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Revised Cedar Creek/House Creek Commercial Thinning Environmental Assessment

Umpqua Resource Area Field Office
Coos Bay District
Bureau of Land Management

EA OR-125-99-03

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CHAPTER I: PURPOSE AND NEED FOR ACTION

The Bureau of Land Management, Umpqua Resource Area, has reviewed its past stand exams of the Paradise and Mosetown Creek area, which indicate that approximately 664 acres of the 40 year old stands would benefit from a commercial thinning. The purpose of the action within the General Forest Management Area (GFMA) and Riparian Reserves (RR) is to increase vigor and growth rates of forest stands, increase wind firmness and root structure, and specifically within the RR to recruit large diameter conifer trees. The need for the action is demonstrated by the uniform structural condition, low tree species diversity, and heavy stocking of the stands, which will cause reduced tree growth rates and reduced stand vigor as competition increases. Approximately 66 acres of Riparian Reserves would be thinned in order to meet Aquatic Conservation Strategy Objectives. The Aquatic Conservation Strategy is a portion of the Northwest Forest Plan developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands. The ROD/RMP (USDI 1995(a), p. 13) states that we should "Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives." The Umpqua Resource Area of the Coos Bay District Bureau of Land Management proposes to commercially thin these 40 year old forest stands of Douglas-fir. The proposed thinning project is located in Sections 27, 33, and 35 of T. 21 S., R. 8 W., and Section 3 of T. 22 S., R. 9 W. , Willamette Meridian. Approximately 624 acres are within the USGS defined 5th field watershed 170030304, specifically the Paradise Creek Drainage, which is a Tier 1 Key Watershed. The remaining 40 acres are within USGS defined 5th field watershed 170030306, specifically the Mosetown Creek Drainage, and are not located in a Tier 1or Tier 2 Key Watershed as defined by the Northwest Forest Plan.

The proposed project area is within the GFMA and RR Land Use Allocations (LUA) as designated by the *Coos Bay District's Resource Management Plan (RMP) and Environmental Impact Statement* (BLM, 1995). This Environmental Assessment (EA) OR125-99-03, addresses site specific, direct, indirect, and cumulative effects of this proposal. The 664 acre thinning is expected to remove the suppressed, intermediate, and some of the co-dominant Douglas-fir trees competing with each other for growing space. Approximately 7 to 11 mbf/acre would be removed. Table 2 lists the approximate acreage in each of the seven proposed units.

This EA is tiered to the *RMP* and its Record of Decision (BLM, 1995) which is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old -Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan)* and its Record of Decision (Interagency, 1994).

A watershed analysis document for the Paradise Creek Watershed, a Tier 1 Key Watershed, has been prepared. This document is available for review at the Coos Bay District Office of the BLM.

The analysis file for this EA, containing such things as Interdisciplinary team meeting notes, specialists' reports, silvicultural prescriptions, stand exam data, etc., is located at the Coos Bay District Office, and is hereby incorporated by reference.

The preliminary scoping process consisted of an interdisciplinary team defining the issues and alternatives that would be examined in detail in the EA. The public was informed of this planned EA through the Coos Bay District's *Planning Update* sent to individuals and organizations on the District's mailing list on December 17, 1998. In addition, letters were sent out to specific individuals and organization on December 21, 1998, notifying them of the scoping period.

Management Objectives

- Thin densely-stocked young forest stands within GFMA and RR to enhance the growth and vigor of the residual stand.

- Manage the forest stand within the RR to acquire desired vegetation characteristics needed to attain the Acquatic Conservation Strategy Objectives. (NWFP ROD p. C-32) The primary objective being development of large conifer trees adjacent to streams to provide long term benefit to acquatic habitat structure. A secondary benefit to upland species is to stimulate the growth of understory vegetation, and increase the natural regeneration of conifer and hardwood species.

- Manage the road system within the Paradise Creek Key Watershed in accordance with the Transportation Management Plan through the Transportation Management Objectives process.

- Produce a sustainable supply of timber, provide jobs, and contribute to community stability by removing excess trees that would otherwise be lost to mortality.

Work toward meeting the Coos Bay District's Probable Sale Quantity (PSQ) for Fiscal Year 2000 and 2001as identified in the RMP and the Northwest Forest Plan.

Protect structural features such as snags and down logs, and maintain large remnant trees.

Issues Identified by the public

Issue: Umpqua cutthroat viability, coho salmon and other fisheries resources - Response: Aquatic resources, including anadromous and resident fish species are not expected to be adversely impacted by the proposed actions. By combining standard BMP's (best management practices) with project design features (such as restricting new road construction to ridge tops, road decommissioning, seeding and mulching exposed soils, full suspension yarding over streams, and streambank no-harvest buffers) the risk of negative impacts to water quality and aquatic life, including resident and anadromous fisheries and their habitat, is negligible. No harvest related activities will occur immediately on or over known fish bearing streams. Local haul routes are ridgetop and graveled surface with no stream crossings, while collector haul routes are all paved and have well stabilized stream crossings.

Over the long term, the habitat of dependant fish and aquatic organisms will improve as stocking levels of dense young conifer stands within the Riparian Reserves are managed to set stand trajectory to achieve mature forest characteristics.

Issue: Landslides affecting Highway 38 - Response: None of the units drain directly into Highway 38. Unit 1 of the Cedar Creek C. T. has approximately 8 acres of the unit situated on a gentle bench that is about 3/4 of a mile from Highway 38. This portion of the unit is less than 30% and has no distinct drainage features. The remainder of the sale units drain into small tributaries of either House or Cedar Creek.

Issue: Actual road densities - Response: BLM road mileages for Key Watersheds has recently been reinterpreted to include all BLM roads on both BLM and private lands as well as private roads on BLM administered lands (I. B. No. OR-2000-134). Table 1 lists the baseline data for the Paradise Creek Subwatershed, as well the proposed projects.

Table 1 - Past, Present, and Future Road Mileages within the Paradise Creek Subwatershed

Paradise Creek Subwatershed	1994 BLM lands	1994 Non-BLM lands	1994 Paradise Base	1995 Road Decomm.	2000 Net Road Miles Paradise	Proposed Road Decommissioning*	2000+ Roads Paradise
	Miles	Miles	Miles	Miles	Miles	Miles	Miles
BLM BST	6.43	7.48	13.91	0.00	13.91	0	13.91
BLM ROCK	11.55	5.01	16.56	2.05	14.51	1.3	13.83
BLM NAT	9.59	1.71	11.3	1.65	9.65	1.3	8.35
BLM SUBT.	**27.57**	**14.2**	**41.77**	**3.70**	**38.07**	**2.6**	**36.09**
PVT BST	0	0	0	0	0	0	0
PVT ROCK	0.74	0	0.74	0	0.74	0	0.74
PVT NAT	2.15	0	2.15	0	2.15	0	2.15
PVT SUBT	**2.89**	**0**	**2.89**	**0**	**2.89**	**0**	**2.89**
NON-INV	6.76	0	6.76	0.47	6.29	1.3	4.99
TOTALS	**37.22**	**14.2**	**51.42**	**4.17**	**47.25**	**3.9**	**43.97**

*This includes closure of project and non-project roads. Some of these roads may be improved and change surface type through this project. Their present surface type is shown in this table for simplicity.

Issue: Other wildlife habitat resources (red tree vole and other surveys will be completed in accordance with the Northwest Forest Plan). Response: Red tree vole and other surveys will be completed in accordance with the Northwest Forest Plan and the S&M SEIS Amendment. See Wildlife writeup on page13 of this EA

Alternatives considered but rejected.

An alternative access route to unit 4 of Cedar Creek C. T. would have followed the existing House Creek Road, 22-8-2.0, and then utilized a Roseburg Forest Products (RFP) road that crosses House Creek. This proposed haul route was rejected because another route utilizing RFP roads that originate off of the Paradise Creek Road, 22-9-9.0, that runs adjacent to unit 4 could be used. The other route would alleviate crossing House Creek and facilitate the removal of an in-stream culvert in House Creek on the 22-8-34.2 road and allow the closure of House Creek Road, 22-8-2.0.

CHAPTER II: DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the proposed action and alternatives.

Alternative 1 - No Action
The proposed project area would not be thinned at this time, but could potentially be proposed for thinning at a later date. Another project area would be proposed for harvest to meet the objectives for the GFMA in accordance with the District's RMP.

Alternative 2 - Proposed Action - Commercial thinning
Under this alternative, about 488acres of GFMA land, 132 acres Riparian Reserves (RR) would be thinned using a cable yarding systems (Table 2 is a summary of GFMA and RR acres to be thinned) and about 44 acres of RR would remain unthinned. About 8 acres of alder would be converted The forest stands would be managed for present and future timber production by thinning Douglas-fir to a level of approximately 100 to 135 trees per acre (tpa). At this stage of stand development, the thinning within the RR would be similar to the GFMA. Since these forest stands are overstocked maintaining windfirmness and enhancing growth are the overriding objectives. Trees within the Cedar Creek C.T., as well as units 3 and 4 of House Creek C. T., would be marked by the BLM personnel. The marking prescription would be to thin from below to a residual tpa of 100 to 135 tpa, with some codominants and dominants taken for spacing. Units 1and 2 of House Creek C. T. will be offered as a purchaser select. Unit 1 would be thinned from below to an average basal area of 120 with 12 inches as the upper diameter limit for cutting. Unit 2 would be thinned from below as well to a residual basal area of 120 with 11 inches as the upper diameter limit for cutting.

All existing coarse woody debris would be retained. Snags would be retained providing they do not pose a safety hazard. A 20 foot No-harvest buffer will be left on either side of all streams. If yarding occurs over intermittent streams it would be done to minimize impacts; yarding corridors would be as close to perpendicular as possible, full suspension will be required and if full suspension is not possible yarding will take place in the dry season. Landings will be located along roads adjacent to harvest areas to facilitate yarding away from small intermittent draws. Skyline corridors will be parallel to each other where possible rather than pin-wheeling from a central landing, All new construction, dirt roads and landings will be seasonally maintained prior to winter rains if planned to be used the following year. Seasonal maintenance may include, but is not limited to, providing adequate water bars, mulching at a minimum of 2000 lbs. per acre using wood chips or straw and seeding with a district approved erosion control seed mix. One proposed dirt spur will be constructed within the RR of a small intermittent stream in unit 4 of House Creek C. T. All other roads to be constructed will be located outside of the RR. Existing roads within the Paradise drainage have been identified for closure. Table 2 and 3are a summaries of the Proposed Action for both sales.

Table 2 - Estimated acreage of GFMA and RR within the eight proposed units.

Cedar Creek Commercial Thinning							
Unit Numbers	Township-Range-Section	GFMA acres	Total Riparian Reserve Acres to be thinned	No-Harvest Riparian Reserve Acres	Total Unit Gross Acres	Percentage Riparian Reserve to be thinned	FOI Symbol
1	21-8-33	72	18	6	96	75 %	S_D3-=,1958
2	22-8-3	17	6	2	25	75%	PL_D3 -=,1960
3	22-8-3	110	30	10	150	75 %	PL_D3 -=,1960

Cedar Creek Commercial Thinning							
4	22-8-3	34	12	4	50	75 %	PL_D3-=,1966
Total acres		233	66	22	321	75 %	
House Creek Commercial Thinning							
1	21-8-27	56	11	4	71	73 %	PL_D-=, 1959
2	21-8-27	38	14	4	56	78 %	PL_D-=, 1959
3	21-8-35	131	25	8	164	76 %	S_D3-=,1960
4	21-8-35	30	16	6	52	73 %	S_D3-=,1960
Total acres		255	66	22	343	75%	

Table 3 - Proposed Road Construction/Improvement/Renovation/Decommissioning for Cedar Creek/ House Creek C. T.

