Yachats Aquatic Restoration Project

Preliminary Analysis

Siuslaw National Forest
South Zone District
Lincoln and Lane Counties, Oregon

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Comments received in response to this solicitation, including names and addresses of those who comment, will be considered part of the public record on this proposed action and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who only submit anonymous comments will not have standing to appeal the subsequent decision under 36 CFR part 215. Additionally, pursuant to 7 CFR 1.27 (d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Person requesting such confidentiality should be aware that, under the FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets.

Contents

Why is the project needed, and what evidence established these needs? CHAPTER 1

Chapter titles are framed as questions intended to focus the writing and to alert readers to judge whether the answers provided are adequate. For readers accustomed to earlier environmental documents, chapter 1 is equivalent to the "Purpose and Need for Action" section.

The Proposed Project

Introduction—District Ranger Bill Helphinstine proposed the Yachats Aquatic Restoration Project (the Project) to enhance watershed function. The Project lies in the Yachats River basin and is about 42 air miles southwest of Corvallis, Oregon (map 1). The Project proposes to implement activities, including placing up to 750 large conifer trees—up to 36 inches in diameter at breast height—in streams throughout the Yachats watershed; removing culverts and fills from two abandoned roads; and, in the Beamer Creek area, noncommercial thinning two acres of a conifer plantation, releasing 5 acres of conifer from alder competition, and removing landing fill. The proposed project was designed to address the problem discussed in The Problem To Be Addressed, page 2. Because some activities have been dropped from the proposed project (see Alternatives Considered But Eliminated from Detailed Study section, pages 6 and 7), Alternative 2 is now considered and displayed as the proposed project**.** Descriptions of the proposed project and other alternatives are located in chapter 2, pages 7 to 9.

Relationship to the Siuslaw Forest Plan—The Siuslaw Forest Land and Resource Management Plan (Siuslaw Forest Plan; USDA 1990), as amended by the Northwest Forest Plan (USDA, USDI 1994), establishes the management direction, desired conditions, and standards and guidelines under which lands administered by the Siuslaw National Forest are managed. These plans are intended to provide for healthy forest ecosystems, including protecting riparian areas and waters. All relevant aspects of the amended Siuslaw Forest Plan—such as management area standards and guidelines—apply to this project. Thus, this assessment is tiered to the Final Environmental Impact Statement for the Siuslaw National Forest Land and Resource Management Plan (Siuslaw Forest Plan), as amended by the Northwest Forest Plan.

The Planning Area

The planning area includes 6 sub-watersheds in the Yachats 5th-field watershed and covers about 28,000 acres. The U.S. Forest Service manages about 76 percent of the area, 23 percent is privately owned, 1 percent is managed by the Bureau of Land Management, about 100 acres are managed by the Oregon Department of Fish and Wildlife, and about 40 acres are managed by the Oregon Department of Forestry. The project area is located in portions of Township 14 South, Range 10 and 11 West; and Township 15 South, Range 10 and 11 West; Lincoln and Lane Counties, Oregon.

The Problem To Be Addressed

Based on available information, including the direction from the Northwest Forest Plan (the Plan) and the Yachats-Blodgett Watershed Analysis, District Ranger Bill Helphinstine identified the following problem:

- ✓ The shortage of properly functioning aquatic habitat in the Oregon Coast Range limits recovery of cold-water species such as coho salmon. Thus, he saw a need to improve watershed function.

Evidence Used by the District Ranger in Deciding to Address These Problems

The record of decision (USDA, USDI 1994b) for the Northwest Forest Plan—based on physical, biological, and societal evidence provided in the Forest Ecosystem Management Assessment Team report (USDA, USDI, et al. 1993) and described in the Plan's environmental impact statement (USDA, USDI 1994a)—is intended to provide for healthy forest ecosystems, including protecting riparian areas and waters.

The Plan identified concern for northern spotted owls, marbled murrelets, and anadromous fish in the Oregon Coast Range Province (which includes the Siuslaw National Forest) because of its isolation and harvest history (chapters 3 and 4; p. 21). The record of decision, which amended the Siuslaw Forest Plan, allocated federal lands in the Yachats watershed into one or more of the following:

- ⇨ Late-successional reserve (pages C-9 to C-20);
- ⇨ Riparian reserve (pages C-30 to C-38); or
- ⇨ Matrix (lands not included in the other two allocations; pages C-39 to C-48).

The Plan identified specific environmental conditions and appropriate commodities and amenities to be produced and maintained in each land allocation. It also outlined the rules and limits governing possible activities for achieving desired conditions in each allocation.

The Assessment Report for Federal Lands in and adjacent to the Oregon Coast Province (USDA 1995a) shows the planning area in the coastal fog zone block (block 1) and the central interior block (block 6). In block 1, mature conifer patches have been substantially reduced in size and the number of acres of all seral stages in the small patch class has increased**.** The mature conifer stands in block 6 have been extensively clearcut, and few patches of functional late-successional forest remain. The central interior block once supported the largest unfragmented patches of late-successional forest in the Province. The Report recommends managing to accelerate successional development and to aggregate small patches into larger ones.

The Report describes the in-stream fish habitat on federal lands throughout the Province as being in marginal to poor condition. It recommends specific actions to improve fish habitat on federal land by restoring immediate habitat conditions by adding large wood to streams and stabilizing, decommissioning, or obliterating roads.

For needing to restore watershed health

The Plan's Aquatic Conservation Strategy is intended to restore and maintain the health of watersheds and the aquatic ecosystems they contain. Stream-survey data from the 1990s found that streams least impacted by past agricultural activities, such as timber harvesting and farming, have 40 to 120 pieces of large wood per mile of stream (Cummins/Tenmile Watershed Analysis, USDA 1995b; Drift Creek Watershed Analysis, USDA 1997a). The National Oceanic and Atmospheric Administration (NOAA) Fisheries Department (formerly the National Marine Fisheries Service or NMFS) assumes that properly functioning fish habitat would have at least 80 pieces of large wood per mile (NMFS 1996).

The Yachats-Blodgett Watershed Analysis (USDA 1997b) identified the following existing conditions in the watershed:

- Streams in the Yachats watershed, most of which have been impacted by past agricultural activities, contain 3 to 20 pieces of large wood per mile. The least impacted streams, such as Glines Creek, have about 40 pieces of large wood per mile.
- Existing low levels of large wood in streams reduce pool quality, off-channel habitat, riffle-streambed quality, and water storage in key salmonid production areas.
- Forest and county roads inhibit large wood and coarse sediment transport, disconnect stream channels, may contribute fine sediment to streams, and may act as barriers to aquatic species migration.
- Existing and future large wood sources for streams are below natural levels.
- Past actions have reduced shading on most streams; large conifers in riparian areas are lacking.
- The water quality (temperature) of the Yachats River is considered impaired because it exceeds the summer stream-temperature standard of 64°F established by the Oregon Department of Environmental Quality (DEQ). Tributaries of the Yachats River, including Depew Creek, School Fork Creek, Stump Creek, Williamson Creek, and the North Fork Yachats River are also listed by DEQ as water-quality impaired.

