Revised Big Creek Analysis Area
Environmental Assessment

Myrtlewood Resource Area

Coos Bay District

EA Number OR 128-98-11
Revised December 1999

TABLE OF CONTENTS

I. PURPOSE AND NEED FOR ACTION 1
Scoping 2
Identified Issues 2
Management Objectives 3
Issues Identified and Analyzed then Eliminated from Further Consideration: 4
Alternatives Considered But Eliminated From This Action 4

II. ALTERNATIVES INCLUDING THE PROPOSED ACTION 6
Alternative I - No Action 6
Alternative II - Proposed Action 6
Alternative III - Alternative Action 9
Summary of Consequences 12

III. AFFECTED ENVIRONMENT 13

IV. ENVIRONMENTAL CONSEQUENCES 16
Alternative I - No Action 16
Direct and Indirect Effects 16
Cumulative Effects 18
Alternative II - Proposed Action 19
Direct and Indirect Effects 19
Cumulative Effects 24
Alternative III - Alternative Action 26
Direct and Indirect Effects 26
Cumulative Effects 29
Other Environmental Effects 30

V. LIST OF PREPARERS 34

Maps

Vicinity Map 5
Alternative II - Proposed Action - Harvest Units 8
Alternative III - Alternative Action - Harvest Units 11

Appendix

Revised Appendix 1 . . . . . Design Features for Action Alternatives and Monitoring
Revised Appendix 2 . . . . . Harvest Unit Details
Revised Appendix 3 . . . . . Road Construction, Improvement, and Renovation Maps
Revised Appendix 4 . . . . . Road Closure Recommendations

Analysis File - available at the Coos Bay District Office

Note: Some Sections have been revised due to changes in the documents or tables because of the deletion of units in the Revised Big Creek EA. Some Sections with Specialist's Reports have been amended or revised to reflect issues and revisions in the Revised Big Creek EA. Two Sections have been added to the Revised Big Creek EA Analysis File. Sections that were not revised or amended are contained in the original Big Creek EA Analysis File.

Section A . . . . . Public Input
Revised Section B . . Issues Identified and Analyzed then Eliminated from Further Consideration
Revised Section C . . . . . Units Considered and Eliminated From This Action
Revised Section D . . . . . Transportation Management Objectives
Amendment to Section E . . . . . Silviculture and Stand Exam Reports
Amendment to Section F . . . . . Soils Specialist's Report
Revised Section G . . . Design Features including Harvest and Reserve Tree Marking Guidelines
Revised Section H . . . . . Timber Sale Planning
Amendment to Section I . . . . . Wildlife Specialist's Report
Revised Section J . . . . . Fisheries Specialist's Report
Revised Section K . . . . . Aquatic Conservation Strategy Analysis
Amendment to Section L . . . . . Port-Orford-Cedar Analysis
Amendment to Section M . . . . . Hydrologist's Report
Revised Section N . . . . . Botanist's Report
Revised Section O . . . . . Riparian Reserve Adjustments and Treatments
Section P . . . . . Site Potential Tree Determination
Revised Section Q . . . . . 15% Standard and Guide Analysis
Section R . . . . . Hazardous Materials Report
Section S . . . . . Recreation Specialist Report
Section T . . . . . Chu-aw Clau-she T.S. Information

I. PURPOSE AND NEED FOR ACTION

The Bureau of Land Management (BLM) proposes to implement forest management activities in the Big Creek Analysis Area. The analysis area is approximately 28 miles southeast of Coos Bay, Oregon near the town of Bridge. It includes the Big Creek, Brownson Creek, Fall Creek, Bear Pen Creek, Axe Creek, and Jones Creek drainages that are tributary to Middle Fork Coquille River. The total analysis area is 16,661 acres in size. The BLM manages 9,021 acres (54%) of the analysis area; the Coquille Tribal Forest manages 1,047 acres (6%), and the remaining lands are private. The proposed harvest activities are located in T28S-R10W, T29S-R10W, and T29S-R11W; Willamette Meridian of Coos County.

The purpose of this Environmental Assessment (EA) is to analyze the effects of harvesting timber from this analysis area and actions associated with the timber sales. The proposed actions would contribute to the District's decadal Allowable Sale Quantity (ASQ).

The Proposed Action includes: 237 acres of regeneration harvest, 245 acres of commercial thinning, and 9 acres of hardwood/brush conversion in the General Forest Management Area (GFMA); 71 acres of regeneration harvest, 11 acres of density management thinning, and 14 acres of hardwood conversion in Connectivity[1]. The commercial thinning (GFMA) and density management thinning in Connectivity acreage includes 90 acres of density management in the Riparian Reserves. Harvest will be accomplished using skyline yarding and/or helicopter. The proposed projects would include 1.9 miles of semi-permanent[2] road construction (all of which would be decommissioned or fully decommissioned after harvest), 13.8 miles of road renovation, 0.9 miles of road improvement, and closure of 11.1 miles of existing roads. The proposed projects could be accomplished by timber sale contracts sold in Fiscal Year (FY) 2000, FY 2001, and FY 2002.

Areas considered for timber harvest are outside of Murrelet Reserves and other Late Successional Reserves (LSRs).

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

This EA incorporates by reference the *Port-Orford-Cedar Management Guidelines* (BLM 1994)(detailed evaluation is contained in Section L of the Analysis File with an Amendment); the *Western Oregon Program - Management of Competing Vegetation*, (FEIS, BLM 1989); the *Western Oregon Transportation Management Plan* (BLM 1996); and the *Big Creek Watershed Analysis* (BLM 1997). Actions described in this EA are in conformance with the Aquatic Conservation Strategy (ACS) Objectives listed on page B-11 and the Standards and Guidelines for Riparian Reserves on pages C-31 to C-37 of the Northwest Forest Plan. A detailed analysis

---

[1] Connectivity is a land use allocation within Matrix, managed on a 150-year area control rotation.

[2] Newly constructed roads decommissioned within one year after completion of timber sale activities associated with the harvest unit they were built to access.

of the consistency of the action alternatives with the ACS is contained in Revised Section K of the Analysis File. These documents are available for review at the Coos Bay District Office of the BLM, North Bend, Oregon.

The actions proposed in this EA are consistent with Oregon's Coastal Salmon Restoration Initiative (CSRI), the Coquille Watershed Association Action Plan (CWAAP), the U.S. Fish and Wildlife Service's September 22, 1998 Biological Opinion on FY1999-2000 timber sales, and the National Marine Fisheries Service's March 18, 1997 Biological Opinion and Conference Opinion on activities covered in the Coos Bay District's FRMP.

The Analysis File contains additional information used by the interdisciplinary team (IDT) to analyze impacts and alternatives and is hereby incorporated by reference.

Background

An EA for the Big Creek Analysis Area was originally sent out for public comment on April 5, 1999. After the comment period ended (May 6, 1999), additional information became available concerning harvest proposals on the Coquille Tribe Forest and marbled murrelet survey results. The Revised Big Creek EA is being completed to reflect the additional information and address issues and concerns raised during the public comment period.

Scoping

The scoping process identified the agency and public concerns relating to the proposed projects and defined the issues and alternatives that would be examined in detail in the EA. The general public was informed of the planned EA through letters to those on the Resource Area's mailing list, those receiving the Coos Bay *Planning Update*, and through the District's Internet site. The scoping letter, mailing list, and public responses are in Section A of the Analysis File.

Scoping by the IDT identified four issues.

Identified Issues

1. Landscape Pattern

   Key Indicators: Late-successional forest characteristics
   Habitat connections

2. Contribute to the District's Allowable Sale Quantity (ASQ)[3]

   Key Indicators: Estimated timber volume (thousand board feet)
   Estimated timber volume from Connectivity (thousand board feet)

3. Riparian Reserve Functions

[3] The ASQ would contribute to the decadal ASQ for the District. This is not intended to be the ASQ that would be sustained in the analysis area for future decades.

Key Indicators: Large woody debris (LWD) recruitment potential
Riparian Reserve species

4. Roads

Key Indicators: Open road density
Impacts to resources

Management Objectives

- Commercially thin GFMA stands to enhance growth rates, maintain good crown ratios, manage species composition, capture mortality of small trees, and produce larger, more valuable logs for the future.

- Conduct density management thinnings in Connectivity and Riparian Reserves to accelerate growth of trees which would later provide large-diameter snags and down logs, promote the development of understory vegetation, harvest mortality of small trees as the stand develops, maintain good crown ratios, and manage species composition. Density management thinnings in Connectivity would also produce larger, more valuable logs for the future.

- Maintain or enhance resource values within Riparian Reserves to meet the ACS objectives.

- Manage BLM-controlled road systems through various types of road closures and decommissioning to maintain or improve wildlife habitats, water quality, and hydrologic function. Reduce the open road density in accordance with the Transportation Management Objectives on BLM-managed lands in the proposed action area.

- Contribute to the District's decadal ASQ volume commitment. Address socio-economic commitment by promoting the production of merchantable timber through multiple timber sales from GFMA.

- Maintain legacy components in GFMA regeneration harvest units through retention of green trees, snags, and coarse wood.

- Limit spread of Port-Orford-cedar (POC) root rot disease (*Phytophthora lateralis* - PL) in the high risk areas (adjacent to roads and in riparian areas) and maintain POC as a species in low risk areas.

- Re-establish conifer stands on sites where hardwoods or brush became established following previous harvest of conifer.

Issues Identified and Analyzed then Eliminated from Further Consideration:

The following issues were identified during the EA process. The design features and requirements of the FRMP put these issues to rest. Analysis of these issues did not suggest different actions nor would they influence the decision. Therefore, they were eliminated from further consideration in this EA. Reasons for elimination are included in Revised Section B of the Analysis File.

Fisheries
Survey and Manage Species
Special Status Species
Water Quality limited 303(d) streams (summer temperature)
Natural Disturbance Patterns
Fragmentation/Interior Habitats
Port-Orford-Cedar Population Viability
Sediment Delivery

Alternatives Considered But Eliminated From This Action

The Big Creek Watershed Analysis identified approximately 989 acres of potential regeneration harvest and 277 acres of potential commercial thinning within GFMA. Potential regeneration harvest units consisted of stands over 60 years of age (based on Forest Operation Inventory data) that were outside of any known Threatened and Endangered (T&E) species sites, Riparian Reserves, LSR, and Timber Productivity Capability Classification (TPCC). Since the Big Creek Watershed Analysis, several potential harvest units identified as murrelet occupied sites were eliminated from any further consideration.

The ID team identified 41 potential harvest units to consider which included: regeneration harvest and commercial thinning units in the GFMA identified in the watershed analysis, commercial thinning units identified since watershed analysis was completed, regeneration harvest units in Connectivity, and density management thinning units in Connectivity. Density management thinning units in Connectivity consisted of stands 35-50 years of age that were of a composition and density that would benefit from thinning. A map of the units not included in the action alternatives, and rationale for their elimination, can be found in Revised Section C of the Analysis File.

