade Del Norte (40% canopy closure over habitat) & may, to some degree, mollusc habitat (6-8 tpa otherwise).
23	Mature & Old Growth.	-	-	-	-	bl-grey papill.	6 2	11	-	Alt. 4 protects habitat: unit deferred. Alt. 1, 3 & 5 degrade Del Norte habitat & may, to some degree, mollusc habitat: 40% canopy closure over all but 1 bl-grey site. Alt. 3: Heli yding.
24	“ <b>Unit is deferred.</b> ”	-	-	-	-	bl-grey papill.	4 4	-	8	Habitat for molluscs & red tree voles maintained: unit deferred.
25	“	3	4515	-	-	bl-grey	19	-	2	Action alts: habitat for molluscs maintained; 60% canopy closure retained. Red tree vole & spotted owl nesting habitat removed; 10 ac. of better vole habitat in unit 24 maintained.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
28	Mature & Old Growth	-	-	ALVI2, CYFA	2 1	bl-grey	25	20	3	Habitat (plant, molluscs, Del Norters & voles) maintained in alt. 1: unit deferred. Alt. 4: Del Norte talus canopy closure maintained at 60%. Other action alts: Bl-grey sites 40% canopy closure, 10 ac. deferred to maintain habitat for red tree voles, & habitat degraded for Del Norters &, to some degree, for molluscs. Heli yding.
29	Mature. Old Growth in draw. Very little regen.	all	4515	-	-	bl-grey	6	-	1	In all action alts: Habitat degraded for spotted owls, red tree voles & may be, to some degree, for molluscs; canopy closure 40%.
31A	Scattered mature. Previously entered. Thick tan oak & other brush patches. Some regen.	all	4515	-	-	bl-grey	2	-	1	Action alts: Pap. site & 1 tree length buffer plus 3/4 of bl-grey sites deferred from unit; red tree vole nest trees & adjacent trees maintained; 6-8 tpa except alt. 4 (40% canopy closure). Habitat degraded for spotted owl & may be, to some degree, for molluscs.
31B	Moist. Mature patches of hardwoods. Otherwise, open understory.	all 2	4515 8026	CYFA	1	bl-grey	2	-	2	Sensitive plant & 10 ac. red tree vole habitat maintained; area deferred. Action alts: Habitat degraded for spotted owls & molluscs; 2 of 3 bl-grey sites removed.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
32	<b>Unit is deferred.</b>	all all	4515 2274	-	-	bl-grey	1	-	2	Habitat for molluscs, spotted owls & red tree voles maintained: unit deferred.
33	Sapling and small pole with some diameters up to 16".	all all	4515 2274	-	-	bl-grey	12	-	-	Action alts: Habitat degraded for spotted owls & may be, to some degree, for molluscs; 40% canopy closure.
34A	Mostly pole. Remnants of large poles and mature. Patches of doghair.	all	8026	-	-	-	-	-	-	Alt. 3: Habitat maintained; 60% canopy closure maintained. Alt. 5: Habitat degraded to some degree; 50% canopy closure. Alts. 1,2 & 4: Habitat degraded; 40% canopy closure.
34B	"	all	8026	-	-	bl-grey	1	-	-	Alt. 3: Habitat maintained for molluscs & nesting spotted owls; 60% canopy closure maintained; 1 tree no-cut buffer around pap. sites. Alt. 5: Habitat degraded to some degree; 50% canopy closure. Alts. 1,2 & 4: Habitat degraded; 40% canopy closure.
34C	"	all 20	8026 4515	-	-	bl-grey	6	-	-	Alt. 3: Habitat maintained for molluscs & nesting spotted owls; 60% canopy closure maintained. Alt. 5: Habitat degraded to some degree; 50% canopy closure, but thinned only from below. Alts. 1,2 & 4: Habitat degraded; 40% canopy closure.
35	<b>Unit is deferred.</b>							-	2	Habitat maintained: unit is deferred.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
34D	Unit is deferred	80 40	8026 4515	-	-	bl-grey papill.	9 4	-	-	
35	<b>Unit is deferred.</b>							-	2	Habitat maintained: unit is deferred.
36	"									Habitat maintained: unit is deferred.
37	<b>Deferred</b>									Habitat maintained: unit is deferred.
38	<b>Unit is deferred.</b> Relatively dry. Large (6 - 16" dbh) hardwoods.	all all all	0923 0951 CenG	-	-	bl-grey papill.	3 4			Mollusc habitat maintained: unit is deferred.
39	North half: Old Growth/scattered poles/tree-form hardwoods. Some brush. South Half: 3 areas: Old Growth/scattered poles/tree-form hardwoods/some brush. Drier continuation of same. And 2nd growth pole (12-20" dbh), mature w/ open understory and <i>big-leaf maple</i> (good habitat for certain special status molluscs).	all all	CenG 0951	-	-	bl-grey papill. tightcoil	18 7 1		2	Alts. 1 & 4: Habitat maintained; unit is deferred. Alts. 2 & 3: Habitat degraded for spotted owls & may be, to some degree for molluscs; 12 - 18 trees per acre [tpa] retained in alt. 2; 6 - 8 tpa in alt. 3. Habitat may be degraded slightly with 12 - 18 tpa retained & by two 20' wide yarding corridors through the 1 tree-length no-cut buffer for tightcoil.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
40	Unit is deferred. Included in Cenoak Timber Sale	-	-	-	-	bl-grey papill.	3 10	-	-	Habitat for molluscs and bald eagle maintained: unit is deferred.
41	½ tan oak brush, ½ poles (6-16" dbh & bigger).	all	3930	-	-	bl-grey papill.	5 2	-	-	Habitat is maintained: unit is deferred.
42A	W part: Old Growth/mature, brush, big-leaf maple. E part: Lg. trees, understory open, previously entered.	all all	4515 3930	-	-	bl-grey papill.	4 6	-	-	Alt. 1: Habitat for molluscs & Del Nortes maintained; unit is deferred. Alts. 3 & 5: Pap. sites given 1 tree-length no-cut buffer. Action alts: Habitat degraded for Del Nortes, spotted owls & may be, to some degree, for molluscs; 40% canopy closure. Red tree vole nests & adjacent trees maintained. Part heli yding.
42B	Same kind of stand as 42 A.	2 all	4515 3930	-	-	bl-grey papill.	1 3	2	1	Alts. 3 & 4: Mollusc, Del Norte, spotted owl & red tree vole habitat maintained; unit deferred. Alts. 1 & 2: Habitat degraded for spotted owls & may be, to some degree, for molluscs; 6-8 tpa retained. All action alts: 10 ac. of red tree vole habitat maintained & Del Norte habitat degraded; 40% canopy closure over talus.
43A	Mature. Previously entered.	all	3930	-	-	-	-	1	5	All action alts: Spotted owl habitat degraded; no other special status species sites known in area.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
43B	Poles, a few large remnants. Previously entered.	all	3930	-	-	-	-	-	-	Alts 3 & 4: 60% canopy closure maintained within 1 tree length of pap. sites; 40% elsewhere. Habitat for spotted owl degraded & may be, to some degree, for molluscs.
44A	Poles, some thick doghair mixed with mature and Old Growth.	all	3930	-	-	papill.	4	-	-	Alts 3 & 4: Habitat for molluscs & spotted owls maintained; unit deferred. Alts 1, 2 & 5: Habitat for spotted owl degraded & may be, to some degree, for molluscs; 40% understory canopy closure. Alt. 5: 40% understory canopy closure maintained within 1 tree length of pap. sites.
44B	<b>Unit is deferred.</b>							-	-	Habitat for molluscs, spotted owls & red tree voles maintained; unit is deferred.
45	Mature, open canopy (~30% canopy closure). Previously entered.	-	-	-	-	bl-grey papill.	5 1	-	2	Action alts: Red tree vole nests & adjacent trees retained, habitat for molluscs may be, to some degree degraded. Alts 3, 4 & 5: 40% canopy closure. Alts 1 & 2: 6 - 8 tpa retained. Alts 3 & 5: 60% canopy closure within 1 tree length of pap. sites.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
46	Mature and Old Growth 20 - 32" dbh. Some larger.	-	-	-	-	bl-grey	10	-	2	Action alts: Red tree vole nests & adjacent trees retained, habitat for molluscs may be, to some degree degraded. Alts 4 & 5: 40% canopy closure. Alts 1, 2 & 3: 6 - 8 tpa retained. Heli yding.
47	Mature, open canopy (~30% canopy closure). Previously entered.	-	-	-	-	bl-grey	1	-	2	Action alts: Red tree vole nest & adjacent trees, including bl-grey site retained by excluding from unit. Other mollusc habitat may be, to some degree, degraded; 6 - 8 tpa retained.
48	Old Growth & mature. Previously entered.	-	-	-	-	bl-grey papill.	3 1	-	1	Action alts: Red tree vole nests & adjacent trees maintained; otherwise 6 - 8 understory tpa retained. Alts 3 & 5: 1 tree-length no-cut buffer around pap. site. Other mollusc habitat may be, to some degree, degraded. Heli yding.
49	Unit is too small from stream buffers: deferred.		-					-	6	Habitat maintained; unit deferred.
50	Large trees too few: deferred. Unentered, widely spaced, lg., up to 44" dbh, poles 8-14" dbh.		-							Habitat maintained; unit deferred.
51	"		-							Habitat maintained; unit deferred.

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
52	Majority of stand=poles. Old Growth & mature. Not many trees>20"dbh, but enough to do a 6 - 8 tpa regen harvest. Larger white oaks.	all all all	0923 0951 3930	-	-	bl-grey papill.	2 3			Alts 4 & 5: White oaks, mollusc & spotted owl nesting habitat maintained; unit deferred. Alts. 1, 2 & 3: Habitat for spotted owls & molluscs may be, to some degree, degraded; 6 - 8 tpa retained.
53	Mixture of very few Old Growth trees>20"dbh, poles in patches. Previously entered. Large trees too few: deferred.							-	-	Habitat maintained; unit deferred.
54		all all all	0907 Cen 0951	-	-	bl-grey papill.	2 4			"
55		all all	0923 0951	-	-	bl-grey	1	-	5	"
56	Large trees too few: deferred.		-					-	8	"
57	May be unsuitable for harvest: deferred.		-							"

Unit #	Stand Condition	Area within 1.3 mi. of spotted owl site		Plants		Molluscs		Occupied Del Norte Talus (ac.)	# of Red Tree Vole Colonies	Effect on Habitat Associated with Special Status Species Adverse effects are less where trees are yarded by helicopter. (Leave trees are more numerous & more uniformly distributed.) Yarding is conventional, unless noted as "Heli yding."
		ac.	site no.	species*	# of sites	species	# of sites			
58		all 16 30	0923 Cen 0951	-	-	bl-grey papill.	27 1			"
59		-	-	ALVI2	1	bl-grey	1	-	4	Action alts: Habitat for molluscs may be, to some degree, degraded. Alt. 4: 40% canopy closure. Other action alts: 6 - 8 tpa in understory retained.
60	Previously thinned: deferred.							-	1	Habitat maintained: Unit deferred.
61	Too few large trees: deferred.									Habitat maintained: Unit deferred.
62	Not commercial size: deferred.	15	-	-	-	papill.	2			Habitat maintained: Unit deferred.
63	Wildlife resources & ECA: deferred.									Habitat maintained: Unit deferred.

\*Plant abbreviations:

CYFA *Cypripedium fasciculatum* "Brownie Lady-slipper"

## **Spotted Owls**

Most proposed units are currently considered suitable habitat. Units 45, 47 and 59, do not provide suitable habitat because the canopy is too open. All the harvest methods in the proposal would remove suitable habitat, except the commercial thin harvest. Approximately 698 acres of suitable spotted owl habitat would be removed under the proposed action. Commercial thin harvest would open up the canopy sufficiently to degrade suitable nesting habitat to dispersal habitat conditions on 267 acres.

