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Finding of No Significant Impact (FONSI)
for
Oxbow Riparian Silviculture Environmental Assessment
EA#OR-125-02-06

I. Introduction

The United States Department of Interior, Bureau of Land Management, Coos Bay District (BLM), has prepared an Environmental Assessment (EA) that analyzed potential impacts of applying silvicultural treatments (hardwood conversion and density management) within the Oxbow project area located in the Umpqua Resource Area.

The purpose of the proposed actions are to restore, enhance, and maintain ecological functions and biological productivity on the Coos Bay District by repairing human disturbed Riparian Reserves through silvicultural treatments

The EA evaluates the environmental elements impacted by the silvicultural prescriptions and the benefits expected to be derived from implementing the proposed actions. The EA also describes the project design features that will be incorporated in order to minimize the potential for adverse environmental harm to occur during the projects.

II. Background

The Coos Bay District (CBD) of the Bureau of Land Management (BLM) is under the direction of the *Coos Bay District Resource Management Plan* (RMP) and *Environmental Impact Statement* (EIS) and its Record of Decision (ROD)(BLM, 1995). The RMP and its' ROD are in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the range of the Northern Spotted Owl* and its ROD (Northwest Forest Plan [NWFP]) (Interagency, 1994). Through these documents, the BLM, in conjunction with other Federal land agencies, is directed to conduct watershed analysis (WA), and to implement restoration projects to aid in the recovery of water quality and aquatic, riparian, and terrestrial habitats.

As stated in the ROD for the NWFP, the Aquatic Conservation Strategy (ACS) was developed to maintain the ecological health of watersheds and aquatic ecosystems on public lands within the range of Pacific Ocean anadromy. The Environmental Consequences section of the EA describes the consistency of the proposed alternative with the ACS.

All Federal agencies are charged with managing programs to enhance the recovery of Federally listed endangered and threatened species and their habitats (Section 7(a)(1) of the Endangered Species Act). Implementing the proposed actions are expected to benefit numerous Endangered, Threatened, and Candidate species.

III. Finding of No Significant Impact

A careful review of the EA, which I herein adopt, indicates that there will not be a significant impact on the quality of the human environment from the implementation of any of the Action Alternatives. I agree with this conclusion and determined that an Environmental Impact Statement (EIS) will not be prepared. This determination is based on consideration of the following factors:

1. The proposed activities will occur in localized areas within the Riparian Reserves of the Upper Smith River Watershed located on the Coos Bay District. The proposed activities are not national or regional in scope.

2. The proposed activities will not significantly affect public health and safety. Best Management Practices incorporating spill kits and containment plans as described in the EA will minimize the risk. In addition, notifications in the event of a release threatening waterways are to be made in accordance with the BLM Coos Bay District Riparian Spill Plan, and Oregon DEQ Administrative Rule (OAR) 340-108, *Oil and Hazardous Materials Spills and Releases.*

3. The proposed activities will not have an impact on unique characteristics of the geographic area such as historical or cultural resources, park lands, prime farmlands, Port-Orford Cedar, wild and scenic rivers, ecological critical areas, or energy development. The project areas are located at previously disturbed sites, and the silvicultural prescriptions will restore the natural physical environment.

4. The effects on the quality of the human environment of the proposed activities are not highly controversial.

5. The possible effects of the proposed activities on the quality of the human environment are not highly uncertain and do not involve unique or unknown risk.

6. The proposed projects do not establish a precedent for actions with future significant effects or represent a decision in principle about a future consideration.

7. There are no significant cumulative effects identified by this assessment. Although there will be removal of vegetation within the Riparian Reserves, the potential impacts are eliminated by the implementation of no-treatment buffers.

8. The proposed activities will not affect districts, sites, highways, structures, or objects listed in, or eligible for listing in, the National Register of Historic Places. Nor will they cause a loss or destruction of significant scientific, cultural, or historical resources.

9. The proposed projects will fully comply with the Endangered Species Act (ESA) of 1973, as amended.

A Biological Assessment of the proposed actions will be reviewed by the U.S. Fish and Wildlife Service (USFWS) through the consultation process provided under Section 7(A)(4) of the ESA. The Biological Opinion will be available for review upon completion at the Coos Bay District Office of the Bureau of Land Management. Any recommendations made by the USFWS will be added to the final decision.

Based on analysis by the Fisheries Biologist, it has been concluded that the proposed actions constitute a “No Effect” to listed fisheries species and Essential Fish Habitat (EFH). Therefore, consultation with the National Marine Fisheries Service is not warranted. This conclusion further supports a Finding Of No Significant Impact.

10. There are no irreversible or irretrievable resource commitments identified by this assessment, except for a minor consumption of fossil fuels for routine operations.

11. The proposed activities will not violate Federal, State, or local laws imposed for the protection of the environment.

/s/ M. Elaine Raper — Date: June 13, 2002

M. Elaine Raper
Umpqua Area Manager
Coos Bay District
Bureau of Land Management

Oxbow Riparian Silviculture Project

Environmental Assessment
EA # OR-125-02-06
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Coos Bay District
Bureau of Land Management

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Chapter 1: Purpose of and Need for Action

1.1 *Proposed Action : Oxbow Riparian Silviculture Project*

The Bureau of Land Management, Coos Bay District, proposes to implement management activities in the Riparian Reserves within the 49,000[1] acre Oxbow project area. These management activities would begin in 2002 and continue yearly as needed.

Specifically, the Bureau of Land Management (BLM) proposes to apply approximately 323 acres of hardwood conversion and density management treatments in the Riparian Reserves.

The proposed project areas are primarily within the Riparian Reserve (RR) Land Use Allocation as designated by the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995). This Environmental Assessment (EA) OR125-02-06 addresses site specific, direct, indirect, and cumulative effects of this proposal.

1.2 *Need for the Oxbow Riparian Silviculture Project*

1.2.1 Diminishing Shade Component and Capacity for Large Woody Debris Recruitment

The Oxbow project area was heavily impacted from past harvest and road construction during and following the Oxbow Burn of 1966. Prior to these harvest and road activities, red alder was present within the Upper Smith River watershed, but was associated with bare soil areas created from streambank scouring, natural slumps or slides, and flood plains. Following the Oxbow Burn and subsequent harvest, affected lands received intensive reforestation. However, many stands within the Riparian Reserves have not responded to these silvicultural treatments. This has resulted in red alder, that was introduced by harvest and road construction activities ,quickly becoming established in these riparian areas. Most of the stands with a predominance of red alder are the result of reforestation failures as evidenced by historical photographs and the presence of conifer stumps. This has left many Riparian Reserves with an unnaturally high component of red alder.

The alder stands within the Oxbow are currently 30-45 years of age. These are expected to continue to grow until about age 90 years, followed by a rapid decline shortly thereafter. Few live alders will remain by stand age 130. Alder stands without a conifer component, but with a salmonberry shrub layer, would become brush fields. Salmonberry brush fields are unable to contribute wood to streams nor the forest floor. These brush fields would provide deep shade above narrow streams but would be unable to provide shade above wider streams. Salmonberry is highly competitive and once established, would exclude any other vegetation from becoming established. This would result in non-attainment of the myriad of benefits a healthy Riparian Reserve provides such as long-term shade, large woody debris, and dependant species habitat.

Those alder stands with a conifer component will slowly transition to a low-density conifer stand with very large individual trees. Without disturbance, a well-established shrub layer under this low-density conifer stand can preclude recruitment of under-story trees; thus, delaying attainment of the structural complexity

[1] All acre figures in this document are from GIS data. Minor acre discrepancies in this document, and the differences between GIS and traversed acres, are attributable to query sequence, rounding, the method used to resolve artifacts and slivers, and digitizing inconsistencies. No warranty is made by the BLM as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data.

associated with healthy late-successional forests.

Alder does produce some woody debris. However, alder's value for instream structure or terrestrial down wood habitat is short term because alder is not decay resistant, and it is comparatively weak, allowing it to more readily break under the force of high stream flows compared with Douglas-fir (Niemiec 1995).

1.2.2 Below Potential Growth of Existing Conifer Stands

The conifer stands within the Oxbow are currently 27 to 44 years of age. Most of the conifer stands reforested after harvest following the Oxbow Burn have been managed for timber production. Some have received active management with silvicultural treatments such as pre-commercial thinning, brush control, and fertilization to enhance growth and vigor. However, most of the conifer stands are very dense because they were not pre-commercially thinned, or have again reached the stem exclusion stage of development since being pre-commercially thinned.

Trees experiencing intense competition stress allocate less food to maintain or increase crown length and volume, root mass, and diameter growth. Trees with a small diameter to height ratio, small root masses and shallow crowns are highly susceptible to disease, bug infestation, and blowing down during wind events. The overall result from non-management of overstocked stands is the retardation of the attainment of the functions of the Riparian Reserve that are contingent on a large diameter tree component: large wood delivery to streams, down wood, and large snags.

1.3 *Objectives of the Oxbow Riparian Silviculture Project*

Objective #1 : Provide long-term shade and large woody debris by restoring human disturbed Riparian Reserves.

Objective #2 : Reduce potential competing hardwood seed sources.

Objective #3 : Maintain treated conversion units as needed.

The result of meeting these objectives would be the restoration of native vegetation within Riparian Reserves, establishment of future sources of large woody material, and economic opportunities would be offered to the public.

1.4 *Scope of This Environmental Analysis*

This section defines and explains the scope (boundaries/limits) of the Oxbow Riparian Silviculture Environmental Analysis. It briefly describes the history of the Oxbow project area, lists and explains the relevant planning documents, identifies the resource issues studied in detail, and identifies the issues eliminated from further study.

1.4.1 History of the Oxbow Planning Process

The Oxbow project area lies within the Umpqua Resource Area of the Coos Bay District, Bureau of Land Management. The Oxbow project area includes the Regional Ecosystem Office's (REO) Upper Lower Smith River 6th field watershed and portions of two other 6th field watersheds (Twin Sisters and Lower Upper Smith River). Initially, this started off as two different projects, Oxbow Density Management and Oxbow Riparian Restoration. After these scoping notices were released, it was decided to merge the two projects under one EA- Oxbow Riparian Silviculture.

The two Oxbow IDTs (Interdisciplinary Team) initiated public scoping (all contacts outside the BLM) in December 2001. The IDTs sent a letter/e-mail to 30 individuals, groups, organizations, or agencies. A full list of people, agencies, and organizations consulted appears in *Chapter 6 : List of Agencies and Persons Consulted and/or Provided Copies.* The general public was also informed through the Coos Bay District's *Planning Update*, the District's Internet Site, and a legal notice published in *The World* newspaper.

The merged team received only two responses. Using these two responses and the information gathered during internal scoping, the IDT identified three potential issues and developed three objectives for the proposed project. The issues are listed and explained in Section 1.4.3 below.

1.4.2 Relevant Planning Documents That Influence the Scope of This Environmental Analysis

This EA is tiered to the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995); which is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan)* and its Record of Decision (USDA-USDI 1994). This EA is also in conformance with the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (USDA-USDI 2001).

The Oxbow Riparian Silviculture EA is also consistent with the *South Coast / Northern Klamath Late-Successional Reserve Assessment* (USDA-USDI 1998); *Noxious Weed Strategy for Oregon/Washington* (USDI BLM 1994) and the *Western Oregon Districts Transportation Management Plan* (USDI BLM 2002). Actions described in this EA are designed to be 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* (USDA-USDI 1994).

1.4.3 Issues Studied in Detail

The Oxbow Riparian Silviculture IDT carefully considered comments received from the public and BLM resource specialists. The IDT determined that the following issues are relevant to the decisions that must be made concerning the Oxbow Riparian Silviculture Project. These issues directly influenced the technical design of the project.

Issue #1 : Effects to Water Quality - Temperature

As this project focuses on vegetation manipulation within Riparian Reserves, stream temperatures could be affected by over-story removal. The main stem Smith River and four smaller streams in the project area are currently listed by the Oregon Department of Environmental Quality for temperature.

Issue #2 : Effects to Water Quality - Sediment

As stated above, this project is located primarily within the Riparian Reserves. Ground disturbing activities and associated road use could increase the sediment generated within the watershed that could negatively impact streams.

1.4.4 Issues Eliminated From Further Study

The Oxbow Riparian Silviculture IDT eliminated the following issues from detailed study, as directed by CEQ regulation §1500.1(b), 1500.2(b) and other sections, because the proposed project would have no effect or cause only inconsequential effects to occur to these issues. No further information on these eliminated issues appears in this Environmental Assessment. However, the Project File contains reports dealing with these eliminated issues.

◻ *New Road Construction*

Issue : Avoid new road construction, especially in roadless areas and late-seral forests

Rationale for Elimination:
There will be no new road construction as a result of this project.

◻ *Leaving Surplus Trees On the Ground Within the Units*

Issue: Could trees that are deemed surplus be left on the ground within the stand after cutting?

Rationale for Elimination:
Douglas-firs are the most common tree species in the proposed thinning units and are the principal host for the Douglas-fir bark beetle. These beetles are able to detect stressed or downed trees over considerable distances, and could travel up to 5 miles to find a suitable brood tree (Don Goheen, forest pathologist, per com.). Leaving all cut trees would result in a sudden recruitment of approximately 60 to 450 or more tree boles per acre to the forest floor. Tree boles on the forest floor that are protected by a canopy provide highly favorable breeding habitat for the Douglas-fir bark beetle. A single event (blow down or thinning and leaving trees on the ground) can result in a bark beetle outbreak that kills green Douglas-fir and lasts about 4 years. Endemic and limited infestations of these beetles could benefit habitat diversity. However, the bark beetle's preference for infesting the largest trees in a younger-aged stand during an epidemic would cause a delay in the attainment of desirable habitat attributes such as green trees, large snags, and large down wood.

Besides attracting bark beetles, excessive amounts of wood left within conifer stands create an increased fire hazard, hinder regeneration, and impede the movement of some wildlife species.

1.5 *Decisions That Must Be Made*

The Field Manager of the Umpqua Resource Area, Coos Bay BLM, must decide whether to conduct riparian silviculture projects within the Oxbow planning area. These projects are described in detail in Section 2.5.2.

The Field Manager must also determine if the selected alternative would or would not be a major Federal action, significantly affecting the quality of the human environment. If the Manager determines it **would not** significantly affect the quality of the human environment, then the manager can prepare and sign a FONSI (Finding of No Significant Impact).

If the Manager determines that the selected alternative would significantly affect the quality of the human environment, then the project must either be dropped, modified or have an EIS (Environmental Impact Statement) and a ROD (Record of Decision) prepared and signed before the Oxbow Riparian Silviculture Project could proceed.

Chapter 2: Alternatives Including the Proposed Action

2.1 *Introduction*

This chapter describes the activities of the No-Action Alternative and one Action Alternative. Then based on the relevant resources described in Chapter 3: Affected Environment and the predicted effects of the alternatives in Chapter 4.0: Environmental Consequences, this chapter briefly summarizes the predicted attainment of project objectives and the predicted effects of the alternatives on the quality of the human environment.

This chapter is composed of the following six major sections:

- History and Process Used to Formulate the Alternatives
- Alternative Design, Evaluation, and Selection Criteria
- Alternatives Considered But Eliminated From Further Study
- Description of Alternatives
- Description of Relevant Past, Present, and Reasonably Foreseeable Actions Related to But Not Part of the Oxbow Riparian Silviculture Project
- Summary of the Activities, the Predicted Achievement of the Project Objectives, and the Predicted Environmental Effects of Alternatives A and B

2.2 *History and Process Used to Formulate the Alternatives*

The Oxbow IDTs (Interdisciplinary Teams) initiated internal and public scoping in December 2001 to develop the Oxbow Density Management project and the Oxbow Riparian Restoration project. The IDTs sent a letter/e-mail to 30 individuals, groups, organizations, or agencies (Chapter 6). During the scoping process, it was decided to merge the two teams into the Oxbow Riparian Silviculture project. The merged team received only two responses (contained in the analysis file). Using these responses and the three issues developed during the internal scoping, the IDT designed Alternative B: Oxbow Riparian Silviculture Project to satisfy the needs and meet the objectives of the project, as described in section 2.5.2 below.

The IDT did not develop other alternatives because it determined during the analysis process that Alternative B resolves to an acceptable degree all of the identified issues.

2.3 *Alternative Design, Evaluation, And Selection Criteria*

The Umpqua Area Manager and the IDT have identified the following criteria with which to design and evaluate the Oxbow Riparian Silviculture project and with which to make an alternative selection decision.

2.3.1 Management Directions For the Oxbow Riparian Silviculture Project (ROD/RMP pages 12-17, D-2, and E-8)

The Oxbow Riparian Silviculture project lies within the boundaries of the Coos Bay District and is comprised almost entirely of the Land Use Allocation (LUA) of Riparian Reserves. From the ROD/RMP, the team reviewed the desired future condition, goals, and standards for Riparian Reserves and identified the following project-area directions:

- Watershed Analysis will precede forest activities in a Riparian Reserve (USDI BLM 1995, USDI BLM 2002).

- An ID Team, including a soil scientist and/or a hydrologist, will review all proposed activities that have potential to adversely impact soil or water.

- Apply silvicultural practices for Riparian Reserves to control stocking, re-establish and manage stands, and acquire desired vegetation characteristics needed to attain the Aquatic Conservation Strategy objectives.

- Stands where portions of young, even-aged conifer plantations are located within the Riparian Reserves would be considered for density management treatments. The objectives of such treatment would be to promote development of large conifers, to recruit large woody debris, to increase diversity of species, increase variation in stand density, and to improve forest health.

- Where hardwood stands dominate streamside areas and there is a lack of large conifers to provide inputs of large wood for instream structure, efforts would be made to re-establish conifers within the Riparian Reserve.

- Naturally-occurring down logs and snags would not be removed from Riparian Reserves except for the benefit of the stream or Riparian Reserve.

