Middle Fork Coquille Commercial Thinning 2001

Environmental Assessment
South River Field Office
EA # OR-105-01-01

U.S. Department of the Interior, Bureau of Land Management
Roseburg District Office
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Roseburg, Oregon 97470

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Chapter 1
PURPOSE AND NEED

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

Background

The Upper Middle Fork Coquille Watershed Analysis (WA, p. 92) identifies 5,509 acres of mid-seral forest stands in the Matrix and Riparian Reserve allocations in the Camas Valley and Twelve Mile subwatersheds. These stands naturally evolved or were reforested following a previous harvest entry. The stands have been actively managed using silvicultural treatments such as pre-commercial thinning and fertilization. Approximately 5,000 acres of the stands are 30-60-years-old, while the remaining stands are between 60 and 80-years-old.

For the purpose of identification in this analysis, proposed units were divided into four project areas based on proximity of units to one another, and most probable access. The proposed sales have been designated as Angel Hair, Diet Coq, Golden Gate, and Smoke Screen. These names will be used in the discussions of the Affected Environment and Environmental Consequences contained in this document, in order to identify specific project areas. A fifth project (Camas Heights) was deferred from consideration at this time, as discussed in Chapter 2 of this analysis.

Purpose

Inventories and stand exams were used to identify even-aged and overstocked stands with high relative stand densities and diminishing crown ratios. Approximately 680 acres allocated as General Forest Management Area (GFMA), Connectivity/Diversity Block, and Riparian Reserves are proposed for treatments.

Treatments would reduce stand densities in order to maintain stand vigor, consistent with stand and landscape objectives described in the Roseburg District *Record of Decision and Resource Management Plan* (ROD/RMP 1995). Management direction calls for commercial thinning in the GFMA and density management in Connectivity/Diversity Blocks where practical and where increased gains in timber production are likely. Stands suitable for thinning generally exhibit closed canopy, increasing rates of suppression mortality and reduced rates of tree growth.

Relative to GFMA stands, the ROD/RMP (pp. 150-151) recommends commercial thinnings in stands less than 80 years of age in order to assure high levels of volume productivity. "Suitable commercial forest land would be managed to assure a high level of sustained timber productivity. Emphasis would be placed on use of intensive forest management practices and investments to maintain a high level of sustainable resource production while maintaining long-term site productivity, biological legacies, and a biologically diverse forest matrix."

Density management in the Connectivity/Diversity Block would be employed to maintain stand vigor, accelerate growth rates of the remaining trees, hasten development of late-successional forest characteristics, and enhance habitat conditions and biological diversity. Treatments would be designed to mimic a natural disturbance, and promote attainment of the "Target Stand Conditions" identified in the ROD/RMP (p. 152).

Density management within Riparian Reserves should also be considered as a means of maintaining or restoring tree growth and vigor, reducing susceptibility to insect infestation, maintaining or enhancing current structural and vegetative diversity, and hastening the growth of larger trees in a shorter period of time. The larger trees would provide shading for streams and a source of large wood for future recruitment into streams.

It is anticipated that the four sales would be offered over the next two or three years and completed over the next three to five years. Thinning in the Matrix allocations would yield an estimated 6.45 million board feet, equal to approximately 11,000 hundred cubic feet (CCF), toward the Roseburg District's declared annual allowable sale quantity (ASQ) objective. (ROD/RMP, p. 8) Volume from density management within Riparian Reserves would be an estimated 2.2 million board feet, equivalent to approximately 3,750 CCF, and not chargeable toward the ASQ.

This EA will provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI). It will consider the consequences of the proposed action and "no action" alternatives, in the short and long term, on a site-specific level and at the fifth-field analytical watershed level. It will also evaluate the consistency of each alternative with the analysis of impacts in the Roseburg District *Proposed Resource Management Plan/Environmental Impact Statement* (PRMP/EIS 1992).

Need

Commercial thinning in GFMA stands is needed to reduce stand densities, in order to maintain stand health and vigor, and provide a high level of quality wood and sustainable timber production.

Density management in Connectivity/Diversity Blocks is needed to meet management direction and accomplish the following objectives.

- Development of a tree species composition over time of approximately "78 percent Douglas-fir, four percent pines, two percent Grand fir, 12 percent other conifers, and four percent hardwood." (ROD/RMP, p. 152) Without treatment, hardwoods will die out as a consequence of overtopping and suppression by Douglas-fir. Elimination of hardwoods would be inconsistent with the objective of maintaining and developing a diverse tree species composition (ROD/RMP, p. 153).

- The ROD/RMP (p. 153) directs that "Commercial thinning entries should be programmed for stands under 120 years of age.", and should be ". . . designed to assure high levels of volume productivity."

- Development of a variety of structures that include ". . . trees of varying age and size, and stands with an assortment of canopy configurations." (ROD/RMP, p. 152) Without density management, and in the absence of disturbance, the stands will continue to develop as even-aged, single-storied stands with closed canopies. There would be insufficient light in the understory to allow establishment of other conifer species and development of additional canopy layers.

There is a need to treat portions of the stands allocated as Riparian Reserves, consistent with the recommendations of watershed analysis. This would lead to controlled stocking, establishment of desired non-conifer vegetation, and acquisition of the desired vegetation characteristics needed to attain objectives of the Aquatic Conservation Strategy (ROD/RMP, pp. 25 and 153-154).

There is also a need for the sales to attain an annual ASQ of 45 million board feet, and meet the socioeconomic objectives of the ROD/RMP and the PRMP/EIS. The PRMP/EIS (Vol. 1, p. xii) estimated that BLM management programs (including timber sales) would support 544 jobs and provide $9.333 million in personal income on an annual basis during the life of the plan. The management direction of the ROD/RMP is to "Plan and design forest management activities to produce a sustained yield of products to support local and regional economic activity. A diversity of forest products (timber and nontimber) will be offered to support large and small commercial operations and provide for personal use." (PRMP/EIS p. 2-41)

The timber sales are also needed to meet the requirements of the O&C Act which stipulates that suitable commercial forest lands revested by the government from the Oregon and California Railroad are to be managed for the sustained production of timber.

Implementation of the proposed action would conform to standards and guidelines contained in the ROD/RMP, as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (p. 3) which incorporates the analysis contained in the PRMP/EIS. The ROD/RMP and PRMP/EIS incorporate the standards and guidelines of the *Final Supplemental Environmental Impact Statement* (FSEIS) *on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl* (USDA and USDI 1994a February 1994) and the *Record of Decision* (ROD) *for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA and USDI 1994b April 1994).

Chapter 2
DISCUSSION OF THE ALTERNATIVES

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

I. Alternative 1 - No Action

Under an alternative of "no action," no commercial thinning or density management would be conducted in these stands. Current stand densities would continue to increase, with growth and maturation of the stands continuing along present trajectories. This would lead to increased suppression mortality and potential stagnation unless some other disturbance occurs. Other Matrix lands would be selected and analyzed for commercial thinning or regeneration harvest to meet the ASQ and socioeconomic objectives of the ROD/RMP and PRMP/EIS.

Road renovation and improvements have been proposed in the project areas to address sediment and other water quality concerns. These actions would not be undertaken, nor would the identified opportunities for road decommissioning and reduction of road density in the watershed. These identified needs and opportunities would require separate analyses and accomplishment under other authorizations.

II. Alternative 2 - Proposed Action

Commercial thinning or density management treatments would be applied to dense and even-aged stands, dominated by Douglas-fir. The treatments would be targeted at reducing relative stand densities. Relative density compares the current density of a stand with the theoretical maximum. For a given average diameter, a stand can support a maximum number of trees per acre, or conversely, for a given number of trees per acre, there is a maximum average diameter possible. Relative density indicates whether the stand is growing well, is in need of thinning, can support an understory, or is experiencing mortality suppression.

GFMA stands would be thinned from below to a relative stand density index of approximately 0.40, removing trees primarily from the suppressed and intermediate crown classes. Some limited removal of co-dominant and dominant trees would also be expected.

Density management in the Connectivity/Diversity Block allocation would be conducted in a similar fashion, but would reduce density to approximately 0.30. On average, one-half of the basal area would be removed to promote conditions where stand development would be more characteristic of late-successional forests. Treatments would be designed to retain hardwoods as stand components and allow development of understory vegetation that would provide cover and forage for wildlife. A second entry would be anticipated in 15-20 years, with subsequent underplanting to create a secondary canopy layer in conjunction with understory vegetation.

Within the Riparian Reserves, variable-width "no-harvest" buffers would be established on all streams. These buffers would be a minimum of 20 feet in width, but could range up to 100 feet dependent on streamside topography, existing riparian vegetation, and the degree of solar incidence to which perennial streams are subjected. If cutting of trees in the "no-harvest" buffers were necessary to clear yarding roads, the trees cut would be left in place. Untreated areas or islands would also be left outside of the "no-harvest" buffers and would be centered on specifically identified habitat features deemed important to riparian-dependent species.

Excepting these two circumstances, Riparian Reserves would be treated in a manner comparable to adjacent upland areas. The prescription would primarily remove suppressed and intermediate trees and maintain a minimum of 35 percent canopy closure, exclusive of the untreated areas. The number of trees/acre retained would be roughly equal to upland areas. Trees designated for cutting would be directionally felled away from "no-harvest" buffers and untreated islands. Short-term needs for large in-stream wood, Decay Class 1 and 2 large woody debris, and snags would be evaluated post-treatment. If necessary, reserved trees would be felled or girdled to address short-term inadequacies.

Dominant and co-dominant trees with a minimum of 30 percent live crown would be favored for retention. In Riparian Reserves, any larger, dominant trees felled for operational purposes would be left on site as down wood. Where practical, and survival probable, hardwoods exceeding 10 inches DBH would be retained.

All existing Decay Class 3, 4 and 5 wood at least 16 inches in diameter and 16 feet long would be reserved under contract provisions. Older remnant trees would be reserved to the greatest degree practicable, but would be selected for cutting if located within the clearing limits of a proposed road. Hardwood and conifer snags would also be reserved and protected from cutting where operationally practicable. Rub trees or unthinned patches would be used to protect snags where they would not preclude attainment of thinning and density management objectives. Any snags that pose an obvious safety risk, are situated in a road right-of-way, or are located within a yarding corridor would be felled and retained on site as large woody debris.

The specific marking guidelines relative to land use allocation, species preference, criteria for selection of trees to be retained, approximate spacing between reserved trees, and target post-treatment basal areas are contained in Appendix B of this document.

Unit areas, land use allocation, anticipated harvest method and any seasonal restrictions for the four sales are summarized in Tables 1 through 4.

Table 1 - Angel Hair
Sections 31, 32, and 33 of T. 29 S., R. 8 W., and Section 5 of T. 30 S., R. 8 W.

Unit	Acres	Land Use Allocation	Yarding Method	Seasonal Restrictions (Y/N)
A	3	Connectivity/Diversity Block	Ground-Based	Y
B	11	Connectivity/Diversity Block	Ground-Based	Y
C	66	GFMA	Ground-Based	Y
D	35	Connectivity/Diversity Block	Ground-Based	Y
E	22	GFMA	Cable	N
F	54	GFMA	Ground-Based/Cable	Y

Table 2 - Diet Coq Sections 29 and 31of T. 28 S., R. 8 W.

Unit	Acres	Land Use Allocation	Yarding Method	Seasonal Restrictions (Y/N)
A	5	GFMA/Riparian Reserves	Ground-Based	Y
B	25	GFMA/Riparian Reserves	Ground-Based	Y
C	15	GFMA/Riparian Reserves	Ground-Based	Y
D	2	GFMA/Riparian Reserves	Ground-Based	Y
E	42	GFMA/Riparian Reserves	Ground-Based	Y
G	2	GFMA/Riparian Reserves	Ground-Based	Y
H	10	GFMA/Riparian Reserves	Ground-Based	Y
I	4	GFMA/Riparian Reserves	Ground-Based	Y
J	17	GFMA/Riparian Reserves	Ground-Based/Cable	Y
K	5	GFMA/Riparian Reserves	Ground-Based	Y
L	12	GFMA/Riparian Reserves	Ground-Based	Y
M	20	GFMA/Riparian Reserves	Ground-Based/Cable	Y
N	7	GFMA/Riparian Reserves	Ground-Based/Cable	Y

Table 3 - Golden Gate Section 7 of T. 30 S., R. 8 W.

Unit	Acres	Land Use Allocation	Yarding Method	Seasonal Restrictions (Y/N)
A	68	GFMA/Riparian Reserves	Ground-Based/Cable	Y
B	5	GFMA/Riparian Reserves	Ground-Based	Y
C	166	GFMA/Riparian Reserves	Ground-Based	Y

Table 4 - Smoke Screen Section 3 of T. 30 S., R. 9 W.

Unit	Acres	Land Use Allocation	Yarding Method	Seasonal Restrictions (Y/N)
A	50	GFMA	Ground-Based/Cable	Y
B	16	GFMA/Riparian Reserves	Cable	Y
C	13	GFMA/Riparian Reserves	Cable	Y

Timber cruising would be accomplished using techniques that could include the felling of sample trees. If it is determined to be necessary, trees would be felled for the formulation of local taper and volume tables, and would become a part of the offered sale volume. Selection and felling of sample trees would be consistent with the assumptions and provisions described in the Roseburg District *3P Fall, Buck and Scale Sampling Environmental Assessment* (USDI 2000a).

Cable yarding equipment would be required to possess the capability of maintaining a minimum of one-end log suspension in order to reduce soil disturbance. At least 100 feet of lateral yarding capacity would also be required so that yarding corridors would be spaced at intervals of at least 200 feet whenever practicable. The intent is to reduce the number of reserved trees that would require cutting to clear yarding roads and landing areas.

Ground-based harvest would be seasonally restricted to the period between May 15th and the onset of regular fall rains, usually around mid-October. Main skid trails, those in which 50 percent or more of the surface area of the trail is exposed to mineral soil, and landings would cumulatively affect less than 10 percent of the yarded area. Existing skid trails would be used to the degree practical and count toward the 10 percent affected area, when combined with new trails and landings. Landings would be tilled upon completion of operations. Selective tilling of haul roads and skid trails would also be done, based upon recommendations of silviculture and soils staff. The location of main skid trails not treated would be mapped and documented for treatment at the time of final regeneration harvest.

Additional operational restrictions may also apply during the bark slip period, from April 15th to July 15th. The bark slip period is that portion of the year when active cambial growth results in bark being less firmly attached to the boles of trees and more susceptible to mechanical damage, particularly in younger trees. Timber felling and yarding in association with right-of-way

clearing would be allowed. Timber felling and yarding within units would generally be subject to restriction, but circumstances may exist where it would be practical to waive bark slip restrictions, such as in the use of harvesters and forwarders that are capable of severing trees and setting them aside without damaging adjoining trees.

Access would be provided by existing system and non-system roads (i.e., jeep roads, truck roads from previous entries), in combination with limited construction of permanent and temporary roads. Temporary roads would be constructed, used and decommissioned in the same operating season. In instances where temporary roads are built but cannot be utilized within the prescribed time frame, such as in times of fire closure, the BLM may winterize these roads and allow their use the following summer. In the event that the spur was intended for access to an area for planned for cable yarding, surfacing may be authorized to accommodate winter operations if there are no other conflicting concerns. In either instance, the roads would be decommissioned following completion of use, unless a specific need for retention was identified. Renovated roads that are left unsurfaced would be governed by the same conditions as temporary roads, subject to one additional provision. If the roads could not be decommissioned because of existing access rights under easements or reciprocal rights-of-way, they would be blocked to prevent vehicular use during winter months and reopened in the future if needed. Table 5 summarizes, by sale, the miles of proposed road construction, renovation, and decommissioning. Actual miles of decommissioning would depend on agreement of reciprocal users to waive their access rights.

Table 5 - Summary of Proposed Road Work

Sale Name	Permanent Construction	Temporary Construction and Decommissioning	Renovation w/ Surfacing	Renovation/ Decommission Following Use
Angel Hair	0.04	0.20	0.82	2.38
Diet Coq	-----	0.55	0.84	0.97
Golden Gate	-----	0.21/0.13[1]	1.29	2.56
Smoke Screen	-----	1.29	0.84	0.87
Totals	0.04	2.25/2.17[1]	3.79	8.95

[1] Difference reflects the construction of 0.08 miles of road on private land which would not be decommissioned.

Among specific road renovation and decommissioning proposed, are the following:

- An unnumbered road originating in Unit E of Diet Coq thinning accesses private lands in Section 36, T. 28 S., R. 9 W. This road would be renovated, including the replacement of a failing log-fill crossing with a temporary culvert and crossing. Upon completion of thinning on Units E, G and H, the culvert would be removed and the stream banks recontoured. The road would be decommissioned and blocked at the north-south property line common to Sections 31 and 36, and at its junction with Road No. 28-9-25.1.

- On Golden Gate thinning, 6 stream crossings on Road Nos. 30-8-8.0 and 30-9-11.1 would be removed following the completion of thinning. Stream banks would be pulled back to a normal angle of repose, and low-water crossings armored with rock would be installed in the event that fire suppression access is needed. Otherwise, these roads would be blocked to all other vehicular use until a future management entry is planned.

Roads to be decommissioned and/or blocked after use would include:

28-8-31.0 28-8-31.1 28-8-31.5 29-8-29.0 (Portion in Unit F of Angel Hair)
30-8-8.0 (last 0.7 miles) 30-9-11.1 (W portion in Unit C of Golden Gate)

Roads to be renovated/improved, surfaced/resurfaced would include:

28-8-29.2 (Segments A and B) 28-8-29.3 (Segments A and B)
29-8-29.3 (Segments A, B and C) 30-9-3.0 (To Units B and C of Smoke Screen)
30-9-11.1 (East Segment to Unit A of Golden Gate)

III. Actions Considered But Eliminated or Deferred From Detailed Study

A. Units Eliminated or Deferred From Consideration For Treatment

Unit F of the proposed Diet Coq commercial thinning was dropped from consideration because the stand density is lower than thought, and there would be no immediate benefits from thinning.