There are 11 spotted owl sites within 1.3 miles of the proposed units. Most sites have been occupied by pairs in recent years. The Perkins Divide site has not been active recently. Given the acreage of suitable spotted owl habitat that would be removed by this sale, the actions would result in a "take" of 9 pairs of spotted owls in the Glendale Resource Area under the Endangered Species Act. This conclusion is based on information taken from Table 5, in which a spotted owl site is taken when the acreage of suitable habitat is either:

- (1) already less than 40 percent of the area within 1.3 miles (1,358 acres) and harvest of timber would take this number to even lower levels, or
- (2) the acreage is above 40 percent within 1.3 miles and proposed harvest would reduce the acreage below 40 percent.

The Centennial Gulch and Scotsman's Grave spotted owl sites would not be taken since the habitat acreage would remain above 40 percent.

Two units (16 and 29) are located within 1/4 mile of two centers of activity. These units could have a direct effect on the viability of these sites, particularly unit 16, since the Folly owl site has relatively little suitable habitat. Each site has a designated 100-acre reserve area, but these reserves are not intended to maintain enough suitable habitat to maintain a nesting pair of spotted owls in the long term.

## **Spotted Owl Critical Habitat**

There are 534 acres in the proposed action located within two designated spotted owl critical habitat units (CHU # OR- 64 and #OR-65). The main functions of CHU #OR-64 are to maintain essential nesting, roosting, foraging and dispersal habitat, and maintain clusters of active spotted owl nest sites. This unit provides a stepping stone to help maintain and improve what little spotted owl habitat presently exists. The main functions of OR-65 are to provide inter-provincial links between the Klamath and Western Cascades provinces, to maintain core areas of suitable owl habitat, to improve spotted owl distribution and connectivity with other CHUs, and to provide nesting/roosting/foraging habitat.

Depending on the alternative, approximately 290 - 500 acres would be harvested within the CHUs. Of these acres, 40 - 100 acres would remain dispersal habitat (resulting from commercial thin harvest).

**Table 6. Effects of the West Grave Timber Sales timber sale on spotted owl sites.**

Unit numbers affecting sites	Owl Site	Acres of NSO Habitat within 1.3 Miles						Disturbance within 1/4 mile of site?
		Suitable Pre-sale	Suitable Post-sale					
			Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
12, 13, 14, 15	Rattlesnake	928	896	797	876	865	813	No
13, 14, 15, 16, 18, 19, 33	Folly	795	633	604	687	667	630	Yes (Unit 16)
3, 4, 5A, 5B, 8	Perkins Creek	918	828	828	861	861	878	No
2, 3, 4, 5A, 5B, 23	Perkins Divide	1,355	1,252	1,252	1,289	1,287	1,292	No
16, 18, 19, 31A, 31B, 34A, 34B, 34C	Told Yah	1,005	866	881	892	892	908	No
42A, 42B, 43A, 43B, 44A, 52	Scottish Grave	1,072	1,029	993	1,029	1,009	991	No
39, 52,	McKnabe Creek	625	621	569	603	625	573	No
39	Centennial Gulch	1,976	1,976	1,924	1,956	1,976	1,924	No
52	Butte Creek	885	881	881	883	885	885	No
29, 31A, 31B, 33, 42A	Poorman Creek	1,100	1,039	995	1,025	959	1,008	Yes (Unit 29)
42A, 42B, 43A, 43B, 44A, 52	Scotsman's Grave	1,500	1,455	1,411	1,457	1,437	1,420	No

The overall effect of the proposed harvest on CHU #OR-64 and #OR-65 would not result in adverse modification of critical habitat since the functions of both CHUs would be retained. Although suitable spotted owl habitat within OR-64 would be reduced by 13 percent, the CHU would still retain essential nesting, roosting, foraging, and dispersal habitat on 50 percent of all lands, with 60 percent of federal lands within the CHU retaining suitable habitat. OR-65 would still maintain the inter-provincial links by providing dispersal opportunities for spotted owls within the CHU, and retaining suitable habitat for spotted owls within the LSRs that encompass much of the CHU.

### **Marbled Murrelets**

Approximately 491 acres of marbled murrelet habitat would be removed, resulting in possible nesting sites being removed from the sale area. The proposed units are located 35-50 miles from the coast, outside the known range of marbled murrelets. Because murrelets likely do not use any habitat in the sale area, the direct impacts to this species would be negligible.

### **Goshawks**

The goshawk is a Bureau Sensitive species in Oregon. Agency policy states that the BLM's actions should not contribute to the listing of that species. The goshawk is considered a Critical species by the Oregon Department of Fish and Wildlife, and is protected under the Migratory Bird Species Act. BLM memo, IM OR-98-012, provides recommended management direction around active sites. The birds fledged two juveniles in 1997 and did not nest in 1998. It appears they are not using the 1997 nest in 1999. A 30-acre reserve and the 400-acre PFFA would be defined after at least one additional nest site is observed.

Goshawks nest in mature trees in relatively closed canopy, but require prey associated with a variety of successional stages. The one known nest tree--they usually have several alternates--is adjacent to one of the proposed units. This stand is proposed for thinning from below (the largest trees would be retained) in all action alternatives. The thinning would promote growth of larger conifers and old growth characteristics. Alternatives 3 and 5 would accelerate the development of old-growth structure and still leave adequate canopy closure for goshawks. Alternatives 1, 2 and 4 leave less canopy closure, which may not be adequate for goshawk nesting. In all action alternatives there would be a seasonal restriction of July 16 to January 31 for felling and yarding, so disturbance during the nesting season would be avoided.

### **Snags, Large Down Wood and Wildlife**

Ninety percent of the terrestrial vertebrates that exist in the forests of the Klamath Province live in or depend on standing or down dead wood (Jimerson 1989). Animals use these structures for foraging, nesting, denning, roosting, resting and as escape routes from predators. Other wildlife use the cavities initially excavated by woodpeckers and nuthatches, the primary cavity nesters. "Many of the primary and secondary cavity nesters eat forest insects and thus play an important

role in regulating their populations” (Bull, et. al. 1997, p.1). In addition, many arthropods and fungi cause decay of such wood. Such arthropods are important food sources for birds, herps, and mammals. Several of the wood-associated fungi are essential to forest ecosystems in storing and retaining nutrients and in soil development (ibid). Generally, snags at least 16” dbh can serve as habitat for most species. However, very large (>36" dbh) snags are especially valuable to the system, as they can serve the greatest number of wildlife species.

In general, harvesting trees, especially in a regeneration harvest, reduces the number of snags likely to be recruited in the future. Following the project design features, the action alternatives would provide enough green tree retention for snags and down wood to meet RMP management direction. However, the largest size classes of snags and down wood, which can serve the greatest number of species--including animals such as Vaux’s swifts and hibernating bears--are not likely to be replaced once the matrix is on an 80-to-100-year rotation. Such large forest structures would likely be limited to Riparian and other reserves. This limitation is likely to reduce the abundance of such species, but the analyses of risks as done for the Northwest Forest Plan results in low risks of regional extirpation for these species. So, while they may decrease, they are not expected to disappear entirely.

### **Connectivity Block**

The section in T 34S, R 7W, section 17 is a connectivity/diversity block, designated in the RMP. Currently 51 percent of the section is in a late-successional forest condition. Harvesting unit 39 under the proposed action would remove 52 acres of late-successional habitat, leaving 46 percent of the block in suitable late-successional habitat. This is still considerably more than the 25-30 percent retention called for in the RMP.

## **Survey and Manage Species**

**Bats** (Fringed myotis, silver-haired, long-eared myotis, long-legged myotis, pallid, and Townsend's big-eared bats)

Preliminary surveys indicate that suitable forest habitat for bats (consisting of dead snags or green trees with thick bark or deformities) does occur in the proposed sale area, but the acreage of bat habitat in the project area or watershed is unknown. The proposed action would remove bat roost trees, perhaps contributing to a reduction of local bat populations. Very large (larger than 36" dbh) trees with adequate crevices for roosting bats that are harvested under the action alternatives are not expected to be replaced future rotations. Changes in microclimates may also result from trees near bat roosts being harvested.

There are no known bridges, mines, caves or abandoned houses within or adjacent to any units, so there would be no effects on bats using these types of structures.

### **Del Norte salamanders**

Del Norte salamanders require high humidity and soil moisture and cool surface temperatures during their activity periods to prevent desiccation. The proposed harvesting, particularly in the 28 overstory removal, regeneration harvest, selection cut, and shelterwood harvest units, would adversely affect Del Norte salamander habitat by changing micro climatic conditions. Retaining 40 percent canopy closure within occupied talus and the one-tree length buffer would mitigate the effects somewhat, but the talus would likely still dry out from increased exposure to solar radiation and drying winds. Because changes to microclimate conditions caused by harvesting can extend into adjacent stands up to 240 meters (750 feet) from unit edges (Chen *et al.* 1995), and because Del Norte salamanders primarily occur in stands with greater than 62 percent canopy cover (Survey and Manage Amphibian Subgroup 1995), it is likely the proposed action alternatives would substantially reduce or eliminate the suitability of talus habitat for Del Norte salamanders in these forest stands. The effects on talus would be less severe in the proposed commercial thin units where the entire units would retain higher canopy closure ( $\geq 50$  percent). Falling trees within occupied talus also directly affects Del Norte salamanders by disturbing the surface talus layer where these salamanders forage and reproduce and by potentially crushing or harming salamanders within the talus. Dropping portions of units with talus, not cable or tractor yarding through talus, and implementing a seasonal restriction for harvesting in helicopter units with talus would minimize these direct effects on individual salamanders.

Broadcast burning on occupied talus would remove some or all of the moss layer which would further cause the sites to dry out. Most of the talus in these units are not covered only by moss, so the impacts are not likely to be great.

The direct effects on Del Norte salamanders would likely be a reduction in numbers of Del Norte salamanders present in the commercially harvested units with occupied talus. The effects of the proposed action on populations are unknown.

### **Great Gray owls**

There does not appear to be suitable great gray owl habitat in the proposed timber sale. There are a few small meadows within the project area, but these openings are considered too small (less than 10 acres), too isolated and too rocky in some cases to provide adequate foraging habitat. As a result, this proposed action would have no impacts on this species.

### **Red tree voles**

Suitable red tree vole habitat occurs in all proposed units. Habitat is considered marginal in the commercial thin units as this species prefers older stands. In general, the commercial thin units would have a short term, adverse effect on voles by opening canopies, thereby restricting the voles' ability to move about the canopy. The canopies in these stands would quickly recover (10-20 years) to the point where the voles could easily move between trees again. In the other commercial harvest units habitat would be removed for several decades.

These effects are reduced somewhat by retaining known nest trees, deferring some known activity centers and the other means outlined in the project design features section. Riparian Reserves would also help in maintaining nest sites and providing movement corridors.

Thus, while there would be localized direct adverse effects, the overall effect on habitat and populations in the sale area would be low to moderate.

### **Molluscs**

Terrestrial mollusc species prefer forest stands with dense canopy. They are found beneath rocks or debris in mossy areas, or even in the canopies of trees. Therefore any type of forest management is certain to affect a variety of mollusc species. The greatest impact would occur from removing forest canopy from the stands. This would increase the sunlight intensity and create a drying effect on the landscape. Since mollusc species do not disperse quickly, the impacts of timber harvest could be long-lasting and could extirpate local snail and slug populations.