- Merchantable logs would be removed where such action would not be detrimental to the purposes for which the Riparian Reserves were established.

2.3.2 Oxbow Riparian Silviculture Project Objectives

- Provide long-term shade and large woody debris by restoring disturbed Riparian Reserves

- Reduce potential competing hardwood seed sources

- Maintain treated conversion units as needed

2.4 *Alternatives Considered But Eliminated From Study*

Alternative B : Oxbow Riparian Silviculture Project went through several reversions until it reached its present proposed configuration. Some initially identified units were eliminated from further study because they did not satisfactorily fulfill the need as stated in Section 1.2 or because they did not comply with the design criteria listed in Section 2.3. In various ways and degrees, these design iterations dealt with the **objectives** listed in Section 1.3 and the **issues** listed in Section 1.4.3. Issues that were eliminated from further study are located in Section 1.4.4.

2.5 *Description of Proposed Alternatives*

2.5.1 Alternative A: No Action

- Under this alternative, the project area would receive no treatment. There would be no thinning to reduce densities in overstocked stands, nor would conifers be restored on sites where they have been replaced by red alder.
  - The alder stands would continue along their current stand development trajectory. When the alders start to decline, after stands reach the age of 90 years, salmonberry will begin to replace the alder as the dominant streamside vegetation. This would result in a permanent reliance on human intervention to supply large wood to the stream reaches currently dominated by alder.
  - Conifers in overstocked stands would continue to compete for limited growing space resulting in suppression mortality and/or reduced growth rates and vigor. This would delay attainment of large diameter trees that would contribute large wood within the Riparian Reserve.
  - The overstocked condition would delay attainment of diverse understory tree, shrub, and herb layers. This, along with reduced tree growth rates, would retard achievement of late-successional characteristics by decades.

2.5.2 Alternative B: Oxbow Riparian Silviculture Project

- On approximately 75 acres, hardwoods would be removed in an effort to convert these areas back to conifer dominated stands.
- Hardwood stands that have been treated would be replanted with the appropriate conifer species mix to maintain species composition diversity.
- Planted areas would be maintained as needed to allow the planted conifers to become established.
- Approximately 248 acres are over-stocked conifer or mixed stands. These would be thinned to allow for improved growth and vigor of the stand.
- Surplus trees from the projects would be offered commercially.

The following table shows the currently identified project areas, the proposed treatment action for each unit, acreage, and the acreage that falls outside of the Riparian Reserve Land Use Allocation (LUA). In designing some of the units, it was necessary to expand unit boundaries outside of the Riparian Reserve. Units that would have mixed treatments (both hardwood conversion and density management) would be classified under "Density Management" for tracking purposes.

Table 2.1 : Proposed Oxbow Riparian Silviculture Project Areas

Project Area	T. R. S.	Proposed Activity	Acres Total	LUA*	Non-Riparian Reserve acres
1	20-8-9	Hardwood Conversion	10	GFMA	2
3	20-8-9	Hardwood Conversion	11	GFMA	
4	20-8-9	Density Management	9	GFMA	
5	20-8-13	Density Management	23	GFMA	
8	20-8-21	Hardwood Conversion and Density Management	9 -HC 9 -DM	GFMA	
9	20-8-27,28	Density Management	31	GFMA	
10	20-8-28	Density Management	25	GFMA	

Project Area	T. R. S.	Proposed Activity	Acres Total	LUA*	Non-Riparian Reserve acres
14	21-8-5	Hardwood Conversion and Density Management	2 - HC 15 - DM	CON	
15	21-8-2	Hardwood Conversion and Density Management	7 - HC 19 - DM	LSR	3
16	21-8-1	Density Management	13	LSR	2
19	21-8-1	Hardwood Conversion	1	LSR	
20	21-8-1	Hardwood Conversion	8	LSR	
21	21-8-12 21-7-7	Density Management	40	LSR	1
22	21-8-11	Hardwood Conversion and Density Management	7 - HC 9 - DM	LSR	2
23	21-8-9	Hardwood Conversion and Density Management	9 - HC 27 - DM	GFMA/LSR	2
27	21-8-11	Density Management	30	LSR	16
29	21-8-19	Hardwood Conversion	4	GFMA	
31	20-9-25	Density Management	5	CON	1

*LUA : Although the projects are within the Riparian Reserves, this is the underlying LUA for that location.

2.5.2.1 Project Design Features - Alternative B

<u>Design Features Applicable to All Units</u>

- If Threatened and Endangered (T&E), Survey and Manage (S&M), Special Status, or Protection Buffer plant, animal, or fish species are found within the units, management guidelines for the species would be implemented. Contracts will include a standard T&E species stipulation.

- Consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Service (NMFS) for some of the units may be required before the decision is signed.

- Incorporate all applicable Project Design Criteria including seasonal or daily timing restrictions, and the Terms and Conditions from the USFWS Biological Opinion.

- Contracts would require appropriate provisions for the disposal of wastes and handling of hazardous materials. State of Oregon Department of Environmental Quality (ODEQ) and Forest Practices guidelines for spill prevention will apply to all contracts.

- Native American Grave Protection and Repatriation Act Notification Requirements (43 CFR Part 10; IM OR-97-052) would be followed. If any cultural materials are encountered during the project, all work in the vicinity would stop and the District Archaeologist would be notified at once.

Table 2.2: Project Area Timing Restrictions

Project Area	Wildlife Seasonal Restriction	Fish/Soil Restrictions	Timber Restrictions
1	4/1-8/5, Then DTR [1]	Dry Season Only [2]	None[3]
3	4/1-8/5 Then DTR	Dry Season Only	None
4	None	Dry Season Only	No falling 4/1 - 6/30
5	None	None	No falling 4/1 - 6/30
8	None	Dry Season Only	No falling 4/1 - 6/30
9	None	None	No falling 4/1 - 6/30
10	None	None	No falling 4/1 - 6/30
14	4/1-8/5 Then DTR	None	No falling 4/1 - 6/30
15	None	None	No falling 4/1 - 6/30
16	4/1-8/5 Then DTR	None	No falling 4/1 - 6/30
19	4/1-8/5 Then DTR	Dry Season Only	None
20	4/1-8/5 Then DTR	Dry Season Only	None
21	4/1-8/5 Then DTR	Dry Season Only	No falling 4/1 - 6/30
22	4/1-8/5 Then DTR	Dry Season Only	No falling 4/1 - 6/30
23	4/1-8/5 Then DTR	None	No falling 4/1 - 6/30
27	4/1-8/5 Then DTR	None	No falling 4/1 - 6/30
29	None	Dry Season Only	None
31	4/1-8/5 Then DTR	Dry Season Only	No falling 4/1 - 6/30

[1]DTR= Daily Timing Restriction for Marbled Murrelets
[2]The Dry Season generally runs from July 1 thru October 15. Soil moisture readings will be used.
[3]These restrictions are to protect bark during high sap flow periods.

Existing Stand Conditions

- Existing snags would be reserved from cutting except those deemed safety hazards. Any snags felled or accidently knocked over would be retained on site.

- All existing down logs in Decay Classes 3, 4, and 5 would be reserved.

- Retain all willows exhibiting a single-stem tree form, dense willow thickets, and all cottonwoods to maintain species diversity and provide a seed source for these species.

Down Wood

- Up to three trees per acre would be cut and retained for down wood material in specified units. The trees recruited for down wood would be selected from among those trees in the mid-size diameter ranges left on the site after thinning. The largest trees would not be recruited for down wood because selecting those trees would mean killing the trees best adapted to the site and by that cause a negative impact on the natural population. The following table has the specific down wood prescriptions for each unit.

▫ In hardwood conversion units where bigleaf maple stems are cut as the result of single stemming maple clumps, maple boles would be preferentially retained for down wood recruitment. In density management units dominated by conifer, conifer boles would be preferentially retained for down wood recruitment. In mixed stands, the preference for the tree species recruited for down wood habitat would be conifers first, bigleaf maple second (if available as the result of single stemming maple clumps,) and red alder last.

Table 2.3 Down Wood Treatment

Unit Number	proposed activity*	Down Wood Treatment
1	HC	Leave 3 downed hardwood trees/ acre - big leaf maples when available. Diameter of trees selected for CWM will be determined from the cruise data.
3	HC	Leave 3 downed hardwood trees/ acre - big leaf maples when available. Diameter of trees selected for CWM will be determined from the cruise data.
4	DM (mixed stand)	Leave 3 downed trees /ac: species preference is for conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
5	HC & DM (mixed stand)	Leave 3 downed trees /ac: species preference is for conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
8	HC & DM	Leave 3 downed trees /ac: species preference is for conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
9	DM	None. Ongoing CWD recruitment occurring around laminated root rot pockets. The chronic mortality associated with the root rot pockets is likely supporting locally elevated bark beetle populations.
10	DM	Leave 3 downed conifer/ac: diameter of trees selected will be approximately equal to the average diameter of the leave trees.
14	HC & DM	Leave 3 downed conifer/ac: diameter of trees selected will be approximately equal to the average diameter of the leave trees.
15	HC & DM	Leave 3 downed trees /ac: species preference is for conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
16	DM	None. Ongoing CWD recruitment occurring around laminated root rot pockets.
19	HC	Leave 3 downed hardwood trees/ acre - big leaf maples when available. Diameter of trees selected for CWM will be determined from the cruise data.
20	HC	Leave 3 downed hardwood trees/ acre - big leaf maples when available. Diameter of trees selected for CWM will be determined from the cruise data.
21	DM (mixed stand)	Leave 3 downed trees /ac: species preference is for conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
22	HC & DM	Leave 3 downed trees /ac: species preference: conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
23	HC & DM	Leave 3 downed trees /ac: species preference: conifer, maple, then alder. Diameter of trees selected will be approximately equal to the average diameter of the stand.
27	DM	Leave 3 downed conifer/ac: diameter of trees selected will be approximately equal to the average diameter of the leave trees.
29	HC	Leave 3 downed hardwood trees/ acre - big leaf maples when available. Diameter of trees selected for CWM will be determined from the cruise data.
31	DM	None. Ongoing CWD recruitment occurring around laminated root rot pockets.

* HC = Hardwood conversion, DM = Density Management

Douglas-fir Bark Beetle Management

- Limit the aggregate recruitment of new Douglas-fir down wood to three per acre or less, when recruiting down logs by killing green trees that are 10-inches dbh and greater.

- Forgo recruitment of new Douglas-fir down logs near known laminated root rot centers. Currently, these would be Units 9, 16, and 31.

- Either forgo or delay recruitment on large Douglas-fir debris if bark beetle populations have built up in the general project area because of large amounts of recent blowdown.

Tree falling

- Trees in skyline cable yarding corridors would need to be cut to facilitate operating a cable yarding system. Trees would be required to be directionally felled into the lead of cable yarding corridors.

- Skyline thinning corridors would be required to be a maximum of 12 feet wide. The location, number, and width of cable yarding corridors would be specified prior to yarding, with natural openings used as much as possible.

- Trees that must be felled within the no-harvest buffer along intermittent streams to provide yarding corridors would be required to be felled toward the stream channel and retained on site to provide bank armoring and coarse woody debris.

- Trees expected to be removed in thinning units would be required to be limbed, topped, and cut into log lengths not exceeding 40 feet prior to yarding.

- Provided there are no seasonal restrictions for T&E species, falling in density management units would be permitted only from July 1 to March 31 to avoid bark damage.

- Within safety standards, all trees would be directionally felled away from roads, posted boundaries, orange painted reserve trees, riparian areas, undeveloped camp sites, and snags.

Yarding

- Units would be required to be harvested with a skyline cable system. A skyline cable system could be permitted to operate during the wet season provided other resources are not affected, i.e. soils and water quality.

- A skyline cable system with 75 foot lateral yarding capability would be required.

- Operations would utilize full suspension where feasible. If this is not possible, one-end suspension would be utilized.

- Yarding corridors would be placed to avoid streams and if yarding is to occur over a stream, full log suspension would be required to protect stream banks. In situations where full-log suspension is not feasible across stream channels with visible surface flow, one-end suspension would be required and the timing for yarding would be limited to the dry season and corridors will be designed as perpendicular to the stream channel as possible.

- There would be no yarding corridors in any fish bearing stream reach.

- Distance between skyline corridors would be required to be a minimum of 150 feet apart at the tailhold end of the yarding corridor.

□ Avoid downhill yarding on steep slopes. Downhill yarding would occur in Unit #3 and operations would be limited to the dry season. Erosion control measures would be used if needed prior to onset of winter rains.

Hydrology

□ Operations within potential flood prone areas, such as Units 4, 19, 20, 21, and 29 would be limited to dry season entry.

□ During rain events delivering more than 1 inch/12 hours, hauling activities would cease on gravel surfaced roads (Unit 23). This will prevent sediment from being generated from haul activities on road surfaces during heavy rain events and reaching stream channels.

□ Where wetlands are encountered, such as in Unit 10, they would be managed according to standards outlined in BLM policy, including the RMP, Executive Orders 11988 and 11990, BLM's *Riparian-Wetlands Initiative for the 1990's*.

□ Full suspension would be utilized when crossing wetland areas during soil saturation. If full suspension cannot be obtained, operations would be restricted to the dry season.

No-Harvest Buffers

□ Thinning and hardwood conversion areas in the Riparian Reserves would have variable no-harvest buffers for all streams within and adjacent to proposed units. No trees would be cut that are located within 20 feet of a stream bank, or within 20 feet of an identifiable topographic break near the bank (generally, the top of the inner gorge), or within 20 feet of the high water level, whichever is greater. For intermittent streams, generally first and second-order streams, no-harvest buffers would be 20 feet for bank stability. Maintaining shade above intermittent streams is less critical than for perennial streams because there is no water in intermittent streams during the time of the year when water temperature is a concern.

□ Buffers for perennial streams, third order and greater, would be determined by site conditions and would be no less than 20 feet for bank stability. The no-harvest buffers would maintain existing canopy closure directly over the stream channel by leaving trees within the designed width. If there are no trees along a reach within the designed no-harvest buffer width, the buffer would be expanded to include trees that do provide overhead shade to the stream if such trees are present.

□ The SHADOW model (Park 1993) was used to estimate the width of existing primary shade in riparian areas along streams in the Oxbow project area. The SHADOW Model provides horizontal distances at which those trees that provide (primary) stream shade during the time when the sun's energy is at its highest, from 11:00 a.m. to 1:00 p.m. Trees that provide primary shading are valuable shade trees to prevent solar heating during the lowest flow periods, generally August 1. The SHADOW model consists of sub-programs for solar, shade, and stream temperature.

The solar sub-subprogram uses solar physics equations, developed by Qugley (1981, as cited by Park 1993) to enter the hour angles. August 1 is the model default date and represents the date with the greatest heat-loading potential for low stream flows in the Pacific Northwest. The SHADOW model calculates the angle of the sun above the southern horizon on August 1 for the 180 degrees between east and west. The program then calculates the zenith and azimuth angle of the sun for each hour of the day from 8 a.m. to 4 p.m.

The shade sub-program uses the solar outputs along with inputs for current tree height, terrain slope, and stream orientation to calculate the width of the forested ground that provides shade to a stream. Consequently, the widths of the no-harvest buffers indicated by the SHADOW Model vary with different combinations of slope, the heights of trees that can cast a shadow on the streams, and direction of stream flow.

The SHADOW Model indicated the widths of no-harvest buffers for units analyzed in the Oxbow to range from 47-feet, for streams most vulnerable to being exposed to direct sunlight by streamside cutting, down to zero, for units where cutting would be confined to the side of the stream opposite of trees and topography that provide all the shade to the stream. The no-harvest widths, for each unit, are shown in the table below.

A minimum 20-foot wide buffer would be applied on those reaches that the model predicted would not be exposed to direct sunlight by the proposed treatments. No-harvest buffers would maintain the pretreatment level of canopy closure directly above the streams.

Table 2.3 : No-Harvest Buffers by Unit

Unit Number	Stream Name(s)	Horizontal Buffer (ft)
1	North Sisters Tributary	20
3	North Sisters and North Sisters Tributary	20
4	North Sisters and North Sisters Tributary	39
5	South Sisters Creek, Bum Creek, and four side tributaries	37
8	Smith River and Smith River tributary	24
9	Smith River and Smith River tributary and Devil's Club Creek	25
10	Smith River and two Smith River tributaries	42
14	Big Creek, Argue Creek, and three Argue Creek tributaries	44
15	Grunt Creek and two tributaries	20
16	Smith River	30
19	Smith River	45
20	Smith River, Halfway Creek, and two Halfway Creek tributaries	20
21	Halfway Creek and ten Halfway Creek tributaries	37
22	Quarry Creek and three Smith River tributaries	20
23	Smith River, Smith River tributary, Mosetown Creek, and four Mosetown Creek tributaries	29
27	Five West Fork Halfway Creek tributaries	20
29	Big Creek and two Big Creek tributaries	47
31	Smith River	40

Noxious Weeds

- To eliminate the introduction or spread of noxious weeds from other areas, all off-road vehicles and machinery would be high pressure washed prior to entering BLM lands.

- If a contractor is awarded more than one unit, they would start in the weed free unit first and complete the contract at the most infested units if feasible.

- Disturbed bare ground resulting from activities would be seeded with weed free native grasses, if available, or the District's standard seed mix, and mulched with weed free mulch and/or fertilized.

Mobile Equipment Entry

□ Vehicles and machinery would stay within the road right-of-way. Only machinery specifically designed to operate within units (e.g. mechanical harvesters) would be allowed off the road right-of-way

□ None of the identified units are to be ground based harvested. If ground-based equipment entry is warranted, it would be restricted to soil moisture that is below the identified plastic limits and to utilize areas with heavy slash cover. The soils resource specialist would be consulted prior to such entry.