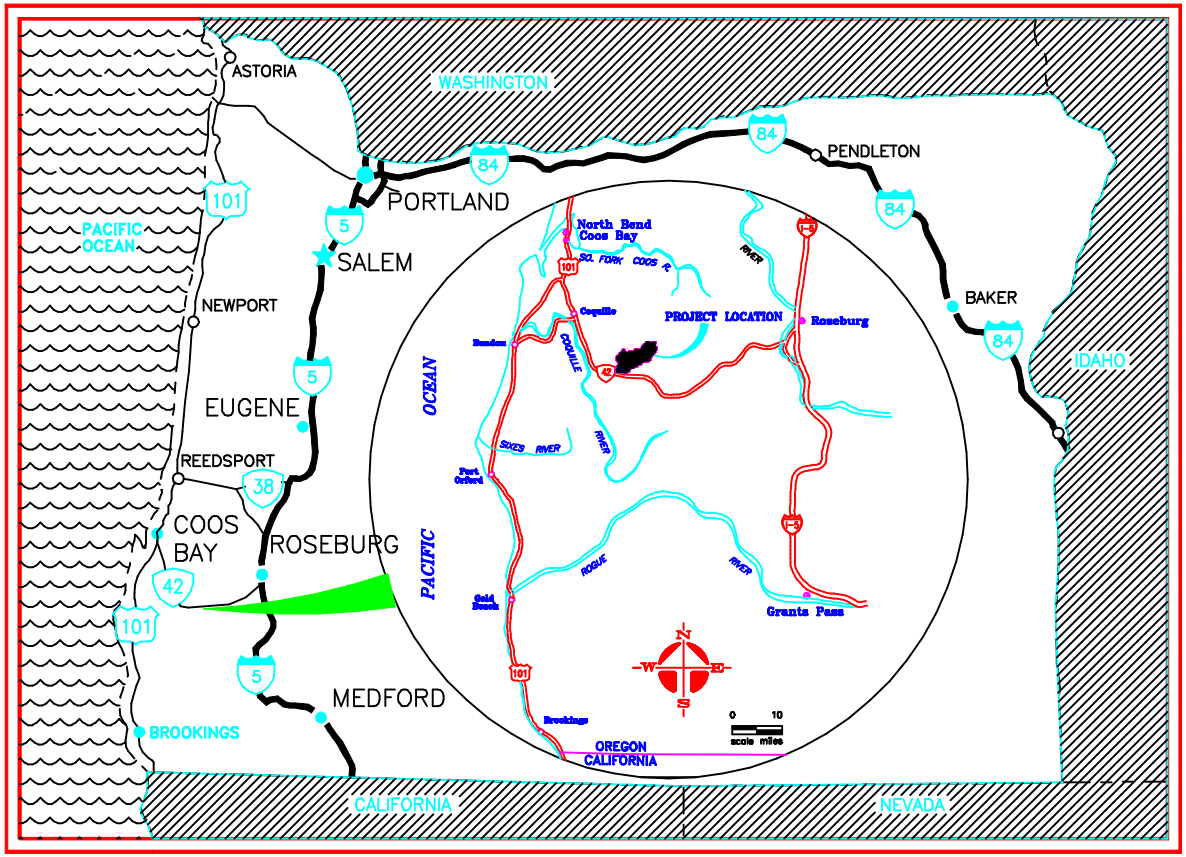
Of the 41 potential harvest units, portions of some regeneration harvest units were eliminated from consideration due to presence of previously unidentified streams. In addition, some potential commercial thinning and density management thinning in Connectivity units (or portions of units) were eliminated because their current stocking levels did not justify thinning.

No units identified in the Big Creek Watershed Analysis as Priority 3 are proposed for harvest (EA Units 1, 13, 13a, 14, 14a, 15, 16, 17, and 18). The primary reason for excluding these units was to minimize fragmentation in stands offering substantial interior forest habitat for wildlife. Also, road construction associated with harvesting these units could involve longer, permanent roads across streams which currently have no roads.

Vicinity Map

Revised Big Creek Analysis Area EA

Myrtlewood Resource Area Coos Bay District BLM



II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternative I - No Action

Under this alternative, no timber harvest or associated management activities would occur within the Big Creek Analysis Area at this time. Meeting the District's decadal ASQ volume commitment would have to be accomplished from other analysis areas.

Alternative II - Proposed Action

This alternative consists of 10 regeneration harvest units in the GFMA (237 acres), 3 regeneration harvest units in Connectivity (71 acres), 6 commercial thinning units in GFMA (245 acres), 1 density management thinning unit in Connectivity (11 acres), 1 hardwood conversion unit in the GFMA (3 acres), 1 hardwood conversion unit in Connectivity (14 acres), and 1 brush conversion in the GFMA (6 acres); totaling 587 acres. This total includes 90 acres of density management thinning in Riparian Reserves and 2 acres of brush conversion in Riparian Reserves.

All perennial, non fish-bearing streams retain the interim Riparian Reserve widths of 220 feet (one site potential tree height - Section P of the Analysis File) on each side of stream channels. All fish-bearing streams retain the interim Riparian Reserve widths of 440 feet on each side of stream channels. Intermittent streams retain the interim Riparian Reserve widths of 220 feet on each side of stream channels except in twelve cases. Riparian Reserves on 12 intermittent stream segments were analyzed and the boundaries adjusted on one or both sides of the stream channel as follows: one segment adjusted to 175 feet, eight segments adjusted to 110 feet, one segment adjusted to 90 feet, and two adjusted to 110 feet or ridgetop (whichever is less). Approximately 16 acres of Riparian Reserve would be converted to GFMA through these modifications. Approximately two acres of GFMA would be converted to Riparian Reserve to encompass potentially unstable areas. In all cases, the adjustments would meet the Aquatic Conservation Strategy (ACS) Objectives (Revised Section K of the Analysis File contains detailed ACS analysis). Details on Riparian Reserve adjustments are contained in Revised Section O of the Analysis File.

Future stocking of regeneration harvest units would closely resemble the original stand species composition through planting and natural seeding.

Commercial thinnings (CT), density management thinnings (DMT) in Connectivity, and DMT in Riparian Reserves would retain 90-130 trees/acre in most units. In these cases, spacing would vary throughout the thinning units and hardwoods would be thinned along with conifer. Young forests in Riparian Reserves would be treated to facilitate development of large trees, snags, and down logs. A brush field in Riparian Reserve which resulted from past harvest/disturbance would be treated to reestablish conifers. Alternative DMT treatments would be applied to all or portions of Riparian Reserves in EA Units 26, 28, and 35 to facilitate development of structural and species diversity. Treatments include thinning with a widely variable spacing between 70-135 trees/acre or clearing circles around individual trees. These treatments would accelerate development of late-successional forest characteristics in Riparian Reserves and improve habitat conditions for riparian dependent/associated species.

Regeneration harvest units would retain approximately 7 wildlife trees/acre in the GFMA units and 13 wildlife trees/acre in the Connectivity units. Skyline cable system and/or helicopter would be used for harvest in all units. New (semi-permanent) road construction would not occur in any Riparian Reserves.

This alternative could be accomplished through timber sales in FY2000, FY2001, & FY2002. Revised Appendix 2 contains detailed unit descriptions. Revised Appendix 3 contains maps showing roads to be constructed, improved or renovated for this alternative.

Regen Harvest Acres (GFMA)	Regen Harvest Acres (Con.)	CT Harvest Acres	DMT Harvest Acres	Hardwd Conver. Acres (GFMA)	Hardwd Conver. Acres (Con.)	Brush Conver. Acres	Total Acres	Total Volume (MBF)
237	71	245	11	3	14	6	587	16,549

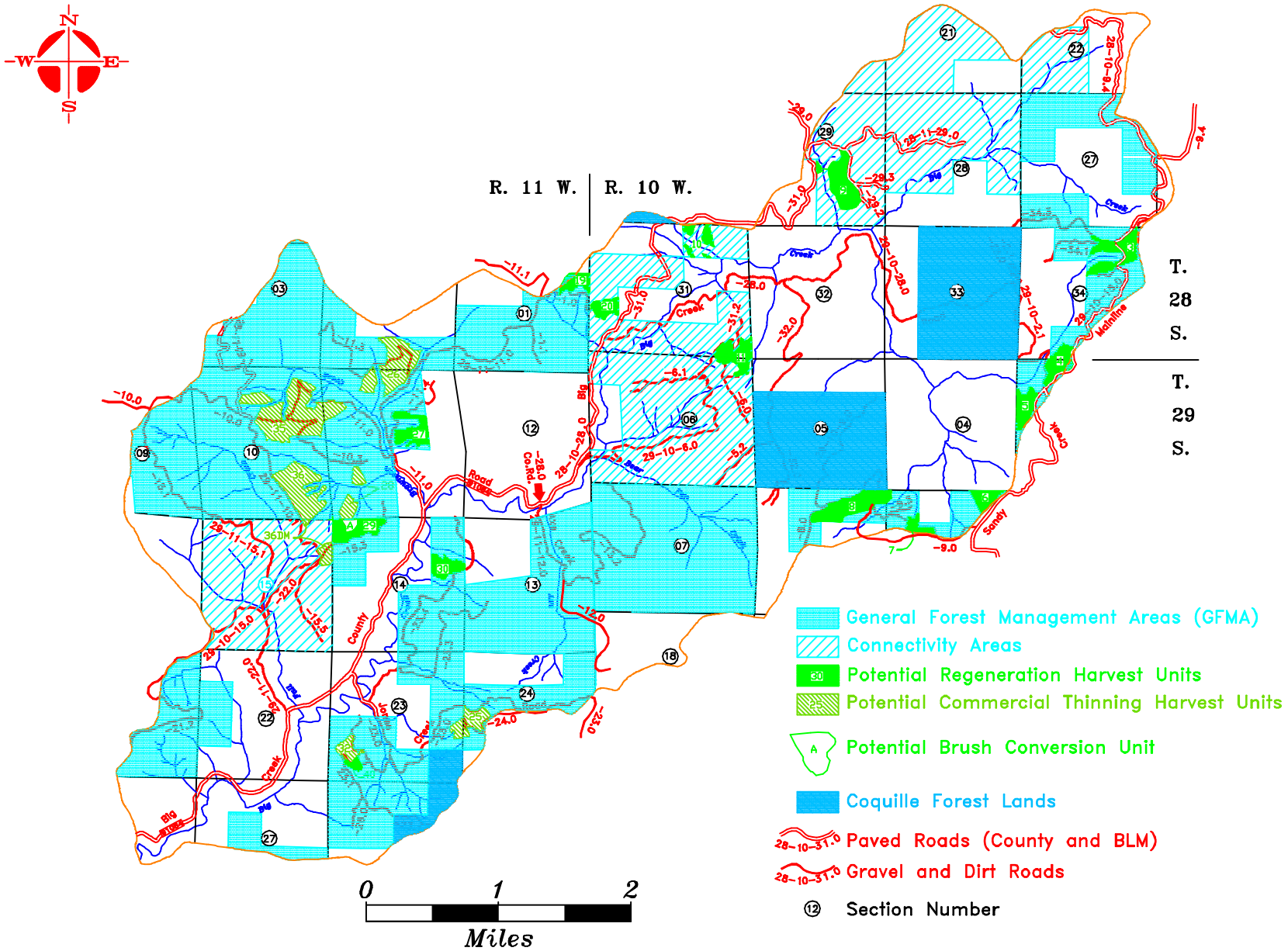
Regen - Regeneration
Con. - Connectivity
CT - Commercial Thinnings (Includes Density management thinning in Riparian Reserves)
DMT - Density management thinnings in Connectivity
Hardwd - Hardwood
Conver. - Conversion
MBF - Thousand Board Feet