The proposed Camas Heights commercial thinning, consisting of approximately 300 acres, was deferred from consideration at this time. Surveys detected below-canopy flight by a number of marbled murrelets. This type of flight behavior indicates occupancy of the survey site by murrelets but the actual nest site location is unknown. A future entry for density management may be considered, subject to a separate environmental assessment.

B. Retention On-Site Of All Trees Cut In Riparian Reserves

Retention on site of all trees designated for cutting within Riparian Reserves was considered as an option to removal. It was concluded that it was not viable because of the risks it could pose.

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

Average stand diameters in the proposed units range from approximately 8 inches to 15 inches DBH. Tree densities within Riparian Reserves proposed for treatment range from approximately 190 trees per acre up to nearly 450 trees per acre. Removal of 50 percent of the trees in the 8-16 inch diameter classes is necessary to achieve silvicultural objectives, requiring the cutting of approximately 100-225 trees per acre in these diameter classes, depending on the average stand density within a given unit.

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

If an outbreak of the nature described were to occur, and a factor of four live trees per acre for every ten down trees per acre is applied, the potential loss of additional live trees could range from approximately 40-90 trees per acre. Since these would most likely be the larger trees intended to provide future snags and large down wood, potential long-term consequences to wildlife and habitat would not be acceptable.

If all girdled or felled trees were retained on-site, fuel loading would be increased by as much as 15-18 tons/acre. Approximately 10-12 tons/acre of this material, less than 3 inches in diameter, represents the size of material that provides the ignition potential and has the greatest influence on the rate of fire spread. Fine fuels also provide the means by which larger fuels are ignited. These fuels would pose a short-term increase in the risk of ignition, lasting one to three years after the completion of density management. Approximately 5-6 tons/acre would be material greater than 3 inches in diameter, which is primarily responsible for fire intensity and duration. The increased potential for high fire intensity would persist for 15 to 20 years until the material is sufficiently decayed. While large fuels do not pose a high risk by themselves, combination with the large tonnage of fine fuels would create an elevated risk of a stand replacement event. This would be inconsistent with management objectives for limiting the size of all wildfires and maintaining long-term ecosystem function within the Riparian Reserves (ROD/RMP, p. 27).

Many of the proposed units are located in areas within the Camas Valley Rural Fire District and the Wildland-Urban Interface, and have been identified as possessing a high-fire risk associated with past management activities. Creation of fuel conditions that would further increase the risk of catastrophic fire would be inconsistent with current National policy and direction to such risks.

C. Retention of A Portion Of The Trees Cut In The Riparian Reserves

In comments received on previous analyses proposing density management in reserved land use allocations, it was suggested that a portion of the trees to be treated to achieve desired stand density could be cut or girdled and retained on-site to provide snags and down wood that would otherwise be lacking if all cut material were yarded and removed.

Such an alternative was not considered because no additional measures were deemed necessary to provide the desired future levels of coarse wood and snags. As previously discussed (p. 5), reservation of existing Decay Class 3, 4 and 5 logs would be done under contract provisions. Existing snags would also be reserved to the degree practicable. It is anticipated that thinning operations and natural processes associated with stand development and maturation would create additional snags and coarse down wood. These events would include mechanical damage, weather damage, insects, disease, and future suppression mortality. The reservation of the larger, dominant trees would also provide the opportunity to create additional snags and down wood if a short-term deficit is identified.

IV. Resources That Would Remain Unaffected by Either Alternative

The following resources would not be affected by either of the alternatives, because they are absent from the area: Areas of Critical Environmental Concern (ACEC); prime or unique farmlands; floodplains; and Wild and Scenic Rivers. No Native American religious concerns, environmental justice issues, solid or hazardous waste, or cultural resources were documented in the project area. It is anticipated that there would be no measurable effect on the introduction of noxious weeds or the spread of established infestations, as discussed in Chapter 3 (pp. 25-26) of this document.

Neither of the alternatives would have any Adverse Energy Impact. No known commercially viable energy resources exist in the project area, nor are there any production, transmission or conservation facilities that would be affected.

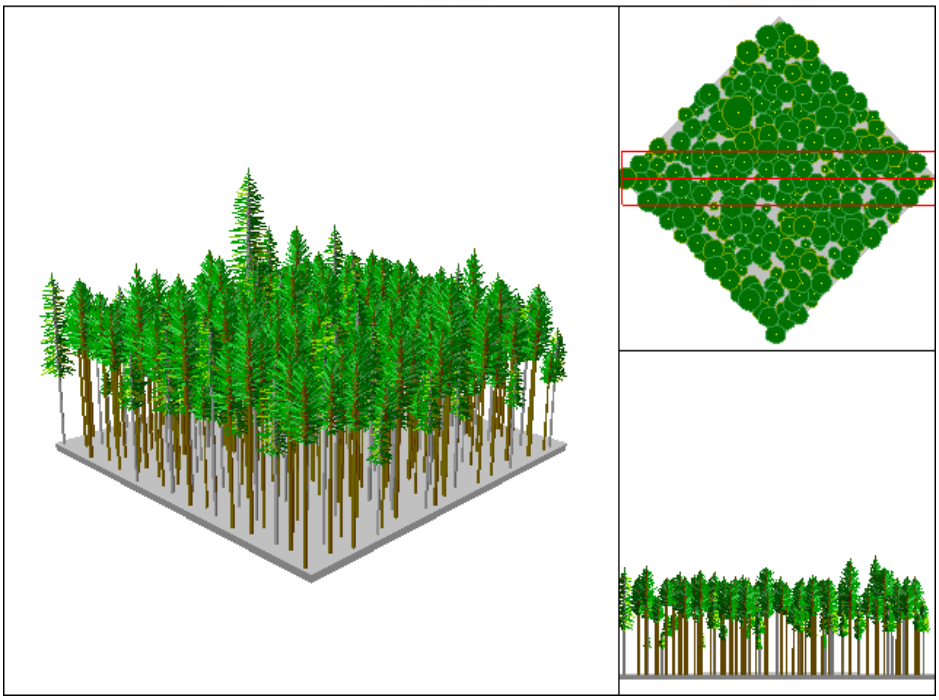
Chapter 3
THE AFFECTED ENVIRONMENT

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

I. Timber/Vegetation

Douglas-fir and grand fir are the dominant tree species in the project area. Other conifers of commercial utility include incense-cedar, western redcedar, western hemlock, ponderosa pine, sugar pine, and Port-Orford-cedar. Hardwood species are present in small numbers and include Pacific madrone, golden chinkapin, red alder, bigleaf maple, Oregon white oak, and California black oak. Rhododendron, vine maple, evergreen huckleberry, ocean spray, hazel and manzanita are the common shrub species. Herbaceous vegetation is generally sparse and where present is primarily composed of Oregon-grape, salal, and sword fern.

Figure 1. Current Stand Condition. *Representation of the current structure and density of the stands proposed for treatment. SW Organon version 6.0 was used to model the existing stand condition. Stand Visualization System version 3.28 (SVS) was used to model the data.*



As illustrated in Figure 1, the stands proposed for treatment are dense and even-aged with closed canopies. Relative stand densities are near or above the level of 0.63 (Organon RDI) at which point competition between trees causes increasing suppression mortality. Crown ratios are still above 30 percent, a level considered important for maintaining or increasing the health and vigor of a stand, and one above which a favorable release and response to thinning would be expected.

Tables 6-9 describe the current stand conditions within the four project areas. Conditions within individual stands tend to be homogenous across the upland areas and Riparian Reserves. This information was obtained from stand exam plots and growth modeling, using SW ORGANON program software.

Table 6 - Current Stand Conditions/Angel Hair Thinning

Unit	Dominant Stand Age	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
A	54	388	236.4	10.6	0.565	77	0.31
B	45	437	228.8	9.8	0.797	100	0.33
C	48	244	185.8	11.8	0.602	80	0.34
D	44	282	215.5	11.8	0.697	90	0.39
E	50	209	190.0	12.9	0.594	93	0.59
F	48	326	252.2	11.9	0.814	100	0.33

Table 7 - Current Stand Conditions/Diet Coq Thinning

Unit	Dominant Stand Age	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
A, B, C,	59	424	259.7	10.6	0.872	100	0.29
E	58	358	285.5	12.1	0.747	95	0.30
G, H, I	65	387	292.9	11.8	0.949	100	0.32
J, M, N	54	190	194.4	13.7	0.494	69	0.37
K, L	37	228	158.2	11.3	0.522	72	0.42

Table 8 - Current Stand Conditions/Golden Gate Thinning

Unit	Dominant Stand Age	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
A, B	57	225	191	12.5	0.605	94	0.45
C	54	225	191	12.5	0.605	94	0.45

Table 9 - Current Stand Conditions/Smoke Screen Thinning

Unit	Dominant Stand Age	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
A	50	319	201.9	10.8	0.678	88	0.36
B	59	357	275.3	11.9	0.889	100	0.34
C	52	311	218.5	11.3	0.719	92	0.39

A. Port-Orford-cedar and Port-Orford-cedar Root Disease

The Upper Middle Fork watershed analysis unit consists of 67,207 acres within four subwatersheds. The BLM manages 25,960 acres, or 39 percent of the total area. A comprehensive inventory of the location of Port-Orford-cedar on private lands does not exist. Port-Orford-cedar occurs as individual or scattered groups of trees rather than as continuous stands, and is present on an estimated 6,163 acres or 24 percent of the BLM-managed lands. There are extensive areas throughout the watershed where Port-Orford-cedar does not occur. Locations on BLM-managed lands were determined by extensive roadside surveys in 1996. If Port-Orford-cedar was observed along a roadside, it was assumed that it was present throughout the entire forest operations inventory unit.

Port-Orford-cedar can be affected by an introduced pathogen (*Phytophthora lateralis*) that causes a root disease. Mycelia of *P. lateralis* grow in the cambial tissues of the roots of Port-Orford-cedar, and may eventually colonize the entire root system of the affected tree. Uptake of water and nutrients is blocked, resulting in tree death. Mature trees may succumb to the disease within two to four years after exposure, and seedlings within as short a time as a few weeks.

P. lateralis is highly adapted for spread in water and soil, and is capable of surviving in a state of dormancy. Viable resting spores may survive in infected root systems for 7 years or more following the death of the host tree (Hansen and Hamm 1996). The disease is spread by the transport of infested soil and overland flow of water, primarily in the fall,

winter, and spring when the cool, moist conditions are most favorable for the pathogen. Vehicular traffic, particularly the use of unsurfaced roads in wet weather, and activities related to road construction, road maintenance and logging can spread the disease by transporting infested soil into disease-free areas. One study concluded that 72 percent of the infected sites in the landscape under examination were the result of vehicular dispersal of contaminated soil along roads (Jules, et al. in press). The disease may also be spread by game animals and casual forest visitors, by transport of infested soil on hooves and feet.

High risk areas include stream courses, drainages, low-lying areas down slope from infected areas, or below roads and trails where inoculum may be introduced. There is no definitive distance along roads or streams that is considered to be at high risk, however, Port-Orford-cedar are not usually infected at a distance greater than 40 feet down slope from roads except where streams, culverts, and wet areas are present to facilitate spore dispersal (Goheen, et al. 1986). Upslope spread of the disease depends on slope steepness and the location of Port-Orford-cedar in relation to roads, ditchlines or streams.

Infested areas were initially identified using 1994 aerial photographs for the Roseburg District portion of the watershed. Spread of the disease was assessed using 1997 Coos Bay District aerial photographs and 1999 Roseburg District aerial photographs, supplemented by on-the-ground verification. Within the entire watershed, an estimated 163 acres are infected. On BLM-managed lands in the watershed, an estimated 79 acres are infected, representing slightly more than one percent of the area in which Port-Orford-cedar is present. In contrast, the Draft Port-Orford-cedar Rangewide Assessment estimates that the infection is present in 8 percent of the entire range of Port-Orford-cedar. The average size of infected areas in the Upper Middle Fork Coquille watershed analysis unit is one acre, with the largest being 12 acres. Infected trees have been observed throughout the proposed units and along the probable haul routes for the Golden Gate and Smoke Screen project areas. Port-Orford-cedar also occurs adjacent to proposed Unit A and in Unit D of the Angel Hair project area. The tree observed in Unit D appears to be infected with the root disease, but this has not been confirmed. No Port-Orford-cedar trees have been identified in the Diet Coq project area.

B. Other Tree Diseases and Parasites

Dwarf mistletoe (*Arceuthobium abietinum*) is a parasite that penetrates the xylem of the host tree. It takes up water, carbohydrates, and minerals causing a general reduction in tree vigor resulting in growth loss, degradation of the structural quality of wood in infected trees, and mortality in older trees. Dwarf mistletoes are generally host specific, infecting a single species. The parasite spreads by spore dispersal and requires a living host to survive. Control is routinely affected by the removal of infected trees, because this obligate parasite has a narrow host range and spreads slowly. Dwarf mistletoe was observed on grand fir in several units of the Angel Hair thinning proposal.

Laminated root rot is caused by the fungus *Phellinus weirii*, and transmitted through root grafts between trees. It may be identified by initial symptoms of needle yellowing, stagnating growth, and tufting of needles at branch ends. Infected trees eventually die standing or fall over as a consequence of weakened root systems. Douglas-fir and grand fir are highly susceptible, while susceptibility of western hemlock is intermediate. Douglas-fir beetles often attack trees weakened by laminated root rot. A small pocket of infection is present in Unit F of Angel Hair thinning, west of Road No. 29-8-29.3.

II. Wildlife

A. Special Status Species

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

1. Threatened and Endangered

The following species inhabit lands managed by the Roseburg District: the Federally-endangered Columbian White-tailed deer (*Odocoileus virginianus leucurus*), the Federally-threatened marbled murrelet (*Brachyramphus marmoratus*), the Federally-threatened northern spotted owl (*Strix occidentalis caurina*), and the Federally-threatened bald eagle (*Haliaeetus leucocephalus*).

Annual surveys by the Oregon Cooperative Wildlife Research Unit have not located any nesting bald eagles within the South River Resource Area. Riverine habitat or other large bodies of water that would provide suitable habitat are absent from the project areas. As a consequence, bald eagles are not expected in the project area, no impacts would be anticipated, and no further discussion is necessary in this analysis.

The project area is outside the historic range of the Columbian white-tailed deer, and not representative of the type of habitat utilized by the species. As a consequence, the species is not expected in the project area, no impacts would be anticipated, and no further discussion of the species is necessary in this analysis.

The Federally-endangered Fender's blue butterfly (*Icaricia icarioides fenderi*) has not been documented on the Roseburg District. The U.S. Fish and Wildlife Service considers the Willamette Valley to be the southern extent of the butterfly's range. Consequently, the butterfly is not expected in the project area and it will not be discussed further.

a. Northern Spotted Owl

Units E, G, H and I of Diet Coq thinning, in Section 31, T. 28 S., R. 8 W., are overlapped by a 1.5-mile radius Coastal Province owl territory and a 1.3-mile radius Klamath Province territory. The Coastal Province territory has been unoccupied since 1992. The activity center of the occupied Klamath province territory is approximately 0.7 miles from Units E, G, H and I. Units A, B, C, and D in Section 31, and J, L, M and N in Section 29 of T. 28 S., R. 8 W., are within a 1.3-mile radius Klamath Province owl territory.
Suitable nesting, roosting and foraging habitat is generally characterized by stands with large conifer trees that have large diameter broken and unbroken limbs, deformities, and large broken tops or cavities which provide nesting sites (Forsman 1984; Hershey 1995; Forsman and Giese 1997).

Within the aforementioned units, there are approximately 112 acres evaluated as suitable nesting, roosting and foraging habitat. Residual overstory trees 100-200+ years of age extend above an understory that is even-aged and well developed, and 59-65-years old. Canopies of older trees are generally situated well above the younger understory. This lack of contact and interaction with the lower canopy may reduce potential use for nesting. The understory stands have a low probability of providing nesting habitat but do provide suitable roosting and foraging habitat. Another 54 acres of similar habitat is present in proposed Unit F of the Angel Hair project area in Section 33, T. 29 S., R. 8 W., but this unit is not located within any owl territory.

The remaining thinning units are 40-65-years old and are generally even-aged within respective stands. They lack nesting and roosting structure, and have dense, single-layered canopies that primarily provide foraging and dispersal opportunities.

All of the Golden Gate thinning units in Section 7, T. 30 S., R. 8 W., and Units E and F of Angel Hair thinning in Section 5, T. 30 S., R. 8 W. and Section 33, T. 29 S. R. 8 W. are located within Critical Habitat Unit (CHU) OR-62.

b. Marbled Murrelet

All of the proposed project areas are within the 35-50 mile management zone.

Suitable nesting structure for the murrelet is similar to that used by the northern spotted owl, consisting of mature to old-growth trees with large limbs, deformities, mistletoe brooms and abandoned animal nests that provide nesting platforms (Evans et al. 2000). By contrast, though, these large trees may be components of a mature stand, or remnant overstory trees in younger stands.

Table 10 summarizes those units that have been identified in field reviews as suitable habitat, or adjacent to suitable habitat.

Table 10 - Proximity of Sale Areas to Marbled Murrelet Habitat

Project Name	Suitable Habitat Within Proposed Units	Suitable Habitat Adjacent to Proposed Units	Proposed Units Without Suitable Habitat or Adjacent Habitat
Angel Hair	F	No	A, B, C, D and E
Diet Coq	A, B, D, E, G, H, I, J, K, L and M	E, G, H, I, and K	C and N
Golden Gate	A and C	B	
Smoke Screen	No	C	A and B

Marbled murrelet surveys in the South River Resource Area had previously resulted in three detections, one in 1999 and two in 2001. These detections were best characterized as overflights. Surveys on the Camas Heights project area, in the summer of 2002, detected a number of murrelets flying above and below the forest canopy, indicative of occupancy. This led to deferral of the proposed thinning, as earlier described (p. 9). No presence or occupancy was documented in any other proposed units or adjacent stands identified as possessing suitable nesting habitat.