Cedar Creek Commercial Thinning				
Unit number/ T-R-S	Gross Acres	New Road Construction*	Road Renovation/Improvement All are Permanent Roads	Proposed Road Decommissioning
1 21-8-33	96	10 stations (rock)	22-8-10.1// 2.87 miles (R) Cedar Cr. Rdg. 21-9-36.1//.7 mile (R) Cedar Cr. Rdg. 21-8-33.0// 28 stations (I) 22-8-4.0 14 stations (I)	Unnumbered spurs 21 stations + 12 stations 21-08-34.1 15 stations
2 22-8-3	25	6 stations (dirt)	Unnumbered spur//26 stations(R) (dirt)	
3 22-8-3	150	18 stations (dirt) 4 stations (rock)	22-8-3.1//30 stations (I)	22-8-3.1 All 34 stations
4 22-8-3	50		21-8-34.2// 12 stations (I). Unnumbered Spurs 8 stations (R)(dirt) 21-8-2.4// .5 miles(R)	Unnumbered spurs 14 stations +
Totals	**321**	**14 stations (Rock) 24 stations (dirt)**	**4.07 miles (R)(rock) // 34 stations (R) (dirt) // 84 stations (I)**	**89 stations**
House Creek Commercial Thinning				
Unit number/ T-R-S	Acres	New Road Construction	Road Renovation/ Improvement All Roads are Permanent	Proposed Road Decommissioning
1 21-8-27	71	15 stations (dirt)	22-8-9.0// 2.6 miles (R) Paradise Cr 21-9-24.1//1.1 miles (R)Graveyard	House Cr.22-8-34.0B 12 stations// 21-8-27.1 8 stations
2 21-8-27	56	12 stations(rock)	22-8-2.1// 2.05 miles (R) House Cr. Rdg.	House Cr. Rdg. 22-8-2.1 6 stations
3 21-8-35	164	38 stations(rock)	21-8-35.1// 20 stations (I)	2 Unnumbered roads 5 & 14 stations
4 21-8-35	52	12 stations(dirt)	21-8-14.1//2.8 miles(R) 21-8-25.1//.8 mile(R) 21-8-26.1 2 stations (R)	

Unit number/ T-R-S	Gross Acres	New Road Construction*	Road Renovation/Improvement All are Permanent Roads	Proposed Road Decommissioning
Totals	**343**	**50 stations (rock) 27stations (dirt)**	**9.35 miles (R)(rock) //20tations (I) 2 stations (R)**	**45 stations**
22-8-2 21-8-34				House Cr. 22-8-2.0 66 stations 22-8-34.0 12 stations
Totals for Sales	**664**	**64 stations (rock) 51 stations (dirt)**	**13.42 miles (R) (rock) //34 stations (R) (dirt) // 104 stations (I) 2 stations (R)**	**134 stations BLM and 78 stations on House Creek 22-8-2.0 + 22-8-34.0**

* R - Road Renovation, I - Road Improvement

Cedar Creek Commercial Thinning

Unit 1

This unit is about 96 acres, 72 acres of GFMA and 24 acres in RR. Three small ridgetop spur roads will be constructed off the 22-08-36.1, Cedar Creek Ridge Road, a rocked road. The 10 stations of proposed roads are outside of RR, have no stream crossings, will be rocked and will have proper drainage structures. The 22-08-4.0 and the the 22-08-33.0 road are existing natural surface roads that will be improved with a lift of rock and additional ditch relief culverts to allow for winter haul. Neither road has any stream crossings.(See Proposed Road Construction and Decommissioning Map in Appendix 1)

This unit will be thinned from below to a residual density of approximately 115 tpa. or a relative density (RD) of 37. The unit will be skyline cable logged with one-end suspension. The road right of way (R/W) will be logged with ground based equipment. Landings will be placed along all roads to eliminate the need to yard across an ephemeral streams. The road R/W will be logged with ground based equipment during the road construction period.

Unit 2

This unit is about 25 acres, 17 acres in GFMA and 8 acres in RR. A 6 station ridgetop dirt road will be constructed off an existing dirt road that will be renovated. Both the new construction and the renovation of the existing road will be fully decomissioned (See Proposed Road Construction and Decommissioning Map in Appendix 1). There are no stream crossings on either of these roads. This unit will be thinned from below to a residual stand density of approximately 120 tpa, a RD of 35. The unit will be skyline cable logged with one-end suspension. The road R/W will be logged with ground based equipment. A small intermittent stream bisects the unit. This unit will be logged in the dry season. A one acre hardwood conversion patch cut is proposed in the north corner of the unit. (See Timber Sale Map in Appendix 1) This area will be planted to Douglas-fir, cedar, and hemlock following harvest.

Unit 3

This unit is about 150 acres, 110 acres in GFMA and 40 acres in RR. The 22-8-3.1, is a dirt road that will be improved with a lift of rock. There are several stream crossings but all the culverts located along the 3.1 are fully functioning. A 12 station ridgetop dirt swing road will be constructed off the 22-08-3.1 in the south portion of the unit. This proposed dirt road follows an old cat road Landings will be located along roads adjacent to harvest areas to facilitate yarding away from small intermittent draws. An additional 4 stations of road will be needed to yard the SE portion of unit 3 above the 22-8-10.1 road. This road is located on an old catroad and follow a bench. It is outside of any RR. A 5 acre hardwood conversion is proposed for this unit. This area is an alder and fir mix with alder being the predominant species. The alder would be removed and the vigorous fir would be left. A small corner of the conversion is within the RR but 150 feet from the stream while the bulk of the conversion is within the GFMA. The area would be underplanted to Douglas-fir, cedar, and hemlock following harvest. A 6 station dirt spur will be constructed off the existing dirt system to access the patch cut and thinning in the north portion of the unit. The remainder of the unit will be thinned from below to approximately 120 tpa or a RD of 35. The unit will be logged with a skyline cable system utilizing intermediate supports to achieve one end suspension. The road R/W will be logged with ground based equipment. All the roads within the unit will provide a continuous landing opportunity so that it will be unnecessary to yard across streams.

Unit 4

This unit is about 50 acres, 34 acres in the GFMA and 16 acres in RR. This unit will require renovation of 26 stations of RFP, 22-8-2.4 road. This is a rocked ridgetop road with no stream crossings. An existing 14 station spur road that parallels this road will be closed. Twelve stations of the 21-8-34.2 road will be improved with a lift of rock. This road follow a broad bench and has no stream crossings. In addition , 8 stations of an un-numbered dirt road in the northwest corner of the unit will be renovated.. The unit will be skyline cable

logged with one-end suspension. The roads will serve as a continuous landing. All yarding will be directed away from small streams within the unit. The road R/W will be logged with ground based equipment. This unit will be thinned from below to a residual tpa of approximately 124 or a RD of 33.

House Creek Commercial Thinning

Unit1
This unit is about 71 acres, 56 acres GFMA and 15 acres in RR. Approximately 15 stations of new ridgetop construction will be necessary to log the unit. All new roads will be dirt. All roads are outside of the RR. The unit will be skyline cable logged with one-end suspension. The road R/W will be logged with ground based equipment. This unit will be thinned from below, to a residual stand density of about 139 tpa. If the unit is a purchaser select, an upper cut diameter limit of 10 inches, could be used as a cutting guide to bring the stand to about 139 tpa or a RD of 40.

Unit 2
This unit is about 56 acres, 38 acres in GFMA and 18 acres in RR. Approximately 12 stations of new construction will be necessary to log this unit. The new road construction will be rocked. The new construction is outside the RR and will have both ridgetop and sidehill construction. The unit will be skyline cable logged with one-end suspension. The road (R/W) will be logged with ground based equipment. This unit will be thinned from below to a residual stand density of about 139 tpa. This would bring the RD to 35.

Unit 3
This unit is about 164 acres, 131acres in GFMA and 33 acres in RR. Approximately 38 stations of new construction and 20 stations of road improvement will be necessary to log this unit. All the new construction is either located on a ridgetop or a broad bench. All new construction is located outside of the RR and will be rocked. The 21-8-35.1 road will be rocked. This road is located on a gentle sidehill and a broad bench with no stream crossings. The roads will be used as continuous setting for landings. All yarding will be directed away from streams. The unit will be skyline cable logged with one-end suspension. The road RW will be logged with ground based equipment. This unit will be thinned from below to a residual density of about 154 tpa. The RD for this stand will be 35.

Unit 4
This unit is about 52 acres, 30 acres in GFMA and 22 acres in RR. Approximately 12 stations of new construction will be needed to log the unit. This road is located on a gently sloping bench. and is within the RR of a small ephemeral draw. The unit will be skyline cable logged with one-end suspension. It will be necessary to yard through several small ephemeral draws. This will be done in the dry season. The road RW will be logged with ground based equipment. This unit has the same cutting prescription as unit 3. This unit will be thinned from below to a residual density of about 135 tpa. The RD for this stand will be 33 following harvest.

Project Design Features
Approximately 664 acres of 40 year old Douglas-fir would be thinned to approximately 100 to 130 tpa with a spacing of about 18 to 20 feet, by removing the suppressed, intermediate, and some co-dominant Douglas-fir. The remaining trees would be available for future crop trees.

Harvest

- Thinning will be done from below removing the suppressed, intermediate, and some co-dominant Douglas-fir, with a resulting spacing of between 18 X 18 to 20 X 20.
- Isolated hardwoods and minor conifer species will be left but dense patches will be thinned.
- Cutting or yarding during high sap flow, March 1st through June 30th, will be restricted as directed by the Authorized Officer.
- One end suspension will be required during in-haul of logs during yarding operations. Intermediate supports may be required to obtain desired suspension.
- Where roads allow, yarding will be done so that corridors are parallel, rather than radiating from one central landing to avoid yarding across ephemeral streams.
- Corridors will be 150 feet apart, as measured from the tailhold or where the skyline reaches the far edge of the unit, and a carriage capable of yarding laterally 75 feet in either direction from the skyline corridor will be required.

Yarding corridors will be kept to a minimum width, 12 feet. Where possible, trees will be left to protect leave trees along the corridors. If trees to be removed in the corridors adversely affect spacing in the resulting stand, previously marked trees may be decruised to bring spacing back to the desired level.

A minimum 20 foot slope distance no-harvest buffer would be maintained on each side of the small ephemeral stream channels within the unit boundaries. Corridor trees cut within the 20 foot t no-harvest buffer along the ephemeral stream will be left on-site.

Where cable yarding is required through the no harvest buffer, logs will be fully suspended to protect streambanks. Trees that are felled within the no harvest buffer to provide yarding corridors will be dropped toward the stream channel to provide bank armoring and coarse woody debris. Where full suspension is not feasible, operations over any stream with visible surface flow will occur during the dry season.

Cut, drop, and leave, on and/or over selected streams, an average of 1 co-dominant conifer trees, per 100 linear feet of stream channel. Trees can be selected from the no harvest buffer width or from the management thinning area adjacent to the channel, where optimal, to reach the channel. A portion of the lower ½ tree height must always reach the stream channel. Suitable trees which are felled for yarding corridors may count towards this design feature.

Where hardwood trees dominate the canopy, and no conifer trees are available close enough to meet the "lower ½ tree on channel" requirement, then large red alder trees can be used. Red alder that shade living understory conifer trees and can reach the channel should be the highest priority for cutting.

The road right-of-way will be yarded with ground based equipment.

All Plus trees (genetically superior trees based on physical characteristics) will be reserved. These trees can be identified by red numbering or aluminum flashing surrounding trees.

Directional felling will be required away from stream channels and reserve areas.

All existing snags will be reserved from felling unless there are safety concerns.

Residual old growth trees may be used as either intermediate or tail supports but will be protected from damage.

All existing coarse woody debris will be retained.

All trees will be bucked to 40 feet maximum lengths with tops and limbs will be left on-site.

Roads

Road construction will incorporate design features to protect water quality. These BMPs (USDI 1995 (a), pp. D3-D4) may include but are not limited to avoiding fragile or unstable areas, minimizing excavation and height of cuts, endhaul of waste material where appropriate and construction during the dry season.

All new construction will be ridgetop or near ridgetop on stable slopes and benches.

Any offsite movement of sediment from newly constructed roads and ditches near streams will be contained with silt fences or sediment entrapping blankets or straw bales, if haul occurs during the rainy season (mid-October to mid-May). Such control measures must allow for the free passage of water without detention or plugging. These control structures and applications should receive frequent maintenance, and be removed at the completion of haul, with sediment retained by the filters to be transported to an upland location to prevent subsequent delivery to aquatic resources.

All new construction, dirt roads and landings will be seasonally maintained prior to winter rains if planned to be used the following year. Seasonal maintenance may include, but is not limited to, providing adequate water bars, mulching at a minimum of 2000 lbs. per acre using wood chips or straw and seeding with a district approved erosion control seed mix.

All newly constructed roads will be fully decommissioned when project activities are completed. Full decommissioning as defined by the Transportation Management Plan (USDI 2001, pg 15) may include, but is not limited to, subsoiling or tilling, removal of stream crossings and cross drains, construction of adequate water bars, stabilizing fill areas, revegetation and blocking access with a suitable barrier.

All road cuts and fills will be seeded with native grass, if seed is available. If none is available, then an approved BLM seed mix will be used.

All material overhanging the edges of landings will be pulled back.

Noxious Weeds

All road construction and logging equipment would be washed prior to moving into, and upon leaving, the proposed sale area to minimize the spread of noxious weeds and the Port-Orford-cedar pathogen, *Phytophthora lateralis*.

All haul routes containing noxious weeds will be brushed prior to any activity to reduce the spread of noxious weeds.

Threatened or Endangered, Survey and Manage and Special Status

If Threatened or Endangered or Special Status plant, animal, or fish species, as listed in the *Coos Bay Districts Resource Management Plan* and its Record of Decision, or Survey and Manage species listed in the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, are found in the sale units, management guidelines for the species will be implemented.

Figure 1 - Cedar Creek C. T. Unit 1

A standard special provision will be included in the contract to protect Threatened and Endangered (T & E) species found on the site after the contract is awarded.

Hazardous Materials

The timber sale contract will contain provisions for compliance with the State of Oregon Department of Environmental Quality (ODEQ 1998) and Oregon Department of Forestry *Forest Practices* (ODF 1998) guidelines for spill response and containment. Site monitoring for solid and hazardous waste will be performed during all operations in conjunction with normal contract administration. Any spills or releases resulting from operations shall be subject to the *Coos Bay District Hazardous Materials Management Contingency Plan* (USDI BLM 1997). Post-harvest road closures will reduce the potential access to sites for illegal dumping. Hazardous material reportable quantities are defined in ORS Chapter 4661, Hazardous Waste and Hazardous Materials 466.605 to 466.680.

Figure 2 - Cedar Creek C. T. Unit 3

Cultural

Upon discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony and pursuant to 43 CFR 10.4(c) and (d), all activities within the vicinity of the discovery will stop and be protected for 30 days or until notified to proceed by the authorized officer.

CHAPTER III: AFFECTED ENVIRONMENT

The description of the existing conditions reflects the application of the No Action Alternative and is the baseline for measuring the effects of the Proposed Actions.