N.C. - Rock Decom. (miles)	N.C. - Dirt Full Decom. (miles)	N.C. - Cementitius** Full Decom. (miles)	Road Improve. (Rock) Decommission (miles)	Road Renovation - Rock (miles)	Road Miles To Be Closed*
1.1	.5	.3	.9	13.8	11.13

N.C. - New Construction
Decom. - Decommission; Roads to be blocked and treated as necessary to restore hydrologic functions after completion of timber sale contract.
Full Decom. - Full Decommission; Roads to be decommissioned, sub-soiled, and planted after completion of timber sale contract.

* - Roads closed under the Road Closure Recommendations, Revised Appendix 4.
** Cement additive to existing soil to temporarily harden surface for timber haul.

Revised Big Creek Analysis Area EA
Alternative II – Proposed Action



REV. JULY 29,1999

Alternative III - Alternative Action

This alternative consists of 14 regeneration harvest units in the GFMA (354 acres), 3 regeneration harvest units in Connectivity (71 acres), 6 commercial thinning units in GFMA (245 acres), 1 density management thinning unit in Connectivity (11 acres), 1 hardwood conversion unit in the GFMA (3 acres), 1 hardwood conversion unit in Connectivity (14 acres), and 1 brush conversion in the GFMA (6 acres); totaling 704 acres. This total includes 90 acres of density management thinning (DMT) in Riparian Reserve and 2 acres of brush conversion in Riparian Reserve.

All perennial, non fish-bearing streams retain the interim Riparian Reserve widths of 220 feet (one site potential tree height - Section P of the Analysis File) on each side of stream channels. All fish-bearing streams retain the interim Riparian Reserve widths of 440 feet on each side of stream channels. Intermittent streams retain the interim Riparian Reserve widths of 220 feet on each side of stream channels except in fifteen cases. Riparian Reserves on 15 intermittent stream segments were analyzed and the boundaries adjusted on one or both sides of the stream channel as follows: one segment adjusted to 175 feet, eleven segments adjusted to 110 feet, one segment adjusted to 90 feet, and two adjusted to 110 feet or ridgetop (whichever is less). Approximately 24 acres of Riparian Reserve would be converted to GFMA through these modifications. Approximately two acres of GFMA would be converted to Riparian Reserve to encompass potentially unstable areas. In all cases, the adjustments would meet the Aquatic Conservation Strategy (ACS) Objectives (Revised Section K of the Analysis File contains detailed ACS analysis). Details on Riparian Reserve adjustments is contained in Revised Section O of the Analysis File.

Future stocking of regeneration harvest units would closely resemble the original stand species composition through planting and natural seeding.

Commercial thinnings (CT) and DMT in Connectivity, and DMT in Riparian Reserves would retain 90-130 trees/acre in most units. In these cases, spacing would vary throughout the thinning units and hardwoods would be thinned along with conifer. Young forests in Riparian Reserves would be treated to facilitate development of large trees, snags, and down logs. A brush field in Riparian Reserve which resulted from past harvest/disturbance would be treated to reestablish conifers. Alternative DMT treatments would be applied to all or portions of Riparian Reserves in EA Units 26, 28, and 35 to facilitate development of structural and species diversity. Treatments would include thinning with a widely variable spacing between 70-135 trees/acre or clearing circles around individual trees. These treatments would accelerate development of late-successional forest characteristics in Riparian Reserves and improve habitat conditions for riparian dependent/associated species.

Regeneration harvest units would retain approximately 7 wildlife trees/acre in the GFMA units and 13 wildlife trees/acre in the Connectivity units. Skyline cable system and/or helicopter would be used for harvest in all units. New (semi-permanent) road construction would not occur in any Riparian Reserves.

This alternative could be accomplished through timber sales in FY2000, FY2001, & FY2002. Revised Appendix 2 contains detailed unit descriptions. Revised Appendix 3 contains maps showing roads to be constructed, improved or renovated for this alternative.

Regen Harvest Acres (GFMA)	Regen Harvest Acres (Con.)	CT Harvest Acres	DMT Harvest Acres	Hardwd Conver. Acres (GFMA)	Hardwd Conver. Acres (Con.)	Brush Conver. Acres	Total Acres	Total Volume (MBF)
354	71	245	11	3	14	6	704	22,865

Regen - Regeneration
Con. - Connectivity
CT - Commercial Thinnings (includes density management thinnings in Riparian Reserves)
DMT - Density management thinnings in Connectivity
Hardwd - Hardwood
Conver. - Conversion
MBF - Thousand Board Feet

N.C. - Rock Decom. (miles)	N.C. - Dirt Full Decom. (miles)	N.C. - Cementitius** Full Decom. (miles)	Road Improve. (Rock) Decommission (miles)	Road Renovation - Rock (miles)	Road Miles To Be Closed*
1.2	.5	.3	.9	16.6	11.65

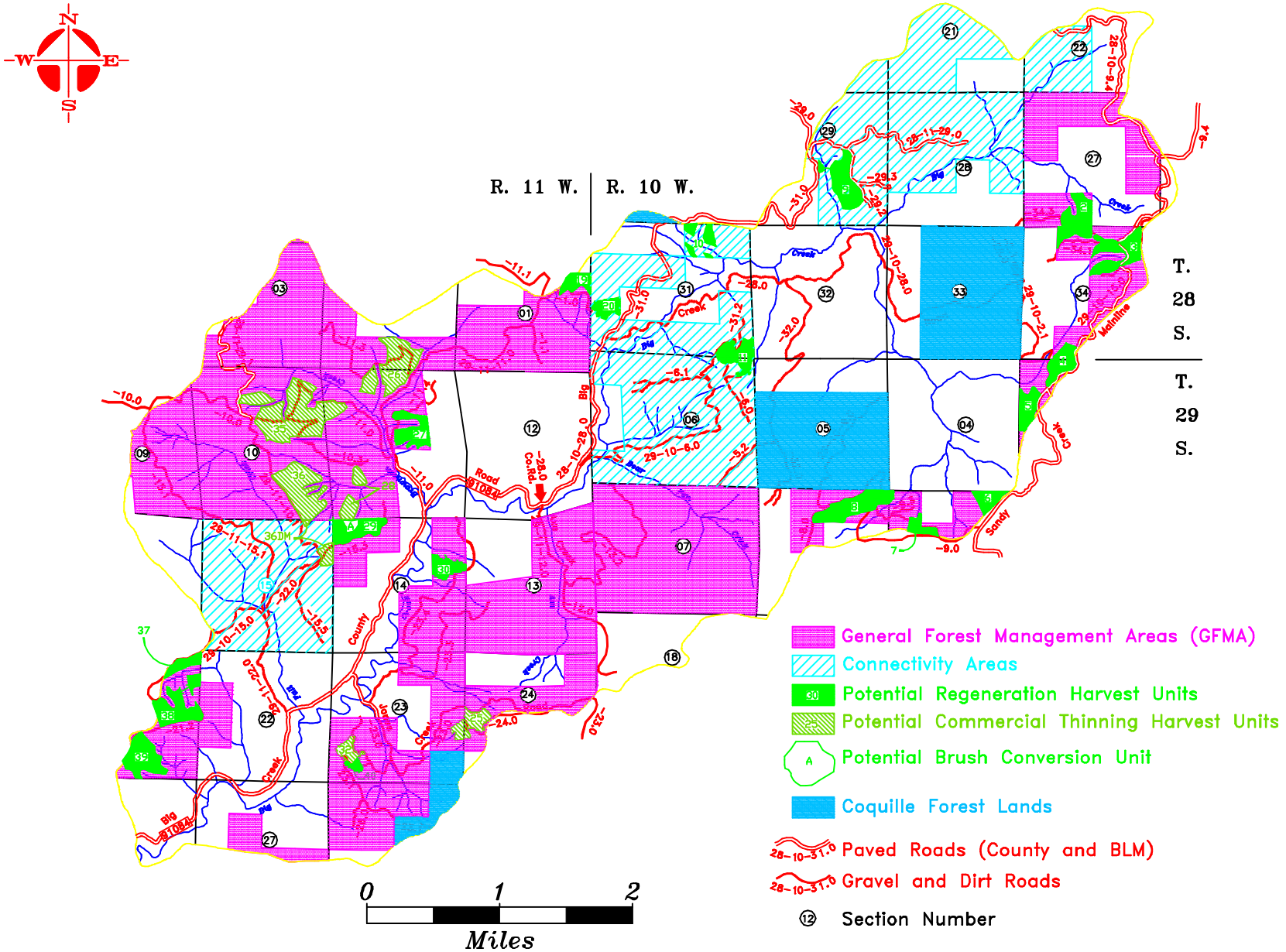
N.C. - New Construction
Decom. - Decommission; Roads to be blocked and treated as necessary to restore hydrologic functions after completion of timber sale contract.
Full Decom. - Full Decommission; Roads to be decommissioned, sub-soiled, and planted after completion of timber sale contract.

* - Roads closed under the Road Closure Recommendations, Revised Appendix 4.
** Cement additive to existing soil to temporarily harden surface for timber haul.

Design Features for Action Alternatives and Monitoring

Design features and monitoring can be found in Revised Appendix 1.