Roads

□ Access to most units for harvest and log hauling would be from existing asphalt roads or good rock surfaced roads. Existing roads are controlled by BLM, or BLM has rights to use existing roads or construct roads under reciprocal road R/W agreements.

□ Some roads are proposed to be upgraded prior to implementation of this project. These upgrades would occur under funding from another source and are not directly tied to this project. If this alternative funding occurs, Units 1, 3, 4, 5, and 23 will be initiated after these upgrades are completed. If this funding is not secured, these unit roads will receive maintenance (see below) and be restricted to dry season haul only.

□ Some roads would require light renovation and/or improvement. Road renovation would consist of returning existing roads back to their original standard of construction. It could include clearing brush/trees, restoring proper drainage, grading, or other light maintenance. Some of the rock surfaced roads would allow cable harvesting and hauling during the wet season. Road improvement would consist of raising the current standard of a road with some capital improvements. Improvements may include but are not limited to: surfacing existing dirt roads or adding rock to existing rocked roads.

□ Maintenance may include but is not limited to: grading to remove ruts, removal of bank slough, placement of silt trapping straw bales, placement of water bars, and adding gravel lifts where needed, such as stream crossings and soft spots in the road surface. Existing roads would be maintained during the life of the project to minimize road drainage problems and possible road failures. Maintenance on BLM asphalt and major rock surfaced roads, would be performed by BLM road maintenance crews. Maintenance on less traveled roads may be required of the purchaser. Units 14, 15, 20, 21, 22, and 27 would require maintenance prior to entry.

□ Dirt surfaces, such as roadside landings or poorly surfaced roads, would receive seasonal preventative maintenance before the onset of winter rains each year prior to the contractor leaving the project area during non-hauling periods. Seasonal preventative maintenance may include, but is not limited to cross-ditching, removing ruts, mulching, and barricades. Bare soil areas would be mulched and seeded with native plant species, if available, and fertilized. If native seed is unavailable, any bare road surfaces would be seeded with an approved District seed mix. Unit 14 has a dirt surface spur that would receive this seasonal preventive maintenance.

□ Road renovation/improvement would be required in the dry season to protect streams.

□ Roads may be used as continuous landings. Extra pullouts may need to be constructed to facilitate the safe operation of equipment. Constructed landings would be limited to existing road prisms.

Landing Pullback

□ Overhanging logging debris around all landings would be required to be pulled back onto the landing prior to the removal of equipment. Material would be placed in a stable location.

Fire Pump Chances

□ Natural surface pump chances would need to be surfaced with rock to prevent sedimentation, as found in Unit 31.

□ For accessible pump chances, cut trees and other vegetation from the inner edge of the access roads.

□ Improve existing or install new signs indicating pump chance locations.

Hazard Reduction

□ Hand or machine pile all slash ½" to 4" in diameter and greater than 2 feet in length within 20 feet each side of those roads within harvest areas not identified for closure after harvest. Hand pile slash within a 150 foot radius of campsites or within 50 feet of designated no cut buffers around campsites. Cover piled slash with black plastic and burn during late fall and winter months.

□ Landing piles resulting from cable yarding operations would be located a sufficient distance away from leave trees to eliminate scorching when burning. Cover with black plastic and burn during late fall and winter months.

□ Where possible, burn piles would be located a sufficient distance away from existing snags and down wood to eliminate fire charring.

□ Compliance with applicable Oregon State fire laws and the Oregon Smoke Management Plan (ODF 1992) would be required.

Recreation

□ Provide information to the public through signs or maps (off-site and/or on-site) regarding temporary road closures or detours prior to performing work and/or during work in the proposed project area.

□ Maintain the corresponding pre-treatment characteristic (i.e. walk-in or vehicle) of public access to the existing undeveloped, dispersed recreation sites after work is performed in the proposed project area.

Monitoring

□ Monitoring would include road renovation inspections, project operation inspections, and noxious weed monitoring. Monitoring would also consist of silvicultural inspections of planting and stand maintenance following regeneration harvest and site preparation until the trees are free to grow. Site monitoring for solid and hazardous waste would be performed in conjunction with normal contract administration.

Conifer Thinning or Conifer Release Prescription

□ The conifer stands within Riparian Reserves would be thinned by removing the less thrifty trees which would leave approximately 90-130 of the healthier stems per acre. The prescription for individual stands will vary depending upon stand age and initial density.

□ Western redcedar and many of the large scattered hardwood tree species, especially bigleaf maple, would be reserved to maintain species diversity.

□ Thin through mixed conifer-alder stands, where the areas occupied by alder are too small to constitute a practical alder conversion unit. Select against the red alders in these units by favoring conifers, bigleaf maple, cottonwoods and other hardwoods.

Hardwood Stand Conversion Prescription

▫ Red alder stands in the Riparian Reserves would be cut and removed either in conjunction with the thinning operations, or as separate regeneration harvest units.

▫ Scattered individual healthy conifers that are dominants, or are understory trees and can respond to release would be reserved. Small dense clumps of conifer occurring within some of the red alder stands would be thinned to improve their growth and vigor.

▫ Prune stump-sprouted bigleaf maple clumps to encourage the dominance of a singe stem.

▫ Retain some dense pockets of bigleaf maple where the number of maple trees would make conifer establishment difficult.

▫ Cut brush and small red alders in a way that leaves the shortest practical stump (4 inches or less), where cutting vegetation competition is necessary to provide growing space.

▫ Reduce the need for frequent re-treatments to control alders by including all the contiguous alder patches inside the conversion unit.

▫ Modify unit boundaries to include all alders directly adjacent to units that pose as a potential seed source. This may include land with a LUA different from Riparian Reserves.

▫ Whole tree yarding or gross yarding of logging residue would reduce site preparation activities post-harvest. This would increase slash/fuel loading on landings and may require relocation of slash off site. Any piles generated from this yarding would be covered with black plastic and burned in the late fall and winter months.

<u>Site Preparation</u>

▫ Multiple site preparation options exist and depending upon anticipated post-harvest site conditions, the most appropriate and effective method or combination of methods listed below would be used to achieve the desired goals:

Gross/Whole Tree Yarding - Conversion units would be gross/whole tree yarded in whole or in part, to aid in preparing the site for planting. In addition to gross/whole tree yarding, areas of units receiving that treatment would also have leftover, broken tops, and all undesired vegetation (brush, non-commercial hardwoods, prostrate conifers) slashed and lopped during or after harvest. Cover the piled slash with black plastic and burn during fall /early winter months.

Hand Piling and Burning - Slash and lop existing undesired vegetation (brush, non-commercial hardwoods, prostrate conifers) during or after harvest, then hand pile all slash ½" to 4" in diameter. Cover the piled slash with black plastic and burn during fall /early winter months.

Jackpot/Swamper Burning - This would be an allowable substitute for hand piling where fuels are unevenly distributed in spotty but heavy concentrations. Jackpot/swamper burning involves covering heavy fuel concentrations with plastic and then burning those concentrations out during the fall/early winter months. Swampers would attend to the burning and create additional planting spots as needed by throwing (swamping) additional slash from the surrounding area into the burning concentrations. Additional saw work would be done as needed to facilitate swamping.

Slash, Lop and Scatter - This process involves using chainsaws to slash existing undesired vegetation (brush, non-merchantable hardwoods, and prostrate conifer) and to de-limb tops of trees left in the units. The slash generated from operations would be scattered sufficiently reduce fuel concentrations and to allow easy access to the ground for reforestation efforts. This is similar to the first method described above but would stand alone for units that do not have gross/tree whole yarding.

- After site preparation, units would be planted with Douglas-fir and shade tolerant species such as western hemlock and western redcedar. In areas subject to seasonal saturated soils, use a high proportion of western hemlocks and western redcedars.

- Grand fir could be added to the planting mix for sites with seasonally saturated soils or partial shade in those parts of the forest where grand fir naturally occurs.

- If suitable cottonwood planting stock can be procured, plant these in stream side areas suitable for cottonwood growth.

2.6 *Description of Relevant Past, Present, and Reasonably Foreseeable Actions Related but Not Part of the Oxbow Riparian Silviculture Project*

Roseburg Resources Corporation (RRC) owns every other section of land located within the Oxbow Riparian Silviculture Project area. RRC schedules timber harvest on it's land using a short rotation, and based on market conditions. As a privately owned corporation, RRC is regulated by the Oregon Forest Practices Act (OFPA) and other applicable state and federal laws.

Chapter 3 : Affected Environment

3.1 *Introduction*

This chapter describes the existing condition of environmental resources within the Oxbow project area that would affect or that would be affected by the implementation of Alternative B: Oxbow Riparian Silviculture. The description of the existing conditions reflects the application of Alternative A : No Action, and serves as the baseline for measuring the effects of the Proposed Action.

3.2 *Description of Relevant Affected Resources*

3.2.1 Project Area Location

The project area is located approximately 20 miles northeast of Reedsport, Oregon within the Upper Smith River 5th Field Watershed. The Oxbow project area is administered by the Umpqua Resource Area of the Coos Bay District, Bureau of Land Management. The Upper Smith River Watershed is one of seven Regional Ecosystem Office 5th field watersheds comprising the Umpqua Subbasin. There are three sub-watersheds within the project area : Twin Sisters, Upper Lower Smith River, and Lower Upper Smith River. There are 15,900 acres of BLM administered land classified as Riparian Reserves within the project area. Maps of the area are located in the Appendix. The following summarizes the legal description:

Sections	Township and Range
19,30,31	T. 20 S., R. 7 W.
7,18	T. 21 S., R. 7 W.
5,7,9,11,12,13,15,17,19,30,21,23,25,27,28,29,31,33,34,35	T. 20 S., R. 8 W.
1,2,3,4,5,7,9,10,11,12,13,15,17,19,21	T. 21 S., R. 8 W.
13,23,25,26,27,35,36	T. 20 S., R. 9 W.
1,2,3,11,12,13,14	T. 21 S., R. 9 W.

Key Watershed

The proposed actions in the Clabber Creek and Halfway Creek drainages are inside the Lower Upper Smith River Tier 1, Key Watershed (USDI BLM 1995 pp. 7-8; Map 3N). This project meets Aquatic Conservation Strategy (ACS) objectives within a key watershed by not increasing the current road system, by conducting restoration within these areas, and having a current watershed analysis completed before projects are proposed. The watershed analysis covering this Key Watershed is the Roseburg District *Smith River Watershed Analysis* (USDI BLM 1995). This watershed analysis contains data, information, and recommendations, which represent the current understanding of conditions and natural processes in the analysis area. It is not intended as a decision document and is used in the context of providing information to the Interdisciplinary Team to develop project alternatives and project design criteria.

3.2.2 Vegetation, Including Sensitive Species

Past Management
Most of the stands proposed for treatment were regenerated subsequent to the timber salvage that followed the 46,000 acre Oxbow burn in 1966. Generally, the stands that are more than 100 feet from streams received vegetation control treatments to insure stand development. Stands that are within 100 feet of streams received limited or no vegetation control treatments beyond site preparation, due to a policy of not aerially applying herbicides next to streams. Some stands, in what is now the Riparian Reserve, received additional treatments to improve growth such as precommercial thinning and fertilization. Most of the

stands proposed for density management are very dense; thus, they are in the stem exclusion phase of development. Of these stands, several were not precommercial thinned. These stands that were precommercial thinned have lower stem counts, and larger average tree diameters. However, sufficient time has passed since the precommercial thinning to allow these stand canopies to also close. Here, too, competition among the trees is causing the crown lengths to shorten. The high competition is resulting in reduced tree growth rates, mortality of understory herbs and shrubs, and mortality of intermediate and suppressed trees.

The stands that are the result of right-of-way clearing and the area of stands within 100 feet of streams, have been managed passively and have received little or no silvicultural treatment. Most of the stands with a predominance of red alder were the result of reforestation failures as evidenced by historical aerial photographs and the presence of conifer stumps. Some of the red alder stands were treated unsuccessfully with herbicides as evidenced by the many forked tops.

Stand exams and field observations reveal that there is considerable variability in species composition. Some stands are essentially all red alder and some are almost entirely conifer. Many stands are mixed. The current conifer stocking level in the predominantly red alder stands is below the minimum standard to meet objectives for development into old growth characteristics in the riparian reserves as defined by Franklin *et. al.* (1986). Most of the project stand acres (77%) are overstocked conifer stands, primarily Douglas-fir, with the remainder of the project stand acres (23%) being predominantly red alder.

In 1995 the Coos Bay District initiated several pilot hardwood conversion projects to restore conifers in alder dominated streamside site, including sites in the Oxbow area. One of these sites is in unit 29 covered by this EA. That project employed alternative methods to convert the alder stand to conifer rather than the conventional approach of using the clearcut method of stand regeneration followed by planting Douglas-fir. Instead, gaps were created by girdling alders. District people planted western redcedar and western hemlock under the girdled alders. Both conifer species are shade tolerant. Initial survival was very good. However, seven years after planting many of the planted trees are about 2 to 2.5 feet tall, which is little more than the height of the trees when they were planted. Some of these trees have died. The best conifers are about 4-feet tall, which is less than half the height of similar aged seedlings growing in the sun. Most all of the girdled alders died and have fallen to the ground. The branches of the alders next to the treated areas now completely arch over the gaps returning the amount of light reaching the forest floor to pretreatment levels. On-site observations indicate the alder crowns can close a 60-foot wide gap. The conifer growth rates will continue to decline and additional conifers will die barring a disturbance that creates new gaps. Girdling the alders is no longer an option because of concerns about creating an overhead safety hazard for employees and contractors working in the unit, and for the public traveling the adjacent road. Because of the spatial relationships of the green alders to the gaps, cutting enough trees to release the conifer would in effect require dropping nearly all the alders between the a steam protection buffer and the road. Given the relative size of the alders compared with the conifers, falling the alders would bury the conifers with debris, or break or crush most of the conifers. There are three choices. Abandon the project, try to release the existing conifers and in the process destroy most of them, or start the project over by creating a larger opening and replanting. This is not a unique experience. Emmingham and coauthors (2000) evaluated 34 riparian restoration projects done by the Forest Service and BLM in the Coast Range. They found active management of both overstory and understory vegetation competition was essential for an alder conversion project to be successful. Emmingham and coauthors (2000) concluded it is a waste of time and resources to attempt restoration of conifers in areas where other resource values will preclude an aggressive approach to establishing conifer dominance.

<u>Conifer overstory</u>
The overstory trees in the conifer stands are a result of reforestation and vegetation control efforts following timber harvest. The conifer stands range from 27 to 44 years old and were established either by planting, aerial seeding, natural regeneration or a combination of these. Individual tree diameters range from 6 to 22 inches diameter breast height (DBH). Depending on the stand, the average stand diameters range from 8 to 12 inches DBH. The stand exams show the conifers averaging 80 feet tall. Other tree species occasionally

found mixed in with the Douglas-fir overstory are: western hemlock, western redcedar, golden chinquapin, bigleaf maple, cherry, willow and sporadic cottonwoods.

Red alder stands
The alder stands are primarily a result of soil disturbance from past harvest and road construction. Prior to harvest activities, red alder was present in the watershed but was associated with bare soil areas created from stream bank scouring, natural slumps or slides, or flood plains. Red alder and associated hardwoods, primarily bigleaf maple, have diameters ranging from 5-27 inches, with an average diameter of 7-13 inches and are approximately 70 feet in height.

Red alder is short lived with a maximum age of approximately 100 years (USDA FS 1990), and is often in association with salmonberry. Salmonberry can reproduce by seed as well as by layering, basal sprouting, and rhizomes. Most seed can be dormant in the soil for many years, perhaps decades, creating a large seed bank (Jensen 1995).

Within most of the red alder stands, conifer and hardwood species, primarily bigleaf maple, are present in varying degrees as scattered clumps or as individual trees. The clumped or scattered individual conifer trees within the alder stands can vary from dominant overstory to suppressed understory. Often conifers that are almost above the canopy will have difficulty growing above the red alder canopy because the wind causes the stiff lateral alder branches to whip the individual conifers, thus damaging and breaking off the terminal buds (Weirman 1979).

Understory
Where light is able to penetrate the canopy, understory brush species consists primarily of rhododendron, vine maple, huckleberry, sword fern, salmonberry, salal, and Oregon-grape. Understory vegetation can be almost non-existent in the very dense conifer stands to almost impenetrable in the open grown hardwood areas.

T&E, S&M, and Special Status Plants
There have been no T&E species documented within the Oxbow project area. The hardwood stands and the dense conifer stands contain habitat for several S&M nonvascular species. Potential habitat for a couple of S&M species (*Platismatia lacunosa*, *Cetrelia cetrarioides, and Diplophyllum plicatum*) exists within project areas. Habitats may exist in the project area for some Special Status Plants.

Port-Orford-Cedar (POC)
The project area is outside the natural range of POC, and no POC is known to be present within the project area or along the haul routes.

Noxious weeds
The project area is known to contain Scotch broom, French broom, Klamath weed, Himalayan blackberry, tansy ragwort, and various thistles. Gorse is not present within the project area, but is present in sec. 26, T. 20S., R. 09W. These noxious weeds are established throughout the area primarily in association with disturbance, including road sides and recently logged areas. Tangy ragwort is currently controlled by biological agents.

3.2.3 Fire

The Oxbow project area has a catastrophic fire history, with the most recent event in the late 1900's. Four very large, high intensity, stand replacing fires involving approximately 103,000 acres occurred during the 20^{th} century and all but one have been attributed to human activities. An 1,100 acre fire of similar stand replacing characteristics (Austa Fire), occurred as recently as September 28th of 1999 in the adjacent watershed 10 miles north of the proposed project area.