The 1951 Vincent Creek Fire burned over 28,000 acres some of which occurred in the Paradise Creek Watershed. The current forest stands within these sales are 40 years old and were logged under contract during the mid-1950's. These stands developed from the

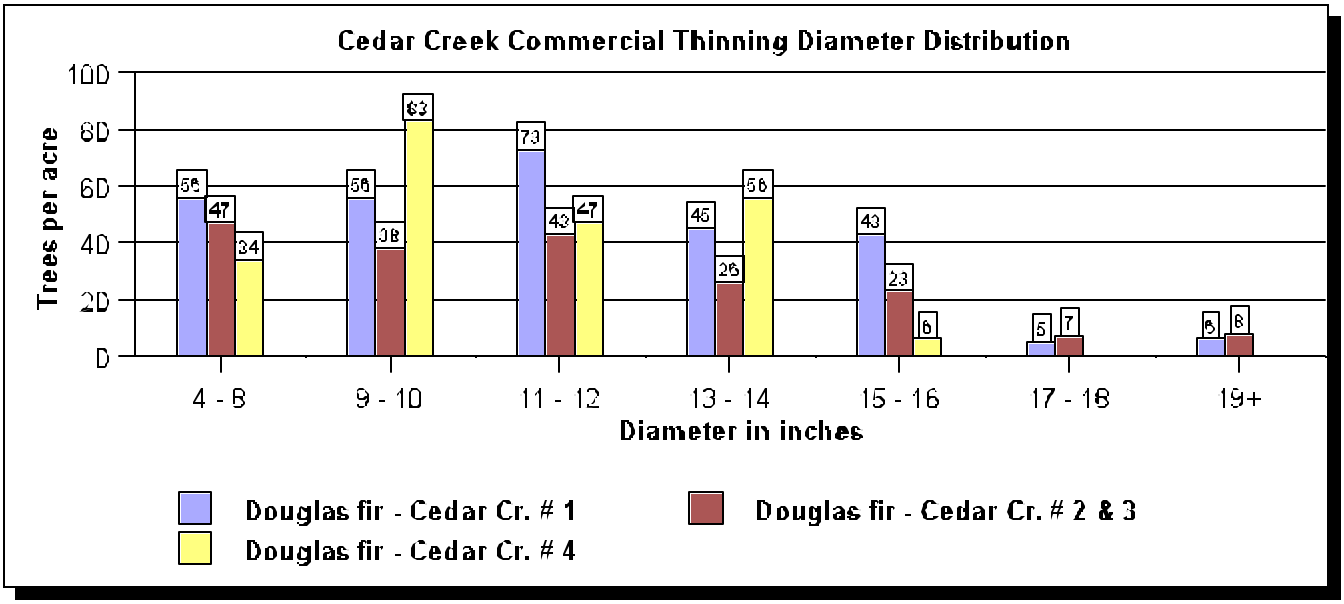

Figure 3 -Diameter Distribution for Cedar Creek C. T.

planting of Douglas-fir and from natural and aerial seeding. The proposed sale area consists primarily of a single canopy layer of Douglas-fir, with small numbers of scattered western hemlock, grand fir, big leaf maple, and red alder. The alder is scattered in small clumps or associated with streams and roads. The project area is outside the range of Port Orford cedar. No Pacific yew trees have been identified in the vicinity.

STAND DEVELOPMENT

Cedar Creek - Unit 1

This area was seeded with Douglas Fir in 1958. It was precommercially (pct) thinned in 1975 to 300 trees per acre (tpa) or a spacing of 12 X 12. The area was fertilized in 1990 with 400 pounds per acre of urea. The stand today is in stem exclusion. The stand has very little development in the shrub layer and almost no minor species regeneration. The primary component of the present shrub layer is swordfern on the north and east aspects with salal on the drier ridgetops and west aspects. The few riparian areas within the proposed unit have an alder ribbon close to the draw with a swordfern shrub layer. The stand presently supports about 275 tpa, with a RD of 62. The range of tree densities is from a low of 219 tpa to a high of 408 tpa, with average plot diameters of 13.5 inches and 9.9 inches respectively. The diameter distribution can be seen below in Figure 1. Coarse woody debris (CWD) is relatively abundant over most of the unit, with 870 feet per acre in Decay Class 4, 124 feet per acre in Decay Class 5, and 186 feet per acre of Decay Class 2, in pieces 16+ feet in length. There is a small portion of this unit that falls to the south of the Cedar Creek Ridge road, 21-9-36.1. The aspect is south. This area did not get a pct, and has stocking levels of 500+ tpa. There is almost no shrubs present. This area was subjected to repeated fires and as a result has minimal amounts of CWD.

Cedar Creek - Units 2 & 3

These two stands are a combination of several units harvested in the late 50's and early 60's with one small portion harvested in 1969. The bulk of these stands were planted in 1957 with Douglas Fir. About 36 acres was interplanted in 1960. Portions of the area were pct'ed in 1975 to a 12 X 12 spacing. A follow up survey in 1977 revealed the area to have about 327 tpa. The forest stand was fertilized

in 1990 with 400 pounds per acre of urea. The stand exam done in 1996 showed that the present stocking levels stand at about 203 tpa with about 195 tpa of Douglas-fir with the remainder in grand fir, western hemlock, and bigleaf maple (see Figure 1 below). The RD is 46. Stand densities range from a low 59 tpa with an average diameter of 18 inches to a high of 365 tpa with an 9 inch average diameter. The portion of the stand that was harvested in 1969 has 366 tpa with an average stand diameter of 9.4. This was examined in 2000. Red alder and big leaf maple can be found scattered in upslope positions but are principally associated with the small intermittent streams. Douglas-fir is still the dominant species within these areas. Two small areas of red alder have been identified in these stands. These areas were once dominated by conifer. The density of these forest stands vary from a low tpa of 52 to a high tpa of 372. The shrub layer varies correspondingly with virtually no shrub layer in the densest part of the stand to a well developed shrub layer in the areas of lower stocking. Shrub species is consists with swordfern on the moist slopes, north and east, and salal on the drier aspects, south and west. Coarse woody debris in the area consists of decay class 2, 3, 4, and 5. In pieces 16 feet in length and longer, the stands have 37 feet, 92 feet, 758 feet, and 18 feet, respectively.

Cedar Creek - Unit 4

This area was harvested in 1965 and planted in 1966 with 2-0 stock at an 8 X 8 spacing or 680 tpa. A survey in 1977 showed the stand density at 378 tpa. The stand was pct'd in 1979 to a 12 X 12 spacing or 300 tpa and was fertilized in 1990 . A stand exam done in 1996 showed that the density had dropped to 231 tpa with only about 4 tpa of western hemlock, the remainder was in Douglas- fir or 227 tpa. The stand densities range from a low of 94 tpa with a 12.5 inch average plot diameter to a high of 327 tpa with an average plot diameter of 10.6 This stand is fairly uniform overall in spacing on the benchy portion. This unit has some small intermittent draws inside the unit with some spotty alder along the creek edges. The shrub layer is almost nonexistent over most of the unit. Coarse woody debris in the area is represented by decay class 1, 2, 3, 4, and 5. In pieces 16 feet in length and longer, the stands have 152 feet, 76 feet, 76 feet, 1140 feet, and 152 feet, respectively.

House Creek - Unit 1 & 2

These stands were planted in 1959 to an 8 X 8 spacing or 680 tpa. These young stands received no further silvicultural treatment for several reasons. They were on steeper topography, unit 1, 70 to 80% slope, and unit 2, 60 to 70 %. The access to these stands was on dirt roads. As a result, these stands were a low priority during the 70's for pct. The 1996 stand exams for these stands were fairly similar with unit 1 having an average of 459 tpa and unit 2 with 622 tpa. The range in tree densities for unit 1 was a low of 118 tpa to a high of 1492 tpa. The diameters correspond to densities with average plot diameters of 11.1 on the low density and 5.7 on the higher density plot for unit. Table 4 displays stand exam datafor all stands. Unit 2 has a range of stocking levels, from a low of 300 tpa with average plot diameters of 9.9 inches to a high of 2,597 with an average plot diameter of 4.6 inches. Figure 4 displays the diameter distribution for the House Creek C. T. Unit 1 is on an exposed ridgeline and as a result has more snowbreak and windthrow near the top of the unit. The stand does have some holes on stocking and the shrub layer is more developed in the small openings but almost nonexistent in the bulk of the stands. Coarse woody debris within unit 1 is present in all decay classes 1, 2, 3, 4, and 5. In pieces 16 feet in length and longer, the stand has 83 feet per acre in class 1, 124 feet in class 2, 269 feet in class 3, 187 feet in class 4, and 83 feet in class 5. Unit 2 has CWD in decay class 3, 4, and 5. In pieces 16 feet in length and longer, the stand has 410 feet per acre in class 3, 410 feet in class 4, and 55 feet in class 5.

Table 4 - 1996 and 2000 Stand Exam Data updated to 2001

Unit number	Acres	Trees per acre(tpa)	cut tpa	residual tpa	Age at thinning	Average Stand Diameter	Cut diameter	Residual diameter	mbf /acre	cut mbf/acre	residual mbf/acre
Cedar Creek Commercial Thinning											
1	96	266	147	115	40	12.7	10.2	15.3	39	11	28
2	25	199	79	120	38	12.8	10.1	14.1	30	6	24
3	150	199	79	120	38	12.8	10.1	14.1	30	6	24
4	50	226	107	119	31	12.2	9.8	14.0	27	7	20
House Creek Commercial Thinning											
1	71	459	335	119	39	9.6	7.3	14.5	24	7	17
2	56	622	462	140	38	8.1	7.1	12.9	18	5	13
3	164	397	249	154	38	9.4	7.6	11	24	9	15
4	52	535	427	135	37	8.7	7.1	12.7	30	12	18

House Creek - Unit 3 & 4

These two stands were seeded in 1960 and portions were subsequently interplanted at an 8 X 8 spacing or 680 tpa. A survey in 1977 showed that the stand density was down to 320 tpa. No silvicultural treatments were ever recommended again for the same reasons outlined for units 1and 2, ie. access, etc. These stands are now in the stem exclusion phase and as such have very little shrub layer development. The stand exam showed the stand density in unit 3 to be about 397 tpa with an average stand diameter of 9.4 inches. The range in stand densities was from a low of 53 tpa with an average plot diameter of 14 inches to a high of 1083 tpa with plot diameter of 8. Table 4 shows the results of the stand exams. The minor species in unit 3, especially the hardwoods, are located lower down near the draw areas. Red alder is almost always the canopy in the perennial draws. Alder may be found in the ephemeral draws as scattered clumps or isolated trees. In unit 4, there is red alder, along the main draws and also mixed in with some of the Douglas-fir on the benchy ground. In unit 4, stand density is about 535 tpa with an average stand diameter of 8.7 inches. The stand densities range from a low of 292 tpa with an average plot diameter of 11.8 to a high of 1189 with plot diameter of 6.6 inches. Coarse woody debris is present but only in decay class 3 and 4 for unit 3. In pieces 16 feet in length and longer, the stands have 41 feet per acre in class 3 and 896 feet in class 4. CWD for unit 4 is represented by class 2, 3, and 4 with 105 feet, 263 feet, and 368 feet, respectively.

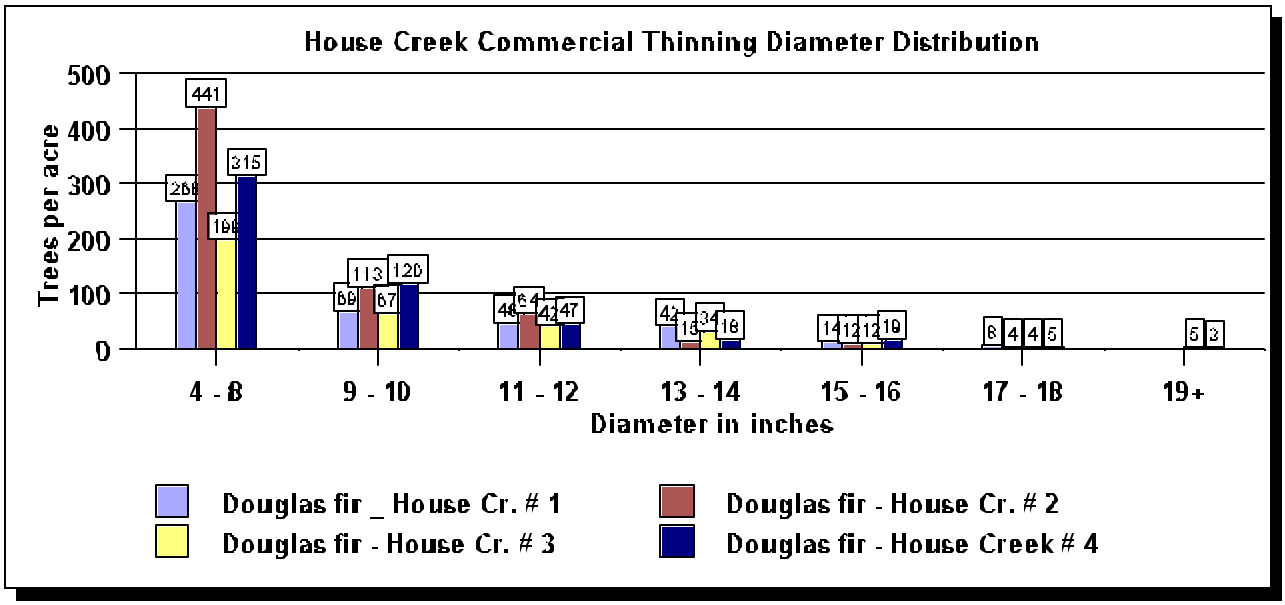

Figure 4 - Diameter Distribution for House Creek C. T.