Public Scoping

Letters describing the actions considered in the proposed Yachats Aquatic Restoration Project were mailed to about 200 individuals, agencies, and organizations identified as potentially interested in the proposed project and analysis. Public comment on the proposed project was also solicited through the Siuslaw National Forest's quarterly "Project Update" publications, the Corvallis Gazette-Times in Corvallis, Oregon, and the Newport News-Times in Newport, Oregon. Scoping letters were mailed on October 2, 2002. A news release was published in the Gazette-Times on October 4, 2002 and in the News-Times on October 9, 2002. Comments were requested by October 31, 2002.

Field reviews, including the Oregon Department of Fish and Wildlife, local landowners, and other concerned citizens, were conducted in the project area during the planning process.

About 22 letters were received in response to these scoping efforts. Public comments contained a wide variety of suggestions to consider. Chapter 2 of this EA includes a discussion of other

alternatives that were considered, but eliminated from detailed study and explains why they were eliminated. Many concerns raised during scoping are relevant to this analysis and are addressed in chapters 2, 3, and/or 4; the project design criteria (appendix A); or the project file.

Decision Framework

The deciding officer (responsible official) is the Siuslaw South Zone District Ranger. The decision will be documented in a Decision Notice and will consider whether or not to implement the Yachats Aquatic Restoration Project by selecting an action alternative or by selecting the no-action alternative. The decision will be consistent with the Siuslaw Forest Plan as amended by the Northwest Forest Plan and will incorporate the associated project design criteria (appendix A), including the required mitigation. Primary factors that will influence the District Ranger's selection of an alternative include how well the alternative addresses the problem (EA, page 2) and how well it meets his expectations for holistic and integrated restoration.

What alternatives were developed to meet the identified needs?

CHAPTER 2

In chapter 2, we considered alternative proposals that were not fully developed for reasons disclosed. We describe fully developed alternative proposals for resolving the problems and meeting the needs identified in chapter 1; it is equivalent to the traditional section, "Alternatives Including the Proposed Action". (The "we" in the previous sentence and throughout the document is our interdisciplinary team).

We designed the alternatives based in part on priorities and recommendations identified in the Forest's late-successional reserve assessments for LSR RO268, and the Yachats-Blodgett watershed analysis. We also evaluated the project activities—in-stream and riparian restoration and road decommissioning—and their placement, based on the histories and current conditions of those sites. For example, we evaluated stream characteristics—such as gradient, connectivity to flood plains, in-stream large wood, shading, and numbers of conifers in the riparian zone—to help identify areas for restoration. Actions for restoring aquatic function and habitat include placing large wood in streams; removing culverts from two abandoned roads to eliminate fish-migration barriers; and planting and maintaining trees in riparian areas to increase future shade and large-wood sources.

In addition to meeting the identified needs, the range of alternatives considered reflects concerns raised during public scoping for the Project, public involvement with recent Forest projects such as the Lower Siuslaw Landscape Management Project (USDA 2002c), the Five Rivers Landscape Management Project (USDA 2002d), and concerns raised during monitoring of District projects. These concerns are addressed in the following section, in the Alternatives Considered in Detail section, in chapter 3, and in the project design criteria (appendix A).

Alternatives Considered But Eliminated from Detailed Study

Several alternatives were considered by the District Ranger, largely based on public comments received during scoping. The following alternatives represent those that were considered, but for various reasons, were eliminated from detailed study.

The proposed project—The proposed project, as described in the October 2, 2002 scoping letter, was not fully developed because permission to place large woody debris (LWD) in the Yachats River mainstem adjacent to private land was not obtained for all proposed large-wood-placement sites. In addition, considering the conflicting viewpoints from the different landowners, the proposed project was not ripe for analysis. Thus, about one mile of large wood placement in the maintstem Yachats River was dropped from the proposed project.

In addition, the proposed project included riparian planting and release and noncommercial thinning of riparian areas. The riparian planting and release activities should not have been included as part of this project because a Decision Memo for “Miscellaneous Small Projects”

(USDA 2002b) authorized riparian planting and release activities for the Yachats watershed. The Yachats Terrestrial Restoration Project EA (to be available for public comment in the near future) will address the noncommercial thinning that was proposed by this project. Thus, none of the alternatives associated with the Yachats Aquatic Restoration Project include riparian planting and release or noncommercial thinning. Because the proposed project as described in the scoping letter no longer exists, the District Ranger has now designated Alternative 2 as the proposed project.

Place large wood in streams with ground-based equipment—To reduce costs, ground-based equipment was considered for placing large wood in the streams instead of a helicopter. However, large-wood pieces will be too long to be transported by trucks and many placement sites are generally not accessible to ground-based equipment because of steep slopes. Thus, this alternative was not fully developed.

Construct trail in the proposed Beamer restoration area—A local resident suggested that a trail be constructed in the Beamer restoration area after project activities in the area are completed. The proposed project does not generate a funding source such as Knutson-Vandenberg (KV) like timber-sale projects, and there is no identified source of funds for building and maintaining a new trail. While building a trail would provide opportunities for environmental education, a trail would not directly contribute to correcting the identified problem. The proposed project does not preclude development of future trail proposals. Developing an alternative that includes a trail does not have any connection with the project, and thus is outside the scope of the project.

Alternatives Considered in Detail

Design criteria (appendix A) outline the practices to be used and their timing and duration when planned actions and activities are implemented. We believe that mitigation measures for all proposed actions are covered by the design criteria. Activities included under Alternatives 2 and 3 are designed to address the problems identified by the District Ranger. The actions incorporate the standards and guides established by the Siuslaw Forest Plan, as amended by the Northwest Forest Plan; the design criteria; and monitoring protocols outlined in appendix A.

Alternative 1: No action—The no-action alternative is required by Council of Environmental Quality regulations (40CFR 1502.14(d)). The no-action alternative forms the basis for a comparison between meeting the project needs and **not** meeting the project needs. This alternative provides baseline information for understanding changes associated with the action alternative and expected environmental responses as a result of past management actions. Selecting this alternative would continue the following resource management actions:

- ✓ Forest management would rely on natural processes to restore hydrologic conditions;
- ✓ Culverts would remain in the two abandoned roads in the Upper Yachats sub-watershed, restricting fish passage; and
- ✓ No additional projects are anticipated for the next 10 years unless a catastrophic event such as a flood or a fire occurs.