2. Proposed or Candidate

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

3. Bureau Sensitive

The northern goshawk has the potential to be present in portions of the project areas. For nesting sites, goshawks favor areas with dense overhead canopy or cover created by tall trees (Marshall et al. 1996). These forest stands may contain a few large trees in stands dominated by younger trees, or be composed entirely of mature and old-growth trees. Generally, nest sites are found in older stands (Reynolds et al. 1982). Large mature and older conifers with larger branches suitable for nest building are present in proposed Units E, G H and I of the Diet Coq project, and Unit F of the Angel Hair project. These areas were also identified above as representing suitable habitat for the northern spotted owl. Two years of surveys in the Diet Coq project area have not identified the presence of goshawks in these stands, nor any indication of utilization by goshawks. One year of surveys has been conducted on Unit F of the Angel Hair project with negative results. Remaining project areas and units within the proposal were evaluated on the ground and found not to meet the suitable habitat quality rating set forth in the goshawk inventory protocol (USDI 1997).

B. SEIS Special Attention Species

Special Attention species are those designated for protection under the Northwest Forest Plan as amended by the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl*, and incorporated into the Roseburg District ROD/RMP. Special Attention species are not considered special status species, unless also designated as such.

Red tree vole

The red tree vole (*Arborimus longicaudus*) is an arboreal rodent that nests and feeds primarily in the canopy of Douglas-fir trees, though known to feed on other conifers such as hemlock and true firs. The red tree vole is more strongly associated older forests, but has been documented in younger forests like those described in this analysis.

"Survey Protocol for the Red Tree Vole (*Arborimus longicaudus*). Version 2.0" established the protocols for red tree vole surveys. Pre-disturbance surveys were required when the average conifer diameter of a stand equals or exceeds 16 inches, or the average diameter is 10-16 inches with older remnant conifers equal to or greater than 21 inches in diameter, or 120 years or greater in age (USDI 2000b). Unit B of the Angel Hair proposal and the units of the Smoke Screen proposal did not meet the criteria triggering clearance surveys. The Golden Gate project area was surveyed, resulting in the location of 21 occupied nest trees and approximately twice as many unoccupied nest trees. Based upon additional data considered in the 2001 Annual Species Review, the requirements for pre-disturbance surveys were modified. Within the central portion of the vole's range, an area that includes the Roseburg District, pre-disturbance surveys are no longer required.

Great gray owl

Great gray owls may be found in a variety of forest types that include: ponderosa pine, lodgepole pine, tamarack, Douglas-fir, grand fir, aspen, or other deciduous tree species. The criteria for pre-disturbance surveys specify that the project area be located above 3,000 feet in elevation and within 1,000 feet of natural meadows larger than 10-acres in size. These habitat features are absent, so there would be no habitat disturbance. Surveys are not required and the great gray owl will not be discussed further.

Oregon shoulderband snail

The Oregon shoulderband snail (*Helminthoglypta hertleini*) typically inhabits rocky areas and talus deposits similar to habitat utilized by the Del Norte salamander (*Plethodon elongatus*). The snail may also inhabit areas where permanent ground cover and moisture are available in conjunction with rock fissures or large woody debris. It is known to forage on hardwood leaf litter and is adapted to somewhat dry conditions

during the summer portion of the year. Occupied sites have been identified in the South River Resource Area in the Canyon Creek and Dickerson Rocks areas. Using soil mapping of areas of potential Del Norte salamander habitat as a surrogate, it was determined that potential habitat for the snail could exist in the Golden Gate project area, but on-site surveys determined suitable habitat was not present. No potential habitat was identified within any of the other project areas.

III. Vascular and Non-Vascular Plants

A. Special Status Species

The following vascular plant species could be present within the proposed project areas.

Eucephalus vialis (*Aster vialis*)
Cimicifuga elata
Cypripedium montanum
Perideridia howellii
Bensoniella oregona
Cypripedium fasciculatum
Polystichum californicum

Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*) is a Federally-threatened species known to occur on five sites on BLM-managed lands in the South River Resource Area, in the South Umpqua River and Lower Cow Creek watersheds. The U.S. Fish and Wildlife Service has identified an array of soil series within a set of geographic quadrangles that would provide suitable habitat. The project area is outside of the geographic range, and the requisite soil types are absent. The proposed units are not considered suitable habitat, surveys are not required, and the species will receive no further discussion in this analysis.

B. SEIS Special Attention Species

The following Special Attention species occupy habitat of the type that is present within the proposed project areas.

Bryophytes
Diplophyllum plicatum
Kurzia makinoa
Schistostega pennata
Tetraphis geniculata
Tritomaria exsectiformis

Lichens
Hypogymnia duplicata
Lobaria linita
Pseudocyphellaria rainierensis

IV. Fish and Essential Fish Habitat

Listed fish species found in the Middle Fork Coquille River watershed, downstream of the project areas, include the Oregon Coast coho salmon and Oregon Coast steelhead trout. The National Marine Fisheries Service designated the Oregon Coast coho salmon (*Oncorhynchus kisutch*) Evolutionary Significant Unit (ESU) as a threatened species (Federal Register, Vol. 63, No. 153/Monday, August 10, 1998/Rules and Regulations), and proposed the Oregon Coast steelhead trout (*Oncorhynchus mykiss*) as a candidate for threatened species designation (Federal Register March 19, 1998). To date, there has been no change in the status of the steelhead trout. Neither species is present within the project areas.

All of the project drainages contain fish-bearing streams inhabited by resident Oregon Coast cutthroat trout (*Oncorhynchus clarki clarki*). The Oregon Coast cutthroat trout ESU is under review by the U.S. Fish and Wildlife Service for candidate status, and was previously listed as a candidate species by the National Marine Fisheries Service (Federal Register April 5, 1999). Jurisdiction and responsibility for any future consultation was subsequently transferred to the U.S. Fish and Wildlife Service (Federal Register April 21, 2000).

Essential Fish Habitat is habitat currently or historically available to coho or chinook salmon. There is no Essential Fish Habitat in the vicinity of any of the project areas because of long-standing natural barriers to fish passage. The first barrier is at Bradford Falls, on the Middle Fork Coquille River, approximately 2.5-miles inside the watershed boundary. Some accounts have steelhead trout passing this barrier during periods of high flow, but further migration is blocked by a second barrier 1.5-miles upstream from the confluence of Twelvemile Creek with the Middle Fork Coquille River. Table 11 lists approximate distance from proposed sales to resident fish-bearing and anadromous stream reaches.

Table 11 - Fish Distribution

Proposed Commercial Thinning	Approximate stream distance (miles) to:	
	Resident fish	Essential Fish Habitat
Diet Coq.	present	11.2
Golden Gate	1.5	3.3
Angel Hair	0.2	5.7
Smoke Screen	0.5	1.8

Aquatic habitat surveys by the Oregon Department of Fish and Wildlife, and observations by BLM fisheries biologists form the basis for describing the present condition of aquatic habitat at the 5th-field watershed level. For the subject streams surveyed (Bridge Creek and an unnamed tributary of Twelvemile Creek), overall habitat condition was assessed as good.

- Habitat access evaluates the presence of physical barriers that restrict or eliminate access by fish to historically available habitat available. Habitat access in the Upper Middle Fork Coquille watershed analysis unit is considered poor for resident fish passage. It is not considered applicable to anadromous species because of the natural barriers to migration noted above.

- The condition of substrate (spawning gravel) was assessed as fair to good. Excess sediment from agricultural activities, timber harvest, and forest roads was considered a problem, however. The project drainages are, however, removed from the effects of agricultural activities in Camas Valley, being located upstream of the valley or well upslope of the Middle Fork Coquille River. Streams in the immediate vicinity of proposed thinning units are primarily steeper gradient headwaters in which sediment accumulation does not occur, with the notable exception of streams located on the valley floor in the Diet Coq project area.

- Stream pools provide rearing habitat for anadromous fish fry and year-round habitat for resident fish. Pool frequency and pool quality were evaluated as fair to good. Conditions affecting the quality of pools may include factors such as sediment, cover, pool size and depth, and the availability of large wood.

- Large woody debris, in the form of trees and logs, provides cover, reduces stream velocities, promotes channel meander, collects and holds substrates, and provides a long-term source of organic material and nutrients. Large wood in streams within proposed units is primarily logging slash in an advanced stage of decay and overall condition is considered poor. Past timber management practices on Federal lands included stream cleaning. Historic harvest on private lands cleared along streams to enlarge pastures and fields, and salvaged deadfall from streams. Current harvest on private timberlands is governed by the less restrictive requirements of the Oregon Forest Practices Act, which requires the retention of far less streamside vegetation than the RMP, and retains fewer trees that may fall into the streams and provide a long-term supply of large wood.

- Off-channel habitat and refugia are considered to be in good condition. These areas adjacent to streams filter out sediment, provide a reservoir of water to maintain stream flows and water temperatures during periods of low flows, and provide habitat for a variety of terrestrial and aquatic wildlife. Streamside shading, that moderates water temperatures during the summer months, was assessed as good to excellent.

V. Water Quality/Resources

Stream Flow

The climate is characterized by cool, wet winters and hot, dry summers. Annual precipitation falls primarily as rain, which is concentrated between the months of November and March.

Stream flows parallel precipitation patterns, with peak flows from November to March, and low flows from July to October. Low base stream flows during summer months are often extreme and small 1st and 2nd order streams generally go dry. Approximately 22,000 acres, or roughly one-third of the watershed analysis unit is located in the Transient Snow Zone. The Transient Snow Zone is generally defined as the lands between 2,000 and 5,000 feet above sea level.

Water Quality

Water quality standards are determined for each water body by the Oregon Department of Environmental Quality (ODEQ). Water bodies which do not meet water quality standards are placed on the 303(d) list as Water Quality Limited (ODEQ 1998). The standards are designed to protect the most sensitive beneficial use (Miner 1996 p. 1). The Middle Fork Coquille River is the only water body in the watershed analysis unit currently listed. The most sensitive beneficial use is as spawning and rearing habitat for resident and anadromous fishes.

Temperature

The Middle Fork Coquille River is listed for elevated temperature from its mouth to headwaters. Elevated temperatures are defined as those exceeding a standard of 17.8° C for summer months. Water temperatures were monitored by BLM personnel at a site near proposed Unit B of the Diet Coq project area. The seven-day average maximum temperature was 18.0° C in the summer of 1999, and 20.1° C during the summer of 2000 (BLM data). Factors contributing to elevated stream temperatures are a lack of shading, high stream width-to-depth ratio and low summer flows (Moore and Miner, 1997), leading to increased solar radiation and stream heating. Some reaches of the Middle Fork Coquille River are subject to all of these conditions. Many of the perennial streams in the watershed, particularly those that pass through agricultural lands, also have elevated summer temperatures that may contribute to temperature elevation in the river.

Sediment

Sediment results from both natural and management-related erosional processes. A study in the Coast Range in Oregon (Benda and Dunne 1997) found that sediment input from all sources in a watershed averaged 0.45 cubic yards per acre per year. Another study in the Steamboat Creek watershed by Stillwater Associates reported an average of 1.4 cubic yards per acre per year, as measured from 1957 through 1996. Sources include landslides, erosive stream banks and roads. At present, no streams in the watershed are listed as impaired by excess fine sediment.

Forest roads can be a major contributor of fine sediment (Reid 1981), resulting from the down cutting of ditch lines and erosion of unprotected road surfaces. Slope failures and landslides can occur as road drainage is concentrated on unstable or erosive slopes. In addition, failure of inadequate stream crossings can increase erosion and sediment. Several roads or road segments in the project areas exhibit excess surface erosion, inadequate drainage, unstable cuts and fills, and inadequate or failing stream crossings.

Field reconnaissance of BLM roads in the project areas revealed erosion and rutting problems on portions of unsurfaced roads with grades exceeding 10 percent. Water is being diverted along and across road surfaces because of a lack of ditches and cross drains, with evidence of sediment delivery to streams within 200 feet of stream crossings. Analysis indicated the following:

- A rusted culvert on Road No. 29-8-6.0 has the potential to deposit 80 cubic yards (c.y.) of sediment into the stream in the event of failure.

- Unsurfaced road segments within 200 feet of stream crossings have the potential to contribute 8-10 c.y. of sediment per 100 feet of road, per year, assuming that cross drains are spaced at 400-foot intervals.

- Existing road fills within Riparian Reserves are not affecting stream flow hydraulics because they are not located in the 100-year floodplain, and no fill failure or scour erosion are anticipated.

Channel Condition and Large Wood

In 1996 and 1997, approximately 14 miles of streams in the watershed analysis unit were evaluated by BLM fisheries biologists and hydrologists for proper function. The surveys assessed approximately 10 percent as properly functioning, and 35 percent on a recovering trajectory. The most common problems identified were associated with a lack of large wood in stream channels that would help to stabilize stream beds and banks.

Aquatic habitat surveys in 2000, by the Oregon Department of Fish and Wildlife found the indicator for large wood to be "Not Properly Functioning" throughout the watershed. The opportunity for future recruitment of large wood was noted as a problem, as described above. Stream bank erosion and channel down cutting were observed and generally attributed to inadequate large wood that would reduce stream velocities and the erosional rates.

VI. Soils

Soils in the project areas are derived from sandstone, siltstone and conglomerate materials. Depths vary from as shallow as 20 inches on steeper slopes to greater than 60 inches on gentler gradients, but are generally 40-60 inches. Surface soils are typically loamy in texture, with clayey subsoils, except on steeper slopes where they are often gravelly to very gravelly loams. With some localized exceptions, soils are generally well-drained with moderate to moderately slow rates of permeability.

Field examination indicates that past timber harvest and forest management have reduced the A-horizon to less than half of what would be found in unharvested areas. This is most prevalent in tractor-yarded areas, though the degree of soil compaction and displacement is highly variable. Main skid trails and natural surface haul roads exhibit the greatest levels of displacement and compaction, while secondary skid trail systems appear nearly or completely recovered.

VII. Noxious Weeds

Noxious weeds are a problem throughout the United States. Exact acreage figures on the extent of infestation on the Roseburg District are not available, but the BLM Oregon State Office reported that the acreage of infestation nationwide increased at the average rate of 14 percent a year between, 1985 and 1991, nationwide. This would translate to an increase of approximately 1,000 acres annually on the Roseburg District, as described on page 7 of the *Roseburg District Integrated Weed Control Plan and Environmental Assessment* (USDI 1995).

The Oregon Department of Agriculture (ODA) has developed a rating system for noxious weeds comparable to that contained in BLM Manual 9015 - Integrated Weed Management. The ODA Noxious Weed Rating System designates weeds as types "A" "B," and "T," which are equivalent to types "A," "B," and "C" described in BLM Manual 9015 - Integrated Weed Management. Species may be classed in multiple categories.

> Type "A" weeds are of known economic importance which occur in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent.
>
> Type "B" weeds are of economic importance which are regionally abundant, but of limited distribution in some counties. Where implementation of a fully-integrated statewide management plan is infeasible, biological control shall be the main approach.
>
> Type "T" weeds are designated by the State Weed Board as target weed species on which the ODA will implement a statewide management plan.

Examples of noxious weeds documented in the project areas include but are not limited to:

"A" Noxious Weed	**"B" Noxious Weeds**	**"T" Noxious Weeds**
Woolly distaff thistle	Bull thistle	Yellow starthistle
Purple starthistle	Canada thistle	Woolly distaff thistle
	Scotch broom	Rush skeletonweed

Implementation of the *Integrated Weed Control Plan* by the District is ongoing in an effort to prevent or reduce rates of spread of weed populations. Efforts have included eradication of target species in areas in which management activities are planned, including mechanical treatments, hand-pulling and some limited herbicide spraying. Management practices aimed at reducing the potential for spread or establishing conditions favorable for weed germination have also been implemented. These measures include required steam cleaning or pressure washing of heavy equipment used in logging and road construction, seeding and mulching of exposed soil with native seed, and revegetation of disturbed areas with indigenous plant species. As a consequence, negligible changes in noxious weed populations are anticipated regardless of the alternative selected, and no further discussion of noxious weeds is necessary in this analysis.

VIII. Cultural and Historical Resources

Previous archaeological reconnaissance (Hanes 1978; Pettigrew et. al. 1984; Connolly 1984) has documented 46 prehistoric sites in Camas Valley, primarily located on privately-owned lands. The Standley (35DO182), Hilltop (35DO183) and Kirkendall Creek (35DO186) sites were all previously tested. The high occurrence of sites and recovered artifacts suggests there was lengthy, village-scale aboriginal occupation in the valley prior to settlement by European immigrants. No documented sites are located in proximity to proposed thinning units. Other sites in the area are situated in the more mountainous terrain south of Camas Valley, and typically consist of small, open artifact scatters on ridge tops or narrow alluvial terraces.

Pedestrian transects were conducted, but did not identify any prehistoric or historic sites. Because of a high potential for sites to occur in Section 31, T. 28 S., R. 8 W., shovel probes were conducted in 32 locations. These probes yielded a single cultural flake which was considered insufficient to warrant further investigation. In the absence of any cultural materials, no impacts to archaeological resources are anticipated, and they will not be discussed further in this analysis.

IX. Fuels Management, Rural Interface and Air Quality

There are no lands zoned as R5 for 1-5 acre residential properties within ¼ mile of any of the proposed units which would require special management consideration. There are no plans to use any prescribed burning for site preparation. Some limited pile burning would be anticipated at landings or adjacent to roads, for the purpose of hazard reduction. Any burning would be done in accordance with the Oregon Smoke Management Plan. Piles would be burned during rainy periods when winds would disperse smoke, and precipitation would wash particulates from the air. As a consequence, impacts to air quality would be within the range and scope of impacts previously identified and addressed in the Roseburg District PRMP/EIS, and air quality will not be discussed further in this analysis.

X. Recreation and Visual Resources

There are no developed recreational sites in the general or immediate vicinity of any proposed thinning units. No special or unique recreational opportunities have been identified, and no recreational developments are planned. Any recreational uses would be of the dispersed form, including activities such as hunting, plant gathering, and wildlife observation. The opportunities to pursue these activities would remain largely unaffected by the proposed action.

Lands in the project areas are designated as Class III and IV for Visual Resource Management. Management Action/Direction allows for moderate levels of change to the characteristic landscape (ROD/RMP, pp. 52-53). Commercial thinning would be consistent with these objectives because it would retain the predominant visual perspective.