SOILS

The Cedar Creek and House Creek Commercial Thinning Timber sales are located in the Coast Range physiographical province. The geological materials associated with the soils of the area are developed from the Tyee formation. The Tyee formation is composed of rhythmically bedded sandstone and siltstone. The Tyee tends to have high ground water in some areas, rapid runoff, steep slopes, and sharply alternating beds of sandstone and softer siltstones The potential for slumps, debris and earth flows are intensified by these characteristics.

The soils found within the proposed Commercial Thinnings are Atring-Larmine Complex, Digger-Bohannon-Umpcoos Complex, Honeygrove Gravelly Clay Loam, Preacher-Bohannon Complex, Preacher-Bohannon-Xanadu Complex, Orford Gravelly Silt Loam, Preacher Loam, Fernhaven-Digger Complex, Fernhaven-Digger Complex, Digger-Preacher Complex, Xanadu Gravelly Loam, and Digger-Umpcoos-Rock Outcrop Complex. Specific soil data can be obtained from the February 1994 Douglas County Area, Oregon Soil Inventory.

HYDROLOGY

The hydrology and climate of the area are typical of the Southern Oregon Coast Range. The high winter precipitation in the form of rain is the main factor influencing the hydrology of this area. Snowfall may occur on occasion, but it is generally light and of short duration, and does not commonly produce rain-on-snow events. Precipitation is variable, with the coast averaging about 74 inches in Reedsport, 50 inches in Elkton and well over 100 inches at the crest of the Coast Range (elevation approximately 3000 feet) (USDI

BLM(b), 1995). The distribution and duration of the precipitation and runoff/stream flow is directly related, and is evident as the high flows are observed during the winter months and low flows are predominant in the summer. This direct relationship indicates the systems are dominated by direct or storm runoff as opposed to baseflow.. Peak flows, low flows, annual flows, and groundwater levels are directly related to rainfall amount, intensity, and distribution. This correlation is due to a high drainage density, permeable soils, low depth to bedrock, high precipitation, and steep slopes.

Most of the sale area (624 acres) drains into the Paradise Creek Drainage (Tier I Key Watershed) and a small portion (44 acres) drains into Mosetown Creek Drainage. The Cedar Creek Commercial Thinning is made up of four units. Unit 1 drains mainly to the north and east into 1st and 2nd order tributaries. Unit 2 drains to the east and north and into a 1st order tributary. Unit 3 drains east into Paradise Creek Drainage and some 1st and 2nd order tributaries. Unit 4 drains southeast into a 1st order tributary and also drains a small portion of the unit southwest.

The House Creek Commercial Thinning is made up of four units. Most of Unit 1 drains to the north into Mosetown drainage while a small portion of this unit drains a 1st order tributary to the south into the Paradise Creek Drainage. Unit 2 drains southwest into some 1st order tributaries of Paradise Creek. Unit 3 drains southeast and southwest due to a ridge running north/south through the unit. Unit 4 drains some 1st and 2nd order tributaries mostly south with some of the unit draining west. All of the drainages in the sale area are low order (1-2), step/pool channels due to the gradient (energy), low sinuosity, high entrenchment, low width/depth ratio and low floodplain development.

Water Quality

The beneficial uses that are dependent on aquatic resources in this subwatershed are: anadromous fish passage, salmonid fish rearing, salmonid fish spawning, resident fish, other aquatic life, wildlife and hunting, fishing, boating, and water-contact recreation.

The 1998 303(d) lists designates Paradise Creek from it's mouths to the East / West Fork Confluence and the Smith River from the confluence of the North Fork Smith to it's headwaters, as water quality limited for temperature accedence (OR-DEQ, 2000). The BLM operates gauging stations on the West Fork Smith River and Vincent Creek, within the Smith River watershed downstream, which continuously collect stage and temperature data, as well as, precipitation gauges at Spencer Slide and at the BLM West Fork Smith Maintenance Shop.

Historic water quality conditions are difficult to determine since no specific data was collected. However, it is relatively safe to assume that, except for periodic major catastrophic events, water quality was considerably higher before large-scale timber harvest operations, extensive road building activities and farming and ranching operations occurred. The major impacts to water quality before modern development were hillslope processes, which at their extreme, were often driven by intense storm events, and fire. In the central coast range, water quality tends to recover quickly following most disturbance events due to quick invasion of vegetation on exposed soils. High water quality, however, does not always result in quality fisheries habitat if individual streams lack specific habitat features such as spawning gravels, pools, and access.

WILDLIFE

Threatened and Endangered Wildlife Species Occurrence and Habitat

There are no northern spotted owl (NSO) site centers within 1.5 miles of any of the 8 proposed units. No NSO Critical Habitat Units (CHU) have been designated within any of the sections in which the proposed action would occur. No suitable NSO habitat would be removed in this action. The habitat within the 8 units is considered suitable dispersal habitat, and the more open stand following thinning would continue to provide dispersal habitat for NSO. All suitable habitat in areas adjacent to the proposed units were surveyed, from 1991 through 1994,for NSO according to U.S. Fish and Wildlife Service (USFWS) protocol standards. There were no detections during any of the surveys.

There are no known occupied marbled murrelet (MM) sites within 0.25 mile of any of the proposed sale units. Suitable habitat exists in section 33, adjacent to Cedar Creek unit no. 1. This habitat was surveyed to protocol standards in 1995 and 1996 and no MM were seen or heard. Approximately 2.4 acres of House Creek, unit no. 4 is within 0.25 mile of unsurveyed suitable MM habitat. None of the proposed units are within designated MM Critical Habitat Units.

There are no known bald eagle nest sites, roosts, or perches within 0.5 mile of any of the proposed units. The american peregrine falcon was de-listed under the Endangered Species Act on August 25, 1999. Following de-listing ,a species is designated as a Bureau

Senstive and will be re-evaluated at the end of a five year monitoring period. There are no known peregrine falcon nest sites within 1.5 miles of any of the proposed units. There are no suitable nest cliffs for peregrine falcons within any of the proposed units.

Survey and Manage Wildlife Species and Habitat

The Draft Supplemental Environmental Impact Statement For Amendment to the Survey and Manage, Protection Buffer, and Other Mitigating Measures Standards and Guidelines (December 1999) is currently under review. The following recommendations would be subject to change, if necessary, to meet new requirements at the time of approval of a Final Supplemental Environmental Impact Statement

Surveys may be conducted for Oregon megomphix, blue-gray tail-dropper, and papillose tail-dropper prior to ground disturbing activities. These surveys would be conducted according to Survey Protocol for Terrestrial C-3 Mollusk Species from the Northwest Forest Plan. Protection measures would be implemented according to existing management recommendations.

As required surveys may be completed for red tree voles prior to habitat disturbing activities following current Regional protocol guidance. Protection measures would be applied according to the most current management recommendations available.

There are no known caves, mines, or abandoned wooden bridges or houses, that are used as bat roosts within any of the units.

No surveys or management action would be required for Del Norte salamander because the proposed action would occur more than 25 miles from the closest known site and therefore is outside of the range where surveys are required.

Other Wildlife Species and Habitat

There are no known unique or special habitat areas within the proposed units. There are very few large snags in any of the units. Course wood is abundant in all units in the advanced decay classes. Most of the existing snags and down logs do not meet the Coos Bay District Record of Decision/Resource Management Plan (ROD/RMP) recommendations due to small size or advanced decomposition class (USDI BLM). Stand development following the proposed action would provide increased availability of larger trees and improved potential to provide larger snags and coarse woody material in the future.

The proposed harvest areas are approximately 40 year-old stands and are considered a closed sapling-pole-sawtimber stand condition. These stands have canopy closure exceeding 60% and often reach 100% which allows very little light through the canopy to support ground vegetation. Stands of this type are used by approximately 36 species of wildlife for the primary purposes of feeding and/or breeding. An additional 92 species of wildlife are known to use stands of this type secondarily for feeding and/or breeding. (Brown 1985) The species composition includes large mammals such as bears, deer, elk, coyotes, bobcats and mountain lions. Smaller mammal species include: bats, shrews, moles, weasels, squirrels, chipmunks, ground squirrels, porcupines, and mountain beaver. Bird species found in habitats such as these include: Cooper's and sharp-shinned hawks, grouse, owls, and many species of songbirds. Several species of salamanders, frogs, and snakes also use closed sapling-pole-sawtimber stands such as these in the proposed harvest area.

The wildlife species that may be found in the proposed units are included in a complete list of wildlife species known to occur on the Coos Bay District. This list is in Appendix T of the Final Coos Bay District Proposed Resource Management Plan and Environmental Impact Statement, Volume II (USDI BLM, 1994). This list also indicates the status of each species. There are several special status birds, mammals, and amphibian species which could occur in the proposed units. Special status includes Bureau Sensitive, BureauAssessment, and Bureau Tracking categories. An explanation of these categories may be found in the footnote following table 3-32 of the Final Coos Bay District Proposed Resource Management Plan and Environmental Impact Statement, Volume I (USDI BLM, 1994).

FISHERIES

Aquatic Habitat, Including Special Status Species.

The Cedar Creek/House Creek commercial thinning falls within the range of three special status fish species: the Umpqua River cutthroat trout, coastal coho salmon, and winter steelhead trout. All three fish species are found in Paradise Creek. Only House Creek unit 4 is adjacent to a major 4th order tributary, Bear Wallow Creek. House Creek unit 1 boundary crosses the ridge and has four small 1st order draws in the Mosetown Creek drainage, specifically the East Fork of Mosetown Creek. These same fish species are found in Mosetown Creek, but the most recent habitat survey (ODFW 1995) did not find any fish in the upper reaches of this stream. Other fishes likely present in Mosetown Creek, Cedar Creek, House Creek, and Bear Wallow Creek are western brook lamprey, speckled dace, and up to 3 sculpin species. The only smaller tributaries known to be fish bearing (resident cutthroat only) are short reaches of a small tributary to House Creek and a small tributary to Cedar Creek.

Four general habitat surveys have been conducted in the Paradise Creek watershed over the last 40 years (1945-1985). More extensive habitat surveys were conducted by ODFW personnel in 1994 and 1996. House Creek was surveyed in 1945 only to identify the upstream extent of anadromous fish. The 1969 survey was the first to specifically address fishery habitat in main stem of Cedar Creek. By 1969, the Cedar Creek/House Creek drainage had incurred approximately 15 years of timber management. The survey noted impacts to the aquatic system by recording large amounts of in-stream silt, and the presence of debris jams. Many of these debris jams, especially in the lower reaches of the stream, were barriers to fish migration.

By 1985, habitat surveys indicated that log jams within Cedar Creek were still obstructing fish passage, while on House Cr. and Bear Wallow Cr. log jams that were not fish passage obstructions dominated the in-stream habitat. In-depth observations of other in-stream habitat features of these creeks were not compiled in the Paradise Creek Watershed Analysis.

The 1996 ODFW Stream habitat survey addressed habitat conditions in both Cedar Cr. and House Cr. This survey showed that main stem Cedar Creek, downstream and adjacent to the Cedar Creek sale units, had good numbers of large woody debris pieces and volume, and that most of it was found in the upper two thirds of the survey reach. Much of this wood was fire scarred and had cut ends and were cull logs left from the early logging. Most of the quality pool habitats were found in the upper one-half of the survey and were associated with these concentrations of large woody debris. Gravel dominated the substrate type in the upper reaches. The lower one third of the survey reach consisted of a sloping bedrock substrate with little woody debris and few pool habitats. The log jams, first noted in the lower reaches 27 years earlier, were gone. What remains in this lower third of the stream is shallow, sloping, bedrock cascades that are impassable to fish, and provides very little fishery habitat. House Creek contained good spawning gravel in the lower one-third and contained many log jams that were possible barriers to upstream fish migration. Bear Wallow Creek was observed to lack good in-stream habitat features and was littered with log jams, a few of which were barriers to upstream fish migration.

Habitat survey summaries done in 1994 for House Creek and 1996 for Cedar Creek are available at the CBDO. Most habitat measurements when compared to ODFW benchmarks fell in the fair to poor range.

Mosetown Creek has had 4 general habitat surveys done since 1956. None of these surveys were carried out to the 1st and 2nd order draws contained in the House Creek Unit #1.

Attaining proper functioning condition, with respect to the physical, biological, and chemical condition of the riparian zone, is the desired future condition for these streams. Features of a properly functioning stream habitat and riparian zone begin in the riparian forest generally occur at 80+ years old. The percent of riparian zone vegetation less than 80 years of age for each watershed is 72% for the Paradise Creek watershed and 90% for the Oxbow watershed. Nearly 60% is 40 years of age and younger in the Paradise Cr. watershed, while that figure is 86% for the Oxbow watershed. These numbers probably reflect not just the habitat condition within the riparian zone but the Riparian Reserve widths as well. Achieving properly functioning condition in these untreated dense stands will take many more decades than stands that are treated to reduce stocking levels.

Riparian Habitat

No extensive riparian habitat inventories have been conducted in these drainages. The Paradise Creek Watershed Analysis took a cursory look at riparian vegetation composition and age structure to classify them as to their functionality. It assumed that riparian vegetation greater than 80 years old provided the structural components that lead to a properly functioning stream system. There is no riparian vegetation greater than 80 years old within any of these thinning units.