Modern fire detection and suppression activities have all but excluded natural low to moderate intensity fire from the landscape. That factor, combined with the intensive reforestation efforts following the large stand replacing fires of 1938 (Smith River), 1951 (Vincent Creek), and 1966 (Russell Creek and Oxbow) have resulted in widespread areas that share very uniform stand characteristics and fuel loading.

Recent harvest activities on both private and BLM administered lands that are adjacent to or near the proposed project areas have received some form of site preparation or fuels treatment to reduce fuel loadings and prepare the site for reforestation. Most commonly these have been in the form of hand or machine piling, cover and burn, and broadcast burning.

3.2.4 Geology / Soils

Geology
The project areas are located in the Tyee sedimentary basin. The stratigraphies include members of the Tyee Formation. Different mapping names have been applied by different mappers to the same units. All of the units are sedimentary sandstone, siltstone, and mudstone, exhibiting similar characteristics attributed to the Tyee Formations.

Quaternary Alluvium and Quaternary Alluvium Terraces form the geology within much of the Riparian Reserve. The Quaternary Alluvium consists of unconsolidated deposits of sand, silt, clay and mud found in the floodplain of streams draining sandstone and siltstone terrain. It consists more of gravel, sand, and silt in floodplains of the upper reaches of streams draining Pre-Tertiary or volcanic terrain. Groundwater production is moderate.

Quaternary Alluvium Terraces are formed from these alluvium deposits. The alluvium terrace deposits consist of unconsolidated or semi-consolidated flat and elevated deposits of river alluvium, situated above general levels of flooding. There is moderate groundwater production.

Soil
The soils within the project are derived from the Tyee and similar formations. They include:

- Wintley Soils
- Nekoma Soils
- Digger Soils
- Umpcoos Soils
- Honeygrove Soils
- Preacher Soils
- Blachly Soils
- Kirkendall Soils
- Meda Soils
- Bohannon Soils
- Damewood Soils
- Peavine Soils
- Xanadu Soils
- Rock Outcrop

Additional detail can be found in the specialist report (contained in the analysis file), and Douglas County Soil Survey data.

Wetlands

The project areas can be within a stream's influence of associated surface water, as well as in areas of high groundwater. The presence of potential jurisdictional wetlands within these project areas is probable. The wetlands are generally less than an acre in size.

3.2.5 Hydrology

The Upper Smith River Watershed climate has a pattern with mild, wet winters and warm, dry summers. The hydrology of the area is driven by precipitation in the form of rain, and the volume of stream discharge closely parallels precipitation.

Annual Yield, Low Flows, and Peak Flows

The average annual precipitation for the project area is 80 inches (Froehlich 1982), with about 80% of the precipitation occurring as rain from October to March. Winter rainfall can be steady for several days and intense rain periods can produce 4 to 6 inches of rain in 24-hours (USDI BLM 1977).

Peak flows in the Upper Smith River Watershed are largely dependent on the duration and intensity of rainfall. Thus, high flows occur during the winter months. Low stream flows occur from July to October and are characterized by extremely low base flows and, occasionally, dry stream channels.

Transient Snow Zone
The maximum elevation within the Oxbow Project Area is 1,758 feet at Devil's Graveyard, making the project area below the transient snow zone (TSZ) and rain on snow events. Therefore, the proposed project is not likely to affect peak flows by rain on snow events, and TSZ effects will not be discussed further in this analysis.

3.2.6 Water Quality

Water quality standards are determined for each water body in the state by the Oregon Department of Environmental Quality (ODEQ). Water bodies which do not meet water quality standards are placed on the Oregon State 303(d) list as Water Quality Limited (ODEQ 1998). High water temperatures is the primary non-point source pollutants of surface water within the Upper Smith River Watershed (ODEQ 1988). There are approximately 548 stream miles within the Oxbow project area, of which 308 stream miles, or 56.2%, are on BLM administered lands. High temperatures may cause severe impacts on aquatic life, particularly fish and invertebrate reproduction. The ODEQ 303(d) listed streams within the Oxbow Project Area are listed below. A total of 40.88 stream miles, or 7.5% of all Oxbow project area streams, are temperature impaired.

Table 3.1: Temperature limited 303(d) listed streams within the Oxbow project area

Stream	Miles
Herb Creek *	2.68
Russell Creek *	2.25
South Sisters Creek *	8.60
Bum Creek *	2.34
Smith River	25.01
TOTAL	**40.88**

* Tributaries within the Twin Sisters Subwatershed

Stream Temperature
All of the streams listed above, in Table 3.1, are listed for exceeding the 17.8°C temperature standard during summer (ODEQ 1998, attachment A). Elevated stream temperatures are typically due to a lack of stream shading, air temperature, a high width to depth ratio and/or low summer flows (Moore 1997). All of these conditions result in additional stream heating. Some or all of the listed streams in the proposed project area are currently affected by these conditions. Other perennial streams in the Smith River Watershed may also have elevated summer temperatures and potentially contribute to elevated temperatures in reaches of Smith River and the other listed streams.

Sediment
There are no streams currently listed by ODEQ as impaired by excess fine sediment in the Smith River

Watershed. However, due to past management activities, excess fine sediment and the resulting degradation to water quality and aquatic life is a major concern. Sediment input to stream channels is a result of both natural and management related erosional processes. According to MacDonald (1991), "An increased sediment load is often the most important adverse effect of forest management activities on streams." Based on this premise, and the state's assessment of non-point sources (ODEQ 1988), there is an increased potential for streams in the Upper Smith River Watershed to be impaired by excess fine sediment.

Bacteria
Currently, in the Upper Smith River, there are no streams currently listed by ODEQ as impaired for elevated levels of bacteria. The proposed project would not contribute to the bacteria in the area and will not be discussed further in this analysis.

3.2.7 Fish Species/ Aquatic Habitat

Fish Species Occurrence
The following lists the fish species known or believed to occur in the Upper Smith River watershed:

chinook salmon
coho salmon
steelhead trout
sea-run and resident cutthroat trout
redside shiner
dace sp.
pacific and western brook lamprey
sculpin sp.

Other than the salmonids listed, the occurrence of fish species in relation to the proposed project areas is not known. It is likely that they occur within the same reaches where coho, steelhead, and cutthroat are found.

The Upper Smith River 5th field watershed is located within the Oregon Coast (OC) Evolutionary Significant Unit (ESU), which extends south of the Columbia River to Cape Blanco. The following summarizes the Endangered Species Act (ESA) status of salmonids within the ESU:

- OC coho salmon were listed as "threatened" on August 10, 1988, and Critical Habitat was designated February 16, 2000. However, in September 2001, the US District Court for the District of Oregon (Judge Hogan) determined that the listing was unlawful and it was set aside as being arbitrary and capricious (*Alsea Valley Alliance v. Evans*). Hogan wrote that the listing by the National Marine Fisheries Service (NMFS) arbitrarily excluded hatchery spawned coho.

  In review of Judge Hogan's ruling, the Ninth Circuit Court of Appeals issued a stay on December 14, 2001. This decision will remain in place until the Court makes a final ruling, which could be months or years. At the time of the writing of this EA, the listing of coho salmon as "threatened" has been reinstated.

  In response to the *Alsea Valley Alliance v. Evans* September ruling, on February 11, 2002, the NMFS decided to review 24 ESUs currently listed as endangered or threatened. This review includes the OC coho salmon ESU. The current listing status for these species will remain in effect until the review is concluded.

- Steelhead trout were listed as "candidate[2]" species on March 19, 1998. Critical habitat is not designated for candidate species.

- On April 5, 1999 the Oregon Coast coastal cutthroat ESU was designated as a "candidate" for listing. This species is under the jurisdiction of the U.S Fish and Wildlife Service.

[2] It is BLM policy to treat proposed and candidate fish species as though they were listed and to conduct informal conferencing with NMFS on actions that may effect these species and their habitats

- On August 9, 1996 the Umpqua cutthroat trout ESU was listed as “endangered.” This species was under the jurisdiction of the NMFS. This jurisdiction was transferred to the U.S. Fish and Wildlife Service on April 19, 2000. On April 26, 2000 the USFWS determined that the Umpqua cutthroat ESU is part of the larger population segment - the Oregon Coast coastal cutthroat ESU. Therefore, this population segment was de-listed and is currently a “candidate” species through its incorporation into another ESU(see above).

Distribution of Special Status Fish Species in the Project Area
A total of 57.1 stream miles are known to be fish-bearing on these public lands. Due to the nature of this project proposal, most of the unit boundaries include fish-bearing streams where special status species are present. The three units currently identified that do not have any fish presence within or adjacent to the boundaries are Units 1, 22, and 27.

Aquatic Habitat and Large Wood
Aquatic Habitat Inventories conducted by the Oregon Department of Fish and Wildlife (ODFW) in 1993 reflect the current condition of Riparian Reserves and Aquatic Habitat. The surveys show a lack of potential for the long-term recruitment of large woody debris along stream channels from these stands. Riparian conifers greater than 20 inches in diameter were inventoried in an area 30 meters from both sides of the channel. ODFW defines “Undesirable” conditions as reaches with less than 150 of these trees per 1000 feet of stream length. Approximately 54.3 miles or 98.0% of the reaches surveyed were found to have “undesirable” numbers of these larger trees, which could contribute to large wood in the stream channels.

Streams within the project area are deficient in large wood and are physically down-cut to bedrock in several reaches. This is the result of previous harvest within riparian areas and the past practice of “stream cleaning.” A lack of large wood and disassociation from the floodplain have allowed increases to stream velocity resulting in the continual scour of stream channels and substrate removal during high flows. The proposed project area, judging from its position in the watershed and present riparian condition, has historically been dependent on large wood to help increase channel complexity, reduce stream energy, capture substrate, aggrade the stream channel, allow floodplain development, and provide aquatic habitat.

3.2.8 Wildlife Species and Habitat

Threatened and Endangered
The Upper Smith River 5th field watershed contains known sites of marbled murrelets and northern spotted owls. There are no other known threatened or endangered species nest sites or activity centers near, or within, the proposed units. The proposed units do not contain suitable marbled murrelet habitat. Units that are in the LSR LUA are in the murrelet Critical Habitat Unit OR-04-C, I and G. None of the Units are within 0.25 miles of an occupied marbled murrelet site. Units 1, 3, 14, 16, 19, 20, 21, 22, 23, 27, and 31, are located within 0.25 miles of unsurveyed suitable marbled murrelet habitat.

None of the units contain suitable northern spotted owl nesting habitat, nor are any units within 0.25 miles of a nest site center. Units 16, 19, 20, and 21 are within Critical Habitat Unit OR-54. Approximately 9 acres are proposed for thinning that are classified as dispersal habitat.

Survey and Manage
None of the units meet the survey triggers for red tree voles as the density management stands contain conifers that are less than 16" DBH on average and do not contain remnants. There are no known *megomphix hemphilli* sites within the project areas. The units are outside the known range for the Del Norte salamander (Bureau Tracking and Survey and Manage Category D).

No caves, abandoned buildings, or wooden bridges were found that could be providing bat roost sites and which would require additional protection under the Survey and Manage ROD (USDA-USDI 2001).

<u>Amphibians and Reptiles</u>
Special Status Species associated with the aquatic system and that could be in the project area include: southern torrent salamander, red-legged frog, foothill yellow-legged frog, and tailed frog. Western toads are associated with forest or shrub areas, and utilize shallow, slow water for breeding. Decayed down logs provide habitat for the clouded salamander. Though no suitable habitat was discovered in the units, the area is within the range of the western pond turtle. The units are most likely out of the range of the common kingsnake, but the sharptail snake may be present.

Other amphibians and reptiles, that are not Special Status Species, are expected to be in the project area. McComb *et. al.* (1993) studied amphibian communities in red alder stands in the Coast Range. Roughskin newts were the most common amphibians captured. Ensatina, western redback salamander, red-legged frog, Pacific giant salamander, and northwestern salamander were also common. Dunn's salamander was more abundant in alder-dominated riparian stands than in adjacent conifer-dominated upslopes (McComb 1994). Western redback salamanders, and roughskin newts had higher capture rates in red alder stands verses four seral stages of conifer stands (Gomez 1992 in McComb 1994). The Pacific giant salamander, Pacific tree frog, and Dunn's salamander are found in the stream channel or along the margins, require standing or moving water for reproduction, and use the channels and margins to disperse to other areas.

<u>Special Status Mammals</u>: Due to the young age of the stands proposed for treatment, it is highly unlikely that the American marten, or fisher currently inhabit the proposed units. Ten bat species could occur in the area. The Special Status bat species are: Yuma myotis, long-legged myotis, fringed myotis, long-eared myotis, and silver-haired bat. The Pacific western big-eared bat could also occur, though the units did not contain caves or other structures suitable for use as hibernaculums or nursery colonies.

The western gray squirrel and white-footed vole may be present, though neither species has been documented. The white-footed vole inhabits riparian areas, particularly along small streams with an alder forest component (Maser 1981).

Comparatively little research has been conducted on the white-footed vole. However, considerable research has been done on red alder, which is the primary habitat for the white-footed vole. Red alder stands, and species dependent on this habitat, are maintained on the landscape by disturbances. Conventional logging and road construction techniques have resulted in compaction and exposed subsoils, and by that provide conditions that allow alder to establish and out compete other tree species. This in turn has provided an abundant seed source facilitating red alder invasion onto surrounding lands with undamaged soils. These management-associated disturbances are responsible for the current red alder abundance outside of the areas affected by naturally occurring disturbances such as land slides, debris torrents and streambank erosion. Consequently, management-associated disturbances has resulted in red alder amounts on the landscape that are higher than the range of natural variability associated with current climatic conditions. Historical inventories indicate the abundance of red alder has increased about 20-fold since the 1920s, though this trend have been recently been reversed by the application of more modern forest practices (Niemiec 1995).

<u>Mammals</u>: Two mammals, the river otter and the beaver, depend on large streams and rivers for their primary habitat. They obtain nearly all their requirements from within the stream channel and associated riparian habitat. For river otters, habitat quality is largely dependent on the availability of complex stream habitats that provide fish and invertebrates prey species. Beavers typically select river and stream reaches where water velocity is low to moderate (reaches which have a low gradient and/or are structurally complex), and forage species such as willow or salmonberry are abundant.

A variety of terrestrial mammals are also closely associated with instream and margin habitats. Species such as racoon, mink, bears, and bobcats typically forage along streams and rivers. They feed on fish, crayfish, macro-invertebrates, and other species drawn to stream side habitats. This is especially true when spawning anadromous fish die, providing an abundant protein source used by a wide variety of species.

Deer mice, Trowbridge's shrews, Pacific shrews, and Virginia opossums were the most common small mammals captured in a study conducted in red alder stands in the Coast Range (McComb 1993). McComb (1994) reported that the following species were more abundant in alder-dominated riparian stands than in adjacent conifer-dominated upslopes: Pacific water shrew, white-footed vole, long-tailed vole, and Pacific jumping mouse. Deciduous tree cover was also positively associated with the capture of white-footed voles, Pacific jumping mice, Pacific water shrew, Pacific shrew, and shrew-moles (Gomez 1992 in McComb 1994). The shrew-mole and Trowbridge's shrew had higher capture rates in red alder stands verses four seral stages of conifer stands (Gomez 1992 in McComb 1994).

Special Status Birds: There is no suitable habitat for bald eagles or peregrine falcons in or adjacent to the proposed units. The Oxbow project area provides habitat for pileated woodpeckers, northern pygmy owls, and northern saw-whet owls. None of these species use the proposed units (classified as closed-sapling-pole-sawtimber) as primary habitat, but may use them for secondary feeding habitat (Appendix 6 of Brown 1985).

Neotropical migratory birds that may be present in the units are listed in Appendix T of the Coos Bay Resource Management Plan (USDI BLM 1994b). Neotropical migratory birds nest at various levels of the forest stands including ground, shrub and canopy level. According to Appendix 6 of Brown (1985), the hardwood portions of the proposed units provide primary habitat for Vaux's swift, Swainson's thrush, cedar waxwing, yellow-rumped warbler, black-headed grosbeak, and brown-headed cowbird. The hardwood stands are providing secondary habitat for 13 other neotropical bird species. The winter wren and Swainson's thrush were more abundant in alder-dominated riparian stands than in adjacent conifer-dominated upslopes in a study conducted in the northern Oregon coast range (McComb 1994). The conifer portions of the proposed units provide primary habitat for Swainson's thrush, yellow-rumped warbler, black throated gray warbler, and pine siskin. The stands are providing secondary habitat for 10 other neotropical bird species.

Habitat
Special habitats that are used by wildlife include cliffs, talus, wet meadows, bogs and other unique areas. Seeps, springs, and small wetlands would be buffered during the marking of the stands. No significant special habitat features were found that would require additional buffering.

The stands are in a developmental stage where the snag and down wood diameters are still relatively small. Suppression mortality created most of the existing snags, which are providing foraging habitat. The snags are also used by birds that can utilize the 9 to 11" DBH snags for nest cavities such as the black-capped chickadee, chestnut-backed chickadee, and downy woodpecker. Field observations indicated that there is a lack of decay class 1 and 2 logs in the units. In addition, down wood inventories from stand exams on four density management units showed that three of the four units were deficient in decay class 2 logs compared to the natural range of coarse woody debris reported by Spies and Franklin (1991).

In general, the density management units provide a temperate coniferous forest plant community with a closed sapling-pole sawtimber stand condition (Appendix 6 of Brown 1985). There are 8 amphibians, 11 birds, and 19 mammals that use this stand condition as primary habitat (Appendix 8 of Brown 1985).

The hardwood units provide a hardwood and shrubby riparian plant community with a closed sapling-pole stand condition (Appendix 6 of Brown 1985). There are 6 amphibians, 14 birds, and 11 mammals that utilize this stand condition as primary habitat for either breeding, feeding, or resting (Appendix 8 of Brown 1985).