Revised Big Creek Analysis Area EA
Alternative III – Alternative Action



REV. JULY 29,1999

Summary of Consequences - Relative Impacts of Alternatives

Consequence	***Alternative I No Action***	***Alternative II Proposed Action***	***Alternative III Alternative Action***
Landscape Pattern (Issue 1)			
Late-successional forest removed (acres)	0	260	377
Percent late-successional forest removed from BLM/Tribe	9% (Tribe)	14%	17%
Percent late-successional forest remaining in analysis area	24%	22%	22%
Incipient old-growth forest removed (acres)	0	0	26
Habitat removal from important connection areas (acres)	0	0	80
Contribute to the District's ASQ (Issue 2)			
Estimated timber volume (MBF)	0	16,549	22,865
Estimated timber volume from Connectivity (MBF)	0	3,196	3,196
Riparian Reserve Functions (Issue 3)			
Net Reduction of Riparian Reserve (Acres)	0	14	22
Potential future LWD recruitment	No change	Enhanced	Enhanced
Impacts to "high value"* Riparian Reserves	None	Low	Medium
Roads (Issue 4)			
Open road density (Miles/Section)^2	4.04	3.25	3.22
Miles of new road corridor (potential barriers to wildlife movements)	0	1.9	2.0

* See definition in Big Creek WA, Page 163.

III. AFFECTED ENVIRONMENT

VEGETATION: The Big Creek Analysis Area lies within the Port-Orford-cedar variant of the western hemlock zone (see Big Creek Watershed Analysis). Much of the area was affected by the 1868 fire which resulted in much of the forest vegetation having birthdates of 1860 -1890. The species composition reflects this combination. Timber sale data from previously harvested (100-120 year old) stands throughout the analysis area reveals that the percentage of Douglas-fir stems ranges from 60 to 75%, with a mixture of Port-Orford-cedar (< 31%), western hemlock (<15%), hardwoods (<15%), grand fir (<10%), and a trace (<1%) of western redcedar. Visual observations of these stands indicate that the understory is comprised of small hemlock, Port-Orford-cedar, myrtle, chinkapin, tanoak, and a variety of shrub species. Within the few patches of residual older forests, the percentage of hemlock and Port-Orford-cedar increase to approximately half the stand composition. Additional information on vegetation diversity can be found on pages 71 - 76 of the Big Creek Watershed Analysis.

Currently, 40% of the forest cover is in late-successional habitat (defined as forests > 80 years of age), with over half of that within some variation of 'Reserve' land use allocation. Additional information on stand ages can be found on pages 12, 13, 74, and 100 of the Big Creek Watershed Analysis.

WILDLIFE: The analysis area contains numerous ecologically and economically important wildlife species. Table C-1 Appendix C of the Big Creek Watershed Analysis contains a list of all vertebrate wildlife species known or suspected to occur. There are 31 wildlife species or species groups of special management concern. These 31 species/groups fall into two categories; some require further site-specific analysis under the regional planning efforts (Northwest Forest Plan); the others are of special local concern. These species of concern rely on the pattern and distribution of key habitats or habitat features such as complex forest structure, late-successional forests, snags and down logs, and rocky habitats.

SOILS/GEOLOGY: The proposed units within the Big Creek Analysis Area are composed of soil types that fall into one of three classifications: The Digger - Preacher - Remote, Preacher - Blachly, or Preacher - Bohannan associations. These soil types are described in detail in the Coos County soil survey of 1989. The Digger - Preacher - Remote soils are shallow to moderately deep, steep to very steep slopes, gravelly and loamy soils derived from sedimentary rock. The Preacher - Bohannan soils are deep to moderately deep, have gentle to moderately steep slopes, and gravelly and loamy soils that formed from sedimentary rock. The Preacher - Blachly soils exhibit deep well drained characteristics on gentle to moderately steep slopes, are clayey in nature and are derived from arkosic sandstone or basalt or sedimentary rock.

Of these soil types the 14F, 15F, 46F, and 58F are the most sensitive to landslides as noted in the Big Creek Watershed Analysis. The erosion hazard is high when bare soil is exposed to rain on steep and very steep slopes. Erosion is moderate when slopes are less than 50%.

The Big Creek Analysis Area has four major fault lines running on a NE to SW direction. Three fault lines are closer to the Sandy Creek subwatershed, and the other fault line cuts across the upper portions of the Fall and Brownson Creek drainages. For the majority of the units proposed for harvest, fault lines are not a factor. However, some units have elevational changes in the

middle of the unit resulting in steep cliffs that could impair yarding by reducing deflection. These are due to uplifts within the formation rather than between faults. EA Units 8 and 35 are impacted by faults and EA Unit 25 is straddled across two different formations.

GEOMORPHOLOGY/HYDROLOGY/WATER QUALITY: Big Creek is a 16,661-acre 6th field subwatershed, within the Middle Fork Coquille watershed. Big Creek is a gentle gradient (0.5%), 5th order stream for most of its length, with steep tributaries including Big, Brownson, Fall, Bear Pen, Axe and Jones Creeks. The subwatershed has about 186 miles of stream channels and a drainage density approaching 7.2 mi/mi^2. Intermittent 1st and 2nd order streams, seeps, or springs, and perennial 1st and higher-order streams are present throughout the Big Creek Analysis Area. Most of the subwatershed is low elevation and below the transient snow zone, except for small portions of upper Big Creek. About 60% of the annual runoff occurs between December and February. Streams are flashy and very responsive to storms with hydrographs showing sharp rises and steep drops. High flows occur <5% of the time, moderate flows 45% of the time, and low flows 50% of the time.

Water quality in Big Creek is affected by watershed processes and land use practices. The primary source of sediment delivery to channels is debris avalanches and shallow rapid debris flows into source streams. This process occurs on an infrequent basis, but yields high sediment delivery volumes. There are many in-channel sources of sediment in lower Big Creek, especially from Rosgen stream types A5, A6, B6, F5 and F6. Watershed analysis showed there were higher turbidities in the Jones Creek drainage during storms, due to the parent material of the area.

Many 1st and 2 nd order channels are either entrenched or heavily embedded with fine sediment (silt and sand). High turbidities from fine sediment delivery are regularly noted during spawning surveys. While certain soils within the analysis area are naturally predisposed to produce fine sediment suspensions during high runoff periods, impacts from past land-management practices have undoubtedly exacerbated the process, with respect to both in-channel and out-of-channel sources. These conditions are likely to exist throughout the private and public land area that was tractor logged before 1980.

Big Creek exceeds the South Coast Basin Standard for summer water temperature from the mouth to Bear Pen Creek, and is listed in the DEQ's 305(d) report.

There are 22 occupied residences in the analysis area, consuming water for domestic and irrigation purposes from surface, spring or groundwater sources. Two water rights on record, permit numbers 34907 and 48468, have spring-fed points of diversion on BLM within Sec. 21, T. 29 S., R11 W., WM. These permit holders use spring water for domestic use and have existing Right-of-Way Agreements with BLM. The points of diversion and transmission lines appear to be within Riparian Reserves.

FISHERIES: The Big Creek watershed supports populations of coho salmon, fall chinook salmon, winter steelhead, coastal cutthroat trout (resident and sea-run), Pacific lamprey, brook lamprey, speckled dace, prickly sculpin, reticulate sculpin, threespine stickleback, and largescale sucker. Oregon Coast coho salmon are listed as threatened under the Endangered Species Act (ESA). Furthermore, Oregon Coast steelhead and coastal sea-run cutthroat trout are federal candidate species; stock status reviews are ongoing to determine if future listings may be warranted. The distribution of resident and anadromous fish within the analysis area is described in the Big Creek Watershed Analysis (p.114); further revisions to fish distribution, based on electroshocking in spring of 1997 and 1998, are on file in the Myrtlewood Resource Area (Revised Section O of the Analysis File). Additional information on fish stocks can be found on pages 16, 114-117 and 126-133 of the Big Creek Watershed Analysis.

RIPARIAN RESERVES: The Big Creek Analysis Area contains about 5,037 acres of interim Riparian Reserve on BLM-managed lands. Age class distribution is as follows: 0-40 yrs (48%), 41-80 yrs (12%), 81-120 yrs (13%), 121-160 yrs (24%), 161-20 yrs (trace), and 200+ yrs (2%). While the majority of these Riparian Reserves contain low to moderate amounts of soft, embedded, down logs from previous harvest (decay class 3+), "hard" (class 1 and 2) down logs are virtually absent. Only 2% of Riparian Reserve stands are greater than 160 years old; it is at this age that trees reach a size that they contribute appreciably to large wood quantities. Over the next forty years, riparian stands currently 120-160 years old (24% of Riparian Reserve) will "self-thin" and begin to provide class 1 logs to riparian forests and streams. However, because the great majority of stands are <40 years old, it would take up to 120 years to reach optimal wood recruitment levels in Riparian Reserves. Additional information on the condition of Riparian Reserves can be found in the Big Creek Watershed Analysis (pp. 82-86) and Riparian Reserve Evaluation (pp. 146-160).

TRANSPORTATION SYSTEM: At present, the open road density on BLM-managed lands within the analysis area is approximately 4.0 mi/mi^2. The road systems access both federal and private lands, consequently the Bureau has existing Reciprocal Right-Of-Way Agreements with Georgia Pacific-West, Menasha Corporation, Al Pierce Lumber Company, and Lone Rock Timber Company. These Reciprocal Right-Of-Way Agreements give all land owners access to their lands, and at the same time, reduce road density by eliminating the need for duplicate road systems. In addition, lands managed by the Coquille Tribe use the road system to access their lands.

The BLM controls approximately 65% (70 miles) of the transportation system (108 miles total) in the analysis area. Approximately 86% (60 miles) of the BLM-controlled roads are either gravel or bituminous surfaced. Many of the unsurfaced roads in the analysis area fall into two categories: either newly constructed roads or old roads in some stage of hydrologic recovery. Most older dirt spurs and roads on BLM-managed lands are not contributing sediment to stream channels from their surfaces.

IV. ENVIRONMENTAL CONSEQUENCES

Alternative I - No Action

Under this alternative, no timber harvest, road decommissioning, or mitigation would take place within the analysis area at this time.

Direct and Indirect Effects (Alt. I)

Landscape Pattern (Issue 1)

Key Indicator: Late-successional forest characteristics

Alternative I maintains the most existing late-successional and old-growth habitat, but foregoes opportunities to facilitate future development of late-successional forest characteristics in younger stands and hardwood/brush stands.

No late-successional forests or forests with late-successional forest characteristics (large diameter trees, broken and decayed trees, large down logs and snags) would be harvested. Approximately 40% of BLM-managed lands in the analysis area contain stands >80 years of age and 25% contain forests >120 years of age. Approximately 60% of these late-successional forests are in Reserves. Old-growth forests (those >200 years of age) occur on <2% of the analysis area (Revised Table W-1, Amendment to Section I of the Analysis File). Late-successional forests in the analysis area along the Middle Fork Coquille River corridor would remain intact; these forests are important potential habitat for bald eagles and some other river-oriented species. Dense conifer stands, with little diversity in plant species or structure, would continue to develop diversity slowly. Brush fields and hardwood stands resulting from past management would continue to develop slowly toward later-successional stages.