No consequences to either of these resources are anticipated, and neither will be discussed further in this analysis.

Chapter 4
ENVIRONMENTAL CONSEQUENCES

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

I. Alternative 1 - No Action

The "no action" alternative would not meet the purpose and need identified in Chapter 1 of this analysis (pp. 1-3). It would not achieve a high level of sustained timber production, maintenance of stand health and vigor, density management, diversification of species composition and diversification of habitat. The "no action" alternative would not contribute toward the ASQ and socioeconomic objectives of the PRMP/EIS and ROD/RMP, nor meet the requirements of the O&C Act. The identification of other forest stands within the Matrix and analysis for commercial thinning or regeneration harvest would be necessary to fulfill these objectives.

A. Timber/Vegetation

General Forest Management Areas

In the absence of thinning, relative stand densities would continue to increase. Current relative density index averages 0.62 for all units in the proposal, but actual densities exceed this level in 9 units. Over time, canopies would become more closed and the crowns of individual trees would continue to recede, resulting in increased suppression and stagnated tree growth.

As the percentage of live crown in individual trees decreases below 30 percent, tree vigor would decline rendering individual trees less capable of adapting to and surviving disturbances, and more susceptible to wind damage, insect attack and disease. The ability of individual trees to release in response to any future thinning treatments would also decrease.

Organon growth modeling was used to project future stand development if the stands were left untreated and grown to an age approximating the culmination of mean annual increment (CMAI). CMAI can be described as the point in time at which a stand achieves its greatest annual increase in volume growth, and after which that rate of growth begins to decline. The expected future conditions of untreated GFMA stands at CMAI is summarized in Table 12.

Table 12 - GFMA Stand Conditions If Left Untreated

Unit	Age at CMAI	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)
Angel Hair (GFMA)						
C	113	122	297.5	21.2	0.765	94
E	106	116	358.0	23.8	0.879	91
F	93	157	306.9	18.9	0.825	95
Diet Coq						
A, B,	104	212	307.0	16.3	0.875	97
E	98	224	353.6	17.0	0.808	96
G, H, I	115	215	360.9	17.5	1.000	97
J, M,	124	130	352.3	22.3	0.739	98
K, L	107	149	364.7	21.2	0.937	100
Golden Gate						
A, B,	127	129	346.3	22.2	0.874	92
Smoke Screen						
A	110	148	337.5	20.4	0.880	98
B	104	189	334.4	18.0	0.917	98
C	112	60	252.7	27.7	0.585	100

Connectivity/Diversity Block

The Connectivity/Diversity Block stands would continue to develop along an even-aged, single storied trajectory. Over time, an absence or loss of many of the habitat characteristics associated with late-successional and old-growth forest would result. Crown closure would remain at nearly 100 percent, and live crown ratios would decline to less than 25 percent. Formation of canopy gaps and stratification of the canopy into multiple layers would generally not occur. Overtopping and suppression of hardwoods would continue, resulting in gradual elimination from the stands.

The growth and development of large diameter trees would be delayed, creating a deficit of large snags and down wood. In Unit A of Angel Hair thinning, suppression mortality in trees 16 inches DBH is projected to occur at approximately 94 years of age, with suppression mortality in trees 20 inches DBH estimated at 109-years-of-age. For Units B and D, comparable events would occur between 69 and 75-years-of-age, and at 104-110-years-of-age.

SW Organon version 6.0 was used to model the anticipated condition of the stands at approximately 150-years-of-age. Table 13 summarizes the expected stand conditions.

Table 13 - Connectivity/Diversity Block (Angel Hair) Stand Conditions If Left Untreated

Unit	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
A	161	424.6	22.0	0.760	93	0.22
B	112	326.1	23.1	0.810	92	0.22
D	123	384.0	24.0	0.940	88	0.25

Riparian Reserves

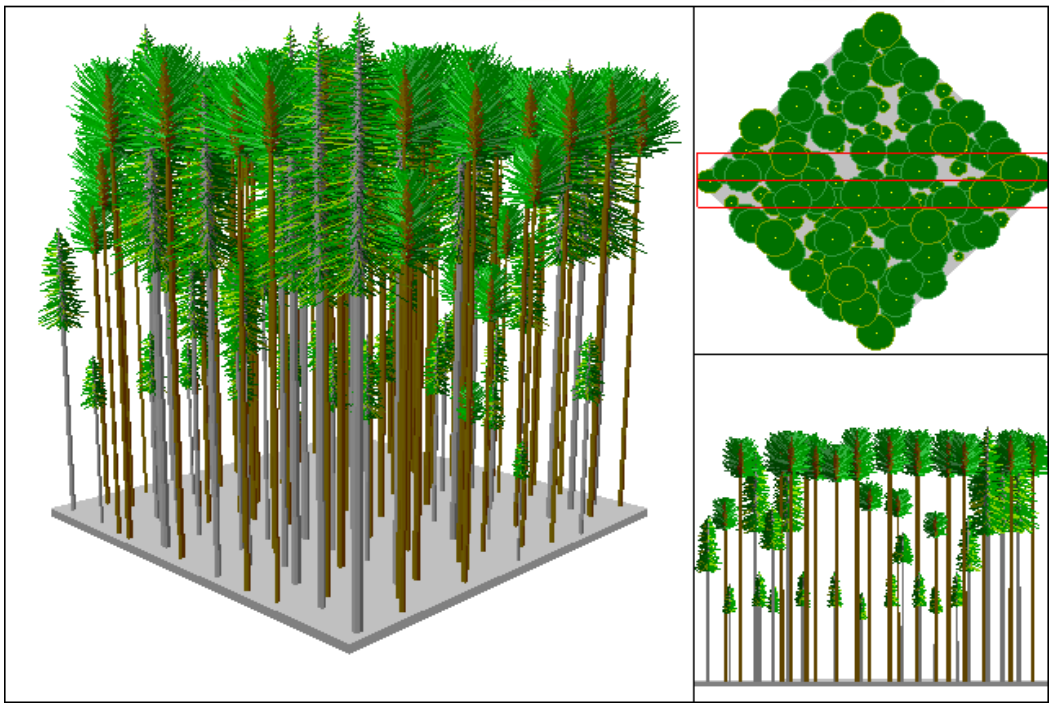
Two objectives of the Aquatic Conservation Strategy (ACS) are maintenance and restoration of the species composition and structural diversity of plant communities in riparian zones, and the maintenance and restoration of habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species (ROD/RMP, p. 20).

Single-storied stands would not develop into multi-storied stands without altering the present growth and developmental trajectories. Natural or wild stands appear to have developed with low tree density, perhaps no greater than 50 trees per acre. These stands regenerated over time and exhibited little competition between trees. It is considered unlikely that the old stands once had high tree densities comparable to managed second-growth stands, and that these densities were greatly reduced by a disturbance which left only the larger trees. Disturbances, such as wildfire, of a magnitude sufficient to promote natural regeneration of Douglas-fir in the old stands are generally absent in young, intensively managed stands (Tappeiner, et al. 1997).

Shade-tolerant species such as grand fir, western redcedar and western hemlock would remain suppressed in the understory. Available sunlight would not be sufficient to allow conifer and hardwood regeneration in the understory. As snags deteriorate and fall, and as large down wood decays, the amounts of each would decline. Suppression mortality would primarily occur in smaller trees and not provide a continuum of the larger material that would persist over time. Suppression could also lead to eventual elimination of hardwoods in the Riparian Reserves and further simplify the vegetative composition of the forest stands, instead of providing a broad range of habitat components necessary for a healthy and diverse population of terrestrial and riparian-dependent wildlife species. This would be inconsistent with ACS objectives, and development of the structural diversity and habitat components characteristic of late-successional and old-growth forest habitat that provides dispersal paths for late-successional and old-growth dependent species of terrestrial wildlife.

The anticipated structural composition of stands within Riparian Reserves, at about 150-years-of-age, if left untreated, is illustrated by Figure 2.

Figure 2 - Future Condition Of Stands In Riparian Reserves If Left Untreated.



1. Port-Orford-cedar and Port-Orford-cedar Root Disease

Any road associated activities occurring within the watershed have the potential for spreading the root disease, whether authorized by the BLM, privately undertaken, or casual in nature. Under an alternative of "no action," the BLM would not harvest any timber in the project areas, and renovation or improvements to BLM roads proposed in conjunction with commercial thinning would not occur at this time. Road use by private landowners, permittees, and the recreating public is beyond the management control of the BLM and would continue, however.

Most private timberlands within the watershed and tributary areas are managed on a 40-to-60-year rotation. Thinning or regeneration harvest of several thousand acres would be reasonably foreseeable over the next five years. Timber hauling would be accomplished over private and BLM roads. Under the reciprocal rights-of-way agreements the BLM has little or no discretion in specifying the terms under which adjacent landowners may haul across BLM-managed lands and roads, or request permission to improve existing roads or construct new ones. The best available information on recent spread of the disease comes from site-specific mapping of infected areas, conducted between 1994 and 1999. It is assumed that the rate of spread indicated by these surveys, estimated at 8 acres annually, would remain relatively constant under the "no-action" alternative.

2. Other Tree Diseases and Parasites

There would be no selective removal of grand fir infected with dwarf mistletoe and retention of non-host species in association with thinning and density management. Dwarf mistletoe would infect additional healthy trees, and spread to subsequent generations of grand fir.

There would be no removal of trees infected with or highly susceptible to laminated root rot, in favor of retention of tree species that are less susceptible. As a consequence, the current infection would continue to spread, affecting additional trees and acreage.

B. Wildlife

1. Special Status Species

a. Northern Spotted Owl

Under an alternative of "no action," there would be no short-term consequences to the northern spotted owl or critical habitat in CHU-OR-62, as stand conditions would generally remain unchanged. Those stands with nesting, roosting and foraging habitat would continue to provide for these needs. Even-aged stands that provide dispersal habitat and limited foraging opportunities would fulfill the same functions, but habitat quality would gradually decline as hardwood trees and other vegetation that provide cover and forage for prey species die out under closed canopies.

In the long term, the even-aged GFMA stands that do not currently provide nesting, roosting and foraging opportunities would not be expected to develop these qualities because they would be scheduled for regeneration harvest at approximate CMAI. Because of their longer harvest rotation, stands in Connectivity/Diversity Blocks would be expected to develop and provide some usable nesting habitat for a period of years, prior to harvest. Stands within Riparian Reserves would continue to provide foraging and dispersal habitat, but in the absence of density management, the development of late-successional conditions that would provide nesting habitat would be delayed by many decades.

b. Marbled Murrelet

Under an alternative of "no action," there would be no direct consequences to murrelet nesting habitat in the near term because there would be no removal of trees that may currently provide nesting opportunities. Those stands with nesting habitat would continue to fulfill that function. As noted above, portions of the even-aged stands allocated as GFMA would be scheduled for harvest at CMAI. They would not be expected to develop structure associated with suitable nesting habitat. In the long term,

absent density management, high stand density would persist within Riparian Reserves and Connectivity/Diversity Blocks. Increasing competition between individual trees, and closed forest canopy would persist, causing individual tree crowns to recede. Tree limbs would die and be shed as a consequence of shading. The type of lateral crown development and large limb growth providing nesting structure and habitat would be lost or its development severely retarded. Older trees pre-dating the younger stands would also die off resulting in a gradual decline in suitable nesting trees.

2. Effects Determination for Threatened or Endangered Species

Because there would be no direct removal or modification of existing habitat, and no management activities with the potential to disturb northern spotted owls or marbled murrelets that may occupy the project areas, the "no action" alternative was determined to constitute "No Effect" on either species, and "No Effect" on designated critical habitat for the spotted owl located in CHU OR-62.

3. SEIS Special Attention Species

An alternative of "no action" would not have any direct effect on any red tree voles that may occupy the Golden Gate project area. Although the species is thought to favor late-successional and old-growth forest, the current stands would continue to provide habitat, with closed canopies providing cover and dispersal paths.

C. Vascular and Non-Vascular Plants

The "no action" alternative would not directly impact any special status or special attention species that may be present in the project area, because there would be no short-term disturbance or modification of current habitat conditions. Those species dependent upon early and mid-seral habitat would be indirectly affected in the long term as normal processes of succession gradually modify habitat conditions, allowing establishment of new plant communities better suited and adapted to the changing conditions.

D. Fish and Essential Fish Habitat

There would be no effect to anadromous fish or Essential Fish Habitat because none are present in the project areas. Resident fish populations and habitat would continue to be directly and cumulatively affected by current watershed conditions that are not properly functioning.

Roads, stream crossings and culverts in the project area that have been identified as chronic sources of sediment would not be renovated or decommissioned, replaced or removed at this time. Excess sediment from these roads and structures would continue to degrade water quality.

Without density management in Riparian Reserves, the growth rate of trees most likely to contribute large wood to stream channels (FEMAT 1993) would stagnate. Without some other

form of disturbance, the stands would remain relatively uniform in age and species composition, resulting in the development of simplified size and age class distributions in upland and riparian areas. This simplified structure would result in stands dominated by smaller trees, which would be inconsistent with the objective of developing old-growth forest characteristics. Near and long term availability of large wood would be insufficient to meet needs for habitat, stream structure and organic nutrients. Suppression mortality would occur primarily in smaller trees and provide smaller diameter material which would not persist over time. The growth of large diameter trees for future recruitment of large wood into streams and riparian areas would be delayed by decades.

1. Effects Determination for Threatened or Endangered Species

Because there are no listed fish species in the project areas because of long-standing natural barriers, and because there would be no management actions undertaken which would alter aquatic habitat, or either degrade or improve water quality, the "no action" alternative would have "No Effect."

2. Effects Determination for Essential Fish Habitat

Because there is no Essential Fish Habitat in the project areas because of long-standing natural barriers, and there would be no management actions undertaken which would alter aquatic habitat, or either degrade or improve water quality, the "no action" alternative would have "No Effect."

E. Water Quality/Resources

Under an alternative of "no action," there would be no timber thinning. No potential for altering the timing and magnitude of peak and base flows would exist. Road densities would remain the same in the absence of any road construction or decommissioning. No correction of identified drainage and sediment problems from existing roads and stream crossings in the project area would occur at this time.

The period of time necessary to grow large trees in the Riparian Reserves would be lengthened by decades. In the interim, there would be insufficient large down wood for in-stream structure and habitat, and the protection of stream morphology and function.

F. Soils

No commercial thinning or density management would occur at this time. Potential impacts to soils such as compaction, displacement, erosion, and loss of organic matter would occur elsewhere in the Matrix, in association with timber harvest in those areas. Implementation of restoration opportunities identified in this analysis which would reduce elevated erosional processes would not occur at this time and would require separate analysis and authorization.

II. Alternative 2 - Proposed Action

This alternative would meet the objectives and management direction described in the purpose and need for action in Chapter 1 (pp. 1-3) of this analysis, and would contribute toward the annual ASQ for the Roseburg District, and socioeconomic objectives of the ROD/RMP.

A. Timber/Vegetation

General Forest Management Areas

Based on Organon modeling, thinning would remove approximately one third of the basal area within respective stands. The largest trees would be retained resulting in an increase in mean diameter. Thinning would maintain some selected hardwoods and less common conifer species as stand components. Reduction of relative density to approximately 0.40, would promote the diameter growth and crown development of the remaining trees. It is projected that full crown closure would be reached within 15 years of treatment. Table 14 illustrates the expected post-thinning conditions for GFMA stands and Riparian Reserves within or adjoining them.

Table 14 - Stand Conditions in GFMA Following Thinning

Unit	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
ANGEL HAIR						
C	117	135.0	14.6	.402	58	.39
E	105	167.0	17.1	.387	76	.54
F	80	151.0	18.6	.408	51	.40
DIET COQ						
A, B, C, D	100	142.7	16.2	.408	54	.37
E	123	170.0	15.9	.409	60	.36
G, H, I	91	145.0	17.1	.405	51	.41
J, M, N	121	165.0	15.8	.394	57	.39
K, L	141	130.0	13.0	.405	56	.42
GOLDEN GATE						
A, B, C	99	140.1	16.1	.401	65	.49
SMOKE SCREEN						
A	127	136.4	14.0	.413	57	.41
B	96	145.0	16.6	.410	56	.44
C	121	135.0	14.3	.405	55	.42

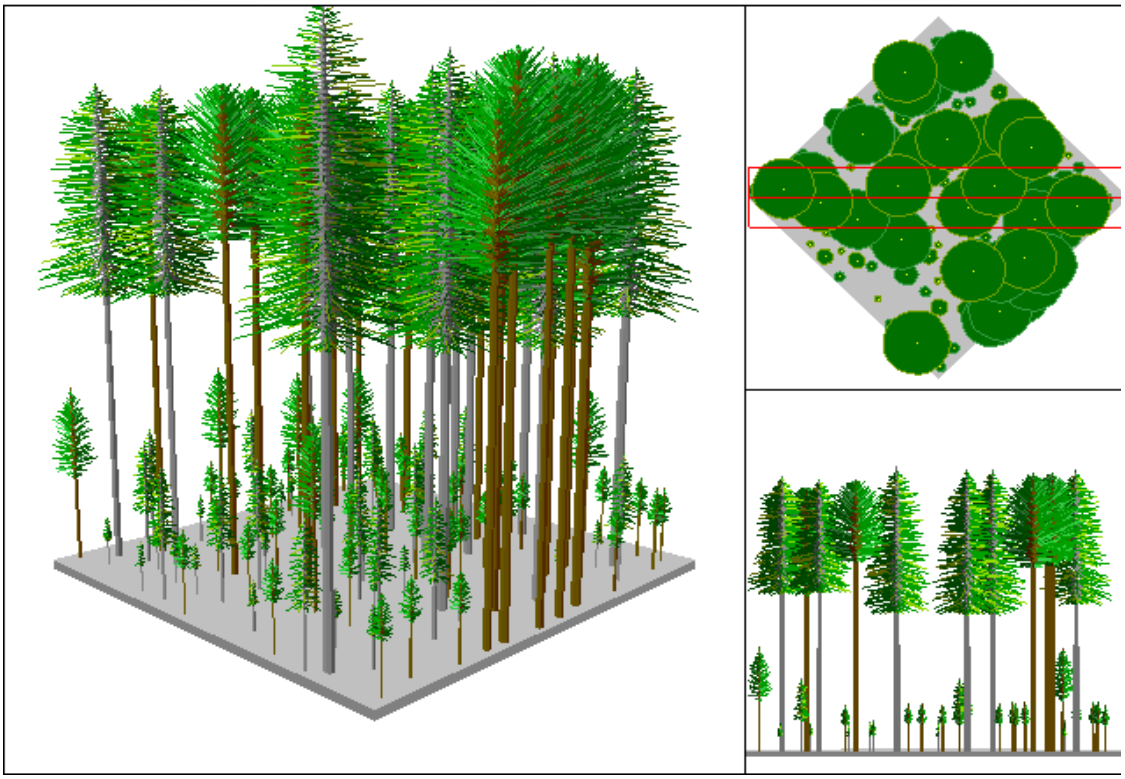
It is also projected that the combined yield from a commercial thinning and final regeneration harvest would average approximately 6,200 board feet per acre more than if the stands were not thinned prior to CMAI. Specific volume/acre gains would vary by individual unit, reflecting the current growth conditions, stand stocking and site potential. On the best sites, an increase of 10,000-20,000 board feet per acre would be expected. The more rapidly growing stands would conceivably benefit from a second thinning, as the relative density index approaches 0.60 again.