Effects of the proposed action on Survey and Manage aquatic mollusks (if they are present in the project area) would vary considerably depending on site conditions. Sediment from roads and elevated water temperatures have already degraded habitat for aquatic molluscs and most other aquatic species throughout the project area. Road-related activities (e.g. maintenance and storm-proofing) would contribute a pulse of sediment to most streams that cross roads, but would maintain the current condition. However, these activities, conducted according to contract requirements, would be consistent with ACS objectives and help prevent more serious road-

related impacts over the long term. Molluscs inhabiting springs and streams that are not connected to roads by surface flow would be unaffected by road work. Riparian Reserves on either type of streams would ensure that water temperature, light and input of organic detritus do not change because of the proposed action.

There is a considerable amount of uncertainty concerning the effects of forest management practices on Survey and Manage mollusc species. Little is known of the life history, habitat relationships and response to disturbance. Largely because of this high degree of uncertainty, the five action alternatives were developed to explore the effects these different approaches would likely have on the Survey and Manage species known to occur in the project area: Blue-gray tail dropper, papillose tail dropper and Crater Lake tightcoil snail. The Oregon shoulderband snail is suspected to occur in this area, but was not documented in any of the surveys.

The blue-gray tail dropper was found to be abundant in most of the proposed sale units. The papillose tail dropper was also common, but in smaller numbers. The Crater Lake tightcoil was located in three units and only as single individuals.

The two tail dropper species were located in some units where past partial cutting has opened up the canopy and typical late-successional habitat no longer exists. This indicates these species may be less closely associated with late-successional forest habitat than was previously thought. It also is some indication that populations of these species may be able to persist after some timber harvest occurs.

For this analysis, it is assumed that Commercial Thin harvest would degrade or reduce habitat quality, but that some level of marginally suitable habitat would remain following harvest, because the remaining overstory canopy (generally at least 40 percent canopy closure) would still greatly ameliorate heating and drying at the ground's surface, especially during the spring and fall months when these species are most active at the surface. Forest canopies recover rapidly following commercial thinning and fully suitable habitat conditions may return in 15-20 years. Select cuts and Shelterwood Harvests would also degrade habitat conditions. The recovery period would vary greatly, depending on how much of the canopy is removed and how old the stand is. Typical Regeneration and Overstory Removal harvest would remove habitat; suitable habitat conditions would not remain following harvest because the site would be exposed to heat and wind to the extent that these species would not be able to persist in these areas. It is not known how long it would take for habitat conditions to recover, but it may be as long as 40-80 years in this area. And it may take longer for recolonization to occur, since these species are not very mobile. Retaining additional canopy in regeneration and overstory removal units (at least 40 percent canopy closure), as called for in some alternatives, would mitigate these adverse impacts and result in retaining marginally suitable conditions. In this case, the effect would be "degrade" rather than "remove" in Table 5.

Retaining small buffers around observed sites, especially in regeneration and overstory removal units would help maintain the microclimate at that site and allow a small population to persist in that refugium. Since these species have extremely limited mobility, the buffers may be large enough to maintain a small population and allow them to recolonize the site when conditions recover (Roth 1996). The adequacy of the buffers in retaining suitable microsite conditions in these harvest units is uncertain, however, since edge effects along clearcuts have been found to extend relatively long distances into forest stands (Brososke et. al. 1997). But, based on the professional judgment of biologists familiar with these habitats, these small buffers do have a reasonable chance to allow populations to persist.

Table 5 summarizes the current habitat conditions of the proposed sale units and the estimated effects of the alternatives on several wildlife species, including molluscs. In general, Alternative 2, deferring units with the highest numbers of individuals (i.e. density), would have the greatest adverse effects on habitat and populations of these mollusc species. The deferrals in this alternative are greatly influenced by the large numbers of blue-gray tail droppers which are likely to be abundant throughout the project area (sixth-field watershed). This alternative has the largest acreage of regeneration and overstory removal harvest (Table 1) which has the greatest impact on habitat. And it also results in harvesting units with some of the highest diversity of Survey and Manage species (i.e. units 13, 15, 28, 39 and 42A).

Alternative 1 would defer units with the highest diversity of Survey and Manage species (units 13, 15, 28, 39, 42A). The impacts to these species are considerably less than Alternative 2 because a greater emphasis is placed on areas where it appears late-successional habitat is more optimal, based on the presence of larger numbers of species. In addition, the Crater Lake tightcoil, a relatively rare species, would be fully protected under this alternative since all three units where it has been located would be deferred (units 13, 15 and 29). Some of the units which were considered to have a high diversity of Survey and Manage species are also in close proximity to active spotted owl core areas; deferring these units under this alternative would also reduce adverse effects on these owl sites.

The effects of Alternative 3 on molluscs would be similar to Alternative 2. The acreage of regeneration and overstory removal harvest is similar. Some of the high-diversity units would be cut under Alternative 3 (e.g. units 13, 28, 39, 42A), but in all but one case (unit 42A) the harvest would be a relatively light, either commercial thinning or retaining at least 40 percent canopy closure in regeneration units.

Alternative 4 would provide the greatest benefits to mollusc species of the action alternatives by considering all species, including the relatively common blue-gray tail dropper. Similar to Alternative 3, three of the high-diversity units which would be protected under Alternative 1, would be cut under this alternative, although the harvest would retain enough canopy throughout the units “degrade”, not “remove” habitat and would maintain marginally suitable habitat. Regeneration and overstory removal acreage would be lower than in the other alternatives and all would be mitigated by retaining at least 40 percent canopy closure where blue-gray tail droppers are common and providing no-cut buffers around sites of papillose tail dropper and Crater Lake tightcoil.

Alternative 5, the Preferred Alternative, would protect Crater Lake tightcoil sites as well as any other alternative. The blue-gray tail-dropper sites would be protected almost as well as under Alternative 4 but a few individual sites would be located in regeneration harvest units and would probably be rendered unsuitable for 20-40 years. Papillose tail-dropper sites would generally also retain 40 percent canopy closure, but again, a few individual sites would be severely affected and probably removed.

Alternative 6 would have no effect on mollusc habitat other than those associated with plant succession. These effects are largely unknown.

In summary, Alternative 2 would have the greatest adverse effects on Survey and Manage mollusc species and Alternative 4 would have the least, of the action alternatives. Alternative 6, the No Action Alternative, would have no adverse effect on these species. It is likely that only Alternative 2 would have adverse effects on the populations of these species in the entire project area. It appears that the two tail droppers are quite wide-spread in this area and removing the acreage proposed in Alternatives 1, 3 and 4 would still retain adequate habitat in the area so that populations would not be in danger of extirpation. Alternative 2 does have this risk, since the Crater Lake tightcoil is only known from very few locations and harvesting units 13, 15 and 39 could potentially extirpate an entire population. It is also possible that these very tiny snails are more common and wide-spread than is indicated by these survey results. Both outcomes are highly speculative at this point and are not supported by any scientific observations. The relatively low risk of extirpating mollusc populations under alternatives 1, 3 and 4 is also supported by observations that the two tail dropper species have been observed in areas where past logging has been done and the canopy has been opened up. The adverse effects of Alternative 5 would be slightly greater on blue-gray and papillose tail-droppers than alternative 4 since some occupied sites would be regeneration harvested in a few units. Based on the abundance and distribution of these species in this project area, these localized impacts to isolated occurrences would most likely have very minor impacts on populations as a whole. However, little is known of the response of these species to logging activities, so the extent of the adverse impacts is highly uncertain.

## Special Status and Survey and Manage Plants

Most units and new road construction corridors were surveyed in 1997 or 1998; 151 acres will be surveyed in 1999. Species found include *Allotropa virgata* (Survey and Manage), *Cypripedium fasciculatum* (S&M, and BLM Sensitive), and *Allium bolanderi* var. *mirabile* (BLM Watch List). *Allotropa virgata* will not be specifically protected. It is considered abundant enough in the core of its range (including the Medford BLM) to be adequately represented within non-harvest allocations. Populations within non-harvest allocations should provide for long-term species viability (Management Recommendations, BLM Instruction Memorandum No. OR-99-27). Some populations may be extirpated by the proposed action.

*Cypripedium fasciculatum* is an interior forest species; management recommendations (OR-99-27) require inclusion of a large enough area to maintain current habitat and microclimate conditions. No effects to *Cypripedium fasciculatum* are anticipated, although scattered individuals that may have been missed by surveys may be extirpated. *Allium bolanderi* var. *mirabile* is a species of rocky or clay soils, in open areas or relatively open forest; buffering these populations will preclude any physical disturbance of the plants or habitat.

All units were surveyed for non-vascular plants in the fall of 1998. No Survey and Manage or Protection Buffer species were found in the project area, although some of these plants were found elsewhere on the Glendale RA. For some of these species, no survey protocols have been developed, and these species are subject to the “Environmental Analysis to Change the Implementation Schedule for Survey and Manage, and Protection Buffer Species.” Species subject to implementation delay found on the Glendale RA include the moss *Buxbaumia viridis*, and the fungi *Sarcosoma mexicana*, *Otidea onotica*, and *Otidea leporina*. These species are identifiable only during irregular periods, and would require multiple surveys to reliably establish their presence or absence. Negative effects may occur to these species if they occur in the project area, but were not found due to the lack of an adequate survey method. Species that were suspected in the project area, and which are not subject to implementation delay, include *Ptilidium californicum*, *Pseudocyphellaria rainierensis*, *Lobaria linita*, *Schistostega pennata*, and *Ulotia megalospora*; only the first of these five has been found on the Glendale RA.

## **B. Cumulative Effects of the Proposed Action**

Many of the cumulative effects associated with this watershed have been addressed in the RMP/EIS for the Medford District, the Supplemental EIS for the Management of Habitat for Late-successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. This analysis tiers to those documents. In addition, the watershed analyses for the Grave Creek watershed located in the Medford District BLM office describes additional cumulative effects. More site specific effects for the Grave Creek West project area are discussed here.

Past and foreseeable future projects in the vicinity include:

- I-Shank and Tunnel Vision timber sales in the Grave Creek watershed, which have been logged within the last few years,
- logging on Josephine County lands,
- Low 5 timber sale, which has logged,
- Serpent's Grave timber sale in upper Grave Creek, which was sold in September, 1998,
- Cen-oak timber sale just southwest of the proposed action area, recently sold by the Grants Pass Resource Area, Medford BLM, which affected the connectivity/diversity block in T 34S, R 7W, sec. 17.
- Decommission approximately 0.8 miles of existing roads in the Grave Creek watershed in 1999(Glendale Resource Area Road Decommissioning Project)

The major cumulative effects of past and foreseeable future management actions on this project area involve fish, hydrology and late-successional habitat. Timber harvest and associated road building on both private and federal land has had serious negative impacts on all these issues.

### **Fish/Riparian/Hydrology**

No aquatic habitat or watershed indicator in the National Marine Fisheries Service Matrix Checklist (Table 4) would be degraded in the long term at the fifth-field watershed scale (Grave Creek). The action alternatives are therefore consistent with Aquatic Conservation Strategy objectives. Refer to the ACS consistency analysis (Appendix C).

Although compaction and road density in the project area would be reduced (p.22 and Table 2) by ripping and planting selected roads and skid trails, the level of activity would be insufficient to measurably improve current conditions at the fifth-field watershed scale. There are 808 miles of road in the Grave Creek watershed.

Reciprocal road use agreements between BLM and commercial forest landowners often limit options for BLM to decommission roads that are not needed to manage BLM lands. It will take the concerted effort of all landowners reducing impacts of roads and tractor logging under their jurisdiction to measurably reduce stream sedimentation, road density and compaction across the fifth-field watershed.