Alternative 2 (Place Large Wood in 13 Streams)—Large wood will be placed in several streams throughout the watershed, including streams encompassed by private land where permission was obtained from landowners. Specific actions include the following and are illustrated in map 2:

Large wood—About 750 trees and root wads would be placed along about 14 miles of streams to enhance fish habitat. This alternative treats all streams identified in the Yachats-Blodgett WA with a stream gradient less than or equal to 4 percent and having less than 40 pieces of large wood per mile. The largest total watershed acres affected would be less than 9,000 acres in size. The objective would be to increase large-wood component in all identified streams. Table 1 shows the large wood prescriptions for each stream by sub-watershed.

Table 1. Large wood prescription for streams—Alternative 2

Sub-watershed	Stream	Number of Trees	Trees per mile
Lower Yachats	Beamer	15	21
North Yachats	Depew	5	10
	Early	5	10
	Fish	15	30
	North Fork Yachats	250	69
	Williamson	110	61
School	School	40	20
Stump	Keller	15	20
	Stump	15	15
Upper Yachats	Grass	110	73
	South Fork Yachats	160	71
Yachats	Carson	5	5
	Yachats River	5	10
Total		**750**	

Abandoned (unclassified) roads—Remove about seven culverts and fill from two abandoned roads in the Upper Yachats sub-watershed. One road is adjacent to the South Fork Yachats River and the other is adjacent to Grass Creek. One culvert is a barrier to upstream fish migration and others are partial barriers or are in non-fish bearing streams.

Beamer restoration area—Remove about 150 cubic yards of landing fill (section 32) from a nearby stream and place in a stable waste area, non-commercially thin 2 acres of a conifer plantation, and release about 5 acres of existing conifer.

Rationale for the alternative to the proposed project—The rationale for Alternative 3 stems from the Yachats-Blodgett Watershed Analysis, North Fork Yachats Limiting Factors Analysis (MCWC 2003), public comments on the proposed action, and field reviews. Alternative 3 would treat portions of the North Fork Yachats River, Williamson Creek, South Fork Yachats River, and Grass Creek (map 3). All are biologically high-priority reaches for fish as identified in the Yachats-Blodgett Watershed Analysis and the North Fork Limiting Factors Analysis.

Public comments on the proposed project revealed concerns about large wood being transported downstream during high-water flows. Because of these concerns, Alternative 3 does not include partnering with willing private landowners to place large wood in the lower portions of the North Fork Yachats River, South Fork Yachats River, and the main-stem Yachats River, even though resources are available to do so.

Field reviews of current riparian vegetation conditions adjacent to Beamer, Stump, and School Fork Creeks indicate that there are sources of large woody debris available for these streams. Based on these reviews, placing large wood in these streams is not recommended at this time.

Field reviews conducted for Carson, Keller, Fish, Depew, and Early Creeks indicate that there are only short, isolated stream reaches where additional large wood would benefit fish. Considering comments raised about the cost of the original proposal, stream work under this alternative was limited to the stream reaches that would gain the greatest benefit from treatment.

Alternative 3 (Place Large Wood in Four Streams)—Large wood placement will be limited to the North Fork Yachats River, Williamson Creek, Grass Creek, and South Fork Yachats River. Specific actions include the following and are illustrated in map 3:

Large wood—About 403 trees and root wads would be placed along about 9.6 miles of streams to enhance fish habitat. The streams proposed for treatment have stream gradients less than or equal to 4 percent and less than 40 pieces of large wood per mile. The largest total watershed acres affected would be less than 5,000 acres in size. Table 2 shows the prescriptions for each stream by sub-watershed.

Table 2. Large wood prescription for streams—Alternative 3

Sub-watershed	Stream	Number of Trees	Trees per mile
North Yachats	North Fork Yachats	158	44
	Williamson	76	48
Upper Yachats	Grass	74	49
	South Fork Yachats	95	42
Total		**403**	

Abandoned (unclassified) roads—Remove about seven culverts and fill from two abandoned roads in the Upper Yachats sub-watershed. One road is adjacent to the South Fork Yachats River and the other is adjacent to Grass Creek. One culvert is a barrier to upstream fish migration and others are partial barriers or are in non-fish bearing streams.

Beamer restoration area—Remove about 150 cubic yards of landing fill (section 32) from a nearby stream and pond and place in stable waste area, non-commercially thin 2 acres of a conifer plantation, and release about 5 acres of existing conifer.

Map 2, Alt. 2

Map 2, Alt. 2

Map 3, Alt. 3

Map 3, Alt. 3

Comparison of Alternatives—Key quantitative differences—based on our estimates—of Alternatives 1, 2, and 3, are compared in table 3.

Table 3. Comparing the key quantitative differences of Alternatives 1, 2, and 3

Objective	Alternative 1, No Action	Alternative 2, Place Large Wood in 13 Streams	Alternative 3, Place Large Wood in 4 Streams
Place large wood in streams:			
Number of trees	0	750	403
Number of streams for large wood	0	13	4
Miles of stream to be affected	0	14	9.6
Remove culverts from abandoned roads adjacent to:			
Grass Creek (number/cubic yards)	0	4/200	4/200
South Fork Yachats (number/cubic yards)	0	3/150	3/150
Restore Beamer Creek area:			
Remove landing fill and deposit in stable waste area (cubic yards)	0	150	150
Non-commercially thin conifer plantation (acres)	0	2	2
Release existing conifer from alder competition (acres)	0	5	5

What alternatives were developed?

What environmental effects are predicted for each alternative?

CHAPTER 3

In chapter 3, we predict the likely effects of each action under each alternative; it is equivalent to the traditional section "Environmental Consequences". The Northwest Forest Plan, FEMAT report, Late-Successional Reserve Assessment, and the Yachats-Blodgett Watershed Analysis provide evidence for baseline environmental conditions from which direct, indirect, and cumulative effects are analyzed in chapter 3. These broad-based assessments of environmental conditions provide a cumulative view of environmental conditions at different landscape scales and consider past, present, and reasonably foreseeable future actions.

One advantage of planning the Yachats Aquatic Restoration Project at the 5th-field watershed scale is an improved analysis of cumulative effects. Knowing the site-specific details of all projects in a large geographic area allows us to predict cumulative effects with more certainty than if projects were analyzed individually. The analysis of direct and indirect effects in this chapter inherently includes cumulative effects because all foreseeable future federal actions in the watershed are included in the analysis. Cumulative effects are summarized on pages 34, 35, 36, and 37 and include how all actions (including those expected from other landowners) affect each resource.