Connectivity/Diversity Block

Following an initial treatment, the relative stand density indices would be approximately 0.30, which is considered a moderate density. Canopy closure would average 40-50 percent. The lower level of canopy closure and the canopy gaps created by density management would allow sunlight to reach the forest floor at levels sufficient to stimulate the germination and growth of understory vegetation. Full canopy closure would again be reached in approximately 15 years. A second entry would be necessary in the future to maintain and encourage understory growth over a prolonged period of time.

Figure 3 is a visual approximation of the expected stand conditions at age 150 years, following two density management treatments.

Figure 3 - Post-Treatment Conditions of Connectivity/Diversity Block Stands at 150 Years



Organon modeling estimates that the quadratic mean diameter in Unit A of Angel Hair thinning would reach 16 inches DBH at a stand age of 58-years, or 40 years earlier than if the stand was left untreated. The quadratic mean diameter is calculated using the DBH of overstory trees and does not average in smaller trees resulting from ingrowth or underplanting. With treatment, Units B and D would reach a quadratic mean diameter of 16 inches DBH, 35 and 27 years earlier than if left untreated. Table 15 summarizes anticipated conditions in the Connectivity/Diversity Block and Riparian Reserves, following a first, and then a second treatment.

Table 15 **Angel Hair residual stand condition (Connectivity)**. *The following table displays the residual stand characteristics, after thinning, in terms of stocking, density, and quadratic mean diameter. The table includes the first and second treatments.*

Unit	Age	Trees Per Acre	Basal Area (sq. ft.)	Quadratic Mean Diameter (inches)	Relative Density Index	Crown Closure (%)	Average Crown Ratio
A*	54	114	145	15.3	.300	44	.37
	94	53	114	19.8	.213	50	.40
B*	45	99	100.0	13.6	.306	46	.41
	75	59	77.7	15.5	.226	44	.44
D*	44	84	105.0	15.2	.308	45	.45
	74	56	93.1	17.5	.258	46	.47

Riparian Reserves

As noted in the description of the proposed alternative, the marking prescription applied in Riparian Reserves would reflect the prescription in adjacent upland areas. The post-treatment stand conditions would be comparable to those displayed in Table 16, and the first treatment conditions in Table 15.

1. Port-Orford-cedar and Port-Orford-cedar Root Disease

Since roads are primary vectors by which *P. lateralis is* spread, the following road management actions would be implemented to minimize the likelihood of transporting infested soil.

- Road construction, renovation and decommissioning would be restricted to the dry season when the risk of spreading spores is least likely.

- Approximately 3.8 miles of unsurfaced roads would be surfaced with rock, and 9.4 miles of unsurfaced roads decommissioned or closed to eliminate vehicular use during wet weather when risk of transporting spore infested soil is greatest.

- All non-merchantable Port-Orford-cedar trees within 20 feet on the uphill side and 50 feet on the downhill side of haul routes would be cut under a service contract to remove potential host trees that could become infected and spread the disease.

- All logging and road construction equipment would be steamed cleaned or pressure washed prior to move-in on contract areas, or prior to return if removed from the contract areas during the life of the contracts. By requiring the cleaning, the risk of importing infested soil into unaffected areas would be greatly reduced (Goheen, et al. 2000).

- Water taken from sources in the project areas for use in road construction, road grading or dust abatement would be treated with a solution of Clorox bleach, to kill any *P. lateralis* spores that might be present.

The following design features would be applied in contract provisions to reduce the risk of the spread of the disease in association with the proposed thinning sales.

- All merchantable Port-Orford-cedar trees within 20 feet on the uphill side and 50 feet on the downhill side of roads bordering or passing through units, and astride haul routes would be cut under the sale contracts to remove potential host trees that could become infected and spread the disease.

- Any Port-Orford-cedar trees selected for retention within units would be spaced a minimum of 50 feet from other Port-Orford-cedar trees to eliminate the possibility of the disease being spread through root grafting. If 3 to 4 trees are located close together, they could be retained as a group, but other Port-Orford-cedar selected for retention would be located a minimum of 50 feet from the group.

- Thinning operations would be sequenced so that areas with documented infection are harvested last to avoid transport of spores into uninfected areas.

- Thinning on any areas accessed by unsurfaced roads would be restricted to summer operations, only.

With the project design features and controls described, and in light of the scattered occurrence of Port-Orford-cedar within the project areas, little or no increase in the rate of spread of the root disease would be anticipated, and the project design features specified might affect a reduction in the rate of spread of the disease in the project areas.

2. Other Tree Diseases and Parasites

The occurrence of Dwarf mistletoe would be greatly reduced or eliminated by removal of grand fir and retention of non-host species such as hardwoods, Douglas-fir, pines, and cedars. If removal of infected trees would create large openings, trees displaying the least degree of infection would be retained to minimize gap size. Once Dwarf mistletoe is contained or eliminated, regeneration of grand fir could occur with little risk of infection.

Small pockets of trees infected with laminated root rot would be thinned to remove symptomatic trees and adjacent non-symptomatic trees to which the disease could be spread by root grafts, and less susceptible species such as cedars, pines and hardwoods would be retained. If removal of symptomatic and non-symptomatic host trees would create large openings, trees with the least indication of infection would be retained.

B. Wildlife

1. Special Status Species

Northern Spotted Owl

One of the project areas, Diet Coq, is overlapped by two historic home ranges, one of which have been unoccupied since the early 1990s. Thinning operations could result in disturbance if conducted during the nesting season. One recent research study suggests that thinning mixed-age conifer stands alters the manner in which they are utilized by owls. In the study, (Anthony 2001) stands were thinned from initial densities of 225-275 trees per acre to a final density of 152 trees per acre. The study concluded that in the short term (10-15 years), owls were not likely to use the thinned stands for foraging and roosting until crown closure returned to conditions that approximated suitable habitat, which were 70-100 percent of pre-thinning levels. Most of the data reflects thinning in stands that overlap an owl activity center, however. Thinning in this project area would occur in the periphery of two territories, one uninhabited, so a correlation with the research would be inconclusive. There would be no potential for disturbance to nesting owls resulting from thinning operations on units not located within any owl territories.

Units in the Golden Gate project area, and proposed Units E and F in the Angel Hair project area are located in Critical Habitat Unit OR-62. The 257 acres within the proposed units comprise slightly less than one percent of the total area of the Critical Habitat Unit. Treatment of proposed Unit F of the Angel Hair project would modify 54 acres of roosting and foraging habitat for the short term, until canopies close again (10-15 years). The remaining 203 acres proposed for treatment are only considered dispersal habitat, and thinning would not affect its utility. Canopy closure would remain above 40 percent, and would return to nearly 100 percent in a short time, so that the thinning would not adversely modify the function of the Critical Habitat Unit.

Thinning of the remaining units described in this analysis would only occur in dispersal habitat. In the long term, the increased structural and vegetative diversity of the stands would provide improved habitat supporting more abundant prey and improved foraging conditions for owls, until such time as final harvest of upland stands occurs. Beyond this time, stands within the Riparian Reserves would continue to mature and would develop late-successional habitat characteristics that would provide nesting habitat as well as dispersal pathways.

Marbled Murrelet

Thinning operations in proximity to occupied habitat during the nesting season, April 1st through August 5th, could result in nest abandonment. The application of Daily Operational Restrictions would be applied unless surveys of suitable or potentially suitable habitat within ¼mile of proposed units have been conducted without detection of occupancy. Unsurveyed habitat is located within ¼-mile of proposed Units A, C and D of the Angel Hair proposal, Unit C of the Smoke Screen proposal, and all Units of the Golden Gate proposal. Daily Operational Restrictions would be applied, consisting of a prohibition of operations until two hours after sunrise and cessation two hours before sunset.

Thinning of potential in-unit habitat (Table 10, p. 17) would not remove trees that possess characteristics that would provide nesting opportunities. It could, however, remove adjacent trees whose crowns interact with the potential nest trees and provide nesting cover. The loss of cover could render the trees unsuitable for nesting because murrelets would be exposed to wind and an increased risk of predation. Thinning in units not containing potential nest structure would not be expected to have any effect. In the longer term, as the thinned stands develop, it would be expected that lateral crown expansion and development would provide more interaction between the crowns of individual trees and provide additional canopy structure that could serve as nesting platforms. Habitat within the Riparian Reserves would continue to provide habitat beyond the point of harvest of adjacent Matrix stands.

2. Effects Determination for Threatened or Endangered Species

Northern Spotted Owl

Because the proposed projects have the potential to modify 112 acres of nesting, roosting and foraging habitat in the Diet Coq project area, and 54 acres of similar habitat in the Angel Hair project area, these actions were determined as "Likely to Adversely Affect" the northern spotted owls. The thinning of remaining units judged to provide only dispersal and possibly limited foraging opportunities was determined "Not Likely to Adversely Affect" owls.

Marbled Murrelet

With the implementation of Daily Operational Restrictions during the nesting season on thinning units located within ¼-mile of unsurveyed suitable habitat, the potential for disturbance to murrelets associated with the proposed actions was determined as "Not Likely to Adversely Affect" the species. Where surveys have been conducted in suitable habitat and have not detected murrelet occupancy, there would be "No Effect."

Because the thinning of units identified as having suitable nesting habitat could modify the existing conditions and render them unsuitable for nesting, in the short term, it was determined that these portions of the proposal are "Likely to Adversely Affect" the marbled murrelet. This would specifically apply to all of the Diet Coq units with the exception of C and N; Unit F of the Angel Hair proposal; and Units A, B and C of the Golden Gate proposal. Thinning of the remaining units contained in the proposal was determined to have "No Effect".

3. Effects on Designated Critical Habitat for the Northern Spotted Owl

The proposed treatments would modify 54 acres of potential nesting, roosting and foraging habitat for the short term (5-15 years), and the remaining 203 acres of thinning would only occur in dispersal habitat. Canopy levels would remain above 40 percent, and return to near closure in the same time frame. As a consequence, the proposed action would not adversely modify function of the Critical Habitat Unit and was determined as "Not Likely to Adversely Affect" the intended purpose of the Critical Habitat Unit.

4. SEIS Special Attention Species

Red tree vole sites located during surveys would be protected in accordance with management recommendations in effect at the time of implementation of a decision or decisions to thin units in which they were located. The management recommendations are designed to protect habitat and microclimate conditions essential for persistence in the short term (FSEIS 1994). In the long term, the proposed action would be expected to benefit the species by accelerating development of late-successional forest conditions thought to be favored by the vole.

C. Vascular and Non-Vascular Plants

Surveys for the presence of Special Status and Special Attention species (p. 20) suspected in the project areas would be conducted prior to implementation of any thinning and density management actions. If any of these species are located, the sites would be protected in a manner consistent with protection of habitat and micro-climate necessary for persistence. Protection measures could include modification of unit boundaries to exclude sites, establishment of buffers, or modification of the marking prescription for the unit(s).

D. Fish and Essential Fish Habitat

The proposed commercial thinning/density management would have no effect on anadromous fish, resident fish, or Essential Fish Habitat located downstream. There would be no measurable changes in habitat access and habitat elements at the watershed or subwatershed levels, though some measurable improvements might occur in individual drainages in which the projects would be located, for the following reasons:

- None of the proposed 0.4 miles of permanent road construction would cross perennial streams, where the installation of stream crossings would be necessary. The replacement of failing log-fill crossings (pp. 8-9) with temporary crossings which would be removed upon completion of thinning would help restore passage to resident fish. There would be no improvement in access for anadromous fish because they are blocked from the upper reaches of the watershed by impassable, natural barriers.

- Streambed substrates (spawning gravels) would be unaffected by thinning operations. Road renovation and timber hauling have the potential to generate sediment. With the implementation of Best Management Practices and project design features that would include limiting road work to the dry months, installing additional cross-drain culverts, armoring splash pads below culverts, surfacing or resurfacing roads, and selectively restricting the season of operations, potential sediments derived from project activities would not be measurable at the project level, let alone the watershed level. Proposed road renovation and stream crossing removal would reduce sediment input from these structures and facilities by more than 90 percent, compared to present levels.

- Current levels of large woody debris would be maintained by reservation of all Decay Class 3, 4 & 5 down wood. Larger, dominant trees in Riparian Reserves would be retained to provide a future source of large wood. Any of these larger trees that may require cutting to clear a yarding corridor would be left on site to supplement currently available large wood. If a post-thinning evaluation indicates an immediate need for additional wood, some of these larger trees would be selected for felling into streams.

- Intermittent streams lack surface flow during the summer months. These are typically high-gradient streams that provide little usable habitat. The broader ”no-harvest” buffers on perennial streams would protect stream structure and function, and retain large down wood that is a primary contributor to the development and maintenance of stream pools.

- Density management within the Riparian Reserves would not degrade off-channel habitat and refugia in the near term, because “no harvest” buffers and untreated areas would protect important habitat features. It would also accelerate the development of late-successional habitat characteristics elsewhere, as previously described. This enhanced habitat complexity would support larger and more diverse populations of riparian-dependent plant, vertebrate and invertebrate species.

Essential Fish Habitat is between 1.8 and 11.2 miles downstream (Table 11, p. 21) of any of the project areas. The greatest potential effect to aquatic habitat from timber harvest activities is sediment mobilization. The thinning activities would not affect Essential Fish Habitat because there are no identifiable sources of sediment potentially great enough, nor realistic pathways by which sediments would be transported far enough downstream to affect Essential Fish Habitat. Timber harvest and hauling activities on unsurfaced roads would be restricted to the dry season so that the potential for sediment is not considered an issue. Haul routes for units proposed for winter operations are primarily paved and would not yield sediment. Proposed road renovation would include the application of Best Management Practices designed to prevent the introduction of sediments into streams.

1. Effects Determination for Threatened or Endangered Species

There are no Oregon Coast coho salmon in the project areas. The proposed action would not measurably degrade any habitat or water quality elements at the project level that would be transferable to occupied habitat lower in the watershed. As a consequence, a determination was made that the projects would have "No Effect" on the coho. Effects to the Oregon Coast steelhead trout would be consistent with those for the coho salmon.

2. Effects Determination for Essential Fish Habitat

Because the proposed action would not measurably degrade any habitat or water quality elements at the project level or watershed level, and because there is no Essential Fish Habitat within approximately 2 miles of the nearest project area, a determination was made that the project would have "No Effect" on Essential Fish Habitat.

E. Water Quality/Resources

Peak Flows - The potential for increasing peak flows would be negligible. Annual water yield would not be measurably affected.

Thinning will increase the potential for recruitment of large wood in adjacent stream channels. Research on stream flows in some headwater streams in Western Washington (Curran 1999) found that spill resistance from step-pool reaches created by large wood contributed 90 percent of the friction loss responsible for reducing flow velocities. This potentially delays flow from these tributaries during storm events and reduces peak flows downstream. Reservation of large down wood already in stream channels, and the potential felling of trees into streams, would maintain step pools which could moderate any peak flow events occurring during the rainy season.

Combining all ownerships, there are 67,207 acres in the watershed analysis unit. The proposed action would involve approximately 675 acres, or one percent of the total area. Any localized, temporary increases in water yield from the dispersed commercial thinnings would not result in notable changes in flows at the watershed level. Any small changes would be further moderated

as the accelerated growth rate of the residual trees and establishment of understory vegetation results in the additional uptake and use of available groundwater.

Water Temperature - Density management within Riparian Reserves would not affect stream temperatures. Variable width ”no-harvest” buffers would be established along streams to retain the direct shading necessary to the maintenance of water temperatures on perennial streams, and on intermittent streams during those times of the year when there is surface flow. These widths would be based on measurements taken with a solar meter.

Sediment - Management activities associated with the proposed thinning all have the potential to increase sediment, but the risk would be negligible, and short-term. It would be expected that overall sediment levels would be reduced in the long term because:

- “No-harvest” buffers would prevent disturbance to stream channels and stream banks and the potential for surface erosion exceeding normal background levels. These buffers would also intercept surface run off and settle out any sediment transported by overland flow before it reached active waterways.

- The retention of large wood in the streams would aid in the capture and storage of sediment, preventing its transport to downstream reaches inhabited by fish.

- Temporary roads would be located on stable ridge top locations requiring minimal excavation and disturbance of normal slope hydrology. Thinning and hauling on units accessed by temporary roads would be seasonally restricted, reducing the potential for sediment generation and transport during storm events.

- Road renovation would correct drainage deficiencies and ditch line erosion through the installation of additional cross drain culverts. Stabilization of fills and cut slopes would reduce surface erosion and the potential for slope failures that could mobilize large quantities of sediment. Removal of failing log-fill crossings, and closing of natural surface roads to wet weather use would also reduce the annual input of sediments.

- Large portions of the haul routes are paved and would not yield any sediments from hauling during winter months and storm events.