It would be difficult to say that the many steep A-Type channels are not properly functioning without 80+ year old trees. These channels are very steep and straight, with little to no flood plain and rapidly transport run-off water. Other channel types without 80+ year old riparian vegetation contain a fair amount of older residual pieces of woody debris. These pieces of woody debris will certainly decay before new woody debris is recruited, thus maintaining stream systems that are not properly functioning.

Riparian habitat in lower Cedar Creek, House Creek, and Bear Wallow Creek have been impacted by past forest management. These streams and riparian habitats have roads/skid trails right on the flood plain for approximately 0.75 miles on Cedar Creek, about 2 miles on House Creek, and about 2 miles of Bear Wallow Creek riparian zone. Red alder trees and understory shrubs dominated by salmonberry make up the majority of the riparian vegetation of these streams and tributaries. Large, riparian zone conifer trees are not available along side these streams to contribute to these streams/riparian habitats. These stream reaches would be considered not properly functioning
.

Since the major tributaries, including Mosetown Creek, have flood plain roads and skid trails it is logical to conclude, and there is photo evidence to document, that downhill yarding through the 1st and 2nd order minor drainages was a common practice. Road building activities included side-casting material which also impacted the 1st and 2nd order drainages. This resulted in the firm establishment of trees and shrubs such as red alder and salmonberry within the narrow riparian zones.

Riparian Reserves

When these stands were planted or seeded, the long term timber management plan was for short harvest rotations of 40 - 80 years depending on the management plan in effect at the time. Managing for maximum yield was a consistent objective for the life of these stands before the NWFP mandated Riparian Reserves. Obtaining maximum yields meant keeping site fully occupied with commercial tree species, thus perpetuating uniform single story stand conditions. The practice of leaving buffer strips between streams and clearcut units did not begin until the late 1960's and the concept of leaving intact buffer strips in regeneration harvest units was not regularly applied until the late 1970's. Consequently, the original stream side stands in the project area were logged and the second growth stands were set on an intensive management trajectory.

Some of the proposed harvest units were set on a trajectory for maximum volume production through single species planting and high conifer density. This resulted in a closed canopy and single story which limited the development of understory vegetation by quickly dominating the site. Late-seral species may be present for a short period in “legacy” features, such as coarse wood y material which will retain habitat features from the previous stand conditions. As these stands age without manipulation, the annual growth rate od individual trees will decline, and their risk of blowdown increases due to a decline in their relative root mass and decline in their diameter to height ratio (Oliver; Larson 1990). Suppression mortality kills the smaller trees in the stand and will provide snags and down wood, but it will be small in size and will last a relatively short time. Few large trees die because of competition (Peet; Christensen 1987). Instead, insect, disease, mechanical, or weather related injury or disturbance cause most mortality among large trees. High stand densities would delay attainment of large diameter trees and consequently also delay attainment of large diameter down wood and snags. Stand projection simulations suggest it will take an unthinned stand 200 years to regularly produce large diameter forest structure associated with late-seral stands (USDI 1999). In contrast, Tappeiner *et al*. (1997) found that many trees in Coast Range old growth stands developed as if they were under low stocking densities. These stands developed large diameter trees capable of providing large structure by the time those trees were 50-years old.

Barring wind throw or other such catastrophic events, the trees in these stands will have short crowns and small diameters relative to their heights, small length and diameter branch size, and low root mass to crown production. Limited understory regeneration will occur and will be confined to open patches and edges. The understory vegetation, including trees that do establish, will not be vigorous and will have little to no growth. The understory trees will have a flat-topped growth form (Oliver and Larson 1990).

BOTANY

The habitat of these stands, and associated rock outcrops, are common throughout the watershed. It is probable that the same species that occur within the proposed action area also occur in adjacent areas. There are several known sites in the proposed area of Protection Buffer and Survey and Manage strategy 1 fungi. These species include *Otidea onotica, Otidea leporina, Phaeocollybia dissilens, Helvella compressa* and *Sarcosoma mexicana*. The rock outcrops are populated by Cusick’s checkermallow (*Sidalcea cusickii),* a tracking species on the Oregon Natural Heritage Program list. Table 1and Table 2 in the Appendix B lists species that will be surveyed before these units are sold.

RECREATION

There are no developed, designated or improved recreation sites in the proposed sale area, and none proposed. The area offers opportunities for adventure driving, hiking, hunting, and other activities which do not dependent on facilities. Few people use the remote access roads for recreation. There are no obvious hunting camps or signs of consistent use by people other than forest management workers. New roads may attract a few people, but overall public use of the area is not expected to change. Observations by staff indicate users are generally local visitors. They are aware of the steep slopes and single lane roads requiring caution when traveling along them.

RURAL/FOREST INTERFACE

There are no rural developments or farmlands within at least five miles of the project area.

CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

The vast majority of the project areas are steep to very steep land forms (>20%) with low to negligible potential to contain significant cultural resources. Surveys were done on the less steep areas and ridgetops; no significant cultural resources were not located.

ENVIRONMENTAL JUSTICE

The proposed area(s) of activity are not known to be used by, or disproportionately used by, native Indian, and minority or low-income populations for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed area(s).

PORT ORFORD CEDAR

None of the proposed areas are within the natural range of Port-Orford cedar.

NOXIOUS WEEDS

Scots Broom, *Cytisus scoparius*, is the primary weed present in these areas. Also noted were occasional Canada thistle and bull thistles. Knapweed was found on a landing of House Creek Unit 2. Tansy ragwort, which is being controlled by biological methods, was also noted in the area.

AIR QUALITY

Air quality is good most of the year due to good air circulation at this site and its proximity to westerly flows of air from the Pacific Ocean

SOLID AND HAZARDOUS WASTE

There are no known solid or hazardous waste sites in the project area.

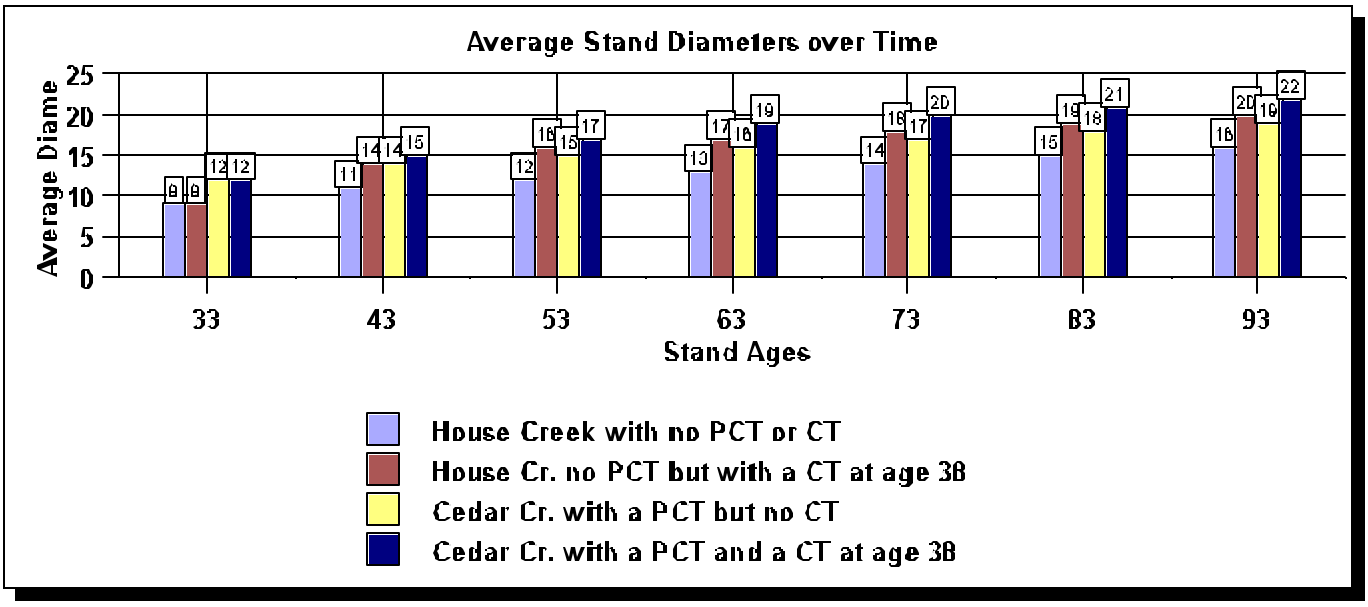

Figure 5 - Comparison of Average Stand Diameters Over Time using SPS

SPECIAL MANAGEMENT AREAS

Wilderness Areas: There are no Wilderness Areas in or near the project area.

Wild and Scenic Rivers: There are no Wild or Scenic Rivers in or near the project area.

Areas of Critical Environmental Concern(ACEC): There are no ACEC's in or near the project area.

CHAPTER IV: ENVIRONMENTAL CONSEQUENCES

Analysis of the No Action and the Proposed Action has shown no impacts to Areas of Critical Environmental Concern (ACEC), prime or unique farmlands, floodplains, wetlands, Wild and Scenic Rivers, or wilderness values.

STAND DEVELOPMENT

Alternative 1 - No Action

Under the No Action Alternative, no thinning would occur prior to final harvest. Growth of individual trees within the GFMA and RR forest stands would continue to slow. Development of late-successional characteristics within the selected forest stands would be delayed. Diameter growth would continue to slow down (see Figure 5 below). Crown width and depth would continue to narrow and recede. Development of regeneration and a shrub layer would be delayed. Overall stand heath and vigor would continue to decline.

Alternative 2 - Proposed Action - Commercial thinning

The proposed thinning both in the GFMA and the RR is a conservative harvest level and is designed to promote establishment of a wind firm stand while enhancing the diameter growth, crown development, and vigor of the residual trees left in the stand. It is also intended to encourage understory development and enhance growth of the shrub species. Diameter growth is highly related to stand density (Tappeiner et al 1997). In the long term, reducing stand densities will increase crown development and diameter growth on the residual trees resulting in accelerating old-growth development (Tappeiner et al, 1992). Marshall and others in 1992 reported that repeated thinnings had increased both crown ratios and diameters of the largest 40 trees significantly over the controls and was density dependent, ie the heaviest thinnings had the largest response. Figure 5 below, outlines projected stand diameter development over time using the Stand Projection System (SPS) of House Cr. Unit 3 and Cedar Creek unit 3. House Creek with no precommercial or commercial thinning shows the lowest average stand diameters. Cedar Creek with a precommercial and commercial thinning shows the highest average stand diameters.

The two small patch cuts proposed in the Cedar Creek C. T. are areas that were once dominated by fir and cedar were heavily disturbed. These areas regenerated naturally to red alder. The red alder would be harvested and the areas would be planted to western red cedar, western hemlock, and Douglas -fir. The areas have a component of Douglas-fir that would be released. These forest stands lack the western red cedar that was common in the area prior to the burn and this project will help restore species diversity.

Other variables affected by stand density are microclimate, understory development, browse quality and quantity, and hiding cover, and size of snags and rate and time of occurrence. These forest stands have very little understory regeneration of shrub species present due to high stocking levels. Marshal, 1992 reported that understory biomass increased from 6 pounds per acre in unthinned stands to 6,300 pounds per acre in the heaviest thinning. The densities of Douglas-fir left within these stands, 110 tpa to 135 tpa, should provide for a range of future management options and insure there is adequate potential recruitment for snags and large coarse woody debris. Logging these stands will provide a pulse of Class 1 and 2 CWD and it is likely that it combined with natural mortality within these stands will add CWD in the future. Post logging stand exams in similar thinning projects have shown class 1 and class 2 CWD levels of about 100 feet and 300 feet respectively. Cutting to this level, 110-135 tpa, will require a 2nd entry in about 20 years with possibly a 3rd entry at about 80 years to maintain high growth rates. Without additional thinning entries competition within these stands for moisture, nutrients, and light will increase and again cause slowdown in growth, and delay development of the understory. Relative densities will again reach the mid to high 40's, where self thinning takes place.

Many of the Riparian Reserves proposed for treatment are in the upper reaches of 1st and 2nd order non-fish bearing streams. These small streams can contribute large structural features(logs and boulders), when they are available, to downstream fish bearing reaches through active hillslope processes such as landslides and debris flows. Some of these channels have delivered their debris in past hillslope processes. It is important to set a trajectory toward achieving large diameter conifer forest conditions in Riparian Reserves to supply large woody material to fish bearing streams when future hillslope processes occur.

SOILS

Alternative 1 - No Action

No effects are anticipated from this alternative.

Alternative 2 - Proposed Action - Commercial thinning

Approximately 2.21 miles of new road construction is proposed under these timber sales. The Cedar Creek Commercial Thinning would include 3800feet (0.73 miles) of new construction. The House Creek Commercial Thinning would include 7700feet (1.48 miles) of new construction. All new construction will be decommissioned after timber harvest activities. All of the road construction will be located on ridgetops or near ridgetops, erosion and sedimentation would be minimal due to the small drainage area. Some soil erosion from cutbank sloughing and from the road surface can be expected, especially from heavy rains during the first winter following construction, harvest and site preparation activities. It is not anticipated that these sediments would enter the streams. Surface erosion generated during harvest, road and landing construction would travel very short distances before being trapped by duff and woody materials.

The Cedar Creek and House Creek Commercial Thinnings will meet the objectives stated in the Coos Bay District Record of Decision and Resource Management Plan of having less than 12% compaction within the harvested areas.

Decommissioning of roads used for the timber sale haul as well as selected existing roads will restore hydrologic function and over time, compaction.