In this chapter, we predict the likely environmental effects of the proposed alternatives, the outcomes of which are based on the assumption that the Forest standards and guidelines, the project design criteria (appendix A), and terms and conditions of the biological opinions associated with this project, have been followed. The project design criteria are also used during formal consultation with the NOAA Fisheries and the U.S. Fish and Wildlife Service (FWS) to evaluate effects on listed species. The use of these criteria is reflected in the amount of take (NMFS 1996) and in the terms and conditions provided in the biological opinions issued by these agencies.

Based on the science literature and our collective experience, we are confident in the accuracy of our analysis of the **current** conditions discussed in chapter 1. In chapter 3, when we describe the environmental effects of each alternative, we are **predicting** those effects based also on the literature and our collective experience; however, we recognize that predictions are inherently uncertain, some just a little and some highly.

Because of the similarities of environmental conditions and ecological processes found in the planning area, we expect site-specific effects and environmental responses to the proposed actions to be fairly uniform throughout. In the following pages, therefore, we expect our generalized discussions on effects can be applied to any given location in the landscape with a high degree of confidence that the effects described will fit the site.

When the District Ranger chose the members of the interdisciplinary team, he considered possible scenarios for this environmental assessment and determined what disciplines would illuminate decisions about them. Relying on his professional judgment and expertise, he chose the disciplines and formed the team of Forest experts in those disciplines. Team members reviewed areas where actions are proposed, reviewed relevant refereed literature and Forest assessments for this planning area, and consulted disciplinary colleagues in the Forest Service, other agencies, universities, and elsewhere. Often, literature reviewed by team members was deemed incomplete and, though studies of similar environments and similar scenarios were reviewed, the expert's professional judgment was required to determine what information can be appropriately used here—and how strongly it supports predictions about what the environmental effects of proposed actions will be. Although team members benefit from the array of research information and the insights of colleagues, they are valued most highly for their experience in and knowledge about the Yachats watershed planning area.

Consultation with other experts helps assure that the literature review did not miss a valuable resource, and it provides opportunity to debate and strengthen the team expert's conclusions about how proposed actions are likely to affect the environment. After several team meetings and one-on-one discussions among team members on how each one's predictions might affect or be affected by all of the others, each team member wrote a section of this chapter. Then all of them reviewed the whole chapter to be sure they find the others' predictions clear and supportable.

In this chapter, team members' position titles accompany their written contributions to indicate that they believe the cited references are relevant, the inferences drawn from them are appropriate, and the predictions are supported by the cited literature and their own professional judgment. In this section, when "we" is used, it means one or more other team members concur.

Aquatic Species (*District Fish Biologist*)

Most fish habitat restoration activities occurred in the Yachats watershed in the late 1980s and the early 1990s. To enhance fish habitat, large wood was added to several streams on public and private land, affecting about 1 to 2 miles of streams. The large wood was designed to stay in place by anchoring the structures with cable and rebar. Some restoration work used road cloth to trap and hold mobile sediment in place. Since 2002, minor maintenance work has occurred at two locations. Repairs were done to keep the structures functioning properly. Future maintenance will focus on removal of cable and rebar that no longer function as anchors.

Periodic monitoring of the Yachats restoration sites has revealed that fish habitat is improving as spawning gravels accumulate over bedrock reaches. Some large-wood pieces have moved downstream. Although theses pieces were designed to stay in place, the short length relative to stream width made these pieces more likely to move downstream than the long pieces proposed under Alternatives 2 and 3. The function of the pieces that have moved downstream is not known, but based on past monitoring, their deposition sites are likely enhancing aquatic and riparian habitats, considering the low abundance of large wood throughout the Yachats watershed. The fish population responses to the restoration work has not been determined in the Yachats watershed, but other large-wood placement projects in other nearby watersheds have

documented increases in rearing densities (Nickelson et al 1992; Paul Burns, pers. comm. 2004) and freshwater survival (Solazzi et al 2000; Steve Johnson pers. comm. 2004; Paul Burns pers. comm. 2004).

Fish habitat

Existing fish habitat and riparian area conditions for the Yachats River basin are described in Yachats-Blodgett Watershed Analysis (USDA 1997), Yachats River Basin Plan (ODFW 1997) and North Fork Limiting Factors Assessment and Restoration Plan (MCWC 2003). Existing habitat conditions described in these documents indicate quality fish habitat is lacking. Key components of quality fish habitat include slack-water refuges for freshwater salmonid survival, food availability, and sediment storage capacity. These documents indicate that large woody debris was removed from several streams throughout the watershed.

Placing large wood in streams—Large wood, generally greater than 24 inches in diameter and 50 feet in length or at least twice the bank-full width in length (USDA 1999), is an essential habitat element for fish. Large wood helps to create quality fish habitat by:

- Creating deep pools with abundant cover and backwater areas for fish. This increases winter and summer rearing habitat for salmonids by providing more physical space and greater habitat diversity (Dolloff 1994);
- Providing slow slack-water refuges during high-winter flows and increasing floodplain connection. These habitat components provide refuges for juvenile salmonids and increase the over-winter survival by reducing the potential for young fish being flushed downstream (Solazzi et al. 1998);
- Trapping, sorting, and storing gravels (sediment) that are required for spawning habitat;
- Increasing fine sediment storage adjacent to streams, which provides additional soil for establishing riparian vegetation. Riparian vegetation can improve stream shade, potentially reducing stream temperatures and increasing the availability of suitable habitat for salmonids; and
- Providing nutrients, which increase salmonid food availability by creating suitable substrate for aquatic insects and by trapping leaves and other detritus that feed the insects.

Alternative 1 (no action)—Alternative 1 maintains the existing habitat conditions, riparian succession, and large wood recruitment rates in the Yachats Basin, resulting in a much slower, natural recovery rate for fish habitat than under the action alternatives. Some areas will continue to degrade before they begin to recover because it will be decades before large trees develop and become sources of large wood that can be recruited into the streams. The current riparian area of alder and some small conifer will add an occasional piece of small wood to streams. Small wood (generally less than 24 inches in diameter and 50 feet in length) benefits both small and large streams. However, its beneficial effects on aquatic processes are much less than large wood because it is more easily moved during high flows and deteriorates more quickly. In addition, small trees are much more abundant in riparian areas of the Yachats watershed than large trees.

Alternative 2—Most Oregon coastal streams have been identified as limited in winter-rearing habitat for salmonids (Nickelson et al 1992). Alternative 2 partially addresses this limitation by

placing up to 750 trees and root wads in 13 different streams in the Yachats 5th-field watershed (Map 2). These wood additions will directly affect about 23 percent of the available habitat for salmonids and will help to replace some in-stream large wood that has disappeared. Placement of large wood is based on recommendations from the Yachats-Blodgett Watershed Analysis (USDA 1997) and initial field surveys of the Yachats 5th-field watershed.