Quality of aquatic habitat is not expected to improve in the Grave Creek and Cow Creek Watershed scale in the near future. Forest practices and other land uses on private lands (e.g. water diversions, road construction and maintenance, tractor logging and lack of riparian protection) are considered inadequate to protect or restore watershed values, based on the standards contained in the Northwest Forest Plan and the RMP

### **Spotted Owls**

Currently in the Grave Creek fifth-field watershed, approximately 23,961 BLM acres are suitable spotted owl habitat, which represents 23 percent of the watershed. After harvesting this proposed action and the Serpent's Grave timber sale, 22,334 acres of suitable spotted owl habitat would remain, a reduction of seven percent. The Tunnel Vision and I-Shank timber sales were relatively light harvest sales, generally retaining suitable habitat in most units. There is virtually no spotted owl habitat on private lands within this watershed as a result of past management.

Overall, the results of past and future management actions have had substantial effects on spotted owl habitat, reducing it to less than 20 percent of the landscape. However, this is within the scope of the effects envisioned in the RMP/EIS since most of the BLM lands in the watershed are designated as General Forest Management Area.

### **Marbled Murrelets**

The proposed action would reduce the acreage of marbled murrelet habitat in the Grave Creek watershed by six percent, leaving approximately 7,392 acres. More than half the watershed is greater than 50 miles from the coast, which is outside the area of concern for marbled murrelets considered in the Northwest Forest Plan. Within 35-50 miles from the coast, where the proposed Grave Creek West sales are located, past sales have substantially reduced the amount of suitable nesting habitat for marbled murrelets. Because it is unlikely marbled murrelets use the portion of the Grave Creek watershed within 35-50 miles from the coast, the cumulative impacts to this species within this watershed are considered negligible.

### **Red Tree Voles**

Analysis of 1997 data indicated there were approximately 24,200 acres of suitable red tree vole habitat in the Grave Creek fifth-field watershed, or 48 percent of the under Federal ownership. Private lands within the watershed contain virtually no suitable habitat as a result of past management actions. Current Federal timber sales, including the proposed Grave Creek West sales, would reduce the amount of suitable vole habitat by about 2,000 acres by the year 2000, leaving about 43 percent of the federal lands with suitable habitat. The cumulative effects on red tree vole habitat limit reproduction and dispersal. This watershed is not likely to provide connections for populations around it. Populations in the watershed would be at some unknown level of risk of localized extirpation from fires and other events.

## **Late-successional Stands in Grave Creek Watershed**

The Grave Creek watershed contains a checkerboard ownership pattern of federal and non-federal lands. Most of non-BLM managed lands are currently in early or mid seral conditions, due to extensive past harvest practices. Almost half of BLM-managed lands are also under 80 years of age due to intensive forest management. When analyzing the Grave Creek watershed, it is apparent that past management practices have greatly fragmented much of the landscape, making it difficult for species associated with late-successional habitat to disperse in the watershed.

The ID team selected proposed units that are relatively small, isolated patches, stands that could be improved in their structure, and stands that would not contribute to fragmenting the western portion of the project area and the Grave Creek watershed in the short term. The ID team used this strategy to avoid disturbing the large block of habitat in the western portion, where the majority of the late-successional habitat in the project area exists. The connectivity blocks in T 33S, R 7W, sec 15 and in T 34S, R 7W, Sec. 11 were avoided. As a result, an adequate level of connectivity over the landscape would be maintained for most species.

The Grave Creek fifth-field watershed currently contains approximately 104,372 acres of private and federal lands. Of this, 50,323 acres are federally owned. Approximately 25,795 acres of federal lands are in late-successional (80 years old or older) condition. Therefore, about 51.4 percent of federal lands in the Grave Creek watershed are currently in late successional condition.

This proposed action would result in harvesting 783 acres of late-successional habitat in this watershed, and the Serpent's Grave timber sale would remove an additional 315 acres, leaving 24,776 acres in the watershed. The harvest of these sales would remove four percent of the late-successional stands. Approximately 49 percent of federal lands in the Grave Creek watershed would remain in a late successional condition after harvest. This is still considerably above the 15 percent called for in the Northwest Forest Plan.

The proposed units in the Grave Creek West project area are generally small to medium size. They are some of the more isolated stands scattered throughout the project area. The proposed action would not fragment large blocks of contiguous habitat. One of the criteria used in selecting harvest units for this sale was to avoid large blocks of late-successional stands to maintain those larger blocks and their interior habitat for the next several years. Protecting Riparian Reserves in harvest units would retain small pockets and corridors of late-successional habitat. Overall, the proposed action, along with other recent actions in the watershed, would make movement more difficult for species associated with late-successional habitat, but would not create new large barriers to dispersal or movement.

## **Alternative 6 - No Action Alternative**

Under this alternative, the impacts described in this EA would not occur at this time.

The short-term addition of sedimentation as a result of road work and hauling would not occur. On the other hand, the beneficial long term effects of improving roads and ripping roads and skid trails would also not occur. The net effect would be to allow the present levels of erosion and sedimentation to occur and increase over time; an overall adverse effect on streams and fish habitat.

The acres of late-successional habitat would not be removed or degraded by timber harvest, so the effects on species associated with late-successional forests would not occur at this time. Since this proposal is located on General Forest Management Area Lands, it is assumed that similar timber harvest would eventually occur on these lands, so the effects on wildlife and plants would be postponed, but not eliminated. In the long term the effects would be similar to the proposed action.

Not thinning the commercial thin units in the proposed action would eliminate the beneficial effects of improving growth and yield in these units. There is a window of time in which commercial thinning is most effective in promoting increased growth in the residual trees. If this thinning is postponed for 10 or more years, the effectiveness of the thinning would be reduced, although the amount will vary by site and depending on how long the thinning is postponed. Eventually, in 20-30 years, commercial thinning would be less viable an option compared with a regeneration harvest, and the opportunity for improving growth will have been lost.

## **VI. Monitoring**

This proposal would be subject to the standard monitoring called for in the RMP. In addition, the following specific monitoring actions would be taken:

1. Roads where rock is applied, or where straw mulch and seed is used, would be monitored twice a year for the first two years to determine if noxious weeds have been introduced. If necessary, the sites would be treated to prevent the plants from becoming established.
2. Any peregrine falcon and goshawk nest sites located in the project area would be monitored to determine the effects of management on the sites.
3. A representative sample of Del Norte salamander sites would be monitored using a reproducible survey method to determine the effects of management on numbers of salamanders on the sites before and for each of the first three years following logging.
4. A sample of units would be surveyed for canopy closure, snag habitat and coarse woody debris following logging.
5. A sample of units with mollusc locations would be monitored to determine the effects of management on habitat and on population levels.

## **VII. Agencies and Persons Consulted**

Landowners within 1/4 mile of the proposed action have been notified that this management action is being considered and asked for their opinions, concerns and suggestions.

A public meeting was held in Sunny Valley, on June 11, 1997 to discuss this proposed sale and identify concerns from the public. Issues brought up at that meeting include:

- effects of this proposal, as well as past logging, on local wells and stream flows,
- effects on visual resources from residents near proposed units,
- logging noise and traffic, and
- effects on roads.

A second public meeting was held on March 19, 1999 to present and discuss the proposed action.

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. In addition, notification of this proposal will be sent to the Oregon Department of Fish and Wildlife, the Oregon Department 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.

All public input was considered by the ID team in developing the timber sale proposal and analyzing the environmental effects of this action. Changes in the preliminary plan as well as the proposed project design features may be based, in part, on information received from the public. The Area Manager will also consider all input before making a final decision concerning this proposal.

**VIII. List of Interdisciplinary Preparers**

<u>Name</u>	<u>Title</u>	<u>Primary Responsibility</u>
Bruce Arrington	Wildlife Biologist	Wildlife, T/E Animals, Survey and Manage
Marylou Schnoes	Wildlife Biologist	Wildlife, T/E Animals, Survey and Manage
Patty Jones	Civil Eng. Tech.	Roads, quarries
Jim Brimble	Forester	Silviculture, vegetation, site preparation
Bob Bessey	Fisheries Biologist	Fish habitat, Watershed, Riparian, Soils
Jerry Nilles	Forester	Overall sale design, logging systems
Craig Olson	Forester	Logging systems, layout, fuels

Reviewed By:

Roger L. Currier

Glendale RA Ecosystem Planner  
for format and adequacy

3-23-99

Date

Lynda L. Boody

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

3/29/99

Date

Appendix A. Summary of seasonal operating restrictions - Grave Creek West Project Area. Shaded blocks are the time periods when activities are allowed. 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	Shaded											
Log hauling - gravel roads				Shaded								
Log hauling - natural surface roads						Shaded	Shaded	Shaded	Shaded			
New Road Construction						Shaded	Shaded	Shaded	Shaded			
Quarry activities in Riparian Reserves						Shaded	Shaded	Shaded	Shaded			
Tractor Yarding						Shaded	Shaded	Shaded	Shaded	Shaded		
Cable yarding in CT	Shaded	Shaded				Shaded						
Logging and road work within 1/4 mile of spotted owl sites	Shaded	Shaded				Shaded						
Blasting without restrictions	Shaded	Shaded	Shaded						Shaded	Shaded	Shaded	Shaded
Logging unit 34 - within 1/4 of goshawk	Shaded						Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
Falling and yarding in occupied talus in helicopter units						Shaded	Shaded	Shaded	Shaded			

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 which were considered for analysis in the Grave Creek West project area, Glendale Resource Area**

Area	Original analysis and comments.
T33S-R8W- Sec. 1	Possible thinning area. Needs spur to thin portion of section.
T33S-R8W- Sec. 12	Small portion on north boundary possible for thinning. Rest of section deferred* due to contiguous stands of late-successional habitat.
T33S-R8W- Sec. 13	Entire section in Grave Creek West watershed deferred due to contiguous stands of late-successional habitat.
T33S- R8W- Sec. 24	Entire section in Grave Creek West watershed deferred due to contiguous stands of late-successional habitat.
T33S-R8W- Sec. 25	Entire section in Grave Creek West watershed deferred due to contiguous stands of late-successional habitat.
T33S-R7W- Sec. 7.	Entire section deferred due to contiguous stands of late-successional habitat and proximity of spotted owl site.
T33S-R7W- Sec. 9	Unit 1 of the old Rock-n-Poorman sale area. Also a possible thinning area. Area just north of the watershed boundary is possible for inclusion as a regen. harvest unit.
T33S-R7W- Sec. 10	Possible thinning area. Area just north of the watershed boundary is possible for inclusion as a regen. harvest cut.
T33S-R7W- Sec. 11	Possible thinning. Area just north of watershed boundary and an area on Rattlesnake Creek is possible for inclusion as a thinning/regen harvest.
T33S-R7W- Sec. 13	Northern part of section that is in the watershed is a possible thinning area. Unit 7 of the old Falling Rattle sale. Unit 8 of Falling Rattle is dropped due to the numerous streams in the unit. Area north of unit 7 is possible regen harvest.
T33S-R7W- Sec. 14	Possible thinning.
T33S-R7W- Sec. 15	Two areas in northern portion of section possible thinning. Unit 3 of R-n-P deferred. Unit 2 of Falling Rattle. Rest of section deferred due to late-successional habitat and Connectivity Block.
T33S-R7W- Sec. 17	Unit 8 & 9 of Rock-n-Poorman, possibility of enlarging these units. Unit 7 is deferred due to stream buffers. Rest of section is possible for regen harvest. Possibly block a jeep road. Needs a spur to log portion of section.
T33s-R7W- Sec. 19	Unit 10 of Rock-n-Poorman, possibility of enlarging unit to the east. Rest of section deferred due to contiguous late-successional habitat
T33S-R7W- Sec. 21	Units 4, 5, 6 of R-n-P. Other areas possible of regen/or/selective/thin cut. Possibly 2 roads to block and a jeep road. Needs couple of spurs to yard portions of section.
T33S-R7W- Sec. 23	Units 1, 2 of Falling Rattle. Rest of section deferred due to contiguous late-successional habitat and proximity to spotted owl site.