Unit	Existing Road Compaction of Unit (%)	Additional Road compaction from Timber Sale (%)	Total Road Compaction after Road Construction
CC-1	4.1%	0.44%	4.54%
CC-2	7.39%	1.02%	8.40%
CC-3	6.24%	0.51%	6.75%
CC-4	11.95%	0.00%	11.95%
HC-1	1.00%	0.89%	1.89%
HC-2	9.31%	0.91%	10.22%
HC-3	5.12%	0.98%	6.10%
HC-4	5.48%	0.98%	6.45%

Water bars and the removal of any culverts should be included as part of the decommissioning after harvest activities. Subsoiling would be of little or no benefit in restoring hydrologic function on ridgetop roadway systems due to the very small amounts of surface runoff. At present, the upper 6" of old skid roads within the timber sale units have mostly recovered from previous timber sale activity and will not be used for these sales. On the old skid trails, trees have begun to seed in and a duff layer of ½ - 1 ½" has developed on the surface. Below 6", partial to moderate compaction is still present. Subsoiling of the old skid roads is not recommended because of the opportunity for residual root damage to occur to the trees which have grown adjacent to the skid trails. The old skid roads have naturally recovered enough that the gains of subsoiling would not oytweigh the disturbance to the process that is ongoing.

Some soil displacement would be expected from yarding activities. Full log suspension is preferred when possible but partial log suspension is suitable. Surface erosion generated during harvest, road and landing construction would travel very short distancesbefore being trapped by duff and woody materials. Seeding and mulching of the bare soils would help minimize the impacts created by road and landing construction.

The Cedar and House Creek units are commercial thinnings with the exception of the two small hardwood conversion units. Within the thinnings, 110 to 135 trees per acre will be left within the units. The average cut diameter of the trees to be removed during harvest activities is 10 inches and the average diameter of leave trees is 15 inches. Residual root strength from the retained trees during harvest should maintain slope stability. Through the use of Best Management Practices (BMPs) such as stream no-harvest buffers, sedimentation would not be expected to reach the streams.

HYDROLOGY

Alternative 1 - No Action

Direct Effects:
No direct effects are anticipated from this alternative.

Indirect Effects:
Riparian shade will continue to increase on those reaches that have not yet reached full canopy closure. Annual yield, low flows, and peak flows will be unaffected by maintaining present forest conditions.

Alternative 2 - Proposed Action - Commercial thinning

Direct and Indirect Effects:

Annual Yield

Forested areas on the Coos Bay District can use large amounts of water to satisfy evapotranspiration demands. It is common in western Oregon, for evapotranspiration to be in excess of 25" annually. However, site conditions determine how much evapotranspiration will actually occur, and depends on slope, aspect, soils, type of vegetation and climatic conditions. A 1979 study by Harr in western Oregon showed annual water yield increases to be in the range of 8-25" for a (Regeneration) harvest. Largest increases occur in the fall and spring, when maximum differences in water storage (interception + soil water exist) (Harr, 1976). Estimates of potential water yield increases from large forested watersheds are in the range of 3-6%, assuming the use of 70-100 year rotation intervals (Harr 1983). After examining some 90 watershed studies worldwide, Bosch and Hewlett (1982) determined that water yield increases are usually only detected when at least 20-30% of the watershed has been clear cut harvested. Annual water yield also decreases from years since harvest and usually is not detected in individual regeneration harvested small watershed studies after 30 years (Harr 1983).

The units are relatively small and well dispersed within the Paradise Creek drainage (634 acres CT in 8,468 watershed acres) and the Mosetown Creek Drainage (45 acres CT in 6,720 acres watershed acres). The most recent vegetative age class distribution indicates 31% of BLM lands in the Paradise Creek drainage are in the 0-30 year old (hydrologically immature) age class (USDI BLM 1995). Information on age classes for private lands was unavailable.

Much of the research on the effects of timber harvest on water yield was done by studying the affects of harvesting entire small watersheds and involved treatments that went from ridge top to creek edge. Little research has been done in the Pacific Northwest looking at the affects of partial cuts, thinnings, patch cuts or the affect of clearcutting while retaining streamside buffers on water yields. However, an average annual yield increase of 2.4 inches was detected for four years after a shelterwood cut, where 50% of the basal area was removed from a southwest Oregon Cascades watershed. A patchcut watershed, which had 20 small clearcuts totaling 30% of the watershed resulted in an average water yield increase of 3.5 inches (Harr et al. 1979 cited in Reiter and Beschta 1995). Where individual trees or small groups of trees are harvested, the remaining trees will generally use any increased soil moisture that becomes available following timber harvest. Because of such “edge effects,” partial cuts, light shelterwood cuts, and thinnings are expected to have little effect, if any, on annual water yields.

Low Flows

Low flows may initially increase, following timber harvest in the analysis area, but the effect is short lived (5-10 years). In addition the absolute difference in additional quantities of stream flow is small (Harr and Krygier, 1972, Hall et al. 1987), and may even be beneficial to fish during the summer when temperatures are high and flows are lowest. Vegetation left in place along with the use of no-harvest buffer strips will use up additional up slope water as stated above. Over time base flows can actually decrease if more consumptive riparian species occupy near stream areas (Hicks et al., 1991). Base flow measurements conducted by the BLM in the summer of 1994 found that base flows within the Paradise Creek watershed, especially House Creek, to be extremely low. Additionally, the Paradise Creek Watershed Analysis (WAU) (USDI BLM 1995) concluded that due to these extremely low base flows, House Creek should be considered a sensitive area with respect to base flows. Therefore, the impact of any marginal increase in base flow or low flow due to commercial thinning activities within the area will most likely have a beneficial effect in regards to stream temperature and aquatic species habitats.

Peak and Extreme Flows

Extreme peak and minimum flows in the low elevation Coast Range, are dependant on climatic patterns rather than vegetation manipulation. Following timber harvest (in this case regeneration harvests), peak flows during fall and spring periods are likely to be increased primarily due to reductions in transpiration and interception losses following harvest (Jackson and Van Haveren 1984 cited in Reiter and Beschta 1995). However, fall and spring peak flows are generally considerably smaller than the larger peak flows that typically occur during large storms in midwinter.

In the analysis area, peak flows are predominantly generated by rainfall events. This is because all of Cedar Creek watershed is located within the rain dominated elevations below the transient snow accumulation zone. In a literature review comparing studies of nine rain-dominated coastal streams, eight showed an increase in peak flows following (Regeneration) harvest and one showed a decrease. In over half of these studies winter peak flows increased, and the smaller fall and spring peak flows increased in eight of the nine studies. The magnitude of change range from a -36% to a +200% (Reiter and Beschta, 1995). These studies considered only small drainages (30-1000 acres), and did not consider timing and synchronization or desynchoronrization effects as water routes through larger mainstem streams. These studies did not consider the distribution of harvest units throughout the watershed. In three of these studies, the peak flow increases were not statistically significant.

Roads can increase peak flows when more than 12% of a watershed is occupied by roads or is in a compacted condition (Harr, 1976). Roads can intercept hillslope subsurface flow and act as extensions of the stream network and route water faster to streams. However, significant ditch flow on existing roads in the analysis area has only been observed for very large climatic events; they normally are dry

or carry little water. Roads occupy only a minor part of the two watersheds, [Oxbow (4.16%), Paradise (4.02%[1])] and do not appear to be causing increases in peak flow. (USDI BLM(b), 1995 and USDI BLM(c), 1995).

In summary, patterns of existing regeneration harvest may be causing some minor increases to winter peak flows, particularly in small tributary drainages. However, larger floods, such as the November 18, 1996 storm, overwhelm any small increase in flow due to removal of forest vegetation and/or present road density levels.

Channel Response to Flow

The majority of the stream miles within the unit boundaries are not especially sensitive to increases in flow. These include steep Rosgen headwater A type channels which are static, neither improving nor degrading (Rosgen, 1994). Below the unit boundaries, these A type channels combine to form mid-gradient B type channels with rock or large woody debris control. These channel are also stable, even with increases in flow. Valley bottom reaches or occasional flats below and downstream of the proposed units also include low gradient C type channels. These channels will continue to be stable, neither improving nor degrading.

Water Quality

Water quality will continue to be affected by some sediment delivery from old roads and natural surface roads. Sediment delivery from streamside non-paved mainline roads and episodic pulses of seddiment from mass wasting events will continue at present rates as long as present traffic levels and road surface conditions persist. Old rusting out stream crossing culverts and underspaced ditch relief culverts may also be a source of sediment delivery or failure, if not corrected.

Stream temperatures down stream from BLM lands may or may not decrease as riparian vegetation matures. Maximum shade density usually occurs when stands grow closed (stem exclusion occurs at 30-40 years on most district sites) and decrease as stands mature.

The no-harvest buffers within the commercial thinning are planned to be 20 feet along intermittent and ephemeral channels and up to 50 feet along portions of perennial streams and perennial headwall areas. Some pathways for short-term sediment delivery may occur as a result of felling and yarding operations, however the remaining intact Riparian Reserves should provide more than adequate filter strips, and there should be no delivery of sediment to water resources from these units. There should be no increase in sediment delivery, if logs are fully suspended above channels and logs are hauled away from stream courses. There should be no effect on temperature from the reduction of crown area along channels and skyline corridors, due to the low number, size and spacing of corridors.

Road Information

The 2.21miles of new road construction should have little effect on water resources because stream channels are avoided and roads are on or near ridgetops or benches. The planned 2.00 miles of road improvement and 13.42 miles of renovation is expected to reduce the potential for road failures and sedimentation over what exists under current conditions, and have a slightly positive effect on water quality in relation to turbidity, due to improved road surfacing and drainage. Only one of the proposed new roads falls within a Riparian Reserve. As designed, the road location is at an adequate distance from the stream as to not pose a potential source for sediment transport to stream channels, and therefore should have no effect on water quality.

All roads identified for closure have been field reviewed. They will be fully decommissioned in accordance with the BLM's TMO manual to restore or maintain hydrologic function. All proposed road construction will take place on or near the ridges and do not cross any unstable headwalls. Roads identified for decommissioning were surveyed and determined to have hydrologic function restored due to factors such as revegetation of shrubs and trees in ditchlines and on roadbeds, no extension of stream channels, ridge top roads, and no evidence of surface erosion. These roads will be blocked to vehicles with a tank trap (earthen barrier). There is one unnumbered spur in unit 3 of House Creek that will need to have a culvert and fill removed to return the hydrologic function of this road.

A net decrease of 3.28 miles of road will be accomplished by decommissioning with this alternative. All new construction, dirt roads and landings will be seasonally maintained prior to winter rains if planned to be used the following year. Seasonal maintenance may include, but is not limited to, providing adequate water bars, mulching at a minimum of 2000 lbs. per acre using wood chips or straw and seeding with a district approved erosion control seed mix. All newly constructed roads will be fully decommissioned when project activities are completed. Full decommissioning as defined by the Transportation Management Plan (USDI 2001, pg 15) may include, but is not limited to, subsoiling or tilling, removal of stream crossings and cross drains, construction of adequate water bars, stabilizing fill areas, revegetation and blocking access with a suitable barrier.

[1] A 1995 BLM Jobs-In-The-Woods project decommissioned 4.2 miles of roads, reducing this density.

Haul Route:
The majority of the gravel-surface portions of the haul routes are on ridge-tops with few stream crossings. Haul routes were reviewed by a BLM Fisheries Biologist and determined to not likely have a potential to deliver sediment to stream channels as a result of haul traffic. If sediment delivery does happen to occur as a result of haul during heavy precipitation, sediment control measures as directed by Resource Area Fisheries Biologist or Hydrologist will be installed at stream crossings to prevent direct delivery

Evaluation of Consistency with ACS Objectives

Alternative 1 - No Action

Aquatic Conservation Strategy objectives could be achieved in the long term in the 5th filed watershed, but little progress would be made in the near to mid term term in attaining ACS objectives on the proposed project site. The section titled "Consistency with the Aquatic Conservation Strategy Objectives" under Alternative 2 of this chapter describes how faster progress can be made toward achieving ACS objectives by thinning.

Alternative 2 - Proposed Action - Commercial thinning

The Proposed Action which proposes thinning in the Riparian Reserves, is consistent with attaining Aquatic Conservation Strategy objectives on the proposed project area in the short term and long term as described below: (Also see NWFP ROD p. B-31and C-32, TM-1, c.)

Objective 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.*

The proposed commercial thinning would maintain and enhance the distribution, diversity, and complexity of the watershed and landscape-scale features. The thinned areas would add to the diversity of the landscape which consists primarily of dense stands of trees that are becoming too crowded for heathy growth. Thinning from an approximate average of 200-527 tpa to an average that ranges from 110-135 tpa will open the understory and will allow development of understory trees and shrubs for a multi-layered canopy, enhancing the diversity of the stand until canopy closure. Thinning throughout the project area will focus on leaving the largest dominant and co-dominant trees. These trees will grow to larger diameters than similar trees in un-thinned stands (USDI 1999) which will provide for larger snags and CWM while enhancing the health and vigor of the residual trees. The streamside no-harvest buffer of at least 20 feet will protect the intermittent and ephemeral aquatic systems from any harvest disturbance by maintaining canopy cover and shade, as well as streambank stability. The remaining area within the upland zone of the Riparian Reserve will be managed for the development of larger diameter trees and understory diversity which contribute to future restoration of the distribution, diversity, and complexity of the watershed and landscape-scale features.

Based on the design features and management objectives this proposal should maintain and contribute toward the future restoration of the elements outlined in ACS Objective 1. This project is consistent with attaining Aquatic Conservation Strategy Objective 1.