The analysis area contains all or portions of 3 Connectivity Blocks (see Big Creek WA for maps of Connectivity Blocks). Blocks 1 and 2 contain 59% and 44% of late-successional forests, respectively; most of these are 81-120 years of age. See Revised Table W-2 (Amendment to Section I of the Analysis File) for a further breakdown of age classes in Connectivity Areas.

Key Indicator: Habitat Connections

All existing connections on BLM-managed lands would remain intact including the three important connection areas in the north and west parts of the analysis area that were identified in the Big Creek Watershed Analysis (p. 96).

Contribute to the District's Allowable Sale Quantity (ASQ)(Issue 2)

This alternative would not contribute any volume toward the decadal ASQ for the District. Based on the FRMP, there is planned regeneration harvest in GFMA and Connectivity, commercial thinning in GFMA, and density management thinning in Connectivity. All of these treatments contribute to the Districts's ASQ. Opportunities to manage Connectivity, convert brush and hardwood stands to conifer, or commercial thin in the GFMA would be delayed or foregone.

Riparian Reserve Function (Issue 3)

All Riparian Reserves associated with proposed regeneration harvest units would remain at interim reserve widths. The No-Action Alternative would not affect the development of the 160 year-old age class in the Riparian Reserves. DMT would not occur within Riparian Reserves, therefore we forego the opportunity to enhance the structural characteristics (including future LWD) in these stands. Habitat conditions for species associated with or dependant upon Riparian Reserves would remain unchanged.

Roads (Issue 4)

Key Indicator: Open road density

The following table summarizes the effects of roads for all alternatives:

Table 1: Road Density

	Alt. I	Alt. II	Alt. III
Miles of new road construction[1]	0	1.9	2.0
Open Road Density on BLM (miles/sq. mile)[2]	4.04	3.25	3.22

[1] All new road construction would be fully decommissioned or decommissioned.
[2] Open roads = roads accessible to motorized vehicles. Target open road density in the FRMP is 1.1 miles/sq. mile with a maximum of 2.9 miles/sq. mile.

There are no direct or indirect effects to open road density under the No-Action Alternative.

Key Indicator: Impacts to wildlife

The existing open road density within the analysis area would perpetuate the current level of disturbance to wildlife, discouraging the use of habitats adjacent to these open roads. No new roads would be constructed; therefore, no new barriers (corridors or graveled surfaces) to movement would be created. Since open road density on BLM would remain the same, the potential for loss of roadside down log habitat through theft and salvage would not change. The overall effect of the No-Action Alternative would be continued disturbance to wildlife and adverse impacts to wildlife habitat at the current high level. None of the recommended road decommissioning proposed under the action alternatives would be completed at this time. Barrier effects of roads on wildlife movements will remain unchanged. Decreased connectivity of habitats due to road barriers limit the ability of wildlife to recolonize habitats and isolates populations making them more susceptible to local extirpation.

Cumulative Effects (Alt. I)

Landscape Pattern (Issue 1)

Key Indicator: Late-successional forest characteristics

Based on aerial photo interpretation, there are no late-successional forests on private lands, and none are expected to develop if private lands continue to be harvested in short rotations. Approximately 20 acres of hardwood forests in Riparian Reserves will be treated to reestablish conifers through Jobs-In-the-Woods (JIW) riparian restoration projects (EA No. OR120-98-12), which will facilitate development of future late-successional forest characteristics. The Coquille Indian Tribe is expected to harvest approximately 333 acres in the analysis area within the next few years. Approximately 319 acres of this is late-successional forest which represents 8.7% of the total late-successional forest on federal/Tribe lands in the analysis area; based on aerial photo interpretation, 13 acres may be incipient or current old growth habitat. The largest, most contiguous blocks of late-successional habitat and key late-successional habitat near the Coquille River would not be affected by Coquille Indian Tribe harvest. Twenty- four percent of the analysis area, all ownerships, are presently in forests greater than 80 years of age. The overall percentage of late-successional forest in the analysis area would be expected to increase by at least 1,000 acres over the next 4 decades as new stands enter the 80+ year age class.

Key Indicator: Habitat Connections

Currently, active timber sales (Sandy Creek Analysis Area EA, No. OR128-96-21) will harvest approximately 273 acres of late-successional forest adjacent to the northeast part of the Big Creek Analysis Area. With Alternative I, no additional late-successional forests would be harvested; therefore, there would be no additional cumulative effects to habitat connections. Mature and older forest connections between mainstem Big Creek and the surrounding uplands would continue to be weak if harvest practices on private land continue as they have in the past.

Contribute to the District's Allowable Sale Quantity (ASQ)(Issue 2)

Delayed harvest may result in lost opportunities for commercial and density management thinnings in some stands. Growth in some of these stands would be reduced due to competition, resulting in decreased long-term volume and value. Delaying hardwood and brush conversions would result in lost opportunities for stands to be reestablished with conifer, again resulting in decreased long-term volume. Not harvesting within this analysis area would shift the burden of meeting the District's ASQ commitment to other watersheds, resulting in greater cumulative effects to those areas.

Riparian Reserve Functions (Issue 3)

Key Indicator: LWD recruitment potential

Past harvest and stream cleaning activities have depleted large woody material and reduced recruitment of large logs to streams and riparian areas. Recruitment is expected to increase as

stands age. In addition, riparian restoration projects to be completed through Jobs-In-the-Woods (EA OR120-98-12) would enhance LWD recruitment potential in portions of this analysis area. The No-Action Alternative would not add to cumulative effects of large wood depletion in the Big Creek watershed, nor would it accelerate tree growth and enhance potential future large wood accumulations in Riparian Reserves that are currently <50 years old.

Key Indicator: Riparian dependent/associated species

Riparian restoration projects to be completed through Jobs-In-the-Woods (EA OR120-98-12) would enhance late-successional forest characteristics, including snag development and LWD recruitment potential in Riparian Reserves. JIW projects will include treating about 20 acres of hardwood stands to reestablish conifers and creating snags within approximately 100 acres of Riparian Reserves (1-2 snags/acre). These projects will benefit riparian dependent/associated species. Harvest on Coquille Indian Tribe lands would be consistent with BLM harvest guidelines including the ACS. The availability of late-successional forest in Riparian Reserves is expected to remain fairly steady for 2 decades then increase gradually until all Riparian Reserve stands are in the 80+ year age class. Habitats on private lands receive only limited protection through the current Forest Practice Act, which restricts habitat connectivity, especially along mainstem Big Creek.

Roads (Issue 4)

Key Indicator: Open road density

Road density on BLM-managed lands would remain the same. However, total road density may increase if private landowners build or reopen (and leave open) roads to harvest private lands.

Key Indicator: Impacts to wildlife

Road density on private lands may increase if new roads are constructed or old roads are reopened to facilitate harvest. An unknown amount of existing roads may be closed or decommissioned on BLM-managed lands through future restoration projects. Barriers to wildlife movements due to roads will likely remain steady or increase slightly if overall road density increases due to activities on private land.

Alternative II - Proposed Action

Direct and Indirect Effects (Alt. II)

Landscape Pattern (Issue 1)

Key Indicator: Late-successional forest characteristics

Alternative II removes some late-successional forest, but does not affect any incipient old-growth habitat. It does not remove any late-successional forest from the Middle Fork Coquille River corridor. It also captures some opportunities to facilitate development of late-successional forest characteristics in young and hardwood/brush stands.

This alternative would harvest 260 acres (7.1%) of late-successional forests in the analysis area (189 on GFMA, 71 on Connectivity), none of which are incipient old-growth forest. Approximately 3 acres (net) of late-successional forests would be permanently removed from Reserves through changes in Riparian Reserve boundaries. No late-successional forest would be removed from the Coquille River corridor, which is important to maintain future nesting options for bald eagles and other species associated with rivers and late-successional forests. After harvest, approximately 38% of BLM-managed lands in the analysis area would contain stands greater than 80 years of age, and 24% would contain forests greater than 120 years of age. The percentage of old-growth forests in the analysis area would stay the same (Revised Table W-1, Amendment to Section I in the Analysis File).

After harvest, Connectivity Blocks 1 and 2 would contain 58% and 40% of forests >80 years of age, respectively. Harvest units would remove 31 acres of late-successional forest from Block 1 and 54 acres from Block 2. Harvest units would affect the most common late-successional forest age class; therefore, they do not further unbalance forest age class distribution in Connectivity Areas. Further breakdown of age classes in Connectivity Areas is contained in Revised Table W-2 in Amendment to Section I of the Analysis File. The FRMP states that each Connectivity Block should contain 25-30% late-successional forest; this alternative meets this requirement.

With a minimum harvest age of 60 years in the GFMA, late-successional forest characteristics would not likely develop again once a stand is harvested. The 150-year area control rotation on Connectivity areas should allow some late-successional forest characteristics to develop before the stands are harvested again.

Changing Riparian Reserve boundaries would result in the net loss of approximately 14 acres of Reserves. The areas removed from Reserves would probably never reach late-successional conditions under current rotation ages. Approximately 90 acres of young forests in Riparian Reserves would be treated to facilitate development of large trees, snags, and down log. A brush field in Riparian Reserve, which resulted from past harvest/disturbance, would be treated to reestablish conifers. These treated stands in Riparian Reserves should develop late-successional characteristics earlier.

Key Indicator: Habitat Connections

Alternative II retains connections in 3 important areas identified in the Big Creek Watershed Analysis (p. 96), and captures some opportunities to facilitate long-term reestablishment of connections currently broken by young and hardwood/brush stands. However, some late-successional forest connections between uplands and riparian areas would be broken or constricted as a result of harvest.

Existing connections would slowly improve as young and mature stands develop, as the contrast between edges decreases, and as canopy gaps close. Conifer forest connections currently broken by brush/hardwood stands would reconnect as these stands are restored to conifers. Connections along Riparian Reserves on BLM-managed land would improve in the future (20+ years) as a result of the Riparian Reserve treatments in young conifer stands and reestablishment of conifer in the brush field. Connections broken by regeneration harvest units from this EA would begin to re-form as the canopy closes and matures 20 or more years in the

future.

Contribute to the District's Allowable Sale Quantity (ASQ)(Issue 2)

This alternative would provide an estimated timber volume of 16,549 MBF, of which approximately 15,786 MBF would contribute to the District's decadal ASQ commitment (an estimated volume of 763 MBF is from density management in Riparian Reserves, which does not count toward the ASQ). Approximately 3,196 MBF (of the total 16,549 MBF) would contribute to the volume for the District that is expected to come from Connectivity. Approximately 245 acres (of the 587 total acres treated) would be commercially thinned, and approximately 11 acres (of the total acres treated) would be density management thinned in the Connectivity. These treatment acres would provide additional harvest options in the future that would not be available if thinning of these stands was deferred. Approximately 17 acres (of the total acres treated) would be hardwood conversion and approximately 6 acres (of the total acres treated) would be brush conversion. These treatment acres would reestablish conifer for future management options.