Large wood - Density management would not reduce present levels of large wood with Riparian Reserves, because existing Decay Class 3, 4 & 5 wood would be reserved under contract stipulations. Larger, dominant trees, and snags felled in the Riparian Reserves for operational purposes would be retained. A portion of this material could be expected to come to rest in stream channels. Additional trees, from among those retained in the marking prescription, would be available for felling into streams to alleviate any identified short-term deficits. The treatments would accelerate the growth of the residual trees so that larger trees would become available for recruitment into streams decades earlier than would otherwise occur.

Channel Conditions - There would be no affect on present channel configuration and structure associated with density management within the Riparian Reserves. The variable width "no-harvest" buffers, in conjunction with directional felling and a prohibition on yarding any material from or through the buffers, would protect stream channels and prevent degradation of stream banks, stream beds, and stream side vegetation.

Riparian Reserves - A stated purpose of Riparian Reserves is to maintain and restore riparian structures and functions of intermittent streams (ROD, p. B-13). Density management in Riparian Reserves would accelerate the development late-successional vegetative and habitat characteristics in these managed second-growth stands in a shorter time period than would naturally occur. The release of residual trees would also increase the growth rates of trees in the areas most likely to contribute large wood to stream channels (FEMAT, pp. V-26 & V-27). This would allow development at a rate comparable with trees in thinned areas outside of the Riparian Reserves, while a failure to treat the Riparian Reserves would result in the largest trees being furthest from stream channels, with little or no potential for interacting with the streams.

F. Soils

With the utilization of ground-based harvest equipment, the potential exists for displacement, compaction, and surface erosion that could result in the loss of long-term soil productivity. To minimize these risks and maintain soil productivity, consistent with the analysis of the PRMP/EIS, the following measures would be implemented:

- The cumulative area affected by main skid trails, landings and large slash piles would be less than 10 percent of the ground-based unit acreage. Main skid trails are defined as those in which 50 percent or more of the surface area of the trail has been disturbed, exposing mineral soil.

- Skid trails in existence from previous entries would be reused to the extent practicable, and would count toward the 10 percent limit on area affected. These trails would be evaluated to determine if amelioration (sub-soiling) was warranted upon completion of thinning operations, or whether the trails would be mapped for treatment at final harvest.

- Operation of ground-based equipment would generally be restricted to slopes of 35 percent or less.

- Ground-based operation would be restricted to the dry season when soil moisture content provides the most resistance to compaction, typically from May 15th until the onset of regular autumn rains in mid-October.

- New skid trails would be pre-designated and located in such a manner that they could be reused at time of final harvest.

The use of cable-yarding equipment also represents a risk for soil displacement and surface erosion. To minimize these risks and maintain soil productivity, the following measures would be implemented:

- A minimum of one-end log suspension would be maintained during yarding.
- A minimum of 100 feet of lateral yarding capability would be required to reduce the number of yarding corridors and the percentage of surface area subject to potential soil displacement.
- Waterbars would be hand-constructed on yarding corridors situated on steep slopes if deemed necessary to reduce the potential for surface erosion caused by run off of precipitation.

Whole tree harvesting would be avoided in both ground-based and cable-yarding operations, so that limbs and tops would remain scattered throughout the units and provide a source of organic material and nutrients for soil replenishment.

III. Other Federal Timber Harvest and Restoration Activities Planned in the Upper Middle Fork Coquille River Watershed Analysis Unit

One other timber sale, a commercial thinning of approximately 75 acres, is currently being conducted in the watershed. The Kola's Ridge Commercial Thinning employs a marking prescription and project design features commensurate with those described for the proposed alternative contained in this analysis. No cumulative affects on available northern spotted owl and marbled murrelet habitat are anticipated. The action was judged to have no adverse affect on Oregon Coast coho salmon and would have no cumulative effects on water quality or Essential Fish Habitat within the watershed analysis unit or below existing barriers to anadromous fish.

Three large stream crossing culverts were replaced in the summer of 2002. These culverts are located on Bingham Creek and Holmes Creek in the Camas Valley subwatershed. Effects to the aquatic environment were assessed as short-term and localized increases in sediment which are expected to flush through the system in the winter of 2002-2003 with no cumulative affect on baseline conditions within the watershed.

IV. Monitoring

Monitoring would be done in accordance with the ROD/RMP, Appendix I (p. 84, 190, 193, & 195-199), with emphasis on assessing the effects of commercial thinning/density management on the following resources: Riparian Reserves; Matrix; Water and Soils; Wildlife Habitat; Fish Habitat; and Special Status and SEIS Special Attention Species Habitat.

Chapter 5
LIST OF PREPARERS, AGENCIES AND INDIVIDUALS CONTACTED OR CONSULTED, AND LITERATURE CITED

This project was included in the Roseburg BLM Project Planning Update (Spring 2000). A notice of decision would be published in the Roseburg *News-Review* if the decision is made to implement the project.

I. Agencies & Persons Contacted:

Adjacent Landowners
Coquille Indian Tribe
Cow Creek Band of Umpqua Indians
National Marine Fisheries Service
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Registered Down-Stream Water Users
U.S. Fish and Wildlife Service

II. List of Preparers and Contributors:

Paul Ausbeck	NEPA Coordinator/EA Writer
Gary Basham	Botany
Roli Espinosa	Wildlife
Dave Fehringer	Forestry
Dennis Hutchison	Soils
Dave Mathweg	Recreation/Visual Resource Management
Jeannette Griese	Silviculture
Steve Niles	Management Representative
Charley Wheeler	Fisheries
Don Scheleen	Archaeology
Larry Standley	Hydrology

III. The following Agencies, Organizations, and Individuals will be notified of the completion of the EA/FONSI:

Steve Carter, Northwest Hardwoods
Cow Creek Band of Umpqua Indians
Nicole Czarnomski, Oregon Natural Resources Council
Robert P. Davison, Wildlife Management Institute
Francis Eatherington , Umpqua Watersheds, Inc.
Chad Hanson, John Muir Project
Daniel Johnson, Douglas Timber Operators
Douglas Forest Protective Association
National Marine Fisheries Service
Oregon Department of Agriculture
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Ronald Yockim, Attorney for Douglas County Commissioners
U.S. Fish and Wildlife Service

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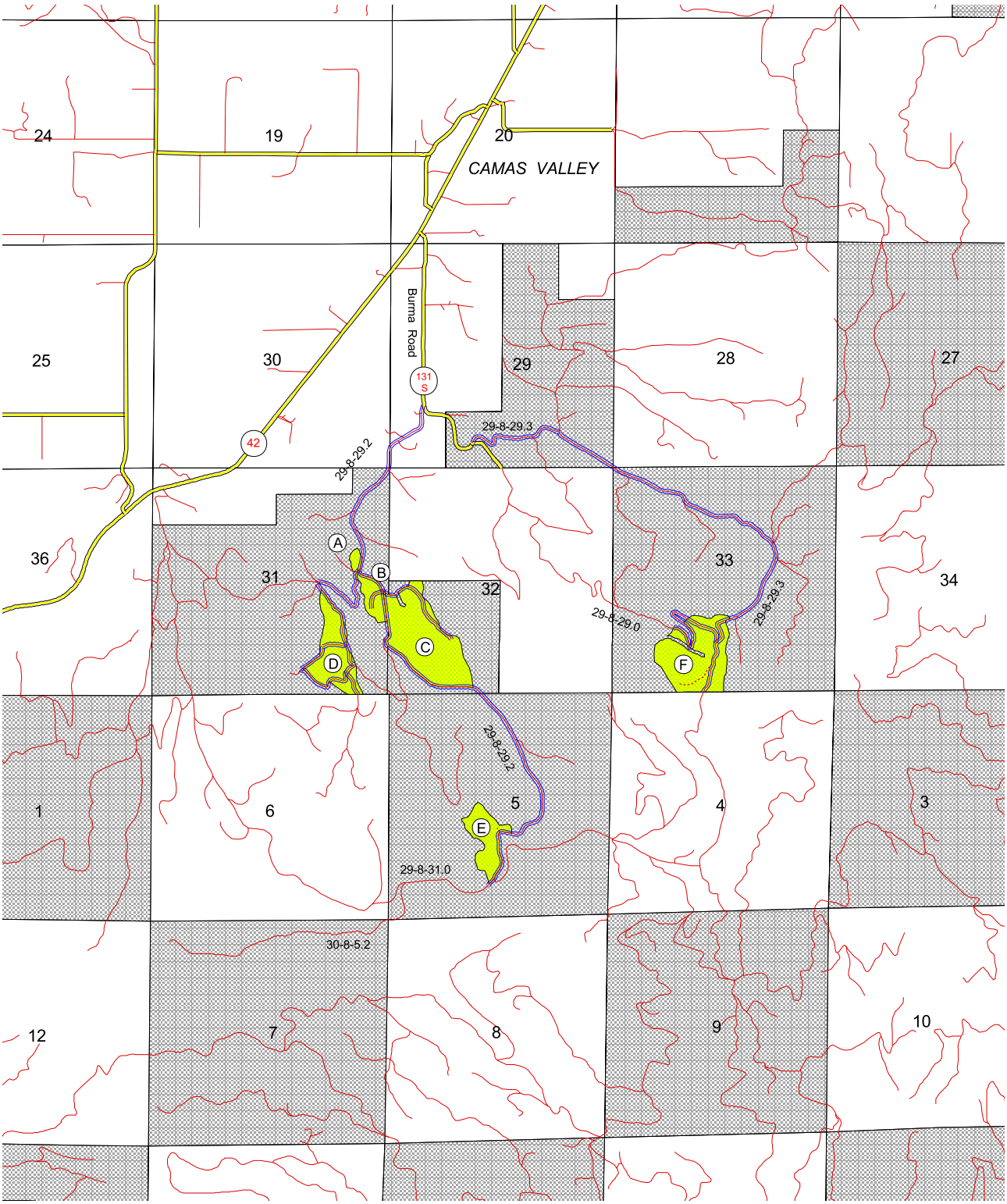
APPENDIX A

PROPOSED UNIT AND VICINITY MAPS

ANGEL HAIR COMMERCIAL THINNING



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Willamette Meridian, Douglas Co., OR.

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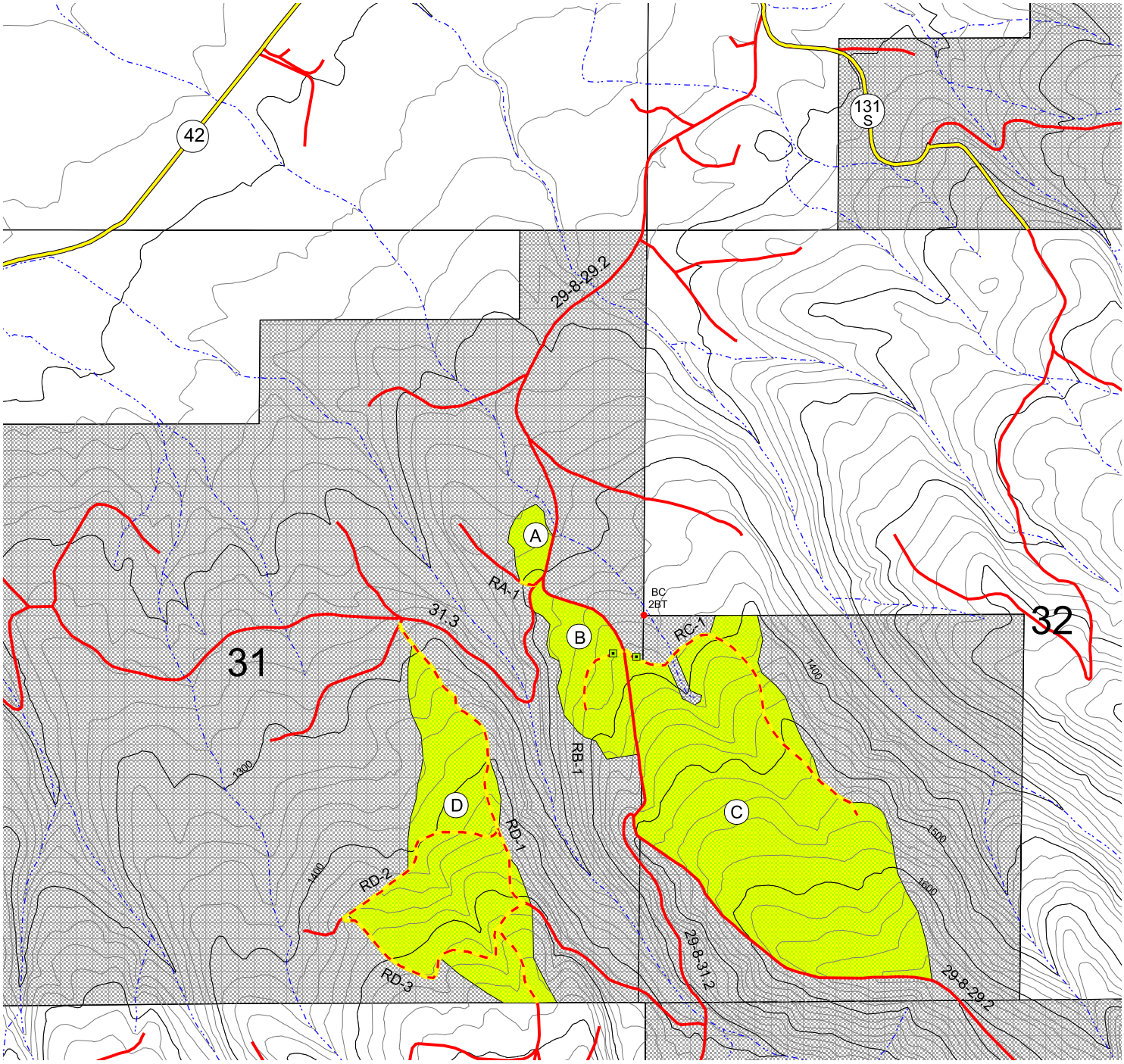
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

County Highway
Access/Haul Route
Existing Road
Temporary Road
Thinning Area
BLM (O&C) Land
Private Land

11-15-2002

ANGEL HAIR

Commercial Thinning



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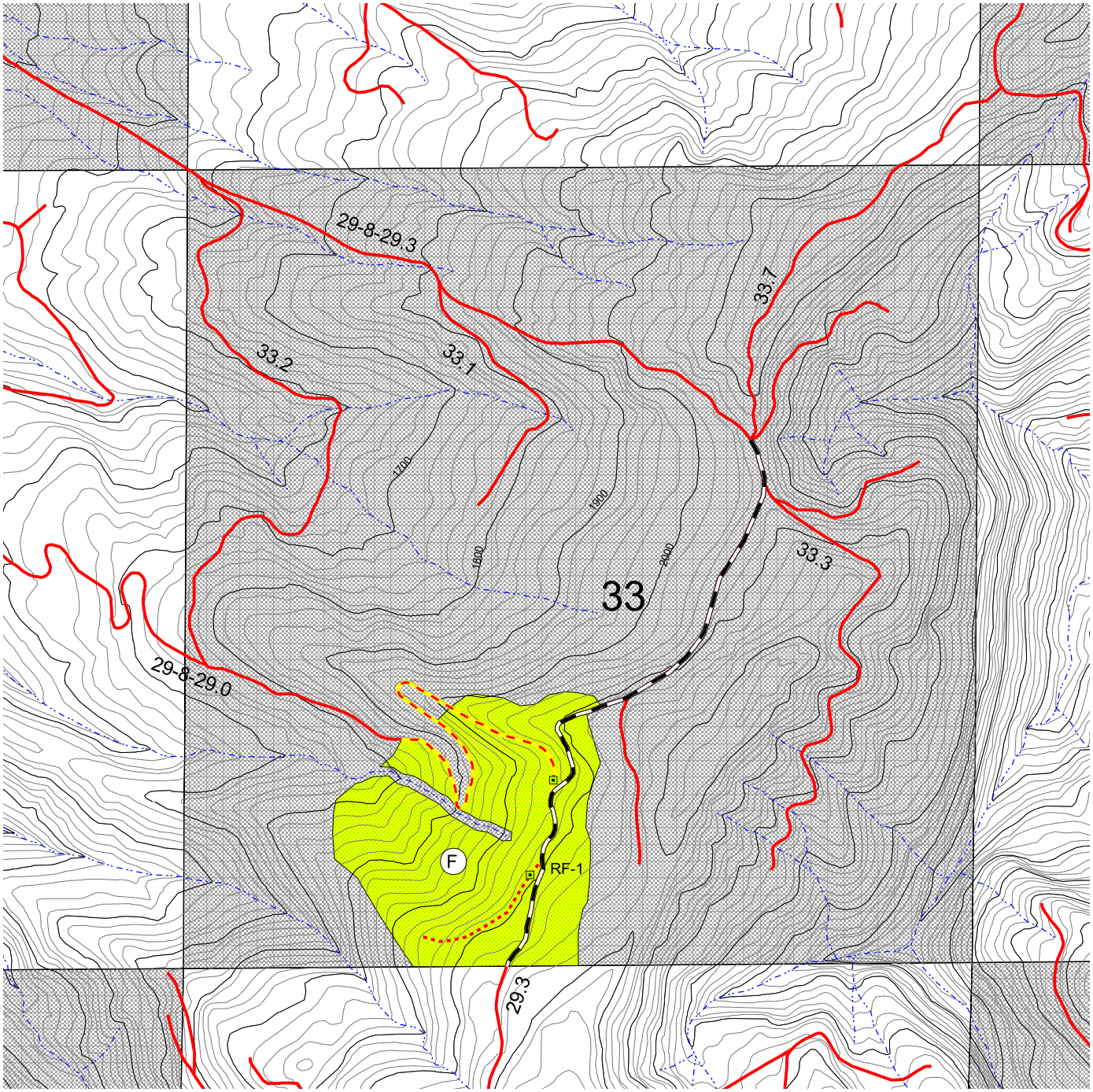
Construct Roadblock
Renovate, Decommission
County Highway
Existing Road
100' Contour
20' Contour
Stream