3.2.9 Recreation

There are no Special or Congressionally-designated Wild and Scenic River, Wilderness, or Back Country Byway lands in the Oxbow project area.

All lands within the project area are either Virtual Resource Management (VRM) Class III or VRM Class IV. The objective of VRM Class III areas is to partially retain the existing character of landscapes. The objective of VRM Class IV areas is to allow major modifications of existing character of landscapes.

The Oxbow project area offers day use and overnight undeveloped, dispersed recreation opportunities throughout the year. In fact, public lands administered by the BLM, in the proposed project area, are available for any legal recreational activity. In 1993, a dispersed recreation use survey and site inventory was conducted. It indicates that the Oxbow (Smith River) Area has received recreational use over time. Therefore, it is logical to conclude that there has been a public recreational need; through which these undeveloped dispersed recreational sites have been serving recreational opportunities to the public. Several pull outs, old gravel stockpiles, and remnant logging landings (approximately 1 acre or less in size) associated with the existing roads and adjacent to the Smith River, serve as undeveloped, dispersed recreation sites. The BLM does not have any developed campgrounds in the Oxbow project area. The proposed 200 acre Big Bend Recreation Site, featuring a campground and nature trail, is proposed in the District ROD/RMP (USDI 1995, pg 48). However, based on current local supply and demand, the BLM has no plans to develop this proposed recreation site any time soon.

Records of historical visitor use estimates, for the project area, does not exist (is not broken down to the respective scale or acreage) within the respective archive (Recreation Management Information System). The most substantiated visitor use data for the project area is the percent of occupancy based on the 1993 use survey. Out of 230 times that the dispersed recreation sites (within the project area) were checked, occupancy was observed 82 times. This equates to 35.65 % recreational occupancies during the summer months in 1993 (see the recreation report within the analysis file for additional information).

Regardless of the actual number or frequency of visits, it is projected that the number or frequency of visits will remain constant relative to local and regional populations. According to the Coos County Tourism Plan of 1996 (TSAIP 1996), most visitors to coastal Oregon counties come to see and be near the ocean. Few of the tourists venture into the Coast Range. Visitors to this area are generally repeat visitors traveling less than 100 miles to the area.

Like visitor use estimates, visitor income levels specifically corresponding to the project area is not available. However, it is noteworthy to point out that undeveloped, dispersed recreation sites (i.e. those within the Oxbow planning area) provide recreational opportunities to low-income visitors, which may be unmet via other resource-based recreation for which a fee is charged.

3.2.10 Cultural Resources and Native American Religious Concerns

Review of project documentation and a records check show no known cultural resources in the project areas.

3.2.11 Environmental Justice

The proposed area(s) of activity are not known to be used by, or disproportionately used by, Native Americans, and minority or low-income populations for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed area(s). Also, BLM concludes that no disproportionately high or adverse human health or environmental effects will occur to Native Americans, minority, or low-income populations as a result of the proposed action(s). Therefore, this subject will not be analyzed further in this EA.

Chapter 4 : Environmental Consequences

4.1 *Introduction*

This chapter is organized by the issues in Chapter 1 and the resources listed in Chapter 3.

Analysis of the No Action and Proposed Action Alternatives has shown no impacts to Areas of Critical Environmental Concern (ACEC), Prime or Unique Farmlands, Wild and Scenic Rivers, Wilderness Values, Port Orford Cedar Management, or Environmental Justice.

4.2 *Effects of Implementing Alternatives A or B on Issue 1 - Temperature*

4.2.1 Alternative A : No Action

Hardwood Conversion
Direct:
Stream temperatures on Smith River and its tributaries in the proposed project area would not be affected.

Indirect:
With little or no vigorous conifer trees in red alder stands, highly competitive salmonberry brush would eventually replace short-lived alder stands when mortality begins to occur. This would result in less stream shading as the alder dies out and is replaced by shrubs.

Cumulative:
Hardwood dominated riparian conditions would have stream temperature increases as the hardwood mortality occurs. Shrub species such as salmonberry would become the dominate riparian vegetation, which increases stream temperatures in the long-term.

Density Management
Direct:
Stream temperatures on Smith River and its tributaries in the proposed project area would not be affected.

Indirect:
Dense second growth stands in Riparian Reserves would continue to grow at a slower rate than if thinned. This would result in unfavorable height to diameter ratios, which increases the risk of blowdown (Smith 1962, p. 422), and subsequent exposure of the stream to solar heating. In addition, the un-thinned condition would delay establishment of understory trees and shrubs with their associated multi-canopy layers that could provide shade in the event that some or all of the overstory shade is lost due to a catastrophic event (Levno; Rothacher 1969 cited in Adams 1994).

Cumulative:
Stream temperatures, on conifer dominated reaches, will continue to decline until the canopy closes above the stream. However, the risk that blowdown could suddenly expose a stream reach to the warming effects of direct sunlight would increase as tree height to diameter ratios become less favorable.

4.2.2 Alternative B : Oxbow Riparian Silviculture

<u>Hardwood Conversion</u>
Direct:
The effects of proposed hardwood conversion on temperature would be similar to those discussed under density management. However, conversion of hardwood to conifer stands has the additional potential to increase summer low flows. Increased stream flow in summer would help reduce stream temperatures during the most critical period, although changes at the drainage (REO 7th field) level would probably not be measurable.

No-harvest buffers would be established (see Chapter 2) for all streams within and adjacent to proposed units. Because of this design criteria there is no anticipated direct effect to stream temperature.

Indirect:
In general, hardwood conversion areas outside no-harvest buffer areas would be replanted with conifer species. The no-treatment strips next to the streams would maintain the pretreatment level of canopy closure directly above the streams. Due to these design features, stream shading would be maintained, and stream temperatures would not be adversely affected by the proposed hardwood conversion.

Cumulative:
Within the proposed hardwood conversion units there is no anticipated direct effect to stream temperature because of design criteria. This treatment would promote development of large conifers, development of multi-layered canopies, and diversify species composition within the Riparian Reserves. In the long term, taller conifers in the riparian area would be more effective than alder in providing shade above the wider stream channels thereby reducing stream temperatures.

<u>Density Management</u>
Direct:
Density management in Riparian Reserves has the potential to increase stream temperature by temporarily creating openings in the canopy and reducing shade. Shade from trees near the stream channel is important for reducing direct solar radiation and therefore stream temperatures.

No-harvest buffers, which would maintain the pretreatment level of canopy closure directly above the streams, would be established for all streams within and adjacent to proposed units. Because of this design criteria there are no anticipated direct effects to stream temperature.

Indirect:
In general, canopy closure in the thinned areas outside no-harvest buffers would be maintained at 60% or above. This level would help maintain shade height and density. It is estimated that canopy closure would reach pre-thinning density in about 10 years.

The increased growth rate of trees released by the proposed density management, would result in larger trees in a shorter time period than would occur without thinning. The reduced height to diameter ratios in thinned stands would make the stands more robust with respect to resisting catastrophic blowdown and canopy loss. The understory canopy which develops in openings that are created by thinning would provide redundant layers of shade in case of overstory tree mortality.

Cumulative:
There is no anticipated increase of stream temperature by the proposed density management. The thinning of conifers would create a potential increase of shade while providing a net long term reduction in stream temperatures.

4.3 *Effects of Implementing Alternatives A or B on Issue 2-Sediment*

4.3.1 Alternative A : No Action

Hardwood Conversion and Density Management
Direct:
Soils - There would be no effect on existing soil conditions.
Streams - Sediment delivery to Smith River and its tributaries in the proposed project area would not be affected.

Indirect:
Soils - This alternative may have some impact on existing soil conditions. The current road system allows motor vehicle access which may cause the disruption of soils and erosion controlling vegetation, allowing for mobilization of sediments to the waterways. The no-action alternative would not allow for the maintenance of native surface pump chance accesses, the placement of waterbars, or the maintenance of roads currently in disrepair.
Streams - In the long term, there is no potential to create additional capacity for sediment storage in the steam system.

Cumulative Impacts:
Soils - The regeneration of forest soils would continue. However, lack of road maintenance may allow for the continued erosion of sediment from the terraces. This could combine with non-project and off-site conditions to increase surface degradation as well as add to sediment delivery to streams. Within the streams themselves, there is no potential to create additional capacity for sediment storage in the steam system with this alternative.
Streams - In the long term, there is no potential to create additional capacity for sediment storage in the steam system.

4.3.2 Alternative B : Oxbow Riparian Silviculture

Hardwood Conversion and Density Management
Direct :
Soils - There would be no mobile equipment entry or ground base systems. Therefore, there would be no equipment related compaction. Operations within units with potential flooding would be limited to dry season entry, ensuring that disrupted soils will be stabilized prior to potential erosion events. Yarding across wetland soils would be managed as stream crossings. If full suspension can not be obtained, the operations would be seasonally restricted until the soil is not saturated. Therefore, there would be no disturbance or destruction of wetland soil character.

Streams -There is no anticipated mechanism for delivery of sediment to the stream network. While some pathways for short-term soil displacement and potential sediment delivery may occur as a result of localized soil disturbance, timing and project design features would eliminate these minor effects from impacting the stream system. Within the Oxbow project area, most of the haul routes to proposed units are paved, eliminating the potential for road surface generated sediment to occur. Gravel surface roads would be upgraded before unit activities occur or would be restricted to summer haul only.

The no-harvest buffer areas would provide an adequate filter strip and would eliminate delivery of sediment to water resources in the short term. For timber haul occurring during the rainy season (generally mid-October to mid-May), the timber sale contracts may require the purchaser(s) to place sediment filters, as needed, at locations specified by the BLM. Once haul is completed, sediment retained by filters would be transported to upland locations to prevent subsequent delivery to aquatic resources.

Indirect:
Soils - Cable logging would create temporary surficial ground disturbance by movement of soil. However, the effect would be temporary as vegetation, especially in a thinned open canopy system, is expected to reclaim the open ground within one or two growing seasons.

Renovation of existing roads would consist of roadside brushing, restoring the surface where necessary, maintaining or improving drainage structures, and applying rock surface to native surface roads where needed. Currently low- or no-maintenance roads used by the project would be upgraded to current standards. Waterbars would be installed as needed. The native surface pump chance would be surfaced, reducing sediment delivery potential.

Activities on some units would be postponed until currently proposed road upgrading occurs. This road upgrading is occurring under a different project and is not directly tied to this EA. If funding sources for these upgrades do not come through, the affected units would be restricted to dry season haul after more minor maintenance occurs. This would eliminate road impacts from winter haul on poorly drained and constructed road surfaces.

Streams - Because of design criteria there are no anticipated measurable increases of turbidity within the streams from soil disturbance.

Cumulative:
Soils - Dry season restrictions as well as other project design features would ensure that soil disturbance does not occur during times of sediment transport potential. The upgrading and maintenance of existing roads should reduce the potential for sediment delivery, reducing by a small amount the entire watershed's current sediment load.

Streams - In the long term, large wood contributed to the stream channel as a result of hardwood conversion has the potential to create additional capacity for sediment storage that would have to be placed by human intervention otherwise.

4. 4 *Effects of Implementing Alternatives A or B on Vegetation*

4.4.1 Alternative A : No Action

4.4.1.1 Overstory and Understory

<u>Hardwood Conversion</u>
Direct:
The alder stands would continue to grow until about age 90 years followed by a rapid decline shortly there after. Few live alders will remain by stand age 130 years (Newton 1994). Conifers would be present if the conifers had established either before the alders or if the conifers established in sizeable gaps between alders (Newton 1968). However in the absence of a disturbance, additional conifers are unlikely to become established under a fully stocked alder stand. The understory conifers are at risk of competition related mortality until they emerge above the alders. This usually occurs about when the alders near their maximum height at stand age 40-years (Newton 1987).

Indirect:
Understory vegetation would respond to changes in the overstory condition. As the stand ages, canopy gaps would form allowing the existing understory vegetation to increase in vigor. As the alder component of the stand breaks up, more light reaches the forest floor allowing the shrub layer to become very vigorous. (Oliver 1990, pgs 252-259).

Cumulative:
After 130 years, and assuming no disturbance of sufficient intensity to free growing space, those alder stands without a conifer component, but with a salmonberry shrub layer, would become brushfields. Trees cannot establish in a salmonberry brush field without a disturbance that frees growing space (Emmingham 1997; Hemstrom 1986; Newton 1994). Salmonberry brush fields are "climax communities" that are unable to contribute wood to the streams. These sites, which had previously supported a late-successional conifer and mixed stands, are currently not on a trajectory to develop late-successional forest attributes. This would also result in the nonattainment of some of the additional habitat area and connectivity benefits that the Riparian Reserve was intended to provide for certain terrestrial late-successional forest associated wildlife species (USDA-USDI 1994, pg B-13).

After 130 years, the alder stands with a conifer component will transition into a low-density conifer stand with very large individual trees (Stubblefield 1978; Newton 1987). Without disturbance, a well-established shrub layer under the low-density conifer stand can preclude recruitment of understory trees thus delaying attainment of the structural complexity associated with late-successional forests. These sites would develop some attributes associated with late-successional forest but would lack others and would be at higher risk of loss to fire. The low density conifer stands would have only a limited ability to contribute large wood to the stream channel and forest floor while maintaining some capacity to provide shade to the stream when compared with moderate to well-stocked conifer and mixed stands.

<u>Density Management</u>
Direct:
As the trees grow and fully occupy the site, competition for growing space results in competition mortality. At the individual tree scale, intense competition would reduce resources available for diameter growth, for root and foliage expansion or replacement, and for providing protective systems for resisting insect and disease attacks. Trees experiencing intense competition stress allocate less food to diameter growth than to height growth resulting in increased height to diameter (H/D) ratios. This increases the risk of tree damage (blowdown) during wind events.

Indirect:
Closed canopy stands allow little light to reach the forest floor. With reduced light, the less shade tolerant herbs and shrubs die out first and as competition for light in the overstory increases nearly all the plants in the herb and shrub layer die. This is the stem exclusion stage of stand development (Oliver 1990, pgs. 146-147) and is the successional stage with the lowest species richness (sources summarized by Harris 1984, pgs. 59-64 and displayed in figures 5.10-5.13).

Understory tree recruitment and herb and shrub layer reinitiation would begin later than in thinned or understocked stands. Also, the higher stocking levels in the candidate stands for thinning would retard attainment of the three functions of the Riparian Reserve that are contingent on the presence of large diameter trees: large wood delivery to streams, large wood delivery to riparian areas and wildlife habitats (FEMAT 1993, pgs. V-26, V-29).

Concerning snag development, Carey *et al.* (1999) observed that suppression mortality in conifers does not contribute materially either to provision of cavities or gap formation. Small snags usually do not have top rot (or cavities) and do not stand very long. They do contribute to the course woody debris on the forest floor for a relatively short time before decaying.

Cumulative:
The no treatment alternative would put these stands on a development trajectory that would be very different from the pattern followed by the stands that developed into the old-growth found in the Coast Range today. Research indicates the stands that survived to become old-growth were understocked when young (Tappeiner 1997; Poage 2000). Although producing old-growth is not a stated objective for the Riparian Reserve, this research suggests the dense stands currently in the project area have a low probability of surviving to become 250-years-old or older and attaining a properly functioning Riparian

Reserve in the long term.

4.4.1.2 T&E, S&M, and Special Status Plants

Hardwood Conversion
Direct:
None anticipated

Indirect:
In alder dominated stands, when the alder begin to die salmonberry would become the dominant plant species within the Riparian Reserve.

Hotspots for macrolichen in young stands include gaps, hardwoods, "wolf" trees (trees with multi-branched, broken canopies), and old growth remnant trees (Neitlich 1996). As no additional gaps would be created in the untreated stands, there would be no probable increase in habitat to stimulate macrolichen growth.

Cumulative:
The existing alder may prevent conifers from growing to an age to become suitable habitat for many species of lichens and bryophytes.

Density Management
Direct:
None anticipated

Indirect:
Overstocked stands in the stem exclusion stage of development allow little light to reach the forest floor, thus limiting growth and even survival of understory chlorophyllous plants. This condition would eventually change as the combination of competition mortality, crown abrasion, and disturbance allow increased light to penetrate the forest canopy.

Thinning and opening young, dense, managed stands would favor bryophyte abundance (Rambo 1998). Since these stands would not be opened up, bryophyte abundance would remain low except in areas where coarse woody debris and forest gaps exist.

Cumulative:
Leaving the stands in an unthinned condition delays attainment of the light levels below the canopy needed to support chlorophyllous plants. Not thinning the stands would also delay the development of crown, limb, and bark characteristics that provide favorable substrates for the establishment of some late-successional forest associated bryophytes and lichens.

4.4.1.3 Noxious Weeds

Hardwood Conversion and Density Management
Direct:
The presence or spread of noxious weeds would continue at current rates. Newly disturbed areas, whether natural or human caused, would be subject to noxious weed establishment due to the presence of residual weed seed beds, surrounding mature weed plants, or human and animal activities that transport weed seeds into disturbed areas. Once established, noxious weeds can dominate a site preventing the establishment of native plants.

Indirect :
Weeds in recently disturbed areas and/or along the road edges could be shaded out as surrounding native vegetation matures. This would eliminate the mature parent weed plant but would not eliminate the weed seed bank in the soil, which can last up to 80 years for weeds like the brooms (e.g. scotch or French broom).

Cumulative:
No significant changes in the current rate of spread or population size of existing noxious weeds would be expected. BLM ownership is scattered among other ownerships, and is available for access by the general public. This dispersed ownership and access increases the potential for the introduction of new weed species and spread of existing weeds. This potential is the same for both the "No Action and Action Alternatives."

4.4.2 Alternative B : Oxbow Riparian Silviculture

4.4.2.1 Overstory and Understory

Hardwood Conversion
Direct:
The alder stands, on sites where merchantable conifer stands had been previously harvested, would be replaced by new conifer stands. Site preparation following alder cutting would increase the number of plantable spots. The new stands on sites supporting hardwood species other than alder would have a hardwood component and would likely develop into a mixed stand.