Riparian Reserve Functions (Issue 3)

The modified Riparian Reserve network and treatments in Riparian Reserves were designed to adequately protect aquatic resources and meet the ACS objectives (detailed information is contained in Revised Section K of the Analysis File).

Key Indicator: Large wood recruitment potential

Density management and brush field conversion in Riparian Reserves are expected to enhance future recruitment of LWD over the long term. Riparian Reserve width reductions would not diminish potential LWD recruitment over the long term.

Under Alternative II, about 90 acres (<2 %) of the Riparian Reserves in the Big Creek Analysis Area are proposed for density management thinning. Treatments in Riparian Reserves would generally be the same as the associated commercial thinnings in the uplands, and would enhance the future recruitment of LWD.

Due to the small diameter and high decay rate of woody material recruited from stands less than 40 years old, the wood provides little in terms of in-stream structure and channel stability. While small diameter logs contribute to organic matter important in food webs, density management thinning in Riparian Reserves is not likely to impact functions associated with down wood in the short term. In the long term (15+ yrs), the growth rate of individual trees and the resultant structural diversity is expected to increase in the thinned Riparian Reserves. This would benefit aquatic habitat and channel stability, because larger pieces of woody structure would be available in a shorter period of time than would occur without thinning.

All Riparian Reserves proposed for reductions are on Rosgen Type-A channels. They are intermittent or seasonally flowing, moderate in gradient (4-20%), and receive the vast majority of wood from local stream-side sources (e.g., windfall, landslides). Of the material delivered to these streams, 95% originates from within 110 feet of the stream bank (see Revised Section J

of the Analysis File). Furthermore, wood recruitment over a ridge is highly improbable. Thus, the proposed Riparian Reserve boundary adjustments on twelve stream segments would not appreciably decrease the large wood recruitment potential.

Under Alternative II, two acres within Riparian Reserves are proposed for brush field conversion. The reestablishment of conifer would improve riparian habitat and channel stability, because larger pieces of woody structure would be available in a shorter period of time than would occur without treatment.

Key Indicator: Riparian dependent/associated species

Riparian Reserve reductions under Alternative II would have minimal impacts to Riparian dependent/associated species.

This alternative would result in a 14 acre (net) decrease in Riparian Reserves, 3 of which are currently late-successional forests. No important habitat microsites (rocks, small wet areas, concentrations of down logs or snags) would be exposed or threatened by the Riparian Reserve reductions. Most adjusted Riparian Reserves would be at least 110 feet wide on each side to accommodate home ranges of relatively immobile wildlife species.

Riparian Reserve reductions are scattered across the landscape, so they are unlikely to compromise function for upland species, whose conservation is dependent on the Riparian Reserve network. The net reduction of 14 acres of Riparian Reserves represents 0.3% of the estimated Riparian Reserve acres in the analysis area.

Young forests in Riparian Reserves would be treated to facilitate development of large trees, snags, and down logs. A brush field in Riparian Reserve, which resulted from past harvest/disturbance, would be treated to reestablish conifers. Special DMT treatments would be applied to all or portions of Riparian Reserves in EA Units 26, 28, and 35 to facilitate development of structural and species diversity. Treatments would include thinning with a widely variable spacing between 70-135 trees/acre or clearing circles around individual trees. These treatments in Riparian Reserves would accelerate development of late-successional forest characteristics and improve habitat conditions for riparian dependent/associated species.

Watershed analysis cautioned against reducing Riparian Reserves in identified “high value” areas. This alternative includes reductions in two potentially “high value” areas (i.e. forest greater than 120 years of age and Riparian Reserves in Brownson Creek drainage). EA Unit 11 contains Riparian Reserves with forests greater than 120 years of age. The design for this unit includes reducing a Riparian Reserve on one intermittent stream segment by 1 acre; however, 2 acres of forest >120 years old would be added to Riparian Reserves. Therefore, there would be an overall benefit, because there would be a net increase of 1 acre in this age-class in Riparian Reserves. Riparian Reserves in Brownson Creek drainage were identified in watershed analysis as having “high value” due to the high proportion of late-successional forest, and potential to provide connections and continuity between drainages. EA Unit 27 is located in Brownson Creek drainage and would include reductions of approximately 7 acres of Riparian Reserves. A closer inspection of Riparian Reserves in this unit revealed that they were not of “high value” because they do not provide connections or continuity of habitat (see Wildlife Report, Amendment to Section I for details).

Roads (Issue 4)

Key Indicator: Open road density

The new construction would result in a short-term increase in open road density. However, the net result of all road work proposed in this alternative is a reduction in open road density on BLM-managed land from 4.04 to 3.25 mi/mi^2 in the analysis area (see Table 1). This would move the road density toward the target of 1.1 mi/mi^2.

Key Indicator: Impacts to wildlife

Overall, this alternative would provide a net benefit to wildlife, because of the amount of road decommissioning.

Alternative II would result in 1.9 miles of new road construction, of which 0.8 miles would be fully decommissioned and revegetated. Even though closed, the remaining 1.1 miles of decommissioned (but not revegetated) new road construction could continue to present partial barriers to species such as small mammals until the road surface revegetates and covers over with forest litter (perhaps 15-25 years). By breaking or weakening connections between habitats, these barriers limit the ability of certain wildlife to recolonize habitats and isolate populations making them more susceptible to local extirpation. Approximately 11.1 miles of existing roads would be decommissioned or closed, and open road density would fall to 3.25 mi/mi^2. The proposed reduction in open road density would result in less disturbance to wildlife, and should allow increased utilization of available habitat. A reduction in open road density could also decrease the amount of roadside down-log habitat removed through theft and roadside salvage. Aquatic species such as amphibians are not expected to be impacted by road-related sedimentation (Revised Section B of the Analysis File - Sediment Delivery).

New road corridors may take 20 years or more to reestablish trees that would close the canopy gap. However, most new road construction occurs within unit boundaries or in adjacent recent plantations. Only 200' of new road construction occurs through forest outside proposed unit boundaries (a young stand on adjacent private land); therefore, roads would not break forest corridors beyond the extent created by the proposed regeneration harvest units. In general, road decommissioning and the decrease in open road density (compared to Alternative I) would reduce harassment to wildlife. Barrier effects of existing roads would decrease in the long-term as decommissioned roads revegetate.

Cumulative Effects (Alt. II)

Landscape Pattern (Issue 1)

Key Indicator: Late-successional forest characteristics

Alternative II would result in a net loss of late-successional forests from the analysis area in the short and long term. No late-successional forests remain on private lands (based on photo interpretation), and none would develop if private lands continue to be harvested in short rotations. The harvest of 260 acres of late-successional habitat in this alternative would be partially offset in the long term by the treatment of 113 acres of young forest and a brush field in Riparian Reserves which would be treated to facilitate development of future late-successional forest characteristics (20 acres of riparian restoration projects from Jobs-In-the-Woods, EA No. OR120-98-12, and 93 acres of DMT from this alternative). The Coquille Indian Tribe is expected to harvest approximately 333 acres in the subwatershed within the next few years, most of which is late-successional forest. The BLM and Tribe harvest together would remove approximately 14% of the existing late-successional forest from the analysis area which would leave 22% of the analysis area (all ownerships) in forests greater than 80 years of age. The largest, most contiguous blocks of late-successional habitat and key late-successional habitat near the Coquille River would not be affected by Coquille Indian Tribe harvest. The overall percentage of late-successional forest in the analysis area would be expected to slightly decrease over the next 2-3 decades as the influx of new 80+ year old stands nearly offsets the loss due to harvest. After 3 decades, the overall percentage of late-successional stands would likely increase as many Reserve stands begin to enter the 80+ year age class (Big Creek WA).

Key Indicator: Habitat Connections

The Sandy Creek Analysis Area EA (No. OR128-96-21) included an assessment to harvest approximately 273 acres of late-successional forest adjacent to the northeast part of the Big Creek analysis area. With Alternative II, an additional 152 acres of late-successional forest would be harvested from this area; together these two actions remove 425 acres of late-successional forest from northeast Big Creek/northwest Sandy Creek. When other older harvests units are included, the result is nearly 2 mi^2 in early-successional stands less than 15 years of age along the shared boundary. This area, however, was identified in both the Sandy-Remote and the Big Creek Watershed Analysis as an area to concentrate harvest units in order to protect other areas of greater concern, such as interior habitats and late-successional forests adjacent to small LSRs.

The Coquille Tribe has proposed to regeneration harvest 333 acres in the analysis area. The Tribe's harvest, however, will not remove habitat from areas important for maintaining connections to adjacent subwatershed or from the Middle Fork Coquille River corridor. The Tribe's harvest does heavily fragment two late-seral stands (277 acres and 311 acres in size) which contain some interior habitats. The Tribe's harvest units, however, will not fragment or compromise connections between BLM interior habitats.

Habitat for dispersal and movement of spotted owls between large LSRs may be deficient in the Jones/Axe Creeks and Lower Big Creek areas. However, neither of these areas has significant harvest proposed by the Tribe or in Alternative II. Other areas in the analysis area appear to retain sufficient dispersal habitat after harvest by Alternative II and the Tribe. Other wildlife

species associated with late-successional forests are also expected to find adequate dispersal conditions in stands that accommodate spotted owl dispersal.

Mature and older forest connections between mainstem Big Creek and the surrounding uplands would continue to be weak if harvest practices on private land continue as they have in the past.

Contribute to the District's Allowable Sale Quantity (ASQ)(Issue 2)

Alternative II provides approximately 4.9% of the decadal ASQ commitment for the District. The 3,196 MBF from Connectivity (of the total 16, 549 MBF) provides approximately 24% of the expected Connectivity ASQ volume for this decade (see Tables E-1 & E-2, page E-9 of FRMP-ROD).

Riparian Reserve Functions (Issue 3)

Key Indicator: Large wood recruitment potential

Past harvest and stream cleaning activities have depleted large woody material and reduced the large wood recruitment potential on approximately half of the Riparian Reserve acreage. The proposed net Riparian Reserve reductions amount to 14 acres (0.3%) of Riparian Reserve in the analysis area, but is expected to maintain large wood recruitment to the affected streams, as discussed above. As illustrated in the Big Creek Riparian Reserve Evaluation (Figure C-4), the proportion of the Riparian Reserve with stands 160+ years of age is expected to increase from 2.2% at present to approximately 39% over the next 70 years This maturation of Riparian Reserves is expected to enhance future LWD recruitment over time. Density management treatments in the Riparian Reserves and the riparian restoration projects to be completed through Jobs-In-the-Woods are designed to further enhance LWD recruitment to streams on BLM-managed lands in the long term.