Thinning Area
BLM (O&C) Land
Private Land

11-15-2002

ANGEL HAIR

Commercial Thinning



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Construct Roadblock
Existing Road
Renovate, Decommission
Renovate, Permanent/Rock
Construct, Decommission
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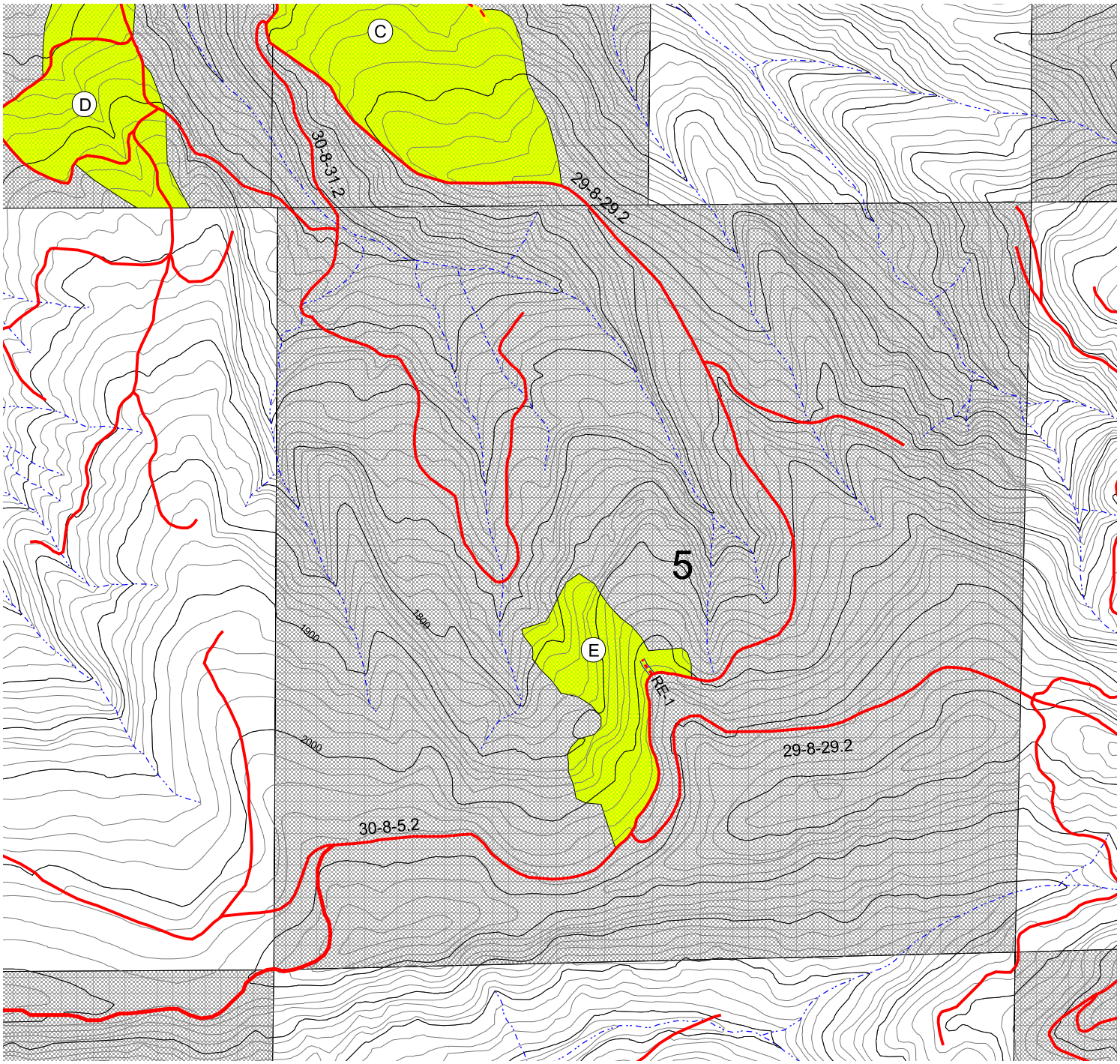
20' Contour
Stream

Thinning Area
BLM (O&C) Land
Private Land

11-15-2002

ANGEL HAIR

Commercial Thinning



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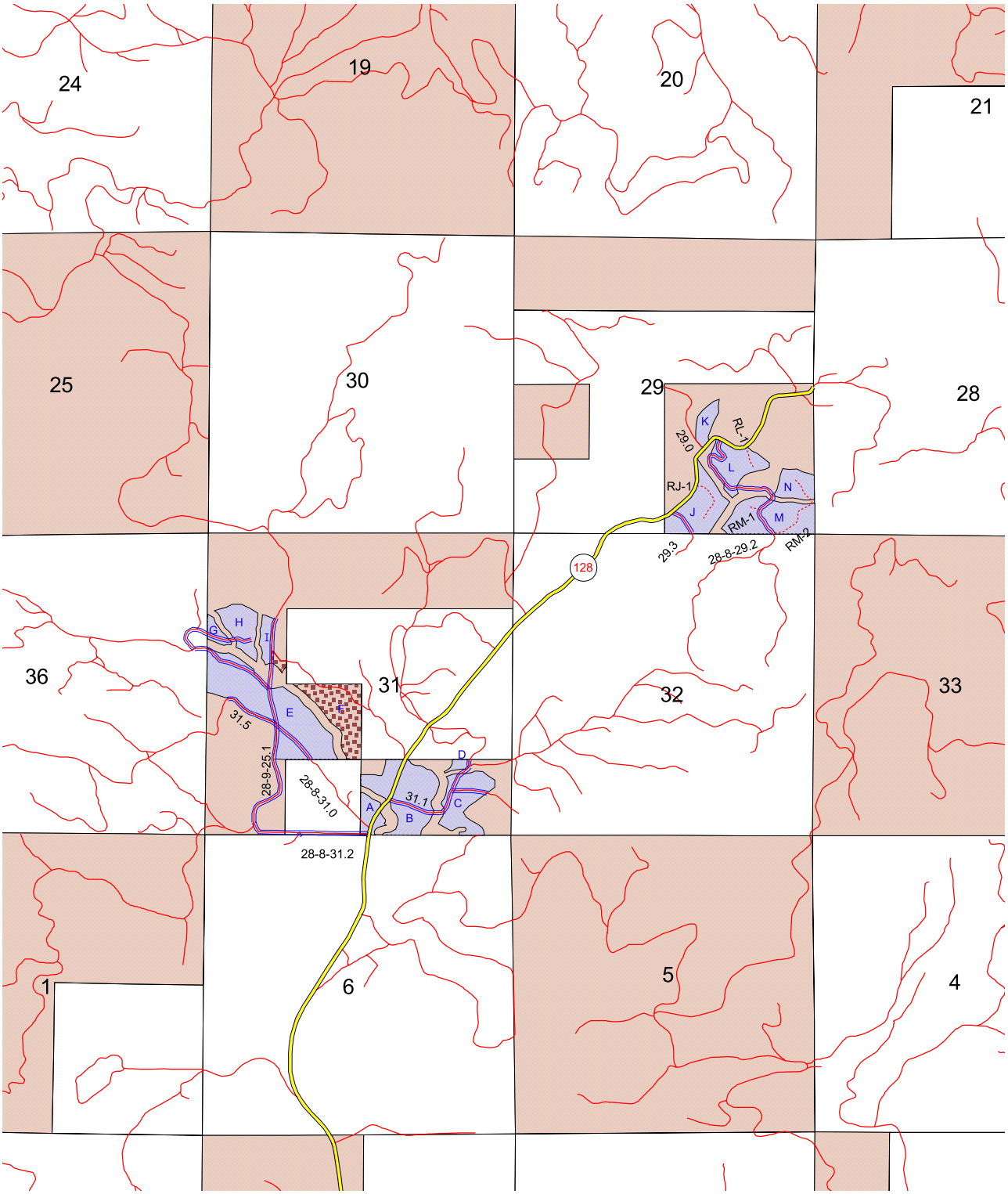
Existing Road
Renovate, Decommission
Construct, Permanent/Rock
100' Contour
20' Contour
Stream

Thinning Area
BLM (O&C) Land
Private Land

11-15-2002

DIET COQ THINNING



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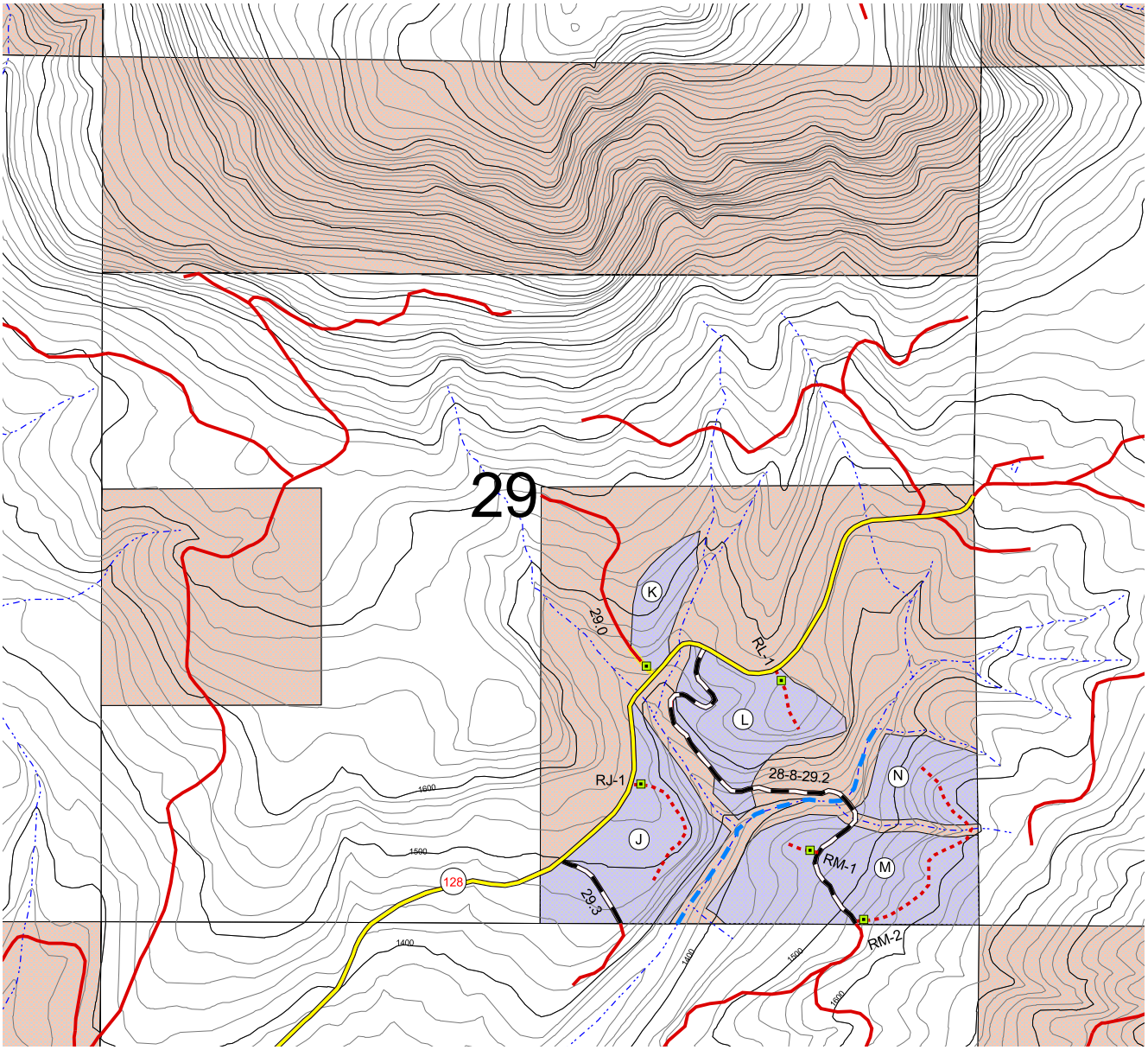
Considered/Eliminated Area
Thinning Area
Private Land
BLM (Coos Wagon Rd.) Land

Temporary Culvert
Paved Road
Existing Road
Access/Haul Route
Temporary Road
Stream

11-15-2002

DIET COQ

Commercial Thinning



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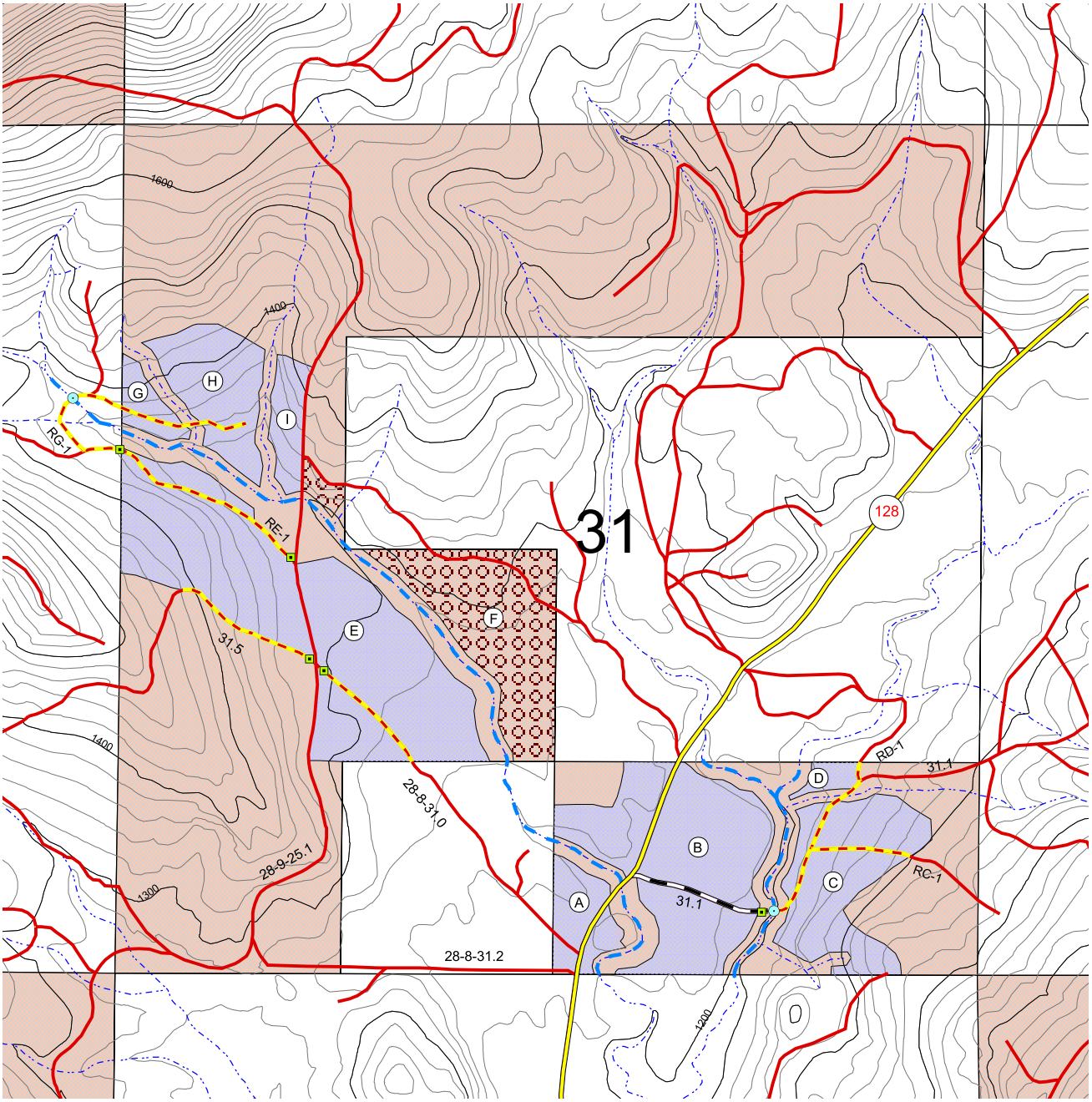
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

- Construct Roadblock
- Considered/Eliminated Area
- Thinning Area
- Private Land
- BLM (Coos Wagon Rd.) Land
- County Road
- Existing Road
- Renovate, Decommission
- Renovate, Permanent/Rock
- Construct, Decommission
- 100' Contour
- 20' Contour
- Stream
- Perennial Stream

11-15-2002

DIET COQ

Commercial Thinning



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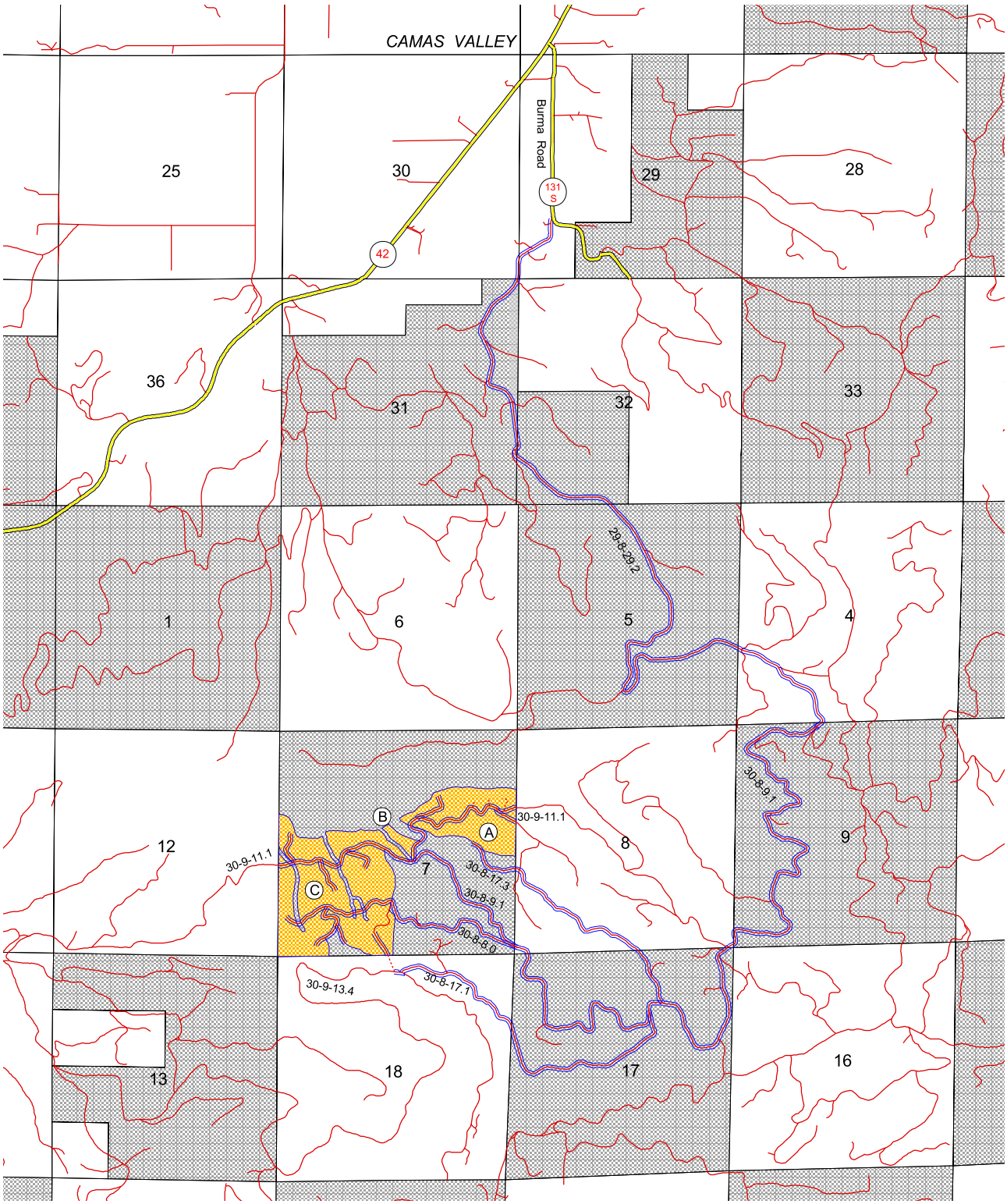
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