Indirect:
Overtopped conifers, which can release, would go through a period of shock until their shade needles are replaced by sun needles. Conifers not capable of releasing would either die of shock or fail to regain epinastic control. Conifers that do release would contribute to the structural diversity of the new stand.

The removal of the alder component would increase the growing space for the vegetation left on the site, and for new plants that are subsequently seeded or planted on the site. Following alder cutting and site preparation, the herb and shrub layer plants that escaped disturbance, and species on the site before treatment that can regenerate from stump sprouts, root suckers, rhizomes, root crowns, or other asexual means, would rapidly recolonize the site. Logging debris would provide a pulse of fine and coarse woody material to the forest floor. The decomposing logging debris would also add organic matter to the soil and release nutrients for recycling.

Cumulative:
Alder conversions across the landscape would restore forest type patterns more typical of a landscape undisturbed by conventional timber harvest practices. This would increase the habitat area and connectivity that benefit certain late-successional forest associated species, and by that meeting one of the intended functions of the Riparian Reserve (USDA-USDI 1994, pg B-13). Alder conversions would increase the amount of habitat used by the wildlife species associated with conifer and mixed stream side stands, and decrease the amount of habitat used by species associated with the alder dominated disturbed sites. Site level reestablishment of conifers next to small and medium sized streams reaches would provide those reaches with sources of large durable wood that can provide in-stream structure. Reestablishing stream side conifers, which have greater height growth potential than alders, would in time result in more shade above wider channels than the stream side alders can provide.

Density Management
Direct:
Thinning would increase the growing space for the trees left on the site. As the trees increase photosynthetic surface to take advantage of the growing space, more food becomes available for the leave trees to maintain or increase crown length and volume, root mass, diameter growth, and produce the pitch and protective chemicals used by the trees to ward off insect and disease.

Indirect:
Thinning dense stands would provide growing space to increase tree diameters, crown depth, and growth rates. This would result in larger average tree, snag, and down wood diameters earlier than in untreated

stands.

Cumulative:
At the stand scale, thinning would decrease the time each stand is in the stem exclusion stage thus moving each stand more rapidly into the understory reinitiation stage of stand development. Thinned stands would produce larger diameter snags and down wood sooner than if the stands were left unthinned.

At the landscape scale, attainment of greater species diversity, multi-canopy structure, larger average tree size, and larger snags and down wood, would reduce the contrast between these stands and remnant mature and late-successional stands. Consequently, the treated stands would contribute to the ability of the Riparian Reserves to provide connectivity and habitat for certain late-successional forest associated species across the landscape (USDA-USDI 1994, pg B-13.)

4.4.2.2 T&E, S&M, and Special Status Plants

Hardwood Conversion
Direct:
Hardwood trees would be selected for falling. Adjacent trees and stands probably have similar epiphytic species richness and abundance as the trees selected for falling. Tree falling would cause some ground disturbance, in addition to causing a loss of habitat for the epiphytic species in the canopy of the individual trees being felled. However, the species lost to the felled trees are typically abundant and would re-colonize disturbed areas.

Indirect:
As the felled trees are removed and the salmonberry is removed from the site, the action would allow more light to the understory and/or forest floor, thus resulting in higher photosynthesis rates for the residual native plants to re-colonize. This may initially result in an increase of brush growth and decreased surface moisture in the summer months. However, as conifers increase in size, light would decrease and shade tolerant plants would increase.

Cumulative:
The proposed hardwood removal action would eventually lead to a riparian area that has many older conifers and snags, which would provide habitat to species which grow in late-successional forests, both in the canopy and on down woody material. As many riparian areas near the project area are dominated by hardwoods, the conversion for some areas to conifers would be beneficial to many species. The re-introduction of native plants would help discourage the establishment of the exotic plant species.

Density Management
Direct:
Thinning dense conifer stands in proposed project areas would increase the stand's vulnerability to infestation by exotics, which thrive in the resulting disturbed soils and brighter light conditions. However, the canopy would eventually close, shading out weedy species. Some herbaceous species and epiphytes may have reduced vigor from the altering of the microclimate, while some species of herbs and shrubs would flourish from the increased sunlight.

Indirect:
Thinning has been observed to be associated with increased abundance of lichen biomass and increased similarity of lichen communities between young and old-growth stands. Gaps and patchy "wolf" tree-rich conifers promote epiphyte macrolichens in young conifer stands by providing more light and moisture accessibility to lichen habitat (Neitlich 1995).

Ground-disturbing activities that involve localized damage increases the opportunity for the establishment of new species (Sousa 1984; Jonsson 1990). In past studies, activities that included both disturbance to the forest bottom layer and treefall gaps, contributed to the structure and the diversity of bryophytes (Jonsson

1990).

Cumulative:
As the recent thrust in forest management in the Pacific Northwest, thinning contributes to the facilitation of late successional characteristics in young managed stands. Thinned stands also consistently show equal or greater richness, frequency, and cover of herbs and shrubs relative to nearby late-successional forests (USDI BLM 2002b).

4.4.2.3 Noxious Weeds

Hardwood Conversion and Density Management
Direct:
No detrimental direct effects are expected. This alternative has design features that would decrease the likelihood of introducing new noxious weeds or allowing them to become established. Additionally, the monitoring/follow up treatments resulting from implementation of this alternative would target any noxious weed for treatment, with priority on eradicating newly introduced weed species. This monitoring/treatment would not occur under the "No Action Alternative."

Indirect:
The long term results of weed treatments would be eradication of most mature weed plants, and suppression of seed bed sprouting through shading and vegetation competition. Releasing or establishing conifers would provide more shade to the site which would decrease noxious weed populations and encourage native plants.

Cumulative:
The cumulative effect of this action would be a reduction in noxious weeds at the project sites. Application of design features would reduce the chance of introducing new noxious weeds or increasing existing populations. Follow up monitoring and treatments would control/eradicate noxious weeds on the site.

No significant changes would occur in the current rate of spread. BLM ownership is scattered among other ownerships, and is available for access by the general public. This dispersed ownership and access increases the potential for the introduction of new weed species and spread of existing weeds.

4.5 *Effects of Implementing Alternatives A or B on Fire*

4.5.1 Alternative A : No Action

Hardwood Conversion and Density Management
Direct :
Under the no action alternative, no "direct" short term consequences to the fuels and fuel loadings of the proposed project areas would occur.

Indirect:
An "indirect" consequence of the no action alternative would result in stagnant stand conditions with associated mortality over time. This would result in a long term build up and accumulation of dead or dying fuels both ground and aerially disposed. These conditions would make the stands more susceptible to a damaging wildfire and would hamper fire control efforts during a catastrophic fire event.

Cumulative:
Stand densities, characteristics and composition that would make the stand naturally fire resistant would not be realized thus hampering the attainment of ACS goals.

4.5.2 Alternative B : Oxbow Riparian Silviculture

Hardwood Conversion and Density Management

Direct :
Under the proposed action alternative, there would be a short term increase in volatile fuel loadings and a short term increased risk of damaging wildfire in the affected areas.

Associated with the proposed action would be increased human activity which would increase the possibility of human caused wildfire.

Indirect:
Harvest/conversion activities would create openings in the project areas which may mimic openings caused by naturally occurring fire which has long since been eliminated from this environment. Thinning dense and stagnating stands would reduce the long term vulnerability of the stand to the possibility of damaging wildfire by removing or reducing accumulated fuel loadings.

Smoke from prescribed fire activities would contribute to minor short term increases in particulate matter in the surrounding airshed. All prescribed fire activities would be conducted in compliance with the Oregon Smoke Management Plan, (ODF 1992, OAR 629-43-043).

Cumulative:
Stand densities, characteristics and composition that would make the stand naturally fire resistant would realized at an accelerated rate thus hastening attainment of ACS goals.

No cumulative effect from smoke would occur as prescribed burning would occur spatially over time.

4.6 *Effects of Implementing Alternatives A or B on Geology / Soils*

4.6.1 Alternative A : No Action

4.6.1.1 Geology

Direct, Indirect, and Cumulative:
This alternative would have minimal direct and indirect impacts on existing geologic conditions. Continued development of the natural system would not impact the underlying stratigraphy except in the aspects of geologic time. Project activities, likewise, would not have short or long term impacts to the regional geology. There would be no construction of new roads. Therefore, there would be no intersection of dip planes or the reactivation of currently inactive slides by road construction.

4.6.1.2 Soils

Direct and Indirect:
This alternative may have some impact on existing soil conditions. The current road system allows motor vehicle access, which may cause the disruption of soils and erosion controlling vegetation, allowing for mobilization of sediments to the waterways. The no-action alternative would not allow for the maintenance of native surface pump chance accesses, the placement of waterbars and cross drains, or the maintenance of roads currently in disrepair.

Cumulative:
The regeneration of forest soils would continue. However, lack of road maintenance may allow for the continued erosion of sediment from the terraces. This would combine with non-project and off-site

conditions to increase surface degradation as well as add to sediment delivery to streams.

4.6.2 Alternative B : Oxbow Riparian Silviculture

4.6.2.1 Geology

Direct, Indirect, and Cumulative:
This alternative would have minimal direct and indirect impacts on existing geologic conditions. Continued development of the natural system would not impact the underlying stratigraphy except in the aspects of geologic time. Geomorphology of the area would continue to be impacted by the present influences.

4.6.2.2 Soils

Direct and Indirect:
There would be no mobile equipment entry or ground base systems. Therefore, there would be no equipment related compaction. Cable logging would create temporary surficial ground disturbance by movement of soil. However, the effect would be temporary, with vegetation, especially in a thinned open canopy system, reclaiming the impacts within one to a few growing seasons. Operations within units with potential flooding would be limited to dry season entry, ensuring that disrupted soils would be stabilized prior to potential erosion events.

Soils exposed during continuous landing construction would be seeded and mulched to eliminate localized soil impacts.

Renovation of existing roads would consist of roadside brushing, restoring the surface where necessary, and maintaining drainage structures. Currently low- or no-maintenance roads used by the project would be upgraded to current standards. Waterbars would be installed as needed. The natural surface pump chance would be surfaced, reducing sediment delivery potential.

Yarding across wetland soils would be managed as stream crossings. If full suspension cannot be obtained, the operations would be seasonally restricted until the soil is not saturated. Therefore, there would be no disturbance or destruction of wetland soil character.

Cumulative:
Dry season restrictions as well as other project design features would ensure that soil disturbance does not occur during times of sediment transport potential. The upgrading and maintenance of existing roads should reduce the potential for creating sediment, reducing by a small amount the entire watershed's current sediment load.

4.7 *Effects of Implementing Alternatives A or B on Hydrology*

4.7.1 Alternative A : No Action

4.7.1.1 Annual Yield, Low Flows, and Peak Flows

<u>Hardwood Conversion and Density Management</u>
Direct:
Flow timing and magnitude would remain unaffected.

Indirect and Cumulative:
Annual yield, low flows, and peak flows would be unaffected by maintaining present forest conditions. As

red alder has a greater evapotranspiration rate compared with conifers (Hicks 1991), riparian areas dominated by stands of hardwood have the potential to reduce low summer flows (see 4.7.2.1).

4.7.2 Alternative B : Oxbow Riparian Silviculture

4.7.2.1 Annual Yield

Hardwood Conversion

Direct:

There would be no measurable increase in annual yield with the hardwood conversion proposed activity. Hardwood conversion has the potential to affect annual yield; in theory, less water is lost to evapotranspiration from the removed vegetation. This water is available for stream flow and/or additional groundwater storage. The affect on annual yield from harvest is proportional to the amount of vegetation removed. As the conversion areas are extremely small in size and are spread over the course of five years, there will be no measurable direct effect to annual yield.

Indirect:

There would be no measurable increase in annual yield with the hardwood conversion proposed activity. The effects of proposed hardwood conversion on stream flow would be similar to those discussed under density management below. However, the following differences between treatments would apply. Conversion of hardwood stands to conifer would increase stream flow in summer since conifers are believed to transpire less water than hardwoods during the summer growing season. A paired watershed study by Hicks *et al.* (1991) indicated that hardwoods which regrew in the riparian area after logging used more water in summer than conifers. Examination showed that August flows 3-18 years after harvest were 25% lower than pre-harvest levels.

Cumulative:

There would be no measurable increase in annual yield with the hardwood conversion proposed activity. It is expected that possibly annual flows would be slightly increased when hardwood is replaced by coniferous species. However, at the scale of the proposed project (75 acres out of 48,430 project area acres), the effect may not be measurable at the drainage (REO 7th field) level.

Density Management

Direct:

No measurable increase in annual yield is expected as a result of the proposed project. Thinning has the potential to affect annual yield. In theory, less water is lost to evapotranspiration from the removed vegetation. This water is then available for stream flow and/or additional groundwater storage. As described below, studies have shown that the effect on annual yield from harvest is proportional to the amount of vegetation removed.

Indirect:

No measurable increase in annual yield is expected as a result of the proposed project. As noted above, responses have been proportional to the amount of vegetation removed. In one study (Harr 1979), a patchcut watershed which had 20 small clearcuts totaling 30% of the watershed resulted in an average water yield increase of 3.5 inches. Huff and others (2000) modeled the changes in water yields in the Sierras resulting from a large-scale thinning and vegetation management program. They concluded the thinning and vegetation management would, on average, increase water yields about 1%.

Research has also shown that the effects of harvest on annual yield are short-lived. Harr (1979) found that the regrowth of shrubs and small trees commonly returns rates of evapotranspiration to prelogging levels within about five years, while Keppeler and Ziemer (1990) and Ziemer *et al.* (1996) found that water yields returned to near pre-logging condition within a range of 1-8 years following harvests. Jackson and Haveren (1984) estimated that annual yield would return to pre-harvest levels within 5-15 years in the Coast Range.

Cumulative:
No measurable increase in annual yield is expected as a result of the proposed project. After examining 90 watershed studies worldwide, Bosch and Hewlett (1982) determined that water yield increases are usually only detected when at least 20-30% of the watershed has been harvested. In an overview of several studies, Satterlund and Adams (1992, p. 253) found that "lessor or non-significant responses occur ... where partial cutting systems remove only a small portion of the cover at any one time." Where individual trees or small groups of trees are harvested, the remaining trees would generally use any increased soil moisture that becomes available following timber harvest.

Since the proposed thinning involves only partial cutting in about 0.5% of the Upper Smith River Watershed, about 248 out of 48,430 acres, no measurable increase in water yield is expected as a result of the proposed project. In addition, any potential effects on water yield from the proposed density management would be reduced gradually over time as the remaining trees in thinned stands increase their growth rate and uptake of nutrients and water.

4.7.2.2 Low Flows

<u>Hardwood Conversion</u>
Direct:
Any increase in low flows, in the short term, would be beneficial. While it is possible for small increases, they would not be detectible. Studies have shown that low flows may be affected by timber harvest. One report, which synthesized results from six paired watershed studies, showed that relative increases in summer flows were initially high after harvest but were eliminated within a few years due to regrowth of vegetation (Harr 1983). Another study showed that base flows can actually decrease below pre-harvest levels if more consumptive riparian species occupy near stream areas (Hicks 1991). This condition may be occurring presently due to the large number of hardwood and overstocked conditions within many of the previously harvested stands. However, there is little historical data to verify naturally occurring low flow levels.

Indirect:
Low flows may initially increase following hardwood conversion in the proposed project area, but the effect is expected to be short lived (5-10 years) and would not be measurable. Any increase in low flows, in the short term, would be beneficial.

Cumulative:
Increases in low flows, while not detectible, would be a short term benefit. One objective of the proposed project is to replace hardwood, a more consumptive species, with conifer in riparian areas. This has the potential to increase summer low flows, but not at a measurable level due to the size of the proposed units.

<u>Density Management</u>
Direct:
Any increase in low flows, in the short term, would be beneficial. While it is possible for small increases, they will not be detectible. The effects of proposed density management on stream flow would be similar to those discussed under hardwood conversion above.

Indirect:
Low flows may initially increase following thinning in the proposed project area, but the effect is expected to be short lived (5-10 years) and would probably not be measurable.

Cumulative:
Any increase in low flows, in the short term, would be beneficial. While it is possible for small increases, they would not be detectible. Small increases in low flows, while they are probably not measurable, is expected to be short lived (5-10 years).

4.7.2.3 Peak Flows

<u>Hardwood Conversion</u>
Direct:
No measurable change in peak flows would be expected. Timber harvest studies (Jackson and Van Haveren 1984 cited in Reiter and Beschta 1995) have shown that peak flows during fall and spring periods are likely to be increased primarily due to reductions in transpiration and interception losses. Rothacher (1973), Harr (1976), Jackson and Haveren (1984), and others found that major high flows were not significantly increased as a result of timber harvest in the low elevation Coast Range.

Indirect and Cumulative:
No measurable change in peak flows would be expected. Large peak flows in the low elevation Coast Range are dependant on the intensity and duration of rainfall rather than vegetation manipulation. As noted above, changes in the magnitude and timing of stream flow has been found to be proportional to the amount of vegetation removed. Judging by the scale and location of the proposed project, there would be no measurable change in peak flows.

<u>Density Management</u>
Direct:
No measurable change in peak flow would be expected following density management in the proposed units. The effects of proposed density management on peak flows would be similar to those discussed under hardwood conversion above.

Indirect and Cumulative:
No measurable change in peak flows would be expected. The effects of proposed density management on peak flows would be similar to those discussed under hardwood conversion above. Judging by the scale and location of the proposed project, there would be no measurable change in peak flows.

4.8 *Effects of Implementing Alternatives A or B on Water Quality*

For Effects on Temperature, see Issue 1 - Section 4.2.
For Effects on Sediment, see Issue 2 - Section 4.3.