Area	Original analysis and comments.
T33S-R7W- Sec. 25	Only small portion of section is in the watershed. This area possible for regen harvest. There are 2 areas adjacent to watershed possible for inclusion as regen harvest. Need spur to yard portion of section
T33S-R7W- Sec. 26	NE1/4NE1/4 is BLM and unit 3 of Falling Rattle. SW1/4SW1/4 has possible regen harvest. Rest of BLM land in section is deferred as not at the stand development stage that warrants a timber sale but does need some treatment - pct-release-brushing.
T33S-R7W- Sec 27	Units 4 & 5 of Falling Rattle. Possible area north of unit 4 for thinning. Rest of section is deferred for further stand structure development.
T33S-R7W- Sec. 29	Area west of Rock Creek deferred due to contiguous late-successional habitat. Stands east of Rock Creek deferred due to stream buffers and not of enough stand structure present. Stands could use a silvicultural treatment to improve existing stands.
T33S-R7W- Sec. 30	Deferred due to contiguous late-successional habitat
T33S-R7W- Sec 31	Deferred due to contiguous late-successional habitat.
T33S-R7W- Sec. 32	Part deferred due to stream buffers and withdrawn land. Rest is deferred due to lack of existing stand structure.
T33S-R7W- Sec. 33	Portion of section deferred due to access problems and stream buffers. Portion of SE1/4 possible regen harvest.
T33S-R7W- Sec. 34	Portion in SW1/4 and NE1/4NE1/4 possible regen harvest. Rest deferred due to stream buffers and withdrawn land.
T33S-R7W- Sec. 35	Southern portion of section possible thinning. Area in NW1/4NW1/4 possible regen harvest. Rest of BLM land in section deferred for future stand development. Stand could use a combination of silviculture treatments to improve or accelerate the development. Possible spur to block.
T34S-R7W- Sec. 1	Two areas in this watershed are possible regen harvest. There are 2 areas adjacent to the watershed that could be included as regen harvest. Possible road to block.
T34S-R7W- Sec. 2	Possible regen. harvest in SW1/4. Rest of this section is deferred due to stream buffers, withdrawn land or stands lacking structure.
T34S-R7W- Sec. 3	Majority of BLM land in this section is possible for regen harvest or thinning. A stand in the SW1/4 is deferred for further stand development.
T34S-R7W- Sec. 4	E1/2NE1/4 possible for regen harvest. Rest deferred for further stand development. This area could use some silviculture treatment (pct-clear around older pine and DF, etc).
T34S-R7W- Sec. 5	Most of NW1/4 is withdrawn. Rest of BLM land in section possible regen harvest or OR.
T34S-R7W- Sec. 6	SE1/4NE1/4 & W1/2SE1/4 possible regen harvest. Area to the south of watershed possible regen and also area of thinning. Small area on the SW portion of watershed possible for thinning. Rest of section is withdrawn or deferred due to access problems and to review TPCC classification.

Area	Original analysis and comments.
T34S-R7W- Sec7	BLM land in watershed possible regen harvest.
T34S-R7W- Sec. 9	Portion east of McKnabe Creek is dropped due to proximity to spotted owl site. Two stands in the NE1/4NE1/4 & E1/2SE1/4 possible regen harvest. Rest of the S half possible select cut. Rest section deferred for stand structure development. Possible road to block, need to check R-O-W agreements.
T34S-R7W- Sec. 10	NE1/4NE1/4 possible regen harvest. SE1/4NE1/4 deferred for further stand structure development.
T34S-R7W- Sec. 11	Section deferred due to Connectivity Block and for further stand structure development and age.
T34S-R7W- Sec. 14	Deferred due to access and for future stand structure development and late-successional habitat
T34S-R7W- Sec. 15	Most of E ½ is withdrawn land, small stand here is deferred as no volume present. West ½ has possible regen harvest and 2 areas of thinning.
T34s-R7W- Sec. 17	Possible thinning. Area adjacent to watershed possible thinning. Connectivity Block.

**\*In this table, “deferred” means deferred from these proposed action alternatives.**

## Appendix C.

### **Aquatic Conservation Strategy Consistency Review for the Grave Creek West Timber Sales, Glendale Resource Area, Medford District, BLM**

The Grave Creek West project area draft Environmental Assessment (EA) was reviewed, in light of the U.S. District Court ruling of April 28, 1998, to document consistency with the Aquatic Conservation Strategy (ACS) in the Northwest Forest Plan. The review consists of two parts: to document compliance with Standards and Guides in the Plan, and to document consistency with each of the nine ACS objectives described in the Record of Decision (ROD) for the Northwest Forest Plan (ROD B-11). The interdisciplinary team reviewed the draft Environmental Assessment (EA) for the project area and discussed the standards and guides and the ACS objectives. They also considered the interim Watershed Analysis for the Grave Creek West watershed.

#### **I. Standards and Guides**

The following Standards and Guides from the ROD concern the ACS and were applicable to this proposal. Other Standards and Guides were not considered to pertain to this particular proposal. The numbers in the headings (e.g. TM-1) refer to the designations in the NFP ROD. The text of the Standards and Guides were abbreviated; for the complete language of the Standards and Guides refer to the ROD.

Riparian Reserves were designated in the project area as called for in the ROD (ROD C-30,31; EA-21, 22). In two units (units 18 and 42A) the Riparian Reserve would be extended farther up the hill to protect riparian habitat (EA-21) Within the Riparian Reserves, the applicable standards and guides for these timber sales were met as described below.

#### **TM-1: Prohibit timber harvest in Riparian Reserves.**

No timber harvest is planned in any Riparian Reserves. Some site-preparation would be done within some of the Riparian Reserves to promote establishment of conifers. This would be designed to protect the streams (EA-22).

**RF-2: Meet ACS objectives for existing and planned roads.**

Only 0.6 miles of permanent road construction is planned under these sales. In addition, temporary roads would be constructed and ripped after use. None of the permanent or the temporary road construction locations is located in Riparian Reserves. The temporary roads would be built to minimize environmental effects. All helicopter landings would be located outside Riparian Reserves (EA-22). Under the proposal many roads in the project area would be renovated and improved to reduce sedimentation and improve flow patterns. And the road maintenance which would occur under the timber sales would be a higher level than would occur with normal BLM funding. No side casting would be done near streams and wetlands. Road work and hauling would be seasonally restricted to minimize sedimentation and end-hauling would be required where necessary to prevent erosion into streams.

**RF-4: Culverts and other stream crossings shall be built to accommodate 100 year floods.**

No culverts were identified in this project area which pose a substantial risk. In renovating existing roads, many culverts would be replaced and would be sized appropriately to accommodate 100 year floods.

**RF-5: Minimize sediment delivery from streams.**

Approximately 1.4 - 2.4 miles of existing roads would be decommissioned, depending on the alternatives (EA-18). Many roads in the project area would be renovated under the timber sales, including treatments termed “storm-proofing.” Storm-proofing includes outsloping roads where practical, adding culverts to improve drainage and flow patterns, replacing aging and faulty culverts, installing water dips on roads to prevent major road failure if culverts become blocked and other actions. The intent is to minimize sedimentation, reduce the need for maintenance and minimize the risk of major road failure. The roads in the project area would be maintained under the proposed timber sales, including cleaning culverts and other practices which would reduce sedimentation. In addition, three roads would be closed with gates and guard rail barricades, which would reduce sedimentation caused by motor vehicle use, especially during winter.

Retaining the Riparian Reserves would serve to filter sediment coming from harvest units and prevent it from reaching the streams.

**RF-6: Provide and maintain fish passage.**

Under this timber sale there would be no new road construction on fish streams. No existing barriers to aquatic species would be replaced due to funding limitations under these timber sales.

**RF-7: Develop and implement a road management plan.**

This is generally a Resource Management Plan (RMP) level Standard and Guide, but this timber sale proposal does include setting timber haul seasons on the roads involved in the proposal.

**FM-1: Design fuel treatment to meet ACS objectives.**

Only six units are proposed for broadcast burning. In these units, as well as the hand-pile units, the prescribed burns would be designed to minimize adverse effects on streams. In some cases, prescribed burns would be used to remove slash and brush within Riparian Reserves, but these would be kept at least 30 feet from the stream (EA-22). There would be a short term adverse impact on the stream, but this treatment would meet long term objectives of establishing conifer habitat which has been degraded in the past. Fire line construction would be designed to avoid soil disturbance and sedimentation into streams (EA-22) where hand lines may be necessary. Helicopter refueling areas would be kept out of areas adjacent to streams.

## II. Aquatic Conservation Strategy Objectives (ROD B-11)

### **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.**

This proposal calls for active management to improve wildlife habitat within Riparian Reserves to help restore connectivity and habitat values.

The original selection of proposed units considered the large scale distribution of habitats and connectivity at the watershed scale. Large, unentered blocks of late-successional habitat in the western part of the watershed (Reuben Creek) were avoided in proposing timber harvest. Relatively small, isolated older stands were selected for harvest. These harvest areas will provide a larger block of late-successional habitat in the future, as they grow along with the adjacent areas. Additional deferrals were made to avoid adverse effects to hydrologic functions in areas heavily impacted by recent timber cutting.

### **2. Maintain and restore spatial and temporal connectivity within and between watersheds. lateral, longitudinal, and drainage network connections include flood plains, 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.**

Similar to the situation with ACS objective #1, the original selection of units deliberately considered connectivity and localized hydrologic effects. Reuben Creek, which contains the largest contiguous block of older forest habitat, was avoided in proposing harvest units. The sale units in this proposal are scattered throughout a large area and would not create any large barriers to movement.

The Riparian Reserves in the project area would be maintained, and in some cases restored through active management. In addition, the designated Connectivity/Diversity blocks in the project area are presently well above the 25-35 percent late-successional forest habitat called for in the ROD. These blocks, along with the Riparian Reserves and other reserves, help provide connectivity across the landscape.

Also, the Resource Area is treating many acres in the project area with pre-commercial thinning, manual brushing and other vegetative treatments, which will serve to improve upland habitat along Riparian Reserves. This will also assist in providing connectivity within the project area.

**3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.**

This proposal includes protection of Riparian Reserves and does not include any new road construction near or across streams. The temporary roads proposed would be built on ridges, away from any streams. There would be no direct or indirect effect on shorelines, banks or bottom configurations. Replacing aging culverts, and adding new culverts, may reduce downstream channel damage by helping to restore a more natural flow pattern. Decommissioning the McKnabe Creek road (if agreement can be reached with private land owners) would greatly improve stream bank integrity in that area.

**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.**

The major water quality parameter identified for this watershed is stream temperature. Retaining the Riparian Reserves would help maintain and, in the long term, improve water temperature on BLM lands. The treatments within the Riparian Reserves would also not affect temperatures. The Riparian Reserves would also serve to filter sediment. Site-preparation would have little or no effect since it would affect a small percentage of the watershed. Ripping the existing roads would help restore natural flows. Additional forest canopy would be retained in units 29 and 32 because of concerns for sedimentation into private water supplies. Finally, landings would not be located within Riparian Reserves, so oil, gas and other contaminants would not be transported to streams.