Objective 2: *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species*

These thinning harvests will maintain both spatial and temporal connectivity within and between watersheds by retaining various no harvest riparian zone widths for all streams within the project area. Commercial thinning would not change the spatial patterns of the different stands within and between watersheds as a continuous stand would still remain and dominant and co-dominant conifer in both the Riparian Reserves and upland areas would be retained. Riparian-dependent organisms will continue to utilize habitats within the no harvest riparian zones and thinning will provide habitat to wildlife species that prefer less dense forested stands. The release of understory shrub and tree species in the stand will, over time, provide habitat connectivity at several canopy levels. No permanent roads or culverts would obstruct routes to areas critical for fulfilling life history requirements of aquatic and riparian dependent species. No actions are proposed that would physically or chemically obstruct routes to areas within or outside the watershed that are critical for fulfilling life history requirements of aquatic and riparian-dependent species. No known terrestrial or aquatic refugia would be affected by the proposed action.

This project is consistent with attaining Aquatic Conservation Strategy Objective 2.

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

These thinnings will, over the long term, maintain and restore the physical integrity of the stream and wetland aquatic systems. The no-cut zone of riparian habitat along all streams would maintain tree/shrub root strength and the physical streambank and channel integrity. Channel morphology will be maintained by eliminating activities on or over streams during wet periods and retaining existing in-channel woody material. No permanent roads or landings would be constructed within the Riparian Reserves. No actions associated with harvest activities are likely to affect streambanks, shorelines, or existing bottom configurations.

Yarding through Riparian Reserves would be minimized and corridor width would be no wider than 10-12 feet. One end suspension could occur at only a few locations and would cross only at intermittent or ephemeral channels during the dry season at low or no flow periods. Trees cut to create yarding corridors will be left in the riparian zone and could be used to deflect logs being yarded.

Growing larger trees in a shorter amount of time, some of which will eventually be recruited to the stream channel, would help to restore the complexity of the aquatic ecosystem.

This project is consistent with attaining Aquatic Conservation Strategy Objective 3.

Objective 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 proposed project is not likely to measurably effect water temperatures, stream turbidity levels, or result in the release of hazardous materials. Present tree and shrub density in the riparian zone provides an adequate canopy cover over most streams. Minor canopy reduction resulting from a minimum of yarding corridors should cause no measurable effects to water temperatures. No-harvest buffers and retention of the dominant trees within the managed Riparian Reserves of the proposed thinning units should also be sufficient for maintaining ambient stream water temperatures. Most streams in the sale area are also small in size or intermittent in nature which makes them less susceptible to heating.

Based on design features, the projects should maintain current water quality parameters and be consistent with ACS Objective 4.

Objective 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.*

It is recognized that sediment delivery, storage, and transport are essential functions of stream systems which contribute to the maintenance of riparian and aquatic ecosystems. Under natural conditions these mechanisms are driven primarily by catastrophic fires followed by infrequent high intensity storm events, although higher frequency less intense storm events also contribute to the natural sediment regime. Ridgetops and mid-slope areas dominate the landscape within these proposed thin units. Many streams within these units are of moderate gradient and low energy. Hillslope processes are infrequent occurrences in these streams and do not naturally produce high amounts of sediment. Since sediment is lacking in many of the bedrock controlled lower stream sections, future recruitment of large course wood is critical to maintenance of sediment within the stream channel. Commercial thinning within the Riparian Reserves accelerates the growth of stream side conifers which will be more effective in storing sediment when they are delivered to stream channels.

Where exposed soil occurs it is not expected to mobilize and reach stream channels. The thick forest floor duff layer will effectively filter any mobilized soil and fine particles dislodged through harvest activities. Project design features and Best Management Practices for the prevention of soil loss and sedimentation will be adequate to prevent disruption of natural processes that occur on site including the sediment regime. The short term impacts of the thinning operations would not prevent or retard restoration of the sediment regime under which this aquatic ecosystem evolved.

The most likely mechanism to deliver large quantities of sediment and debris to the drainages is a mass failure. In the short term, these thinnings would not alter the amount and type of sediment that would be associated with this type of failure, therefore the sediment regime is maintained.

By implementing Best Management Practices and Project Design Features, measurable increases in turbidity and fine sediment levels above background levels or outside of the range of natural variability will be avoided. Therefore, the proposed project would be consistent with ACS Objective 5.

Objective 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.*

Stream flows, (peak, high, and low flows) are directly related to and influenced by the size of a precipitation event. The greater the amount of water going into a system, the larger the potential stream flow. The quantity of water and the rate at which it reaches the channel and passes through the system during a particular storm event is influenced by storm and watershed size, vegetative cover, topographic features, and/or existing roads. The proposed action will, to a very small degree, influence only the vegetation cover.

The minor impact on hydrology and streams in the analysis area is anticipated to be only for a short period of time. Minor increases in the annual yield, low flows, and the spring and fall peak flows may occur, due to the increase in the amount of water available because of the removal of vegetation and the corresponding reduction in evapotranspiration losses during the spring and fall. However, these changes will most likely occur only on an onsite basis and detection of changes at the site as well as the mouths of Paradise Creek or Mosetown Creek will most likely not be detectable or outside the range of natural variability.

The 20foot no-harvest buffers establishment from this proposed action will ensure that in-stream flow of the intermittent streams will not be directly impacted by timber harvest actions. Maintaining a tree density of 110 to 135 trees per acre within the Riparian Reserve will maintain sediment, nutrient, and wood routing in the aquatic system while protecting the timing, magnitude, and spatial distribution in the flow regime. The water will be utilized by the remaining vegetation and the corresponding reduction in evapotranspiration losses normally associated with the removal of vegetation will be eliminated. Additionally, any potential increase in low flows may be beneficial, because more water would be available during the critical low flow season. Therefore, the proposed project would be consistent with ACS Objective 6.

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

The no-cut riparian zones of each stream should provide the vegetative complexity and stream bank stability needed to maintain the timing, variability, and duration of the floodplain inundation. The no-harvest buffer around meadow and wetland vegetation, where present, will maintain the water table elevation by reducing solar intensity through shading, maintaining bank stability, maintaining microclimates around down logs, litter layers, and providing duff and litter recruitment. The no-harvest buffers will eliminate the risk of stream bank soil compaction thus maintaining infiltration rates and the capacity to store water within the floodplain. Therefore, the proposed project would be consistent with ACS Objective 7.

Objective 8: *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

This treatment should help to maintain and restore species composition and structural diversity of plant communities in the uplands as well as riparian areas. Thinning in the Riparian Reserve will create larger, more vigorous trees in the long term. Some of these largertrees will eventually provide large woody material for in-channel use and snag habitat in the Riparian Reserve. Physical complexity will be restored through the addition of larger snags, large woody debris, trees with deeper crowns, variability in tree sizes, and increased understory vegetation. The proposed thinning treatment will set a trajectory for development of late-successional characteristics in which a second entry would provide increased growing space, additional snags/large woody material, and increased recruitment and survival of understory trees. The development of understory trees and shrubs will create a multilayered canopy and increased species diversity within the Riparian Reserve.

The proposed action will maintain species composition and structural diversity of plant communities in riparian areas due to the provision for variable width no-harvest buffers and the implementation of project design criteria.

This project is consistent with attaining Aquatic Conservation Strategy Objective 8.

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

Thinning prescriptions that include no-harvest buffers and leave areas, contain design features to retain or recruit large snags and down wood, and provide for retaining the full range of tree species in the project area will result in greater post-treatment diversity of habitats. Thinning will speed the stand's transition from mid-seral to mature (when defined by an average stand diameters and abundance of understory vegetation), by shortening the time the stand is in the stem exclusion stage of stand development (Oliver and Larsen 1990). Thinning will increase tree crown depth and volume, will increase understory vegetation size, vigor, and diversity, and by increasing tree size growth trees will have greater bole surface area and increased bark furrowing. The net effect is a greater and more diverse range of habitats for riparian-dependent species.

This project is consistent with attaining Aquatic Conservation Strategy Objective 9.

WILDLIFE

Alternative 1- No Action
This action would have no immediate negative consequences to wildlife, however this alternative would result in slower development of late successional characteristics in the proposed harvest areas and therefore result in a slower increase in quality of habitat for species associated with late successional forests. This alternative would provide small diameter, short-lived snags sooner than the proposed alternative. This alternative would have "no effect" on threatened or endangered terrestrial species.

Alternative 2 - Proposed Action
Activities involved with the proposed action may cause short term disturbance to a variety of wildlife species and could effect normal activities and expose individuals to additional risk. The smaller, less mobile species such as mollusks, amphibians, and small mammals, would be particularly vulnerable to adverse effects on a local level, but should not be seriously affected on a population scale.

Yarding of logs across large down logs in advanced states of decay would cause damage to an important habitat feature which would not be replaced in the short term. Some existing snags would also be damaged as a result of the proposed action.

The proposed action would not reduce canopy closure below 60 % but may decrease potential habitat for red tree voles in the short term, although longer term positive benefits may occur.

Reports from a large study on the effects of commercially thinned and unthinned 40 to 55 year old Douglas fir stands in the Oregon Coast Range indicate that bird detections and bird species richness have increased in thinned stands. (Hagar et. al., 1996). Weikel (1997) found that thinning for old-forest characteristics will likely have a positive impact on populations of cavity nesting birds in both the short and long term.

The commercial thinning would slowly change the designation from a "closed sapling-pole-sawtimber" stand to a "large-sawtimber" stand. The more open crown cover would permit the development of ground vegetation. Many of the same wildlife species will continue to use the stand. Commercial thinning would replace the slower, natural thinning process and would remove many of the trees which would have eventually become small snags and small down woody material. Cavity nesting habitat would not naturally develop, nor would there be a natural mortality caused increase in down coarse woody material in the near future because of removal of these trees during the thinning operation. The thinning operation would result in some immediate increase in coarse woody debris due to the addition of nonmerchantable logging slash. Thinning would reduce the canopy closure for several years which would alter the species composition slightly. Timber harvest in the proposed areas would decrease the amount of thermal cover and hiding cover for big game species. Thermal cover rejuvenates in approximately 5 to 7 years in a commercially thinned area. Increased understory growth following the proposed action should benefit elk and deer populations. Elk populations are currently at a low to moderate level with good growth potential, however, limiting factors may be forage availability because of reduced harvest in the area over the past several years. Deer populations are lower than in the 1970s and 1980s and are stable or slightly decreasing (J. Toman, pers. comm.).

Effects Determination
There are no known threatened or endangered species nest sites or activity centers within the proposed sale areas or within distances that would require restrictions on harvest related activities. Due to the lack of suitable habitat and the absence of known sites, the proposed action would have "no effect" on threatened or endangered species.

There is an area consisting of approximately 2.4 acres in the northeast corner of proposed House Creek unit no. 4 which is within 0.25 miles of unsurveyed suitable marbled murrelet habitat. The aspect and topography would allow for an exception to Project Design Criteria (PDCs) contained in current consultation opinions. This part of the unit is sloping away from the unsurveyed suitable marbled murrelet habitat and is separated by a large ridge. All other suitable marbled murrelet habitat within 0.25 miles of any of the proposed units has been previously surveyed, and there were no marbled murrelet detections during any of the surveys. This proposed action would be outside of a LSR/CHU and no removal of suitable habitat would occur. Because this would be a commercial thinning, no edge would be created, therefore additional windthrow would not be expected. After discussions with other district wildlife biologists, it was decided that this would be an appropriate situation to make this exception to PDCs, due to the small potential of disturbance or risk to marbled murrelets or their habitat (USFWS 1998).

FISHERIES

Alternative 1 - No Action

Direct

There will be no short term or long term, positive or negative, direct impacts to fish or fish habitat under this alternative in these watersheds.

Indirect

The quality and quantity of stream habitat can be directly related to stream channel complexity and relatively clean water. High quality aquatic habitat is a result of large in-stream features such as boulders and CWM distributed throughout the channel and adequate substrate for organisms to colonize. Leaving these units untreated would produce the highest numbers of future down logs to the riparian and stream habitat, but these downed logs would have a small diameter, have little durable heartwood, and rot in a short period. These smaller logs do not provide the large, stable, in-channel structure needed to maintain good channel stability and in-stream complexity. Suppression mortality in these stands produces large amounts of organic matter that may enter streams, but does not provide durable and long lasting riparian/stream structure. The present dense canopy closure provides considerable shading to perennial streams and aquatic habitat. These untreated units will continue to provide conditions that maintain high quality cold water to on-site streams, as well as delivering it to downstream fish bearing streams. These streams and Riparian Reserves will continue to function at risk, in part due to a deficiency of CWM for in-channel structure.

Left to grow under current conditions, the attainment of mature forest characteristics that result in major contributors towards proper riparian and hydrologic functions, would not occur for possibly hundreds of years. The resulting in-stream fishery habitat restoration would similarly be delayed.

Alternative 2 - Proposed Action

Special Status Species - Fish

Since there are no fish species present within the boundaries of these sales, no direct impacts to listed or candidate fish species are expected. Indirect adverse impacts to the closest coho salmon and steelhead trout (1.5 to 2.0 miles downstream) are not expected.

Aquatic Habitat

Measurable, direct negative impacts to aquatic/fishery habitat or water quality are not expected from the proposed actions of this alternative. Trees will be directionally felled away from stream channels. Skyline cable yarding will be designed to avoid yarding through perennial streams to the extent possible. Where yarding through perennial streams is unavoidable, full suspension will be required and individual trees cut to provide a corridor across a channel will be left on site. Where yarding through a small intermittent streamside is unavoidable, yarding will occur in the dry season. The no-harvest buffers, along with the gentle slopes and the filtering action of the duff layer ensures, with a high degree of confidence, that no measurable amount of sediment will enter stream channels and that turbidity levels will not be elevated above background levels.