4.9 *Effects of Implementing Alternatives A or B on Aquatic Habitat and Fish Species*

4.9.1 Alternative A : No Action

4.9.1.1 Aquatic Habitat

<u>Hardwood Conversion</u>
Direct:
There would be no direct effects to the fisheries resource if this alternative is implemented.

Indirect:
Benefits of enhancing the structural characteristics, including future large woody debris, in the project area would not occur. Habitat conditions for species associated with or dependent upon late-successional Riparian Reserves and Essential Fish Habitat (EFH) would remain unchanged. The small contribution to the streams by alder would eventually cease when the alder stands convert to salmonberry.

Cumulative:
This alternative would not add to the cumulative effects of large wood depletion in the watershed, nor would it enhance or accelerate potential future large wood sources. Without a conifer component alongside the streams, large wood input would rely largely upon human restoration activities.

<u>Density Management</u>
Direct:
There would be no direct effects to the fisheries resource if this alternative is implemented.

Indirect:
Benefits of enhancing the structural characteristics, including future large woody debris, in the project area would not occur at an accelerated rate. Habitat conditions for species associated with or dependent upon late-successional Riparian Reserves and EFH would remain unchanged.

Cumulative:
By not enhancing growth of existing conifers along side streams, large wood input would rely upon human restoration activities until these stands reach an age to be contributory and self-sufficient.

4.9.1.2 Special Status Species

As there would be no direct Federal action, there would be no need to consult with the National Marine Fisheries Service (NMFS).

4.9.2 Alternative B : Oxbow Riparian Silviculture

4.9.2.1 Aquatic Habitat

<u>Hardwood Conversion</u>
Direct:
No-harvest buffers would be established (see Chapter 2) for all streams within and adjacent to proposed units. These buffers would maintain current temperature regimes, filter any potential sediment from ground disturbing activities, maintain bank stability, and provide a wood source to stream channels.

Units that have seasonally saturated soils would be restricted to dry season activities only. This would further prevent sediment from being generated in these units to reach the stream channels.

Most of the haul routes are paved. Some gravel-surface haul routes would be restricted to summer haul only. The remaining gravel-surface haul routes may be fitted with silt fencing/straw bail barriers as needed to prevent sediment run off during the winter season. Hauling on these roads would also be restricted during periods of heavy rainfall (> 1 inch/12 hours) in order to prevent sediment from being generated by road travel. Additionally, some gravel-surface roads may be upgraded as part of ongoing restoration activities within the Resource Area. These particular road upgrades are not associated with this project proposal. If funding is secured, Units that would be served by these upgrades, would be scheduled to occur after the roads have been improved. This would further eliminate the chance for sediment delivery to stream channels as a result of this project. If this funding is not secured, these roads would receive standard maintenance and then be restricted to dry season haul only. Due to these project design features, there would be no direct effect to the fisheries resource from implementation of this alternative. For more discussion of these project design features, refer to Section 2.6.1.

Indirect:
Under the Proposed Action, approximately 75 acres in Riparian Reserves would be treated to restore conifer species and facilitate development of large trees, snags, and down logs in areas that were formerly

dominated by conifers. Restoration of conifers from hardwood-dominated riparian forests in the Oregon Coast Range is crucial to the creation of stream habitat favorable to anadromous salmonids (Emmingham 2000) and EFH. Conifers provide the large logs necessary for complex stream habitat; these large logs are the key elements in debris jams, which foster the development of pools, accumulation of gravel, hiding cover, and off-channel habitat for fish during high flows (Emmingham 2000).

Although the conversion process curtails the short-term contributions of small nondurable hardwood pieces to the forest floor and nearby streams from the treated areas, the alders in the no-harvest buffers would provide wood sources until those alders break up about age 90 to 130 years. By that time, the planted conifer would be well-established and provide durable wood sources in the long-term. Naturally occurring stream bank erosion would likely maintain a component of alder next to the stream channels. Because the reestablishment of large conifer would take decades, the benefits to riparian function would not occur in the short-term.

Cumulative:
Although not contemporaneous with the proposed actions, the expected cumulative effects of this alternative are beneficial overall and would tend to offset the current homogeneity of the stands within the Oxbow project area and benefit listed fish species and EFH in the long-term. The alder conversion projects would restore conifer to locations where it formerly existed, and eventually become late-successional forest in areas not managed for timber production.

<u>Density Management</u>
Direct:
Under the proposed action, approximately 248 acres of young conifer and mixed stands in Riparian Reserves would be thinned to facilitate development of late-successional characteristics such as large trees, snags, and durable down logs. No-harvest buffers would be established (see Chapter 2) for all streams within and adjacent to proposed units. This would maintain current temperature regimes, filter any potential sediment from ground disturbing activities, maintain bank stability, and provide a wood source to stream channels.

Units that have seasonally saturated soils would be restricted to dry season activities only. This would further prevent sediment from being generated in these units to reach the stream channels.

The effects from roads would be the same as discussed under hardwood conversion above.

Indirect:
After the stands are thinned, the growth rate of individual trees and the resultant structural diversity is expected to increase in the long-term (15+ yrs). 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.

Cumulative:
Thinning operations would increase tree growth and diversity of stand characteristics with a trend toward conditions similar to that of late-successional forests.

4.9.2.2 Special Status Species

For this proposal, the numerous design features incorporated into the project actions would lead to a “no effect” (NE) determination, and the issuance of an incidental take permit would not be required from the NMFS. Temperature and sediment are the two indicators which could have impacted listed fish species. By using the Shadow Model to delineate no-harvest buffers along all streams, there would be no discernable effects to stream temperatures. The Shadow Model is based on simple trigonometry using tree height, slope, and stand/stream aspect. Additional project design features have been incorporated that would prevent the likelihood of road-generated sediment from impacting streams.

4.10 *Effects of Implementing Alternatives A or B on Wildlife Species and Habitat*

4.10.1 Alternative A : No Action

Hardwood Conversion
Direct:
The impacts associated with the proposed treatments would not occur. There would be no noise disturbance to northern spotted owls or marbled murrelets that may be in the vicinity. There would be no logging damage to existing snags, down logs, or the shrub layer. However, snags and down logs would be created from suppression mortality and thus would be small in size. Large conifer trees, snags, and logs in the riparian area would remain scarce, reducing the variety and abundance of wildlife habitats available. There would be no down wood creation which would leave those stands targeted for treatment at a deficit for decay class 1 and 2 logs. The hardwood dominated stands would continue to provide some habitat values for wildlife, but it would be less than those of the mixed hardwood - conifer stands that were historically present.

Indirect:
In the long term, the alder would eventually die out and most of the red alder units would become a salmonberry / brush field which is a less desirable condition for native wildlife species.

Cumulative:
The red alder units would become a salmonberry / brush field which would decrease the amount of conifer riparian areas available to wildlife in the sub-watershed.

Density Management
Direct:
The impacts associated with the proposed treatments would not occur. There would be no noise disturbance to northern spotted owls or marbled murrelets that may be in the vicinity. There would be no logging damage to existing snags, down logs, or the shrub layer. However, snags and down logs would be created from suppression mortality and thus would be small in size. Large conifer trees, snags, and logs in the riparian area would remain scarce, reducing the variety and abundance of wildlife habitats available. There would be no down wood creation which would leave those stands targeted for treatment at a deficit for decay class 1 and 2 logs.

Indirect:
In the short term, the vegetative habitat characteristics of the density management stands would remain favorable for species that utilize the closed sapling-pole-sawtimber stand condition described in the Affected Environment. In the long term, the dense areas of suppressed Douglas-fir would remain until the stand had self-thinned, delaying attainment of some habitat characteristics for as long as 200 years (USDI BLM 2001).

Cumulative:
Under the No Action Alternative, natural succession in the density management units would continue at a slower pace, extending the time required for many habitats and wildlife populations to recover.

4.10.1 Alternative B : Oxbow Riparian Silviculture

All Treatments
By conducting all activities that create noise above ambient levels in accordance with U.S. Fish and Wildlife Service (USFWS) Project Design Criteria, disturbance impacts to any nesting marbled murrelets, spotted owls, or other threatened or endangered species located in the vicinity of the proposed project

would be minimized. Seasonal and daily timing restrictions are outlined in Chapter 2.

In the short term, the proposed action would not cause negative impacts to Survey and Manage wildlife species as discovery sites would be managed according to current approved management recommendations. In the long term, the proposed action would either add a conifer component back into the stands, or speed the development of the existing conifer in the stands which would have a positive impact on Survey and Manage Species.

Down wood creation in the proposed units would increase current decay class 1 and 2 amounts and benefit wildlife species that utilize down wood. The structures would serve as foraging, nesting cover, and dispersal habitat for a variety of birds, small mammals, and amphibians.

<u>Hardwood Conversion</u>
Direct:
Removal of red alders within the unit and single stemming the bigleaf maples would provide the additional light and growing space needed to establish conifer in the unit. The proposed action would also allow for tree species diversity by the retention of bigleaf maple, and retention of red alder in the stream buffers. Reestablishing conifer in the areas would create a vegetative and structurally complex conifer/hardwood forest with a species composition more similar to pre-burn conditions. Leaving some cut hardwoods on site would provide an input of down logs for wildlife habitat in the short term.

None of the units were natural red alder stands, and thus the proposed action would not remove stands that were at one time historic habitat for the white-footed vole. In addition, the units would be small in size, stream buffers would retain red alder, and the project would be treating a small amount of red alder relative to the abundance of alder-dominated stands in the subwatershed.

Indirect:
Hardwood conversion would have a beneficial effect on most wildlife species, especially those associated with late-successional conifer forest including Special Status and Survey and Manage species, as it would restore the conifer component of the stands. In the long term, the planted stands would also contribute conifer snags and down wood which are more beneficial to wildlife and longer lasting than alder.

Burning the alder conversion units may affect northern spotted owls, marbled murrelets, neotropical migratory birds, and other wildlife as it could occur during the nesting season and could utilize equipment that would generate noise above ambient levels. There is also a risk that smoke may enter into suitable habitat stands in the vicinity. However, it would not be a significant negative effect as the recommended seasonal restrictions from the USFWS Biological Opinion would be applied when possible, the action is scattered over several small units, and smoke management plans would be applied that would decrease the risk of smoke drift into any adjacent suitable habitat.

Cumulative:
Restoration of these stands to a conifer riparian habitat would provide more suitable habitat for most native wildlife species. It would also provide more forested connectivity throughout the sub-watershed. Thus, the proposed action should help speed restoration of key conifer riparian habitat that would be used by more native wildlife species associated with this habitat than are currently present in the sub-watershed.

<u>Density Management</u>
Direct:
The thinnings would not remove or degrade suitable habitat for the northern spotted owl. The treatments would not negatively affect any constituent elements of Critical Habitat. There is only 1 unit that is over 40 years of age and classifies as dispersal habitat. The other proposed stands are not dispersal habitat, as they are small in diameter, very dense (thereby impeding mobility), and contain little structural diversity. As the stands in the LSR density management treatments would not be thinned below 60 trees per acre, the canopy cover would not be below 60 percent, which is in conformance with the LSR Assessment (pg. 71, USDA-

USDI 1998). There are 8,685 acres (33%) of dispersal habitat on federal land within the Upper Smith River 5th Field Watershed.

The proposed units do not contain suitable marbled murrelet habitat. There are 2,768 acres (11%) of suitable habitat available to murrelets on federal land within the Upper Smith River 5th Field Watershed. The treatments in the LSR units would not negatively affect any constituent elements of Critical Habitat. The Marbled Murrelet Recovery Plan (USDI USFWS 1997) includes the use of silvicultural techniques such as thinning to increase the speed of development of new habitat. Within this plan, Task (3.2.1.3) states that thinning accelerates tree growth and can be used as a tool to produce large trees more quickly than in normal stand development.

Indirect:
Thinning had a neutral or positive effect on most forest-floor small mammals in a study conducted in the Tillamook Burn area of Oregon (Hayes 2001b). The authors reported that thinning and thinning intensity may enhance habitat quality by opening the canopy and allowing for increases in understory vegetation. It may also accelerate development of structural characteristics. The Oxbow burn area is very similar to the 35 to 50-year old even-aged Douglas fir community in this study, and thus thinning in the proposed units should also have a neutral or positive effect on the existing forest-floor small mammal community.

In the same Tillamook study area as above, Hayes (2001) concluded that the short term impacts of thinning for most bird species in the study were positive, neutral or of a minor negative impact. In addition, thinning can increase structural complexity of stands over time and bird species would benefit from the treatment if done in conjunction with retention of legacy structures, down wood, retention of some densely stocked stands, and other conservation measures. Bird species that had increased detections in response to thinning were the dark-eyed junco, warbling vireo, American robin, hairy woodpecker, Townsend's solitaire, evening grosbeak, western tanager, and Hammond's flycatcher. Density management in the proposed units would have similar results and thus would be beneficial to some birds, and would have only minor short term impacts to others. Thinning would increase tree crown depth and volume, would increase understory vegetation size vigor and diversity, and by increasing tree size there would be a greater bole surface area and increased bark furrowing. The net effect of this is a greater and more diverse range of foraging substrate that would be used by several bird species (Weikel 1997).

Thinning would increase understory shrub development which would provide cover for neotropical migratory birds that are shrub nesters. Units within 0.25 miles of unsurveyed suitable habitat for the marbled murrelet would have seasonal restrictions for harvest activities This restriction would also protect nesting songbirds in the proposed units from disturbance during the nesting season.

Cumulative:
Density management would produce larger conifer trees, snags, and down logs in a shorter time period than if the stand was not managed. The presence of this type of habitat across the landscape would provide more suitable habitat for wildlife species associated with older, conifer dominated riparian areas. It would also provide more forested connectivity throughout the sub-watershed. Thus, the proposed action should help speed restoration of key conifer riparian habitat for use by more native wildlife species associated with this habitat than are currently present in the sub-watershed.

4.11 *Effects of Implementing Alternatives A or B on Recreation*

4.11.1 Alternative A : No Action

Direct:
The existing recreational use and/or activities are expected to continue to occur on BLM administered public lands in the area. Minimal regulatory constraints would continue to preserve the visitors's freedom to choose where to go and what to do.

Indirect:
There would be no human manipulated opening created in the forest which may attract or deter visitors. There would be no temporary access closures to limit visitor traffic.

Cumulative:
There are no foreseeable cumulative impacts to recreation.

4.11.2 Alternative B : Oxbow Riparian Silviculture

Direct:
Some visitors may be temporarily displaced from some undeveloped, dispersed recreation sites during any work on public lands including periodical restoration and silvicultural treatments. Minimal regulatory constraints would continue to preserve the visitors' freedom to choose where to go and what to do, although some temporary closures and/or detours may be expected during any work on public lands including periodical restoration and silvicultural treatments.

Indirect:
Visitation in the area may fluctuate when dense forested areas are opened up in this alternative. More openings in the vegetative cover may be more desirable for some visitors and less desirable for others. Visitation in the area may fluctuate with temporarily reduced access.

Cumulative:
There are no foreseeable cumulative impacts to recreation.

4.12 *Effects of Implementing Alternatives A or B on Cultural Resources and Native American Religious Concerns*

4.12.1 Alternative A : No Action

There are no effects anticipated from this Alternative.

4.12.2 Alternative B : Oxbow Riparian Silviculture

There are no anticipated direct, indirect, or cumulative effects on cultural resources or Native American religious concerns from the proposed action if project design features are followed. The proposed action is not likely to expose, damage, or destroy any cultural resources.

4.13 *Effects of Implementing Alternatives A or B on Energy Development*

As there are no road closures associated with either alternative, energy development and accessibility would remain unchanged from its current condition. In the past, some energy exploration has occurred within the general areas of the project. No results have been disclosed by the companies conducting the explorations; however, while a lease is currently open for bid containing the project area, no bids or permit applications have been filed to begin development of any energy reserves.

4.14 *Effects of Implementing Alternatives A or B on Solid and Hazardous Waste*

4.14.1 Alternative A : No Action

No effects are anticipated from the No Action Alternative.

4.14.2 Alternative B : Oxbow Riparian Silviculture

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

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

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

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

4.15 *Consistency With Aquatic Conservation Strategy Objectives*

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and the aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of Pacific Ocean anadromy (USDA-USDI 1994, p. B-9). The appropriate landscape scale for evaluating the consistency of individual and groups of projects with the ACS is the watershed, corresponding with the "fifth-field" hydrologic unit code (HUC) as defined in the "Federal Guide for Ecosystem Analysis at the Watershed Scale"[3]. The proposed projects are all within the Upper Smith River 5th Field Watershed (HUC# 1710030306).

The intent of the ACS is to maintain and restore aquatic habitats and the watershed functions and processes within the natural disturbance regime by prohibiting activities that retard or prevent attainment of the ACS objectives. The primary emphasis of the Standards and Guidelines for Riparian Reserves is restoration of the ecological processes and stream habitats that support riparian-dependant organisms.

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[3] Reference November 9, 1999 Regional Ecosystem Office memorandum concerning Northwest Forest Plan Requirements for ACS consistency determination.

The conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime, but it is not possible to provide for the complete recovery of aquatic systems on federal lands within the range of the northern spotted owl within the next 100 years, and full recovery may take as long as 200 years.

ACS OBJECTIVE 1 - *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.*

The project involves commercial thinning and alder conversions on Riparian Reserve land use allocations (LUAs). The total acreage does include some GFMA and LSR lands. Measures would be taken when implementing the projects to assure the maintenance and restoration of watershed and landscape features as described in the Project Design Features section of this EA. Coarse wood and snags would be retained in the project units and additional down wood would be left within the units. Increased spacing created by the project will release minor conifers species, thereby increasing overall stand diversity and providing long-term habitat for riparian and aquatic-dependent species. The development of larger trees and a diverse understory is expected to provide greater benefits to more species.