Key Indicator: Riparian dependent/associated species

Snags, a critical late-successional forest characteristic, will be created within approximately 100 acres of Riparian Reserves through a JIW project (1-2 snags/acre). Approximately 20 acres of hardwood forests in Riparian Reserves would also be treated to reestablish conifers under JIW. These actions, along with density management treatments in Riparian Reserves, would result in an overall long-term benefit to riparian dependent/associated species on BLM-managed lands, because development of late-successional habitat would be accelerated. Harvest units on Coquille Indian Tribe lands would retain Riparian Reserves consistent with the ACS. The availability of late-successional forest in Riparian Reserves is expected to remain fairly steady for 2 decades then increase gradually until all Riparian Reserve stands are in the 80+ year age class. The current Forest Practices Act prescribes less protection along streams than federal or Tribal lands; this may limit the value of riparian habitats on private lands (especially along lower Big Creek) and interrupt connectivity of higher-quality riparian habitat on BLM and Tribal land.

Roads (Issue 4)

Key Indicator: Open road density

There would be a net decrease in the road density within the analysis area on BLM-administered lands. Additional road closures and road improvements are expected to occur through other management activities, such as Job-in-the-Woods. The Coquille Tribe has also proposed to reduce open road density of Tribe-controlled roads in the analysis area. The combined activities further contribute to attaining the target road density on BLM and Tribe lands. Future timber harvest on BLM-administered lands in the analysis area may offer opportunities to close additional roads, further decreasing road density on public lands. However, overall open road densities in the analysis area may not decrease if new roads are constructed or opened on private lands.

Key Indicator: Impacts to wildlife

Road density on private lands may increase if new roads are constructed or old roads are reopened to facilitate harvest. Cumulatively, this alternative would provide benefits to wildlife above Alternative I, because there would be a net decrease in the overall number of roads in the analysis area.

Alternative III - Alternative Action

Direct and Indirect Effects (Alt. III)

Landscape Pattern (Issue 1)

Key Indicator: Late-successional forest characteristics

Alternative III would harvest substantially more late-successional forest than Alterative II, including some incipient old-growth forest. Some of this late-successional forest would be removed from the important Middle Fork Coquille River corridor. This alternative does capture some opportunities to facilitate development of late-successional forest characteristics in young and hardwood/brush stands.

This alternative would harvest 377 acres (10%) of late-successional forest in the analysis area, including 28 acres of incipient old-growth forest and 80 acres of late-successional forest along the critical Middle Fork Coquille River corridor. Approximately 9 acres (net) of late-successional forest would be permanently removed from Riparian Reserves through changes to Riparian Reserve boundaries. Post harvest, approximately 36% of BLM-managed lands in the analysis area would contain stands greater than 80 years of age and 24% would contain forests greater than 120 years of age. The percentage of old-growth forests in the analysis area would change by less than 1% (detailed information in Revised Table W-1, Amendment to Section I of the Analysis File).

The effects to Connectivity Blocks in the analysis area would be the same as Alternative II.

Changing Riparian Reserve boundaries would result in the net loss of approximately 22 acres of Reserves as compared to 14 acres in Alternative II. Otherwise, the potential for the analysis area to provide long-term late-successional forest would be similar to Alternative II.

Key Indicator: Habitat Connections

Alternative III removes late-successional forest from 1 of 3 important connection areas and captures some opportunities to facilitate long-term reestablishment of connections currently broken by young and hardwood/brush stands.

Some connections between uplands and riparian areas would be broken or constricted as a result of harvest. Two of the 3 existing important connecting areas identified in the Big Creek Watershed Analysis (p. 96) would be maintained; one would be weakened in the Anderson Mountain area where 80 acres (3 regeneration harvest units) would be removed.

Existing connections would slowly improve as young and mature stands develop, as the contrast between edges decreases, and as canopy gaps close. Conifer forest connections currently broken by brush/hardwood stands would reconnect as these stands are restored to conifers. Connections along Riparian Reserves on BLM-managed land would improve in the future (20+ years) as a result of the Riparian Reserve treatments in young conifer stands and reestablishment of conifer in a brush field. Connections broken by regeneration harvest units from this EA would begin to re-form as the canopy closes and matures 20 or more years in the future.

Contribute to the District's Allowable Sale Quantity (ASQ)(Issue 2)

This alternative would provide an estimated timber volume of 22,865 MBF, of which approximately 22,102 MBF would contribute to the District's decadal ASQ commitment (an estimated volume of 763 MBF is from density management in Riparian Reserves, which does not count toward the ASQ). Approximately 3,196 MBF (of the total 22,865 MBF) would contribute to the volume for the District that is expected to come from Connectivity. Approximately 245 acres (of the 704 total acres treated) would be commercially thinned and approximately 11 acres (of the total acres treated) would be density management thinned in the Connectivity. These treatment acres would provide additional harvest options in the future that would not be available if thinning of these stands was deferred. Approximately 17 acres (of the total acres treated) would be hardwood conversion and approximately 6 acres (of the total acres treated) would be brush conversion. These treatment acres would reestablish conifer for future management options.

Riparian Reserve Functions (Issue 3)

The modified Riparian Reserve network and treatments in Riparian Reserves were designed to adequately protect aquatic resources and meet the ACS objectives (detailed information is contained in Revised Section K of the Analysis File).

Key Indicator: LWD recruitment potential

This alternative would reduce Riparian Reserves by 22 (net) acres on fifteen stream segments as compared to 14 (net) acres on twelve stream segments in Alternative II. Total acres of density management treatment in Riparian Reserves would be the same as Alternative II. The direct and indirect impacts to large wood recruitment potential would be the same as in Alternative II.

Key Indicator: Riparian dependent/associated species

Overall impacts to riparian dependent/associated species would be higher than Alternative II.

This alternative would reduce Riparian Reserves by 22 acres (net), 9 of which are currently late-successional forests.

Riparian Reserve reductions would be scattered across the landscape in 7 units (as compared to 5 units in Alternative II), so they would be unlikely to compromise function for upland species, whose conservation is dependent on the Riparian Reserve network. The net reduction of 22 acres of Riparian Reserves represents 0.4% of the estimated Riparian Reserve acres in the analysis area.

EA Units 38 and 39 also contain potentially “high value” Riparian Reserves because of their potential to connect to the adjacent subwatershed and offer late-successional forest in the Middle Fork Coquille River corridor. In EA Unit 38, one side of a Riparian Reserve would be reduced to 110' to follow an existing road (approximately 2 acres of reduction); the Riparian Reserve reduction area would have been fairly ineffective for Riparian Reserve values since it was isolated from the rest of the Riparian Reserve network by the road. Additional reductions in Riparian Reserves in EA Unit 38 would be 6 acres on 2 intermittent streams. These 6 acres contain late-successional forest in the important Middle Fork Coquille River corridor which could potentially be used by bald eagles; although, it is not currently being used. The Riparian Reserve reduction in EA Unit 39 would affect a relatively insignificant area (approximately 1 acre of predominately alder) in a small part of an existing Riparian Reserve network which retained full interim Riparian Reserve widths.

All other impacts would be the same as Alternative II.

<u>Roads (Issue 4)</u>

Key Indicator: Open road density

The new construction impacts would be the same as Alternative II. There would be reduction in the open road density on BLM-managed land from 4.04 to 3.22 mi/mi^2 in the analysis area (see Table 1) which is slightly lower than in Alternative II. This alternative would also move the road density toward the target of 1.1 mi/mi^2.

Key Indicator: Impacts to wildlife

Overall, this alternative would provide similar net benefits to wildlife as Alternative II; more road corridors are created but additional roads are being decommissioned.

This alternative would result in 2.0 miles of new road construction, of which 0.8 mile would be fully decommissioned and revegetated. Even though closed, the remaining 1.2 miles of decommissioned (closed to traffic but not planted) new road construction could continue to present partial barriers to species such as small mammals until the road revegetates and covers over with forest litter (perhaps 15-25 years). By breaking or weakening connections between habitats, these barriers limit the ability of certain wildlife to recolonize habitats and isolate populations making them more susceptible to local extirpation. Approximately 11.7 miles of existing roads would be decommissioned or closed, and the open road density would fall to 3.22 mi/mi^2. The proposed reduction in open road density would result in less disturbance to wildlife, and should allow increased utilization of available habitat. A reduction in open road density could also decrease the amount of roadside down-log habitat removed through theft and roadside salvage. Aquatic species such as amphibians are not expected to be impacted by road-related sedimentation (Revised Section B of the Analysis File - Sediment Delivery).

Other impacts are the same as Alternative II.

Cumulative Effects (Alt. III)

Landscape Pattern (Issue 1)

Key Indicator: Late-successional forest characteristics

This alternative would remove 377 acres of late-successional forest in the short-term as compared to 260 acres in Alternative II. The BLM and Tribe harvest together would remove approximately 17% of the existing late-successional forest from the analysis area which would leave 22% of the analysis area (all ownerships) in forests greater than 80 years of age. Therefore cumulative impacts would be slightly higher than Alternative II. Other cumulative effects would be similar to Alternative II.

Key Indicator: Habitat Connections

This alternative would harvest 190 acres of late-successional forest from the northeast part of the analysis area as compared to 152 in Alternative II. Together with actions in the adjacent subwatershed (Sandy Creek), a total of 463 acres of late-successional forest would be harvested from northeast Big Creek/northwest Sandy Creek as compared to 425 acres in Alternative II. Alternative III removes dispersal habitat from the lower Big Creek area which appears deficient in dispersal habitat even before harvest. Timber harvest in Alternative III may reduce dispersal habitat availability to the point that spotted owls have difficulty dispersing across this area. Cumulative impacts would be slightly higher than Alternative II.

Contribute to the District's Allowable Sale Quantity (ASQ)(Issue 2)

Alternative III provides approximately 6.9% of the decadal ASQ commitment for the District. The Connectivity volume is the same as Alternative II.

Riparian Reserve Boundary Functions (Issue 3)

Key Indicator: Large wood recruitment potential

Past harvest and stream cleaning activities have depleted large woody material and reduced the large wood recruitment potential on approximately half of the Riparian Reserve acreage. The proposed net Riparian Reserve reductions amount to 22 acres (0.4%) of Riparian Reserve in the analysis area, but are expected to maintain large wood recruitment to the affected streams, as discussed above. As illustrated in the Big Creek Riparian Reserve Evaluation (Figure C-4), the proportion of the Riparian Reserve with stands 160+ years of age is expected to increase from 2.2% at present to approximately 39% over the next 70 years. This maturation of Riparian Reserves is expected to enhance future LWD recruitment over time. Density management treatments in the Riparian Reserves and the riparian restoration projects to be completed through Jobs-In-the-Woods are designed to further enhance LWD recruitment to streams on BLM-managed lands in the long term.