Adding large wood to streams increases stream roughness, allowing mobile sediment to deposit near the large-wood sites. In-stream large wood creates variable flow velocities that sort mobile sediment into different size class deposits. Sediment sorting accumulates spawning gravel that is suitable for fish species in the Yachats watershed. Large wood also plays a key role in resisting downstream transport smaller pieces of wood and other material, such as leaves, needles, and salmon carcasses. Thus, large wood has a major influence on the long-term retention capability of the stream (Flitcroft et al. 2002).

A major effect of adding large wood to streams is the increased amount of mobile sediment that will be collected and stored near the large-wood sites. Most medium-sized streams in the Yachats watershed—similar in size to streams proposed for large-wood additions—are either scoured to bedrock, or they have a thin layer of sediment over the bedrock that is easily eroded during high flows. Deep sediment deposits near the large-wood sites will create more stable spawning gravels during high flows, thus increasing egg-to-fry survival. This stored sediment will increase the frequency of over-bank flows, allowing juvenile salmonids access to off-channel habitats that are preferred for over-winter rearing (Nickelson et al. 1992). Deep sediment deposits will also allow the large wood to scour deep pools needed for salmonids in summer and winter. More frequent over-bank flows, a more aggraded stream channel, and more abundant pool and riffle sequences are expected to increase surface and ground water exchange (Poole and Berman 2001). Ground water can buffer natural stream-heating processes (Poole and Berman 2001) and increase the availability of preferred summer-stream temperatures for salmonids in the Yachats watershed.

As streams adjust to and orient the added large wood, a few banks will erode. Minor amounts of fine sediment will be transported downstream during high flows. This sediment is expected to decline over time and is not expected to impact fish or their habitat. Large wood is expected to collect and store much more sediment than it will introduce with bank erosion. Where streams adjust to added large wood, bank erosion may occasionally cause some small trees to fall into the channels and be captured by the large wood. These small trees will add complexity to fish habitat.

Large wood allows pockets of fine sediments and organics to collect in slow-water areas. Fine sediment and organic material create quality habitat for other aquatic species such as the Pacific lamprey (*Lampetra tridentata*). During its larvae stage the lamprey burrows into soft sediment in shallow areas where it lives and feeds from four to six years (Close et al. 2002).

Alternative 3—Effects of placing large wood in streams on fish habitat are identical to effects described for Alternative 2, except that Alternative 3 decreases the amount of large wood added from 750 to 403 pieces, reduces treated stream miles by 43 percent, and treats only four of nine streams that were identified in the Yachats-Blodgett Watershed Analysis as lacking large woody

debris (table 2). Areas not treated will remain unaltered and be left to recover naturally at a slower rate compared to Alternative 2.

Removing fill from the abandoned roads—About 2.5 miles of existing abandoned roads contain about 350 cubic yards (yds^3) of fill material at an estimated seven stream-channel crossings. These areas are currently eroding, causing chronic, minor adverse effects to fish habitat. This fill material could become a large source of fine sediment to streams if culverts become obstructed and fills fail (collapse). Road-fill failures in small streams that lack large wood can create unstable spawning bars and channel widening through secondary erosion as the sediment moves downstream (ODFW 1997).

Roads often create channel barriers when fill material or culverts are placed in the stream channel that do not allow large wood and sediment to move downstream naturally. The effects of blocking the migration of large wood and sediment downstream can limit the quality of spawning and rearing habitat for aquatic species downstream. Using the Benda and Cundy (1990) debris-torrent model, six of the seven stream-channel crossings are likely barriers to potential debris torrents that can deliver large wood and sediment to fish-bearing streams.

Channel barriers may also block upstream movement of aquatic species, thus reducing their available habitat. Robison et al. (1999) documented that upstream migration of juvenile salmonids is prevented or restricted at culverts when outlet drops exceed 6 inches, gradients exceed 0.5 percent, velocities exceed two feet per second, or the depth of the outlet pool is less than 12 inches. One channel barrier, located in a tributary to Grass Creek, is currently functioning as a barrier to upstream cutthroat and steelhead migration. There is about a quarter of a mile of fish spawning and rearing habitat upstream from this barrier. Besides juvenile salmonids, other aquatics species such as lamprey and amphibians may not be able to migrate upstream from the channel barrier. The other six stream-channel crossings are either partial barriers to fish passage or are located on non-fish bearing streams.

Alternative 1 (no action)—By not mechanically removing the 350 yds^3 of fill material from these roads, the chronic, minor source of sedimentation to streams will continue to impact fish habitat. About 200 feet of downstream spawning habitat could be adversely affected should the fill material fail during a winter-storm event. In the event of failure, redds are likely to be buried, reducing productivity at this site. Culvert sites will continue to function as barriers to the natural, downstream movement of large wood and sediment.

Alternatives 2 and 3—These alternatives would remove about 350 yds^3 of fill material from abandoned roads located at seven sites in the Upper Yachats watershed. This would eliminate the potential for minor, long-term adverse effects on fish habitat. Removing this material will prevent large amounts of sediment to enter streams from road-fill failure, because they are valley-bottom roads that contain fill directly over salmonid habitats.

By removing the seven channel barriers, Alternatives 2 and 3 would restore the natural processes of sediment and large wood movement in four streams. Also, about a quarter mile of additional spawning and rearing habitat would be made available to cutthroat and steelhead in a tributary to Grass Creek.

Culvert and fill removal activities are expected to produce minor**,** short-term increases in turbidity near activity sites in perennial streams, with turbidity decreasing as distance increases. Monitoring of several road-decommissioning projects on the Siuslaw National Forest revealed that very little sediment is actually eroded downstream, when design criteria are followed. Design criteria**,** such as, covering newly excavated banks adjacent to stream channels with organic debris (e.g., brush and tree limbs), substantially limits erosion and provides roughness for sediment deposition during the first winter. Within one year, about 80 percent of bare-soil areas adjacent to streams become revegetated. Most sediment transported downstream following culvert removal originates from the sediment plain that often forms just upstream from culverts. Where large sediment plains exist, organic debris will be placed into channels to help stabilize the sediment plain. All actions will be implemented during low stream flow, which will limit the geographic extent of the effects.

Restoring the Beamer Creek area—About 150 cubic yards of fill material exists near Beamer Creek (Lower Yachats sub-watershed) and has potential to erode into the creek and negatively impact fish habitat. About two acres of a dense conifer plantation exist in the area and about five acres of existing riparian conifers are being suppressed by hardwoods.