No vegetation manipulation would occur within Riparian Reserves that would degrade the aquatic systems. As there would be no new road construction, there would be no increase in road densities. On the few units that would be affected, the provision of yarding corridors through Riparian Reserves would result in only minor gaps in the overstory canopy and not degrade the Riparian Reserve (ie. the Riparian Reserve system would continue to provide adequate shade, woody debris recruitment, and habitat protection and connectivity). The design features proposed for the projects are expected to maintain the elements outlined in ACS Objective 1.

The first Aquatic Conservation Strategy of maintaining and restoring coarse scale distribution, diversity, and complexity of watershed and landscape scale features are provided for by an array of land use allocations. Watershed and landscape features associated with late-successional forests, are provided by the Late-Successional Reserves and Riparian Reserves. Matrix lands provide these features associated with early and mid-successional forests. Management direction provides for retaining legacy structures/ attributes on the Matrix lands like coarse woody debris, snags, and wildlife trees. These provide features found in unmanaged early and mid-successional landscapes. These legacy structures fulfill habitat requirements for some early and mid-successional associated wildlife species. These structures also make this habitat more hospitable and permeable for late-successional associated species (Hicks 1999).

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

The second ACS objective to maintain and restore spatial and temporal connectivity is attained, in part, by including the following inside the Riparian Reserve:

- The drainage network
- Hydrologic features like flood plains and wetlands
- The source areas of sediment and organic material to insure that these materials are available to the stream and in quantities that are within the range of natural variation for the watershed. These source areas include riparian vegetation, streamside slopes, and headwalls.

The Key Watershed component of ACS fulfills the refuge aspect of this ACS objective.

No permanent roads or culverts would obstruct routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species. The density management and alder conversion projects would retain the dominant conifer in both the Riparian Reserves and upland areas, and spatial and temporal connectivity would be maintained (canopy closure post-thinning would be a minimum of 60% in the thinned stands). No known refugia would be affected by the proposed projects. The proposed action is consistent with ACS Objective 2.

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

The physical integrity of the aquatic systems in the vicinity of the proposed treatment areas would be maintained by the Riparian Reserve network. Incorporation of design features described above would avoid impacts to stream bank and existing bottom configurations. Where thinning and alder conversions occur within Riparian Reserves, a minimum of 20 foot no-harvest buffers would be maintained along all stream channels, and the trees within the buffers would remain on site. There would be no yarding across fish-bearing stream channels. Over non-fish-bearing stream channels, full suspension of logs would occur where possible, and if not, yarding operations would be restricted to the dry season. These and other design features for the project would maintain or improve the elements outlined in ACS Objective 3.

ACS OBJECTIVE 4 - *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

The proposed projects are not likely to have a measurable effect on water temperatures or turbidity levels, or result in the release of hazardous materials. The no-harvest buffers, retention of the dominant trees, and post-thinning canopy closure of at least 60% should be sufficient to prevent temperature impacts. Full-log suspension over snon-fish bearing treams would prevent damage to streambanks such that no erosion or sedimentation would occur during wet periods of the year. Where full log suspension is not feasible, one-end suspension would be required and yarding would be limited to the dry season. If haul occurs on gravel-surface roads during the wet seasons, sediment filters would be located to prevent road-generated sediment from entering aquatic and riparian habitats. Road related construction and improvement work involving earth moving equipment would be accomplished during the summer months.

Refueling of gas or diesel-powered machinery will not occur in close proximity to stream channels. The contractor would be required to have a hazardous materials action plan to contain and clean-up any spills. Mechanisms would be in place to respond quickly to the incident to avoid contamination of a waterway. The design features of the proposed actions are expected to maintain the elements outlined in ACS Objective 4.

ACS OBJECTIVE 5 -*Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

Implementation of Best Management Practices (USDI BLM 1995b) and project design features should prevent any measurable increases in turbidity and fine sediment levels outside of the natural range of variability (see discussion for ACS Objective #4 above). Design features will minimize or eliminate road generated sediment delivery to streams along the gravel surface portions of the haul routes. Design features would prevent sedimentation or turbidity increases that would measurably affect the sediment regime. Portions of the project areas considered at high landslide risk would be protected as part of the Riparian Reserve network, and would not influence the timing, volume, rate or character of landslide events. The elements outlined in ACS Objective 5 would be maintained.

ACS OBJECTIVE 6 - *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

The hydrology of the area is driven by precipitation in the form of rain. The area may occasionally receive snow, but the quantity and duration of the snow does not normally produce rain-on-snow events. Due to the small scale of this project (<1% of the Upper Smith River watershed), the projects would not measurably affect the hydrology of the streams and tributaries within the project area. There would be no measurable effect to annual yield, low or peak flows. Therefore, this project would maintain ACS Objective 6.

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

The proposed action would maintain the current Riparian Reserve network on federally administered lands. The timing, magnitude, variability and duration of floodplain inundation will be maintained in the short- and long-term at both the site and 5th field watershed scales. Areas that are not currently connected with the floodplain would likely remain disconnected in the short-term and possibly in the long-term. No change in the current flow regime outside the range of natural variability is anticipated (see ACS Objective #6).

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

The current Riparian Reserve network would be maintained on BLM administered lands. The proposed action would not alter any streamside vegetation that would be expected to influence stream temperature at the site or 5th field watershed scales in the short- or long-term. Thinning in the Riparian Reserves will release minor conifer species, increase overall stand diversity, and provide shading and surface litter. The development of larger trees and a diverse understory is also expected to provide greater benefits to more species. By maintaining the Riparian Reserve network, adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, channel migration, and coarse woody debris recruitment are expected to be maintained on federal lands. No-harvest buffers and other design criteria would protect identified wetland areas. Therefore, it is concluded that the proposed project is consistent with ACS Objective 8.

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

On a broad scale, the NFP provides for the maintenance and restoration of habitat to support well distributed populations of riparian-dependent species, primarily through the Late-Successional Reserve and Riparian Reserve networks. Other NFP components that further contribute to this goal include designation of Key Watersheds, mitigation measures for Survey and Manage Species, maintaining 15% of all watersheds in late successional forest condition, retaining 25-30% late successional forest in Connectivity blocks and retention of northern spotted owl 100 acre core areas and marbled murrelet occupied sites in Matrix lands.

The proposed action would maintain all the appropriate NFP land use allocations and management standards within the Upper Smith River watershed, including the Riparian Reserve network. This would result in the protection of habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species in the short- and long-term. The proposed project would be consistent with the elements of ACS Objective 9.

Chapter 5 : List of Preparers

Name	Title	Project Role
Aimee Hoefs	Fisheries Biologist	Team Lead, Fisheries
Tim Barnes	District Geologist	Geology, Soils, Energy Development
Bill Elam	Forestry Technician	Fire / Silviculture
Terry Evans	Plans Forester	Forestry
John Harper	Park Ranger	Recreation
Scott Knowles	Natural Resource Specialist	Noxious Weeds / Environmental Justice
Shanna Olson	Hydrologist	Hydrology
Frank Price	Landscape Ecologist	Ecology
Stephan Samuels	Archeologist	Cultural Resources / Native American Religious Concerns
Jenny Sperling	Botanist	T&E, S&M, Special Status Plants
Tim Votaw	HazMat Coordinator	Solid and Hazardous Waste
Kathy Wall	Wildlife Biologist	Wildlife

Chapter 6 : List of Agencies and Persons Consulted and/or Provided Copies

The general public was notified of the planned EA through the Coos Bay District's *Planning Update*, the District's Internet Site, and a legal notice published in The World newspaper.

The following public agencies and interested parties were notified with e-mail scoping letters:

Organization / Individual	Contact
Coast Range Association	Sale Monitoring
Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians	
Department of Land Conservation & Development - Coastal	Christine Valentine
Division of State Lands	
Kerns, Hugh	
Sierra Club	Pam Hewett
Umpqua Watersheds, Inc.	Francis Etherington
Wildlife Management Institute	West Representative

The following public agencies and interested parties were notified with hard copy scoping letters:

Organization / Individual	Contact
Association of O&C Counties	Rocky McVay
Douglas County Board of Commissioners	Chairman
Douglas Timber Operators	Dan Johnson
Fontenot, David	
Governors Natural Resources Office	Paula Burgess
John Muir Project	Chad Hanson
Kalmiopsis Audubon Society	
Klamath-Siskiyou Wildland Center	Joseph Vaile
National Marine Fisheries Service	
Native Plant Society of Oregon	Steven Jessup

Organization / Individual	Contact
Oregon Department of Agriculture - Noxious Weed Control Program	David Issaicson Tim Butler
Oregon Department of Environmental Quality	Coos Bay - Pam Blake Portland - Stephanie Hallock
Oregon Department of Fish and Wildlife	Chairman
Oregon Department of Forestry	Jim Brown
Oregon Natural Resources Council	D. Heiken
Southern Oregon Timber Industries Association	
Yockim, Ron	

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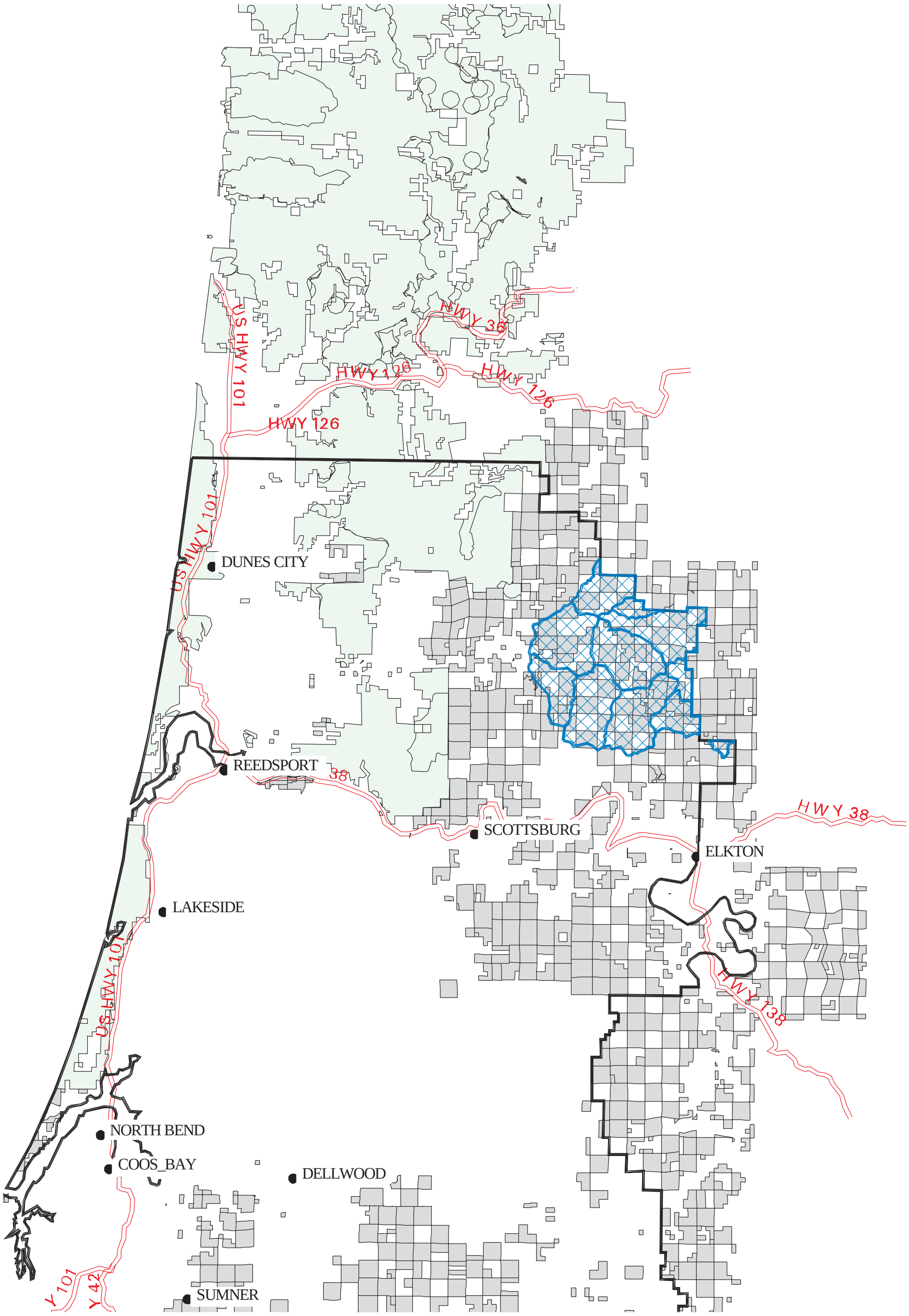
MAPS

Map 1: Vicinity of Oxbow Riparian Silviculture Project

Map 2 : Drainage Names and Acres by Drainage With Proposed Units

VICINITY OF OXBOW RIPARIAN SILVICULTURE



MAP FEATURES

- BLM Administered Land
- Project Location
- USDA Forest Service Land
- BLM District Boundary

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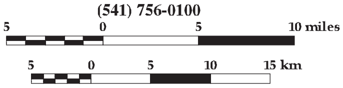
North Bend, Oregon 97459
(541) 756-0100



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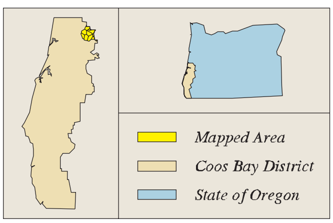
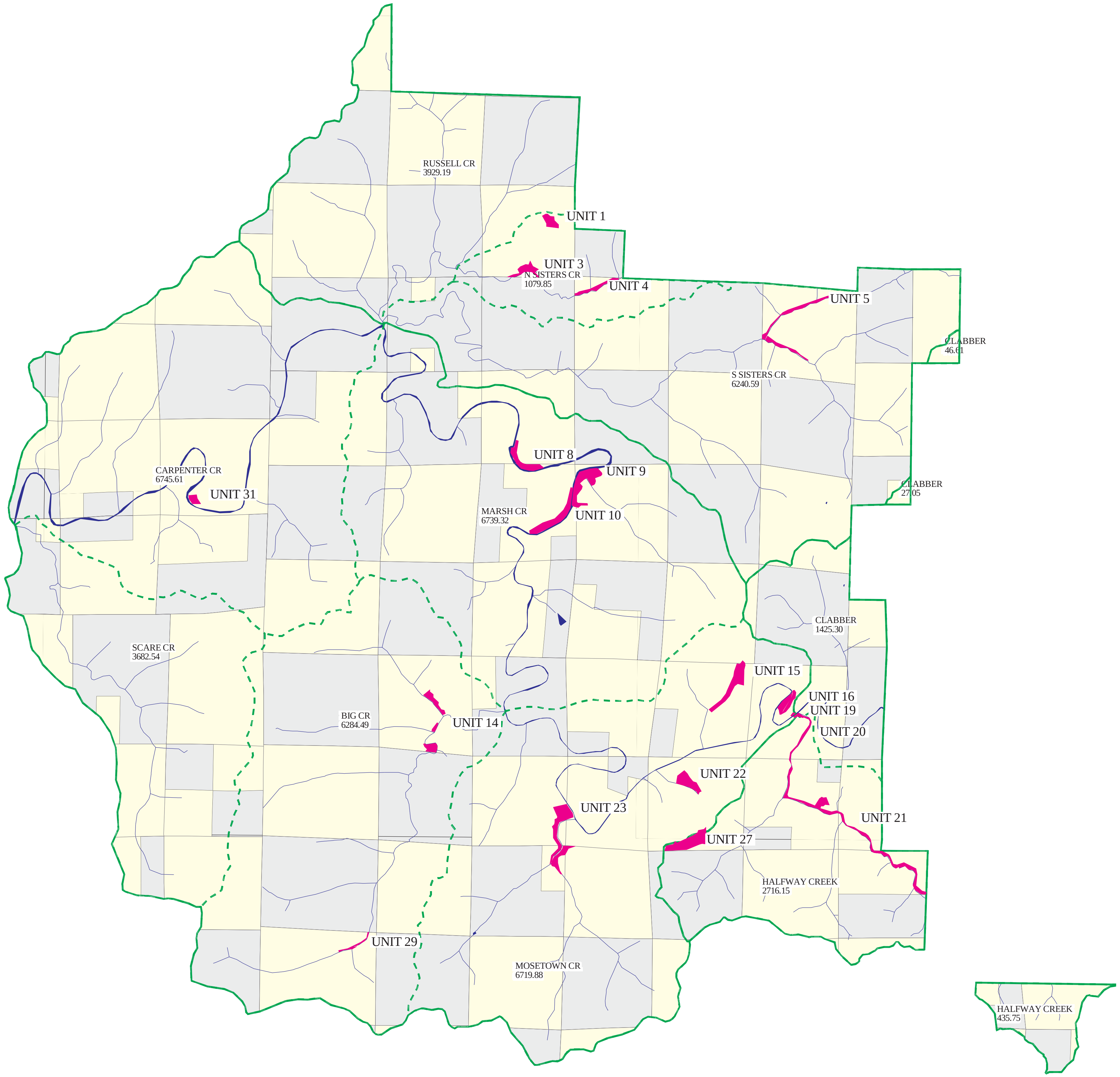


Map 2 - Drainage Names and Acres
by Drainage With Proposed Units
OXBOW RIPARIAN SILVICULTURE



MAP FEATURES

BLM Administered Land
State, Private or Other Lands
Streams, 3rd-Order or Greater
7th-Field Drainage Boundary
Subwatershed Boundary
Proposed Restoration Mgt. Units

N
W E
S

Scale 1: 75697

0.5 0 0.5 1 1.5 2 miles
1 0 1 2 3 km

Universal Transverse Mercator
Zone 10, Spheroid Clark 1866, NAD 1927

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