**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.**

Again, retention of the Riparian Reserves would serve to filter sediment from timber harvest units. Units were selected in areas where the risk of landslides would be minimal. Blocking and renovating roads would improve drainage, reduce sedimentation and reduce the risk of major road failure. Little permanent road construction is proposed. Active landslide areas were avoided in locating roads and harvest units.

Several measures were included to minimize sedimentation, including constructing, using and decommissioning landings within one year; restricting side-casting, seasonally restricting hauling and road work; the use of dust abatement treatments and logging restrictions.

Performing the road maintenance, replacing and adding culverts, constructing the temporary road would all result in a short term increase in sedimentation as a result of soil disturbance. This is considered local and transitory in nature and would dissipate within a few months. Because the Proposed Action would cause only highly localized and short-term stream sedimentation, it would not increase sediment input at the watershed scale over the long term. The potential for catastrophic slides during winter storms would be reduced.

**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.**

Several units were deferred from the proposal because of potential high cumulative hydrologic impacts on small headwaters stream basins. This played a major part in the original planning for this proposal.

The proposal would replace aging and inadequately-sized culverts to avoid future road failures. Water dust abatement on roads would not be taken from streams in the project area. Transient snow zone openings are relatively high in some places, but stream channels don't show any adverse effects from high or flashy flows. Landings would be ripped to encourage infiltration rather than rapid runoff. Based on these considerations, the ID team concluded this proposal would not greatly affect flow patterns in the watershed.

**7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.**

The type and amount of timber cutting would not alter flooding frequency or intensity at the watershed level. The proposed units are a small percentage of the entire watershed. Nor would there be any direct effects on adjacent meadows, since there are no meadows near the proposed units.

**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 to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.**

Retention and restoration of the Riparian Reserves would serve to meet this objective. In addition, the units are relatively small compared with the scale of the fifth-field watershed and are widely distributed, which reduces local impacts.

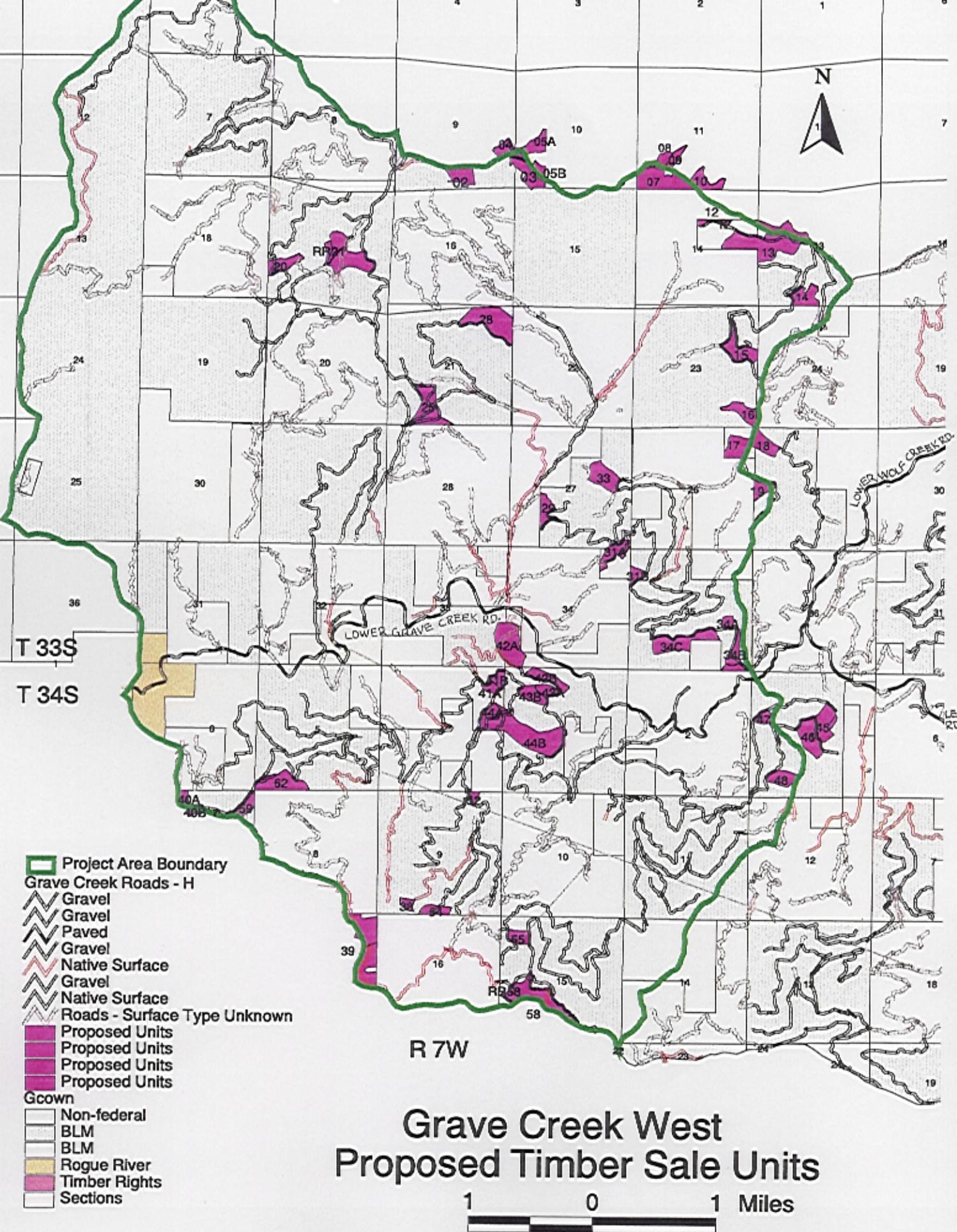
**9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.**

There would be some adverse, localized effects on populations and species distributions, but this is offset by the fact that large blocks of unentered habitat were avoided in designing this proposal. Thus, refugia would remain within this watershed after this proposal, and connectivity would not be degraded. There would be adverse effects from regeneration and overstory removal harvest in the short term (over the next 20-30 years) but in the long term, the Riparian Reserve and other reserves would recover their habitat conditions and contribute to supporting these species in the watershed. Several units were deferred from this sale to reduce local impacts on populations associated with late-successional and riparian habitat.

Based on this review, the proposed project would be 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 would not hinder or prevent attainment of Aquatic Conservation Strategy objectives at the 5th field watershed scale over the long term.

## Appendix D. Literature Citations

- Brosofske, Kimberley D., Jiquan Chen, Robert J. Naiman, and Jerry F. Franklin. 1997. Harvesting effects on microclimatic gradients from small streams to uplands in western Washington. *Ecol. Applic.* 7(4):pp1188-1200.
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- Survey and Manage Amphibian Subgroup. 1995. Management recommendations for Survey and Manage salamanders in Pacific Northwest forests. Edited by D.H. Olson (subgroup lead). Draft document dated 06/09/95. 77 p.