- Construct Roadblock
- Temporary Culvert
- Considered/Eliminated Area
- Thinning Area
- Private Land
- BLM (Coos Wagon Rd.) Land
- County Road
- Existing Road
- Renovate, Decommission
- Renovate, Permanent/Rock
- 100' Contour
- 20' Contour
- Stream
- Perennial Stream

11-15-2002

GOLDEN GATE THINNING



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Willamette Meridian, Roseburg OR., BLM

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

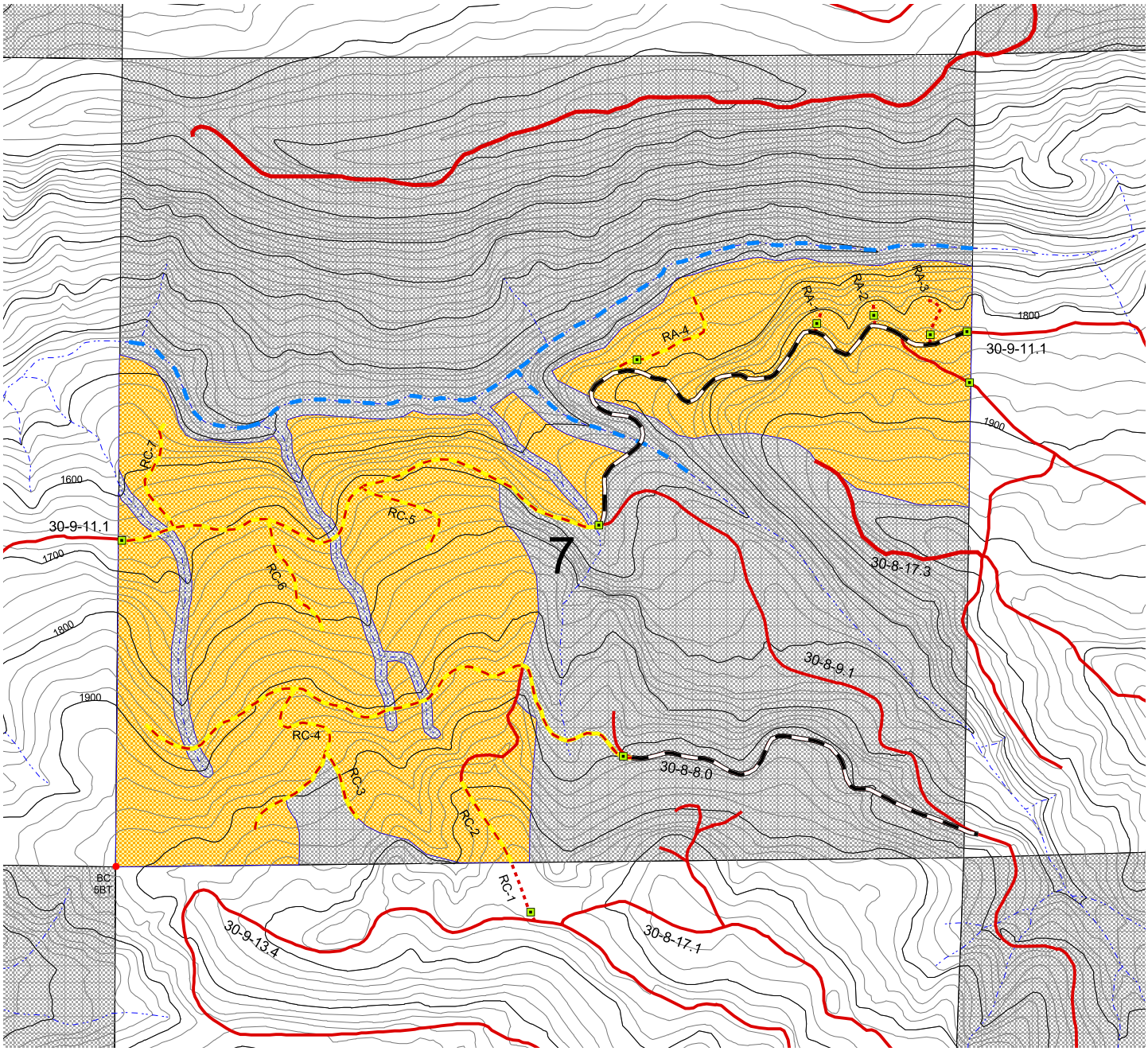
County Highway
Existing Road
Access/Haul Route
Temporary Road

Harvest Area
O&C Land
Private Land

11-15-2002

GOLDEN GATE

Commercial Thinning



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Willamette Meridian, Roseburg OR., BLM

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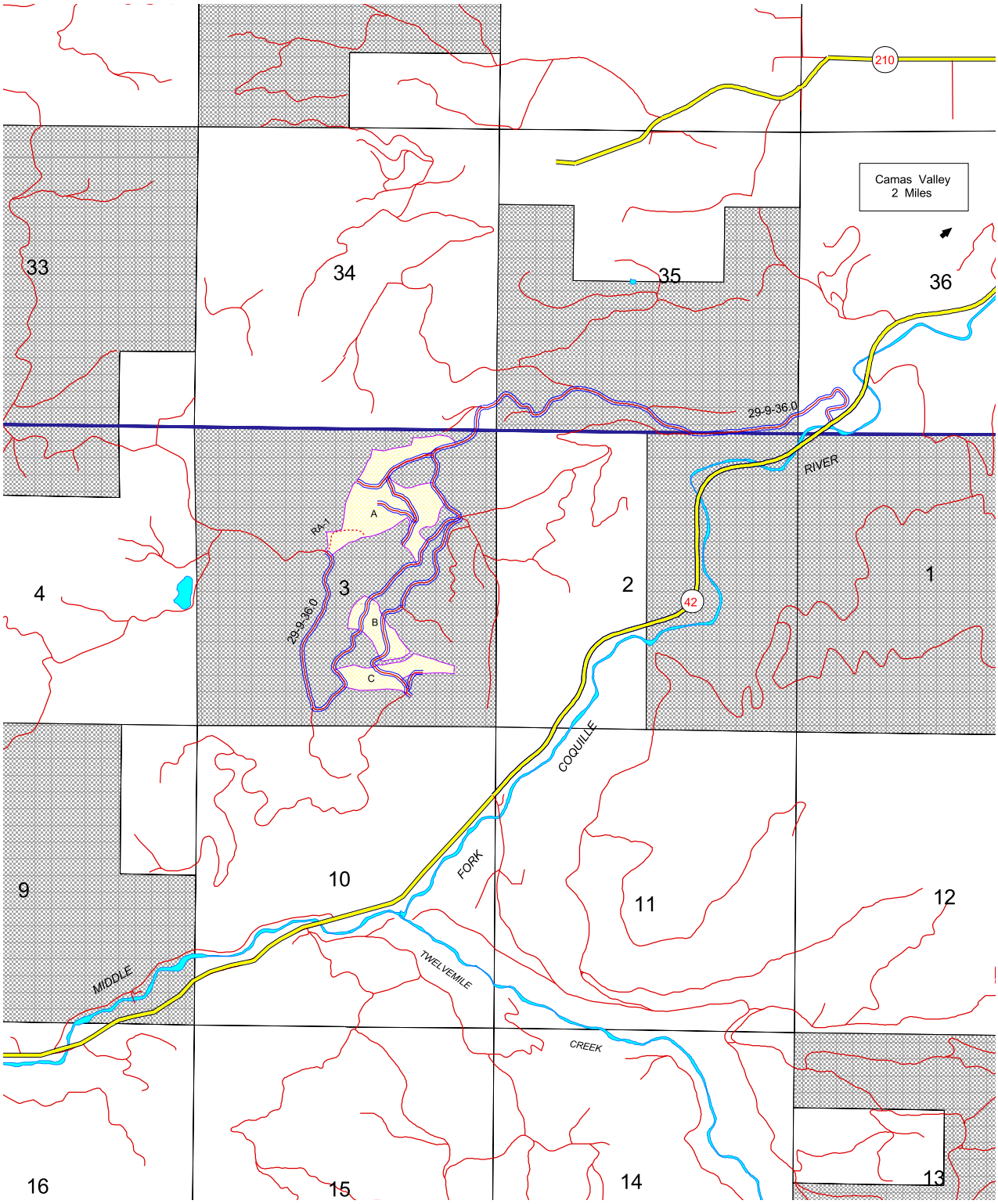
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Original data was compiled from various sources. This information may be updated without notification.

Construct Roadblock
Existing Road
Renovate, Decommission
Renovate, Permanent/Rock
Construct, Decommission
Stream
Perennial Stream
100' Contour
20' Contour

Thinning Area
O&C Land
Private Land

11-15-2002

SMOKE SCREEN THINNING



N
W E
S

T30S, R9W

Willamette Meridian, Roseburg OR., BLM

0 0.5 1 Miles

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

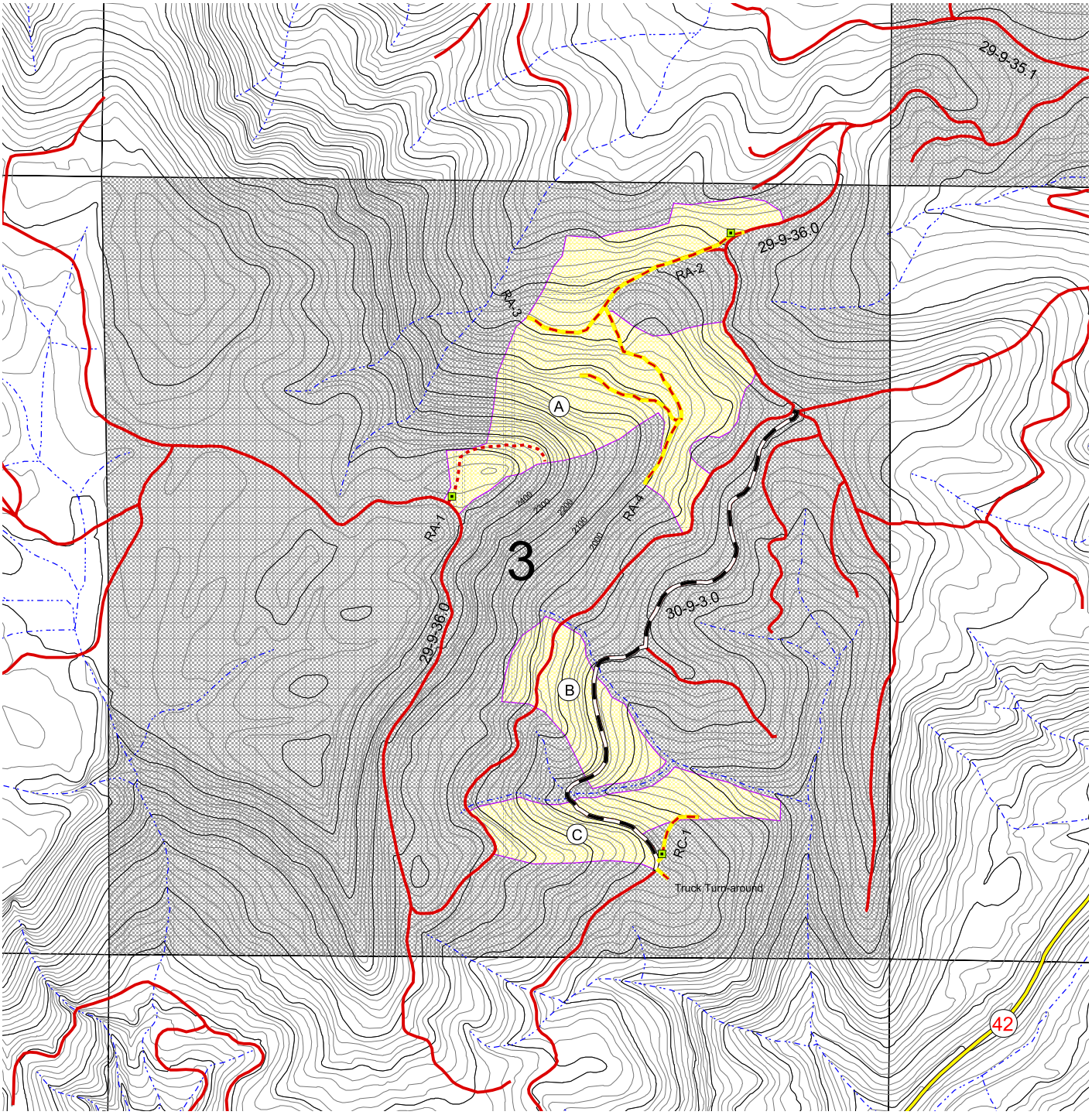
Access Route
County Highway
Temporary Road
Existing Road

Thinning Area
BLM (O&C) Land
Private Land

11-15-2002

SMOKE SCREEN

Commercial Thinning



N
W E
S

T30S, R9W

Willamette Meridian, Roseburg OR., BLM

1000 0 1000 Feet

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

Construct Roadblock
Thinning Area
BLM (O&C) Land
Private Land

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

11-15-2002

APPENDIX B

THINNING and DENSITY MANAGEMENT MARKING PRESCRIPTIONS

Marking Guidelines

General Marking Guidelines that apply for all areas:

1. Select dominant best-formed tree at the appropriate spacing for retention.
2. Trees marked for retention should have greater than 30 percent live crown.
3. Discriminate against grand fir (favor Douglas-fir, pines, and other conifers species) in all units except the following: Angel Hair, units B and C; Smoke Screen, units A and B.
4. In the following sales/units favor Douglas-fir over all other conifer species: Golden Gate and Smoke Screen unit C.
5. Space off of Plus trees by 25 feet.
6. Select for harvest those trees that exhibit signs of disease, especially laminated root rot, dwarf mistletoe, or Port-Orford-cedar root disease.

Grand fir dwarf mistletoe: (In particular, Angel Hair, unit F). Select non-host species for retention such as; Douglas-fir, other conifers and hardwoods. If removal of most of the infested grand fir trees creates large openings select the healthiest and least infected trees for retention.

Laminated Root Rot: (Angel Hair, unit F, west of the 29.3 road). Remove symptomatic trees and adjacent non-symptomatic trees and retain less-susceptible tree species. If removal of all symptomatic and non-symptomatic trees creates a large opening select the healthiest trees for retention. Less-susceptible species include: hardwoods, POC, western redcedar, Ponderosa pine, sugar pine, and incense-cedar.

7. Select for harvest all POC along haul routes, within 20 feet on the upslope side and 50 feet on the downslope side would be cut.
8. Space POC (healthy trees) reserved as crop trees within thinning units a minimum of 50 feet apart. If 3 to 4 POC trees are next to each other; they could be left as a group and any other reserved POC trees spaced at least 50 feet from the group.
9. Reserve all residual old-growth conifer trees unless in proposed road/route.
10. Reserve leave trees around large concentrations of large down wood to protect decay class 3, 4, and 5 down woody debris reserved under contract provisions.
11. Reserve all hardwood and conifer snags where not located in or within reach of a probable yarding corridor, or where they represent a demonstrable safety risk to personnel. Where needed designate rub trees or leave unthinned areas to reduce the potential for disturbing or damaging snags. The size of the unthinned areas would be dependent on the height of the snag.

Additional Marking Guidelines that apply to Riparian Reserves:

1. Mark all trees within 20 feet of streams for retention. Use topographic and vegetative conditions to mark the actual width of the no entry buffer along streams channels
2. Mark areas for non-treatment centered on key habitat features.
3. Apply general marking guidelines.

Marking Guidelines for Hardwoods:

1. For GFMA units, when possible, reserve hardwoods 10 inches and greater DBH by painting. Take into consideration likelihood of trees surviving thinning operations.
2. For Connectivity/Diversity Block units and Riparian Reserves, when possible, reserve and space off hardwoods 10 inches and greater DBH.

UNIT	Spacing (Feet)	Basal Area (square feet)
ANGEL HAIR After Thinning		
A	20	145
B	21	100
C	19	135
D	23	105
E	20	167
F	23	151
DIET COQ After Thinning		
A, B, C, D	21	143
E	19	170
G, H, I	22	145
J, M, N	19	165
K, L	18	130
GOLDEN GATE After Thinning		
A, B, C	21	140
SMOKE SCREEN After Thinning		
A	19	136
B	21	145
C	19	135

APPENDIX C

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

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

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

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