Alternative 1 (no action)—Alternative 1 would not remove the 150 yds^3 of fill material near Beamer Creek. The existing risks to fish habitat would be maintained. Effects on fish habitat in this tributary and the Yachats River (less than 200 feet away) are expected to be minor and ongoing. The dense conifer in the plantation and the five acres of existing riparian conifers would continue to be suppressed, slowing their development into large trees.

Alternatives 2 and 3—The 150 yds^3 of fill material would be removed near Beamer Creek to prevent the potential for it to enter the stream and negatively impact fish habitat. Some short-term sediment may enter the stream during and following removal, but effects to fish habitat would be minor and short-term and be less than that associated with removing fill material from abandoned roads because it is a smaller exposed area. The material would be deposited in a nearby stable waste area away from the stream.

Thinning the dense conifer plantation and releasing the conifers are not expected to reduce stream shade or cause sediment to enter the nearby stream. These treatments would speed the development of trees that could benefit future fish habitat sooner.

Fish Populations

Salmonids present in the Yachats watershed include Oregon coast coho salmon (*Oncorhynchus kisutch;* currently federally listed as threatened), Oregon coast chinook salmon (*Oncorhynchus tshawytscha)*, Oregon coast steelhead, (*Oncorhynchus mykiss irideus)*, and resident cutthroat trout *(Oncorhynchus clarki clarki)*. All salmonid stocks in the Yachats 5^{th}-field watershed, except resident cutthroat, are depressed or have low population abundance, with some stocks having a moderate risk of extinction (ODFW 1997). Abundance of juveniles has shown an increase from 1998 to 2002 (MCWC 2003), a time period when other coastal watersheds are seeing increasing fish populations (Bob Buckman, pers. comm.). Buckman believes that coho in the Yachats watershed are not responding at the same levels as in other coastal systems because of limited good coho habitat in the watershed. Lawson (1993) states that increased ocean productivity can

increase fish populations in the short term even though freshwater habitat quality may be decreasing. He explains that further reductions in freshwater habitat quality may increase the likelihood of species extinction during the next cycle of low ocean productivity.

Alternative 1 (no action)—The no-action alternative will maintain existing fish abundance and fresh-water survival rates of salmonids in most streams. Fresh water survival rates may decrease in streams with early-successional conditions adjacent to streams and low flood-plain interaction, such as the Yachats River above Grass Creek and Williamson Creek, until riparian vegetation becomes established and incorporated into channels, creating floodplain interactions. Overall, fish populations may have a slow recovery with the limited habitat that is available.
The culverts in the abandoned roads in the Grass and Williamson sub-watersheds will continue block upstream and downstream migration of aquatic species.

Alternatives 2 and 3—These alternatives, although to a lesser extent under Alternative 3, implement ODFW Yachats River Basin Fish Management Plan (ODFW 1997) by adding large wood to stream channels to improve fish production. Wood additions in similar Oregon coast streams resulted in increasing fresh water survival of steelhead and coho by about two to over seven fold above pre-treatment rates (Burns pers. comm., Johnson pers. comm., and Solazzi et al 1998). Thus, we expect to see improved survival in areas treated when compared to similar areas not treated.

Effects on fish from adding large wood may include some short-term disturbance during log placement. Fish will disperse, but observations made during past, similar helicopter projects have shown that fish re-colonize the project area within a few minutes after large-wood placement. Fish could be struck by logs during placement, but this is unlikely.

Removing culverts from abandoned roads that are barriers to fish passage are expected to improve production of juvenile salmonids by allowing access to currently inaccessible spawning and rearing habitat.

Restoring the Beamer Creek area—Proposed activities, such as removing fill material and thinning a conifer plantation, may have minor, beneficial effects on fish populations because activities are designed to reduce the sedimentation of the stream and speed the development of future large wood for the stream.

Essential fish habitat (*Magnuson-Stevens Act*)—Actions to restore watershed health under Alternatives 2 or 3 may affect Oregon coast coho salmon and Oregon coast chinook salmon or their habitats. These actions are not likely to adversely affect coho and chinook salmon or their habitat, because the effects will be minor and short term. Adding large wood to streams will increase short-term bank instability and may increase turbidity and sediment. There is also a risk of hitting an occasional salmon when large wood is placed in a stream. These effects are minor, when compared to the long-term habitat improvement expected from these actions. Therefore, no adverse effects to essential fish habitat for coho and chinook salmon are expected from these proposed actions.

Regional Forester's sensitive species—The Regional Forester's sensitive fish species in the project area include Oregon coast steelhead, Oregon coast chinook salmon, and coastal cutthroat trout**.** Project design criteria (appendix A) should prevent adverse affects on these species. Chum salmon (*Oncorhynchus keta) and* Umpqua dace (*Rhinichthys evermanii)* are not known to be present in the project area.

Soil and Water Resources (*District Hydrologist*)

Sediment production

Placing large wood in streams—Currently, all subbasins in the project area have insufficient wood in the channel and floodplain to retain sediment, or connect streams to their floodplain (USDA 1997). This affects the sediment regime in the basin, allowing some stream banks to erode and decreasing the time sediments—and their nutrients—remain in the stream channel.

Alternative 1 (no action)—This alternative would maintain the existing stream-channel conditions. Stream-bank erosion would continue at the present rate and sediments and their nutrients would move through stream systems at the existing rate.

Alternatives 2 and 3—Alternative 2 would place about 750 pieces of large wood in 13 different streams in the Yachats watershed. Alternative 3 would place about 403 pieces in four different steams. Effects on water quality in streams result from sedimentation processes inherent in large-wood placement. The short-term effect of wood placement includes displacement of fine sediment into streams during the placement process. This effect is expected to be minor in extent and duration. Conifer species will be placed in the stream channel, because they are more durable than hardwood species when exposed to repeated wet and dry conditions as stream levels fluctuate (Bilby et al. 1999).

Large wood in channels affects the physical characteristics of streams, including channel type, sediment storage, and substrate roughness (Bilby and Bisson 1998). Stream channels are expected to adjust to the wood additions by displacing sediment in some areas and depositing it in others, largely in the immediate vicinity of the placed wood. In the treated area, stream channel stability would be enhanced, providing sites for trees and other stabilizing riparian vegetation (USDA, USDI, et al. 1993).

Sediment that is stored behind the placed wood would locally raise the water table, increasing stream interaction with the floodplain and hyporheic zone. This interaction would increase stream productivity because of biologic activity in that zone. Floodplain interaction traps sediment and slows velocity during flooding, thus reducing flood impacts (USDA 2002a). Treatment effects are likely to be localized; provide long-term benefits; and cumulatively improve channel stability and water-quality parameters, such as temperature and turbidity.