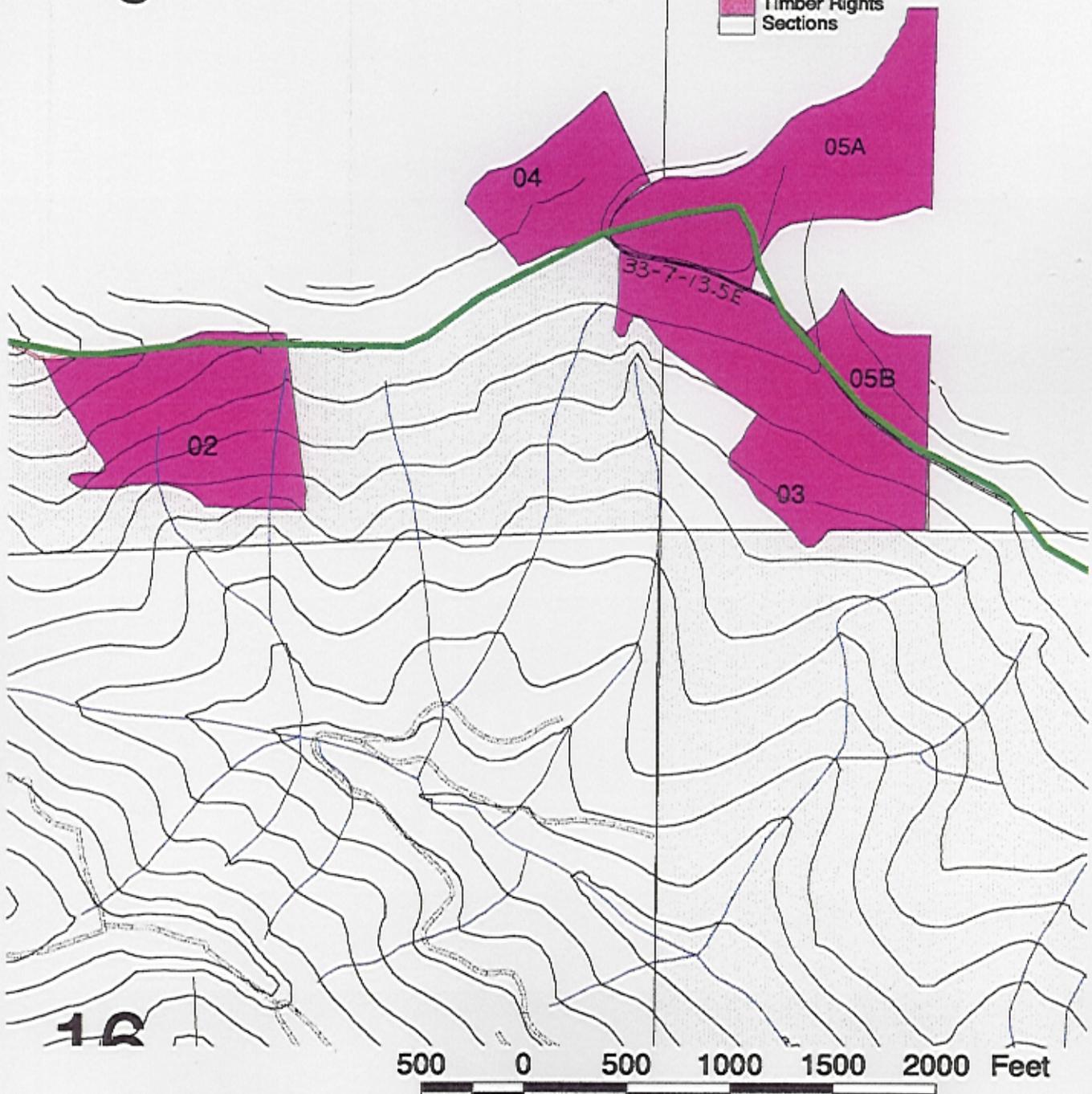


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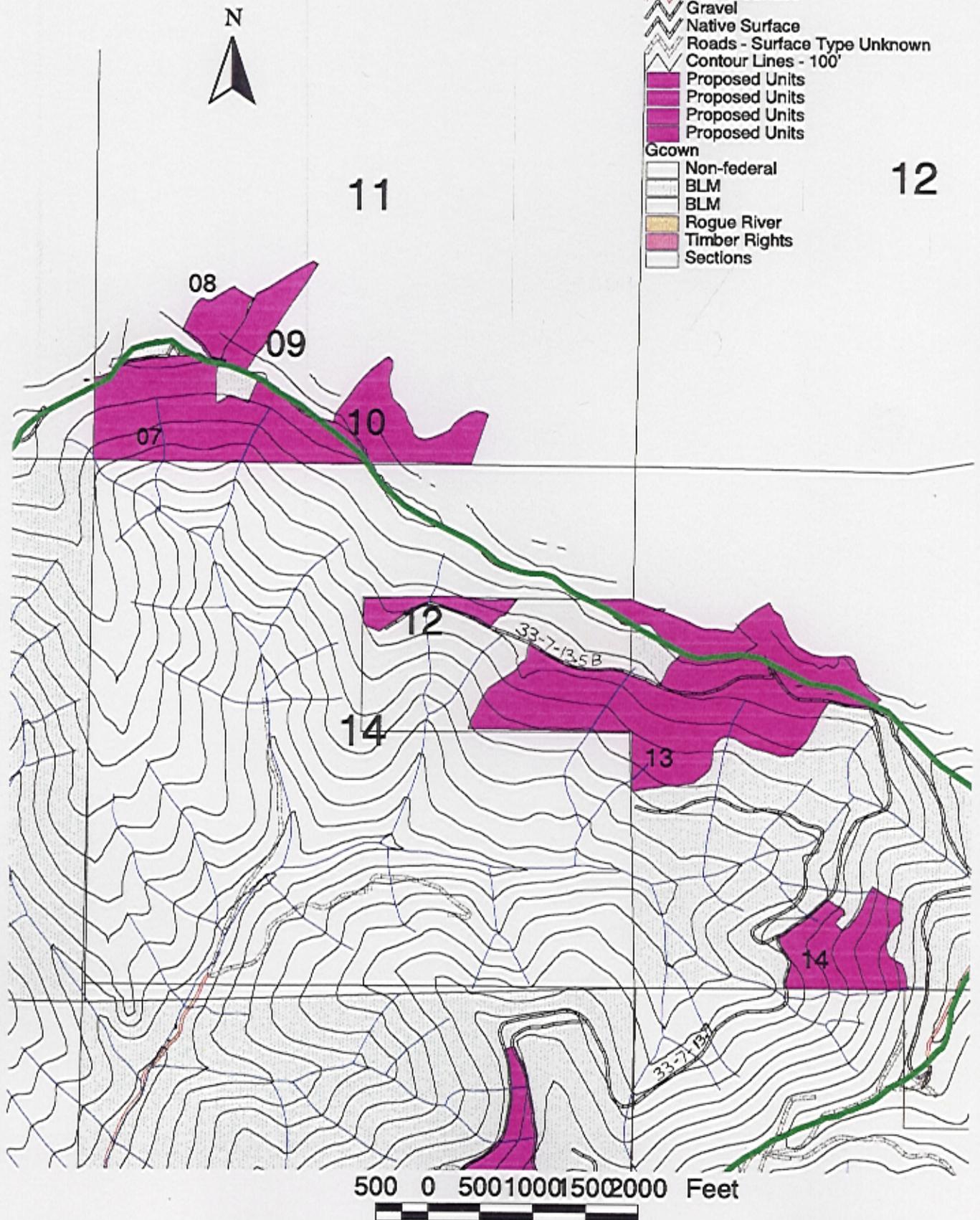


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- Streams
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- Gravel
- Gravel
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- Gravel
- Native Surface
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- Roads - Surface Type Unknown
- Contour Lines - 100'
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- Rogue River
- Timber Rights
- Sections



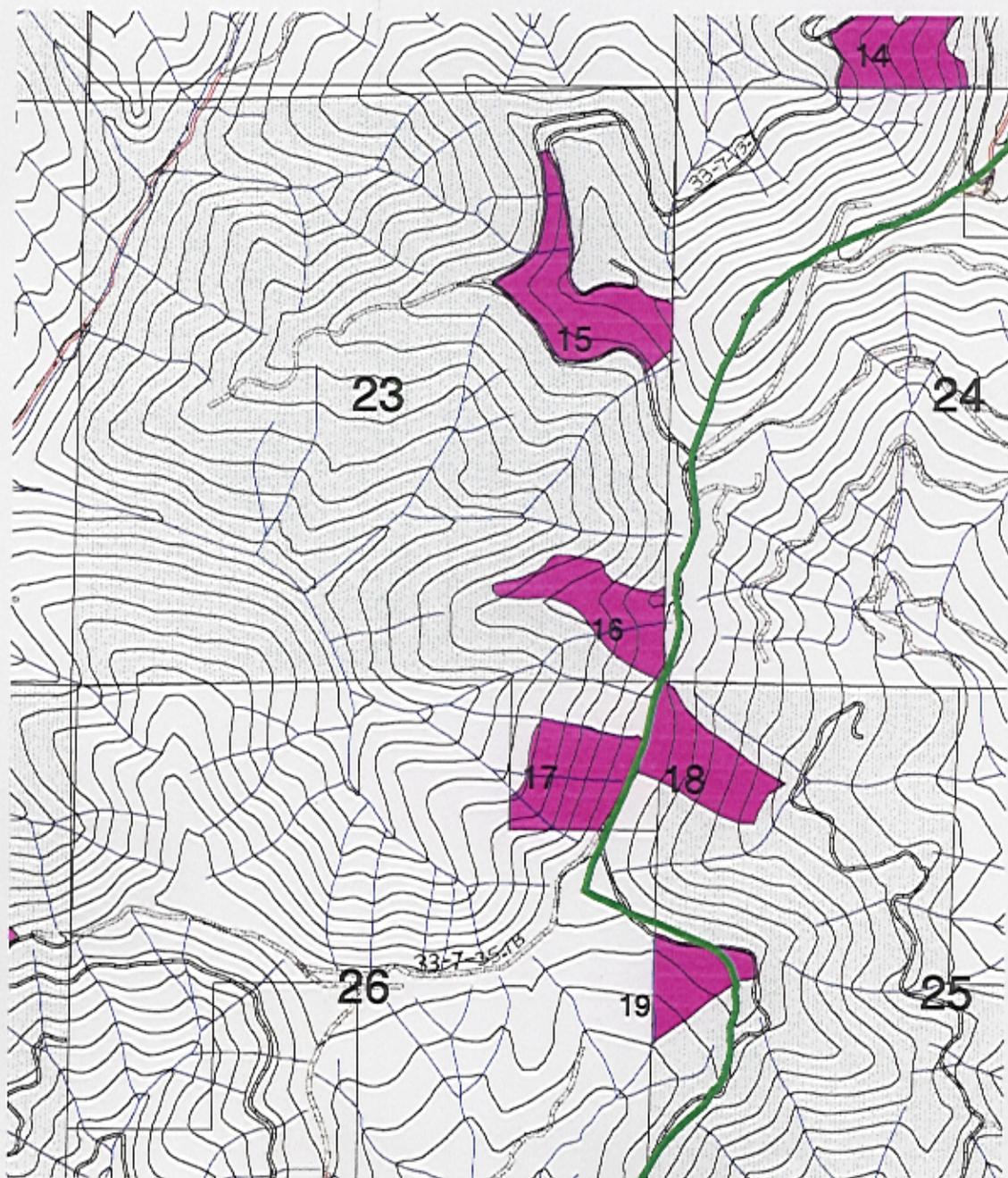
# Grave Creek West Proposed Timber Sale Units



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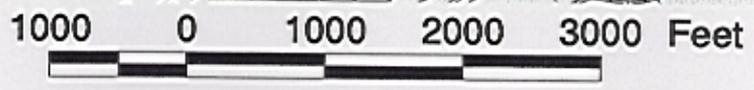
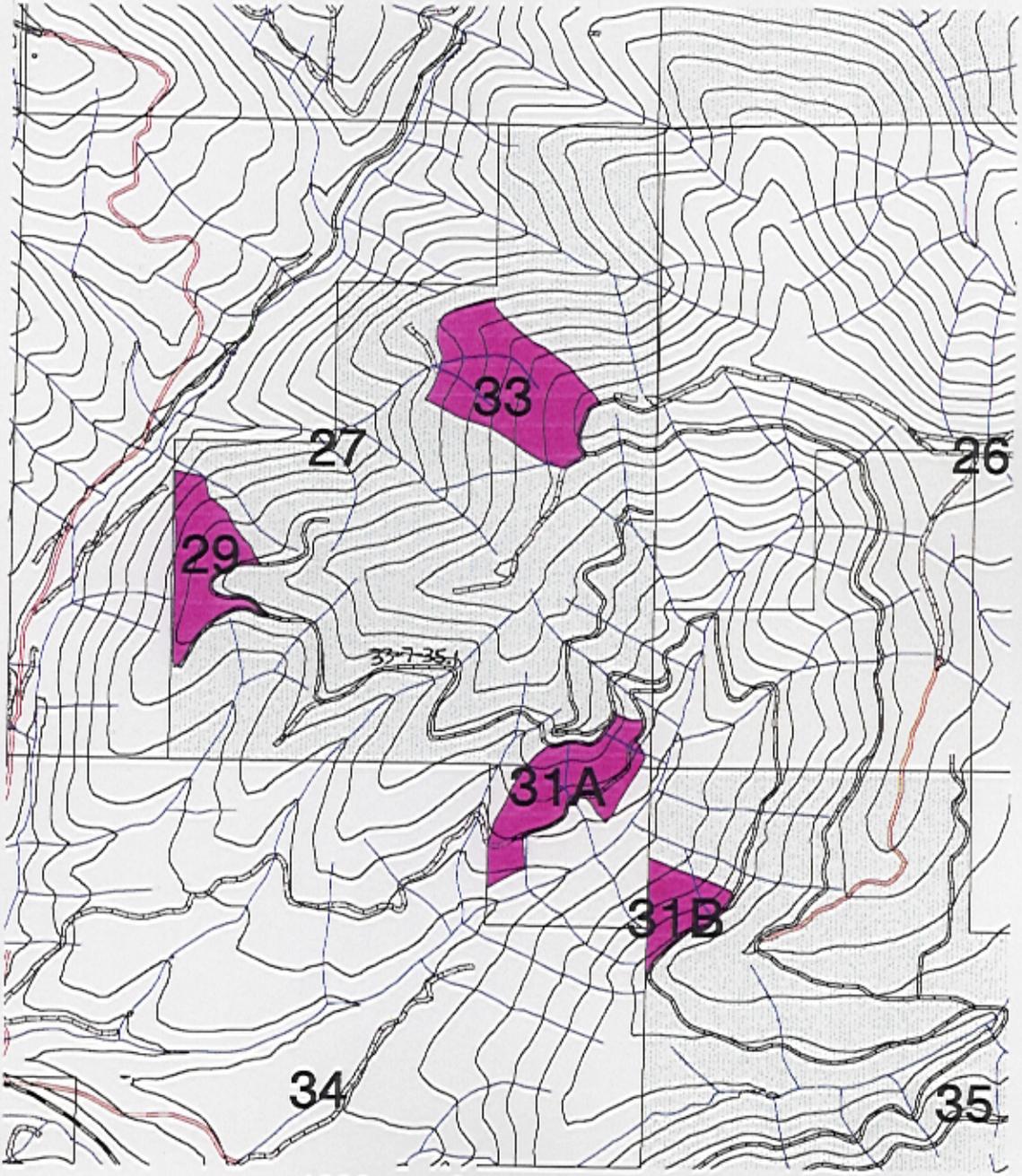
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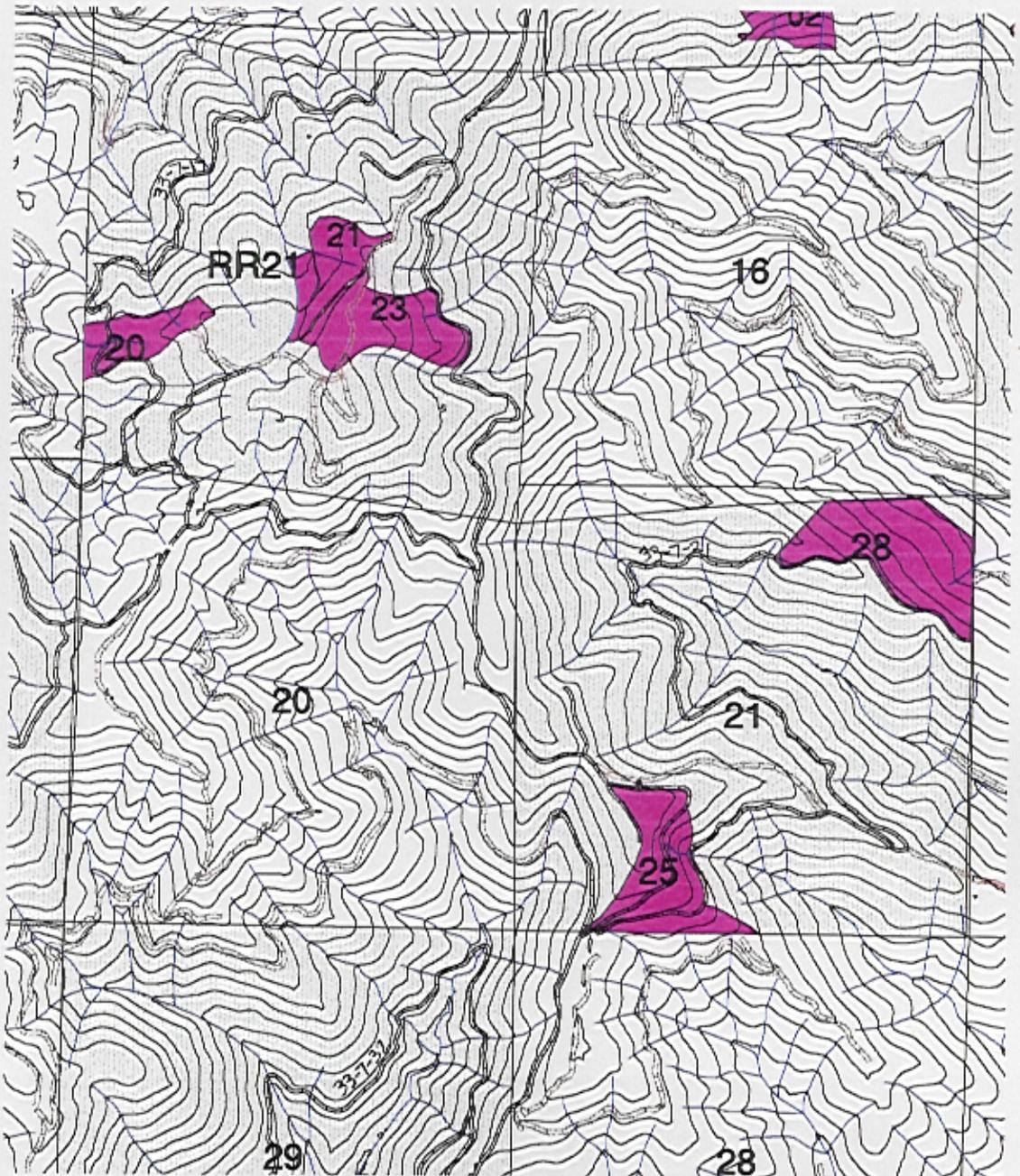
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# Grave Creek West Proposed Timber Sale Units