Cutting and dropping one co-dominant conifer tree into 1st and 2nd order stream channels every 100 feet will not result in measurable impacts to fish habitat, aquatic habitat, water quality, or the Riparian Reserve. Approximately 111 trees will be cut as in-channel CWM over nearly 2.1 miles of non-fish bearing stream channel. First and second order tributary stream lengths flow into Paradise Creek (4,900 feet of frontal stream), House Creek (1,750 feet of frontal stream), Cedar Creek (2,250 feet of frontal stream), and Mosetown Creek (2,220 feet of headwater stream).

No measurable impacts to aquatic habitat or the Riparian Reserve are expected from new road construction or the improvement/renovation of existing road surfaces. All applicable best management practices will be used for construction and renovation. Only one new road will be constructed within the RR. Existing roads in the units to be improved and/or renovated are ridgetop with no stream crossings. Haul route improvement and/or renovation will also include installation of additional ditch relief culverts. All new road construction will consist of ridgetop or near ridgetopspur roads. All new constructed spur roads, landings, and improved and/or renovated dirt spurs would be fully decommissioned to pre-project hydrologic function.

Riparian Reserves

The project area forest stands (including GFMA and RR) were regenerated following timber harvest and are occupied with high stocking levels of a single story conifer and have little structural diversity, and little understory.

The proposal to leave similar numbers of trees in the Riparian Reserves to within 20 feet of streams as on Matrix is a conservative prescription that foregoes the most rapid attainment of large diameter trees adjacent to streams in favor of maintaining the connectivity function of the canopy for upland species. This conservative approach would necessitate a second density management entry in the future to keep the Riparian Reserve stands on a trajectory to develop late-successional characteristics. This light silvicultural treatment prepares the stand for a second density management entry by building tree strength (increased root mass, crown diameter, and stem size). A second entry will hasten the development of late-successional characteristics by introducing a multilayered canopy structure. At this residual tree density, Riparian Reserve trees will continue to contribute adequate shade to the stream channel. Competition

mortality will be delayed in the area of thinned Riparian Reserve, but over time, contributions of functional sized CWD to the channel will be accelerated. Aquatic Conservation Strategy objectives would not be retarded with this alternative. The stands, including the Riparian Reserve, would benefit from improved tree vigor. Thinning would open up light to the understory and contribute to a diversity of species until canopy closure. A more diverse understory would provide nesting, roosting, and foraging habitat for small birds and mammals, and provide forage for big game.

Thinning in Riparian Reserves would result in only minor short term impacts to wildlife for long term gains toward old-growth structural habitat. Thinning would remove those trees that would have died through suppression, however, the remaining trees would grow to larger diameters (USDI 1999) which would allow for larger snags and down wood over time and would provide for more suitable wildlife habitat in the long term. USDI (1999) estimates that it would take an unthinned stand 200 years to develop forest structure and diversity. Under conventional thinning the stand would reach this stage at approximately 160 years with larger diameter trees than unthinned stands. A second entry in the future, to provide additional growing space, recruit and insure survival of understory trees, and create additional snags, would further shorten that period.

Direct shade to intermittent and perennial stream channels will be adequately maintained by the proposed no-cut reserve of the riparian zone. Side lighting will be minimized and reduced as tree canopy cover responds to the thinning by becoming more dense. Cold, high quality water will continue to be provided to downstream fish bearing streams.

Aquatic Conservation Strategy objectives would not be retarded with this alternative. The stands, including area within the Riparian Reserve, would benefit from improved tree vigor.

Coarse Woody Debris (CWD)
Hill slope processes are vital to providing long lasting durable CWD to the main stem creeks and it's larger tributaries. This CWD accumulates in stream channels creating a wider diversity of aquatic habitat features. Much of this material originates from the upper areas of tributary streams and enters the mainstem creeks through episodic landslides. Individually arranged whole trees are more commonly recruited as they fall to the channel from within a half site-potential tree distance of the riparian zones. If large tree recruitment is to occur, large trees are required to be positioned across the landscape at sites capable of contributing to landslides as they happen.

Many stream reaches within this sale area are deficient in CWD in their channels. Numerous streams have potential to develop landslides that contribute CWD to downstream fish bearing channels. A goal of the Aquatic Conservation Strategy is to re-establish large trees (20-50 inches DBH) on sites that are likely to contribute to the on-site, as well as downstream, aquatic habitats through hill slope processes.

Based on present average tree diameter and height, obtaining a functional piece of CWD to the stream channel would require a tree to fall to the channel from within approximately 30 feet of the stream edge. Only small diameter tops are expected to reach stream channels if they fall from 30 to 60 feet from the stream edge. These small diameter pieces contribute little to long term stream functions.

Density management in Riparian Reserves would increase tree growth rates in the area most likely to contribute large wood to stream channels (FEMAT 1993, pp. V-26&27). Thinning second growth stands located within the Riparian Reserves ensures greater growth and tree size in a shorter time period than would occur without thinning due to an increase of available light, nutrients and water for the remaining trees. This alternative should allow the trees within the Riparian Reserves to develop at a rate consistent with the thinned upland stands. Restricting thinning of second growth stands in the Riparian Reserves would create a situation where the largest trees are furthest from the stream channel with less chance of interacting with the stream

BOTANY

Alternative 1 - No Action
Without harvest, these stands will continue to follow successional stages that are typical of forests in the western hemlock vegetation zone.

Alternative 2 - Proposed Action - Commercial thinning
Harvesting the stand will increase its vulnerability to infestation by exotics, which thrive in the resulting disturbed soils and brighter light conditions. However, the canopy will eventually close, shading out weedy species. Some herbaceous species and epiphytes may have reduced vigor from the altering of the microclimate, while some species of herbs and shrubs will flourish from the increased sunlight. Eventually, as the forest grows, conditions will come to approximate the current condition.

It is probable that thinning the stand will allow it to become habitat for some species of epiphytic lichens and bryophytes faster than a natural stand. Current knowledge indicates that dense stands in the stem exclusion stage do not provide adequate air flow and light to provide habitat for, or be inoculated by, some species of lichens and bryophytes.

There is little information about the effect of thinning on fungus populations. To mitigate any impact to, Survey and Manage fungal species, surveys will be be completed in accordance with current protocols and known sites will be managed according to current management recommendations. Following is a table listing species to requiring protection under existing guidelines.

Survey and Manage Species which Require Management*

Species	Current S&M Strategy	Final SEIS Category	Number of Sites
Helvella compressa	1,3	OFF	1
Otidea leporina	Protection Buffer	1B	3
Otidea onotica	Protection Buffer	1F	1
Phaeocollybia dissilens	1,3	1B	2
Sarcosoma mexicana	Protection Buffer,3	OFF	5

* Species found as a result of surveys

CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

It is not expected that cultural resources will be affected by this commercial thinning project. However, if cultural resources are observed during project activities, work must stop and the District Archeologist will be notified.

ENVIRONMENTAL JUSTICE

No Action/Proposed Action Alternatives
The BLM concludes that no disproportionately high or adverse human health or environmental effects will occur to native Indians, and minority or low-income populations as a result of the proposed action(s). There are no identified direct, indirect, or cumulative impacts in the area of Environmental Justice (see Chapter 3 - Affected Environment discussion)

PORT-ORFORD CEDAR

No Action/Proposed Action Alternatives
There should be no direct, indirect, or cumulative impacts to POC. This area is outside the natural range of POC. In addition, the standard vehicle washing stipulation aids in preventing the introduction or spread of the root pathogen.

NOXIOUS WEEDS

Alternative 1 - No Action
No direct impacts should occur to noxious weeds that are present. Indirect and cumulative impacts to noxious weeds (specifically Scots broom) within the units and on roads that are not used and/or maintained would most likely be to decrease in health, vigor, and density and completely disappear from well shaded areas. Existing seed beds will continue, to exist where the canopy is open and disturbance to the soil surface could cause these seeds to spread to other areas and/or cause them to sprout. Open patches within the units, especially on old road beds, will continue to support existing weed populations (i.e. maintain the population, provide a continuous seed source, and increase existing seed bed depths). Weeds are likely to spread along main road systems at the current rate, with some possible reduction in areas where shading and ground cover increase due to the maturing standcondition.

Alternative 2 - Proposed Action - Commercial thinning

Direct impacts would be the cutting of existing mature plants on any road system to be used, both within units and along haul routes. Roads that are decommissioned will be treated for weeds, planted and/or reseeded and mulched with competitive species (native when

available - this includes trees, shrubs, and other forbs, but mostly grasses). Disturbed sites such as new roads and landings, etc., are to be seeded and mulched to prevent of weeds from becoming established. The units themselves could have a short term increase in weed populations from the thinning disturbance and increased sunlight. However, indirect and cumulative impacts should be a decrease, or status quo, of overall weed populations. This would be a result of the weed treatments along the haul routes and road decommissioning/closures (which are forgone under the No Action Alternative), and treatment of any newly disturbed sites. Disturbance within the stands is minimal making it unlikely new weed sites will become available/established and existing plants respond quickly to increased sunlight thus out competing any new plant trying to become established. In addition, as the stand matures shading will again make the habitat unfavorable for weed establishment or survival.

SOLID AND HAZARDOUS WASTE
Alternative 1 - No Action

No effects are anticipated from the No Action Alternative.

Alternative 2 - Proposed Action - Commercial thinning

No effects are anticipated from the proposed action, unless a release of hazardous materials occurs as a result of harvest operations. Depending upon the substance, amount, and environmental conditions in the area affected by a release, the impacts could range from minimal and short term to more extensive and longer lasting.

Minor amounts (less than 2 gallons) of diesel fuel, gasoline or hydraulic fluid leaking from heavy equipment onto a road surface, with little or no chance of migrating to surface or ground water before absorption or evaporation, would be an example of minimal impact.

If a petroleum substance is released at or above the State of Oregon reportable quantity of 42 gallons, or has the likelihood of reaching ground or surface water regardless of amount, it could cause from mild to more severe localized impact to the environment. This impact could range from localized contamination of soil and vegetation, to entry into surface water and subsequent toxic effects upon fisheries and aquatic life and /or habitat. The greater the quantity of material released, the more serious the effects are likely to be, coupled with variable conditions such as the location of the spill, seasonal water levels, flow velocity, and rainfall.

Proposed road closures will diminish the future potential for illegal dumping of solid and hazardous waste along roadsides and on landings.

The Proposed Action is subject to provisions of the Oregon Forest Practices (ODF 1998) section pertaining to Petroleum Product Precautions (OAR 629-57-3600) and Oregon Department of Environmental Quality Spills and Releases Guidelines (ODEQ 1998). BLM Administrators shall monitor and report any spills utilizing the reporting procedures in the Coos Bay District Hazardous Materials Management Contingency Plan (USDI BLM 1997).

CUMULATIVE EFFECTS

HYDROLOGY

Alternative 2 - Proposed Action - Commercial thinning

This alternative could have the effects listed above at the site scale. However, these effects become increasingly difficult to detect downstream because of fluctuations in flows from groundwater sources,an increasing network of tributaries, or timing and varying intensities of precipitation events. In light of this natural variability coupled with the fact that as streams join and form increasingly large drainage networks, the ability of individual actions in small drainages to affect the hydrology in the larger subwatersheds and watersheds as a whole decreases. The magnitude of any effect is generally proportional to the area that is treated and the type of activity that takes place. Since these commercial thinning projects that impact only 7.5% (634 acres out of 8,468 acres) of the Paradise Creek drainage, and 0.67% (45 acres out of 6,720 acres) of the Mosetown Creek drainage it is not possible to separate these cumulative effects of the action from natural variability.

In summary, the proposed action is of sound design, and will have little effect on water resources when implemented in accordance with design features and BMP’s listed in this EA. Overall watershed condition will continue to improve.

WILDLIFE

Alternative 2 - Proposed Action - Commercial thinning

Cumulative effects of timber harvest at the landscape level were analyzed in the Final Supplemental Environmental Impact Statement (FSEIS) and mitigation measures have been incorporated into the Northwest Forest Plan Record of Decision (USDA and USDI, 1994). The implementation of the proposed action would be consistent with the Standards and Guidelines set forth in the plan. Impacts to wildlife on a more localized scale are included in this document in the Environmental Consequences section.

CHAPTER V: List of Agencies and Individuals Contacted

The general public was notified of the planned EA through the publication of Coos Bay District's semi-annual *Planning Update*.

The proposed project is being reviewed by the U.S. Fish and Wildlife Service through the consultation process provided under section 7(A)(4) of the Endangered species Act of 1973.

Scoping letters were mailed to the following adjacent landowners, informing them of the proposed project:

Roseburg Resources, Roseburg, OR

Scoping letters were also mailed or e-mailed to:

Association of O&C Counties
Coast Range Association
Kalmiopsis Audubon Society
Oregon Natural Resources Council
Sierra Club
Confederated Tribes of the Grand Ronde Indians
Donald Fontenot
Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
Division of State Lands
Department of Land Conservation and Development
Department of Forestry
Umpqua Watersheds
Many Rivers Group
Rogue Forest Protective Association
Hugh Kern
Southern Oregon Timber Industries Association

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APPENDIX A

General Location Map

Proposed Road Decommissioning and Construction Map

Unit Maps