The length and diameter of large wood, presence or absence of root wads and branches compared to a stream's bank-full width and depth, along with wood placement in the stream corridor, affect the potential of wood movement (Abbe 1998). The Forest Service is restricted in the size of wood available for placement, in part because of the needs for other forest species and in part because of the limitation of machinery to move wood, such as helicopters. In recognizing these

limitations and to protect the investment in large-wood placement, placement sites are chosen to minimize the potential for downstream movement of placed logs in bank-full and greater stream-flow events. Some adjustment in location will typically occur, e.g., twisting or shifting, based on a multiyear study of log placement in Tenmile Creek, which included flood events. Based on this study, wood placed as part of this project would not be expected to move more than one tenth of a mile (Sleeper, pers. comm.).

By adding less wood in fewer streams, Alternative 3 is expected to produce less short-term sediment than Alternative 2.

Removing culverts from the abandoned roads—Under Alternative 1, culverts will remain in the two abandoned valley-bottom roads. These roads are likely a source of chronic fine sediment, primarily where water is running off their surfaces. Existing road-stream crossings also affect the sediment regime in stream channels, preventing or limiting the distribution of large wood and larger sediments (e.g., boulders). When road-stream crossings fail, fill material enters stream channels and cause an immediate increase in fine sediment and turbidity. Failed road-stream crossings erode adjacent land and are a chronic source of fine sediment, until they reach a stable configuration and become vegetated. Material from potential failure sites is likely to enter stream channels directly, potentially adversely affecting water quality and water users downstream. The no-action alternative would retain these effects.

Under Alternatives 2 and 3, removing culverts and associated fill will produce minor amounts of fine sediment during project implementation and up to one year later, or until vegetation is established on bare-soil areas adjacent to streams**.** Design criteria are intended to minimize the amount of fine sediment entering stream channels, while work is in progress and after the work is completed, including reestablishing vegetation. Culvert removal effectively eliminates the roads as chronic sources of fine sediment, which originates from water running off compacted surfaces and road-stream crossings. Thus under these two alternatives, fine sediment from sites where culverts are removed will be eliminated in the long term, protecting downstream water quality and its users. In addition, the sediment regime in the seven stream channels currently affected by the roads will be restored, allowing the distribution of large wood and coarser sediments.

Restoring the Beamer Creek area—Alternative 1 retains the existing conditions. Functioning wetlands provide a number of water-quality benefits, including filtering out fine sediment. The Beamer Creek site is one of the few remaining wetland-spruce ecosystems on the Forest, and is a potential seed source for this riparian area in the Yachats basin as recovery continues. Invasive reed canary grass has already compromised the effectiveness of this wet area. Failure to remove the landing fill and manage vegetation could result in reduction or loss of function, with detrimental consequences to restoration in the basin.

The actions proposed under Alternatives 2 and 3 will improve wetland function and enhance riparian vegetation in the Beamer Creek area. Actions will enhance the vigor of a unique ecosystem and provide a potential seed source for native species, which support riparian restoration within the basin. These actions are expected to reduce the risk of invasive plant infestation. No adverse effects on water quality parameters, such as summer stream temperature, sediment, and turbidity are expected, either short-term or long-term.

Soil productivity

Alternative 1 will not implement actions that affect existing soil productivity. Loss of productivity will continue where surface water flows over the abandoned roads and erodes the soil. The potential exists for soil erosion and subsequent loss of productivity, if road-stream crossings fail.

Placing large wood in streams—Under Alternatives 2 and 3, placing large wood in streams may locally displace some soil, although this effect is expected to be minor. Minor**,** short-term, local stream bank erosion is expected but should be within the range of natural levels in systems with sufficient large wood. As the wood begins to function, stream bank stability should increase as riparian vegetation grows in the stabilized, stored sediment. No soil compaction is expected. In the long-term, soil productivity is expected to increase in affected areas.

Tree falling and removing the trees by helicopter are not expected to measurably affect soil productivity.

Removing culverts from the abandoned roads—Under Alternatives 2 and 3, soil productivity will gradually recover, where culverts and compacted fills are removed from abandoned roads. This action will not create any additional soil compaction or displacement, because excavated soil will be limited to the previously compacted and disturbed roadbed.

Restoring the Beamer Creek area—Soil productivity will gradually recover, where the compacted fill is removed from the abandoned road. This action will not create any additional soil compaction or displacement, because excavated soil will be limited to the previously compacted and disturbed roadbed. Thinning and release activities are expected to enhance soil stability and reduce erosion. No short-term, adverse soil-productivity impacts are expected from the treatment actions.

Water quality—temperature

Each 6th-field subwatershed in the Yachats Watershed has at least one stream that appears on the DEQ 303(d) list for increased summer stream temperatures. Listed streams include Depew Creek, School Fork Creek, Stump Creek, Williamson Creek, North Fork Yachats River, and the Yachats River. Streams in the analysis area are not listed for any other parameter than temperature (DEQ 1998). A water quality restoration plan for the Yachats basin has been completed, detailing plans to improve water quality. Lack of large wood was identified in the Yachats Water Quality Restoration Plan (USDA 2003d) as a factor that affects summer stream temperatures in 303(d) listed streams in the basin.

Analysis of the effects of the Yachats Aquatic Restoration Project on summer stream temperatures focused on effective stream shade, because the principal source of heat for small forest streams is solar energy striking the stream surface (Brown 1969). Conditions where effective shade is greater than 80 percent of complete shading should exhibit no increase in stream temperature (DEQ 1999). Analysis for this planning effort includes modeling the Yachats basin for effective shade. The shade model indicates locations with less than 80 percent shade

from vegetation within 10 meters of the stream channel (USDA 2003d). The model does not include shade provided by down wood that lies across the stream.

Placing large wood in streams—Alternative 1 will not place large wood in streams. Currently, all subbasins in the project area have insufficient wood in the channel and floodplain to hold sediment or connect streams to their floodplain. Instability in these areas prevents the establishment of trees to provide shade, protect streams from solar radiation, and moderate stream temperatures.

Alternatives 2 and 3 will have minor effects on the current effective shade during the summer, but are expected to accelerate vegetation recovery within ten meters of the stream center. No short-term effect on stream temperature is expected from this action, since local vegetation would remain (with the possible exception of a few branches from trees in the immediate vicinity of placed logs). In the long term, Alternatives 2 and 3 are expected to enhance stream channel stability in the treated streams and provide sites for trees and other stabilizing vegetation. This in turn would provide shade to reduce the adverse effects of solar radiation and moderate summer stream temperatures (FEMAT 1993). Sediment stored behind the added large wood would locally raise the water table and increase stream interaction with the hyporheic zone. This increased interaction decreases daily water temperature fluctuations (Poole and Berman 2001; Wordzell, pers. comm.; Naiman et al., 2000). Treatments are expected to provide long-term benefits by lowering summer stream temperatures.