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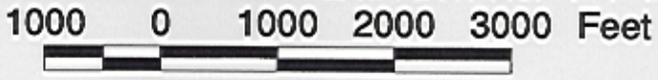
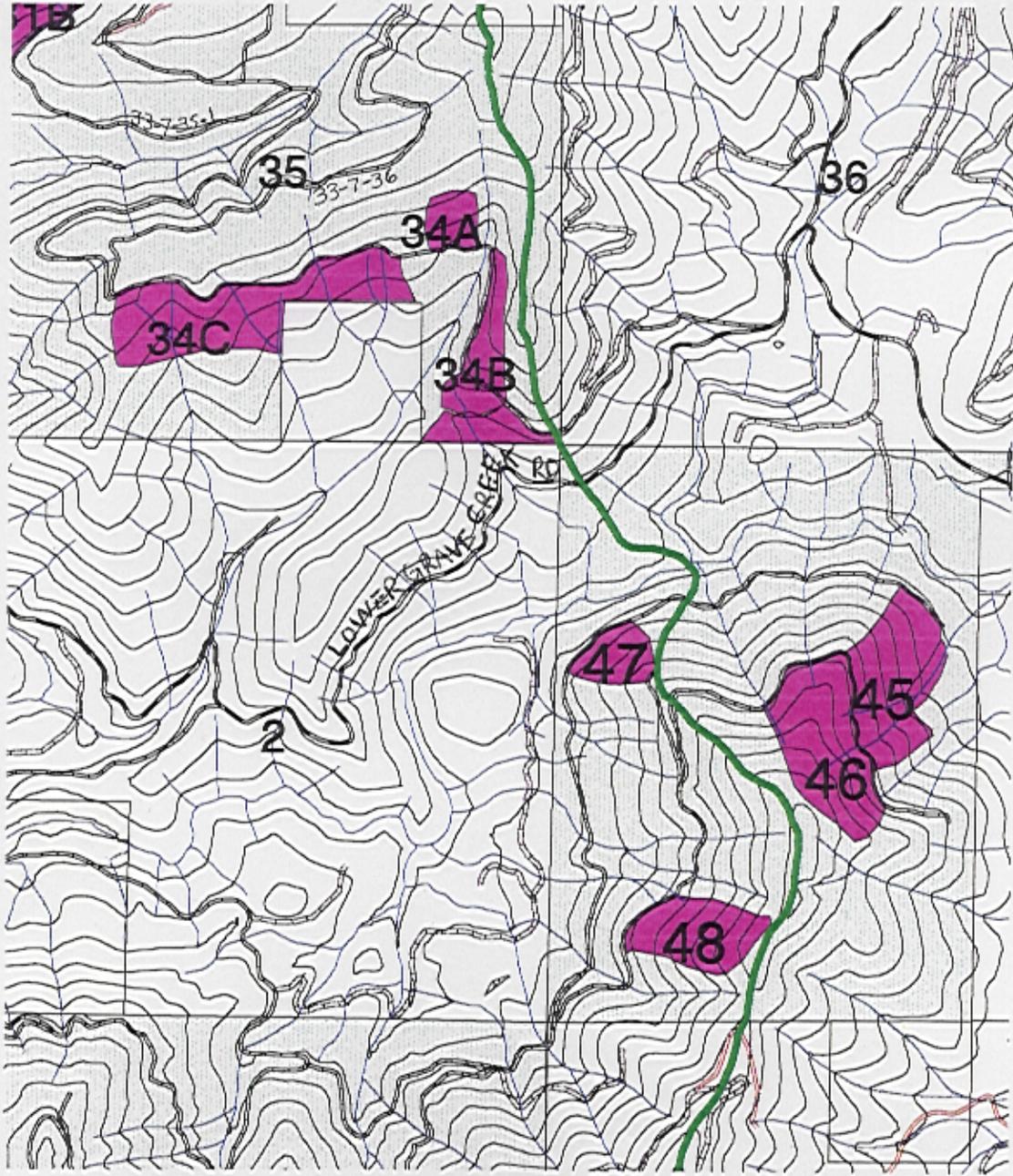
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# Grave Creek West Proposed Timber Sale Units



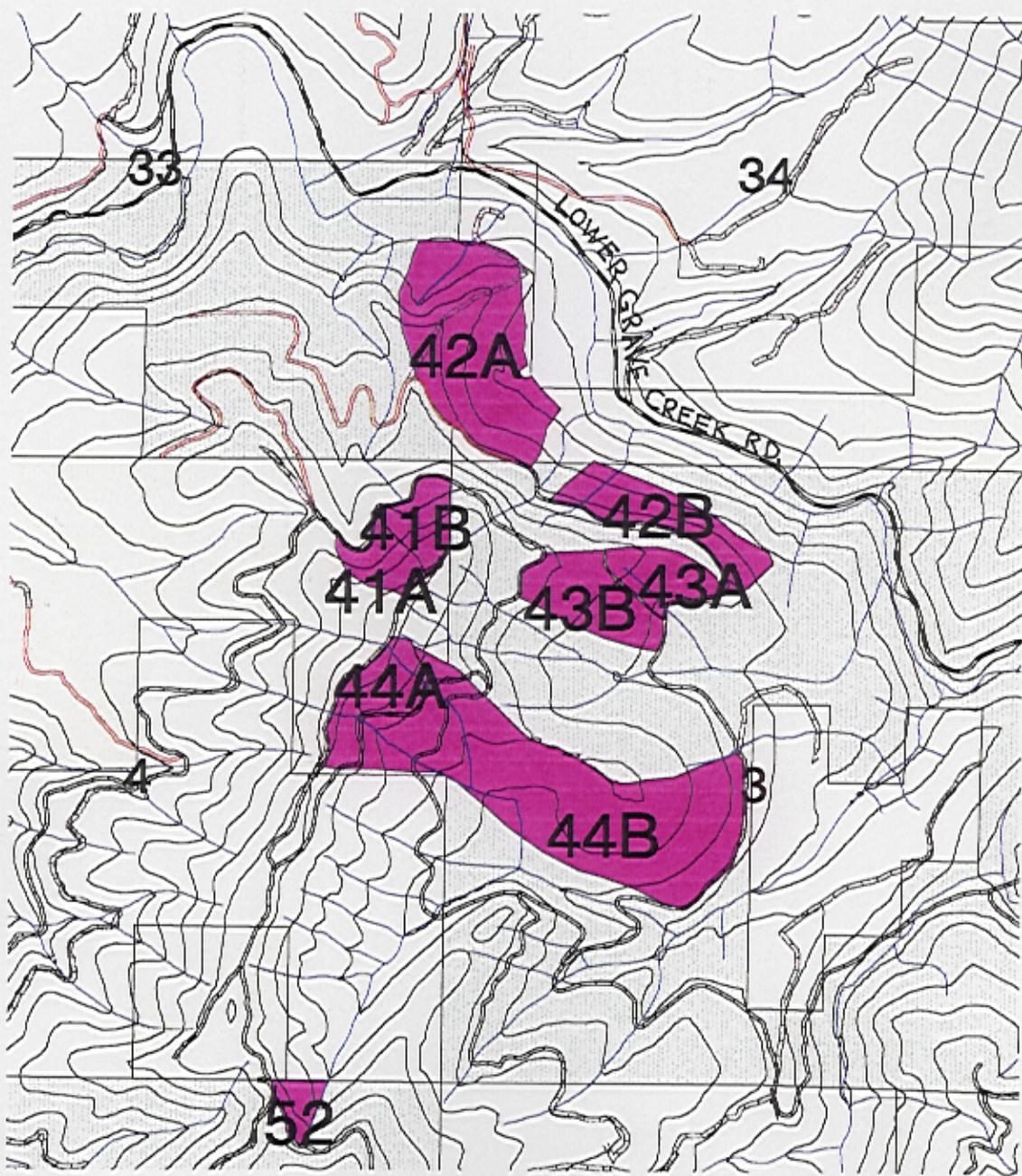
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- Proposed Units
- Proposed Units
- Proposed Units
- Proposed Units
- Grown**
- Non-federal
- BLM
- BLM
- Rogue River
- Timber Rights
- Sections



# Grave Creek West Proposed Timber Sale Units



- Project Area Boundary
- Streams
- Grave Creek Roads - H
- Gravel
- Gravel
- Paved
- Gravel
- Native Surface
- Gravel
- Native Surface
- Roads - Surface Type Unknown
- Contour Lines - 100'
- Proposed Units
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