Other cumulative impacts would be the same as Alternative II.

Key Indicator: Riparian dependent/associated species
Same as Alternative II.

Roads (Issue 4)

Key Indicator: Open road density
Same as Alternative II.

Key Indicator: Impacts to wildlife
Same as Alternative II.

Other Environmental Effects

None of the EA units are in or near 1) Areas of critical environmental concern, 2) Farm lands, prime or unique, 3) Flood plains, 4) Wild and scenic rivers, or 5) Wilderness values. Therefore, none of the alternatives have impacts on these resources.

Common to All Action Alternatives

Air Quality

Prescribed burning would adhere to smoke management/air quality standards of the Clean Air Act and State Implementation Plan. This would mitigate the expected impacts.

Cultural Resource Values

The Big Creek Analysis Area has been the location of both prehistoric and historic cultural activities. Reported and recorded cultural resource locations are briefly described in the Big

Creek Watershed Analysis (page 134). None of these locations are within or in the vicinity of the harvest units covered in this document. Field reconnaissance did not reveal the presence of additional cultural resources. Therefore, this project is not expected to effect prehistoric or historic cultural resources. However, if any potential cultural resources are encountered during project-related work, all work in the vicinity should stop and the District Archeologist must be notified at once.

Native American Treaty Rights

The Big Creek Analysis Area is within the boundaries of traditional territory described for the Coquille Indian Tribe. Although the Coquille Indian Tribe signed two treaties with the United States (in 1851 and 1855), neither were ratified by the Congress, and so are not in force. In 1996, Congress created the "Coquille Forest", composed of fifty-four hundred acres of BLM-managed land in the vicinity of this analysis area. Four parcels of Coquille Forest land (comprising 1,047 acres) are found within this analysis area. The District has been involved with the Coquille Indian Tribe in the coordination of planned activities within the analysis area. None of the proposed alternatives are expected to affect Tribal uses.

Hazardous Materials/Solid Waste

No hazardous materials have been found to date in the action alternative units. Section R of the Analysis File contains the HazMat review. All Action Alternatives are subject to Federal and State regulatory guidelines for petroleum product use and storage. Spill Prevention, Control and Countermeasure Plans (SPCC) are required under the Oregon Forest Practices Act (Rule OAR 629-57-3600) and by Department of Environmental Quality (Rule OAR 340-108, inclusive). Spill containment capabilities on equipment sites are recommended.

Threatened and Endangered Species

The analysis area is within the range of four federally listed Threatened and Endangered Species: the northern spotted owl, marbled murrelet, bald eagle, and Oregon Coast coho salmon. In addition, Critical Habitat for northern spotted owls has been designated in the analysis area. Impacts to these species and Critical Habitat have been addressed in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. All mandatory terms and conditions from the Biological Opinions have been or will be incorporated in accordance with the Endangered Species Act.

Northern Spotted Owl

Regeneration timber harvest would remove suitable nesting, foraging, and dispersal habitat from within the home range of three of the known owl sites within or near the analysis area. Removal of habitat from within their home range exacerbates the critical condition of owl sites in the planning area and decreases site viability. The action alternatives of this proposal would result in a "May Affect, Likely to Adversely Affect" for the Northern Spotted owl, because habitat would be removed thereby reducing foraging and dispersal habitat. In addition, 83 acres (Alternative II) or 120 acres (Alternative III) of suitable habitat for spotted owls would be removed from designated Critical Habitat for spotted owls.

The conservation strategy for the Northern Spotted Owl within the Northwest Forest Plan relies primarily on a system of large reserve areas (LSRs), and maintenance of viable owl sites outside these reserves are not critical for the conservation of the species. Similarly, the LSR network and northern spotted owl Critical Habitat encompass nearly the same number of acres on the District (within < 0.5%).

Marbled Murrelet

Although all proposed harvest units and adjacent suitable habitat will have met the two year Marbled Murrelet survey protocol prior to harvest, the action alternatives of this proposal would result in a "May Affect, Likely to Adversely Affect" for the murrelet since the removal of potential future habitat that is currently unoccupied would preclude nesting in the future. If additional occupied behavior is detected, effected units will be dropped or harvest season will be modified as appropriate to comply with the results of consultation with the USFWS.

EA Unit 30 is within 0.25 mile of an occupied murrelet site; however, through informal consultation with the USFWS, we determined that full seasonal restrictions were unnecessary because only a small part of the occupied stand is within 0.25 mile of EA Unit 30. The majority of the occupied stand is > 0.25 mile from the unit and is insulated from harvest unit activities by a ridge. The unit does not affect existing habitat. All murrelet activity in the occupied site was located over 0.5 mile from the unit. The survey station located nearest the unit did not receive any murrelet detections. To lessen the chance of disturbing nesting murrelets, harvest activities should not occur April 1 - July 1.

EA unit 8 and 35 may require guyline anchors in the adjacent murrelet occupied site LSR. Three settings would be necessary requiring about 12 total guyline trees. Guyline trees would need to be felled as per OSHA regulations (and left on site). Field review of the sites suggest that relatively small, non-habitat trees exist that could be felled without appreciably affecting murrelet nesting habitat. Murrelet activity was not noted in the vicinity of potential guyline trees. In a letter dated July 27, 1999, the REO LSR working group concurred with the BLM's interpretation of the LSR Assessment (USDA-USDI 1998) that guyline trees for BLM harvest units could be felled in LSRs, as long as some precautionary guidelines are taken to avoid adverse impacts (which have been incorporated into Design Criteria).

Bald Eagle

No bald eagles are known to nest within or near the analysis area. Suitable habitat may be present along the Middle Fork Coquille River. Isaacs (personal communication) felt bald eagles historically nested along the river as far up as Remote. Nests averaged 0.5 mile from water in Oregon (see Section I of the original Analysis File). Effects to future bald eagle habitat were considered under the Landscape Pattern issue. Potential impacts to bald eagles will be consulted on and will meet the objectives outlined in the 1986 Recovery Plan for the Pacific Bald Eagle.

Coho Salmon

Big Creek is within the Oregon Coast coho salmon ESU. The approximate distribution of coho salmon habitat within the analysis area is illustrated in the Big Creek WA (Figure III.6-5). Units 26 (CT), 27 (Regen), 28 (CT) and 35 (CT) are the only proposed units adjacent to coho salmon habitat. Units 26, 28 and 35 (commercial thinning units) would have at least a 220' no-harvest buffer along the associated fish-bearing streams; Unit 27 (regeneration

harvest unit) would have a 440' no-harvest buffer along the associated fish-bearing stream. The proposed road construction would occur on stable benches and ridges with no stream crossings. Given the protection afforded by the Riparian Reserve and no-harvest buffers, consistency with the ACS objectives (see Revised Section K), conformity with the NMFS March 18, 1997 Biological Opinion, and the additional provisions of the design features, the impacts of action alternatives on coho salmon are expected to be limited to those associated with short-term turbidity from culvert work. The proposed actions are subject to formal consultation with the NMFS, and will be modified as appropriate to comply with the resulting Biological Opinion.

Survey and Manage Species

Red Tree Vole

Surveys for red tree voles are being conducted using the procedures described in BLM Instruction Memorandum No. OR-97-009. Surveys are planned to be completed by spring 2000. Management of currently known sites and new sites discovered during protocol surveys will follow the management recommendations provided in the aforementioned Instruction Memorandum or any future direction.

Del Norte Salamander

Protocol surveys for the Del Norte Salamander have been completed. Suitable habitat was searched but no Del Norte salamanders were located. The analysis area is approximately 13 miles north of the known range of the salamander.

Mollusks

According to latest guidance, surveys for Survey and Manage (S&M) mollusks will be required in the proposed harvest units. Protocol surveys are ongoing and appropriate management recommendations will be implemented on sites occupied by S&M mollusks prior to any ground-disturbing activities. The intent of these management guidelines is to ensure the local species persistence.

Vascular Plants, Bryophytes, Lichens, and Fungi

Surveys are required prior to ground-disturbing activities for any Survey and Manage Component 2 and Protection Buffer species. Surveys are only required for species whose ranges and habitats are known or suspected to occur within the analysis area. All proposed units will have surveys conducted for all species according to established protocols prior to ground-disturbing activities. These surveys are currently on-going and are expected to be done by spring of 2000. A summary of the species to be surveyed, their key habitat features and timing of surveys are provided in the Revised Section N of the Analysis File.

Surveys so far have located the following Survey and Manage Component 1-2 and Protection Buffer species: *Ulota megalospora* (bryophyte), *Diplophyllum albicans* (bryophyte), *Loxosporopsis corallifera* (lichen), *Helvella compressa* (fungi), *Gymnopilus punctifolius* (fungi), *Ramaria araiospora* (fungi), and *Ramaria aurantiisiccescens* (fungi). Management of these and any other Survey and Manage/Protection Buffer species will follow management recommendations. The intent of these recommendations is to ensure local species persistence. An up-to-date report summarizing survey efforts (dates surveyed, survey routes, etc.) is on file.

Noxious Weeds

Noxious weeds, such as Scotch broom, French broom, gorse, and tansy ragwort are currently scattered throughout the analysis area and occur primarily along roads and in disturbed areas. Any disturbance is likely to increase the chances of noxious weed infestation. The design features outlined in the action alternatives (i.e., washing of vehicles prior to entry and mulching/seeding) would help reduce the risk of noxious weed spread.

Sensitive Plant Survey

No negative impacts are expected to any special status plant species occurring within the analysis area. Surveys for those species suspected to occur within the analysis area is currently ongoing. If locations of special status plants are found, appropriate protection measures will be implemented. A description of the special status plant pre-field review is included in Revised Section N of the Analysis File.

Irreversible and Irretrievable Commitment of Resources

Some irreversible and irretrievable commitment of resources would result from the proposed actions. Crushed rock from quarries would be committed to reconstruction and construction of the road system. Energy used to grow, manage, and harvest trees, and in other management activities is generally irretrievable. Irreversible and irretrievable commitments as stated above are discussed in the Coos Bay District FRMP.

V. LIST OF PREPARERS

The following is a list of the Revised Big Creek Analysis Area EA Interdisciplinary Team members:

Core ID Team Members

Michael Kellett	Fisheries Biologist
John Guetterman	Wildlife Biologist
J. Michael Oxford	Forester/Team Lead

Other Contributors:

Dan Carpenter	Hydrologist
Jay Flora	GIS/ARD Coordinator
Steve Fowler	Silviculture
Nick Jansen	Fuels Management
Jim Kowalick	Silviculture
Paul Leman	Forester
Bruce Rittenhouse	Botanist
Stephan Samuels	Archeologist
Rod Smith	Engineering
Dale Stewart	Soil Scientist

Timothy Votaw	Environmental Protection Specialist
Dan Miller	Recreation Specialist