Removing culverts from the abandoned roads—These roads are adjacent to streams listed by the Department of Environmental Quality as 303(d) for summer temperature impairment. Although culverts provide shade, their effects on stream temperature are not measurable. Alternative 1 will not remove any culverts. Because the roads are more than 10 meters from the streams and are located to the north or east sides of the streams, loss of potential vegetative cover from keeping the culverts in will have no measurable effect on stream temperature.

Alternatives 2 and 3 will remove the culverts and associated fill material, allowing shade vegetation to grow next to the streams. Because the roads are more than 10 meters from the streams and are located to the north or east sides of the streams, potential vegetative cover that may develop after removing the culverts will have no measurable effect on stream temperature.

Restoring the Beamer Creek area—Alternative 1 will not treat the Beamer Creek area. Consequently, vegetation in this wetland spruce ecosystem will take longer to recover.

The proposed actions under Alternatives 2 and 3 will result in improved wetland function and enhanced riparian vegetation. Actions will improve the vigor of a unique ecosystem and provide a potential seed source for native species, which supports riparian vegetation restoration in the basin. Vegetation treatment will reduce the risk of invasive plant infestation, because it will help to recover shade more quickly. Actions in this area are not expected to measurably affect summer stream temperatures, either short-term or long-term, because of the small area proposed for treatment adjacent to streams.

Downstream movement of large wood

Based on a few comments received during public scoping, there is a concern that large wood additions to stream channels may increase risk of damage to private property if wood moves downstream.

Placement of large wood in streams is expected to maintain or decrease the risk of downstream private property impacts from infrequent high flows with return intervals of less than 20 years. This expectation is based on planned wood placement design; wood movement data from past projects; and the expected increase in the channel storage capacity of water, sediment, and wood in areas where large wood is placed. Placement of large wood will be designed to minimize risk of adverse impacts to private property.

A similar wood-addition project was implemented in Tenmile Creek in 1996 and district personnel have monitored in-stream movement of placed wood pieces annually. Considering all 241 pieces of large wood added to Tenmile Creek, 49 percent of the short pieces (20 to 75 ft.) have moved while only 18 percent of the long pieces (80 to 140 ft.) have moved. Of the 88 pieces of wood placed in Upper Tenmile Creek, which is similar in size to streams proposed for treatment in Alternatives 2 and 3 (except the five pieces proposed for the Yachats River mainstem under Alternative 2), only 11 pieces of wood (13 percent of the total) moved downstream in seven years. Six of the 11 pieces were placed with the expectation that they would float and collect in jams downstream, which they did. The maximum distance that any of these pieces moved was about 0.1 mile, although one planned short (30 ft.) floater moved 0.6 mile. Only five pieces of wood that were not planned to float moved downstream for a maximum distance 0.1 mile. All five of these pieces moved during two high-water flows with an estimated return interval of 4 to13 years. Large wood placed in Tenmile Creek has been observed to increase storage of water, sediment, and wood at the placement sites that otherwise would have been transported downstream during high-water flows.

Downstream movement of large wood pieces during large floods (>20-year return period) is expected to be greater than during smaller floods; however, the downstream effects are difficult to predict. Large-wood additions have the potential to adversely affect private land if the wood moves to and deposits at sensitive locations. Or it may decrease downstream impacts by retaining water, sediment, and debris at less sensitive sites.

Private property impacts are expected to be high during these large floods, regardless of wood movement, considering the erosive power of these rare natural events. Existing wood in most larger stream channels will be mobilized and deposited in new areas. Some steeper channels may deliver large volumes of wood and sediment to lower-gradient streams through debris torrents. For example, three late-1990 floods (<20 yr return interval) added two to three times the amount of large wood to Tenmile Creek than had been placed in the channel in the fall of 1996 (Steve Johnson, ODFW, pers. comm.).

The primary control over wood movement is how the wood is placed in the stream channel. The proportion of each piece placed in the channel or on the bank, and its orientation relative to the channel, will strongly influence its stability. Wood pieces on or near private property will be oriented in a manner to minimize the likelihood of downstream movement. Wood size relative to

stream size is another important factor that influences stability. Large wood placed in small streams is stable and rarely moves downstream except during infrequent large floods; small wood in large streams may move downstream with only minor increases in water flow.

Alternative 1 (no action)—The no-action alternative will maintain the existing risks associated with private property near stream channels. The risk of adverse impacts is related to flood size, watershed condition, property location, and landowner perception. Typical high water, that occurs every year or two, rarely causes adverse impacts to private property on stream-adjacent areas. However, potential adverse impacts increase as flood size increases. Wide, forested riparian areas and in-channel large wood can reduce downstream effects of floods, because they increase hydraulic roughness and decrease the stream's capacity to erode banks and transport sediment and wood (Allen et al. 2003; Buffington and Montgomery 1999). Although some landowners may view bank erosion and channel changes as adverse impacts on private property, other landowners recognize that these dynamics are part of natural stream processes and may not consider these impacts adverse.

Alternative 2—This alternative offers slightly more risk of downstream impacts from wood movement than Alternative 3. More large-wood pieces (80 to 140 feet long) would be added, more streams are proposed for treatment (tables 1 and 2), and five large-wood pieces would be placed in the main stem of the Yachats River—a much larger stream than all the others proposed for treatment. The likelihood of movement from the additional wood pieces in streams treated under Alternative 2 is similar to that of Alternative 3, because 99 percent of the pieces will be placed in streams smaller than the Yachats River. The five pieces proposed for placement in the Yachats River under Alternative 2 are most likely to move downstream because of stream's large size. However, by placing these pieces on the stream margins with a high proportion of the wood placed on the bank, the risk of downstream movement would be relatively low, based on the Tenmile Creek study that began in 1996.

Alternative 3—Large-wood pieces that would be added to streams will be 80 to 140 feet long, compared to the channel width (15 to 30 feet) of the affected streams. These lengths will reduce the likelihood of downstream movement. Because of the fewer large-wood pieces and streams involved, Alternative 3 would slightly reduce the risk of large-wood movement, compared to Alternative 2.

Terrestrial Species

Wildlife (*District Wildlife Biologist*)

Federally listed species—As required by the Endangered Species Act of 1973, as amended, a biological assessment (project-file document) has been prepared for this project (USDA 2003e). This assessment evaluates and describes the potential effects of proposed actions on species listed under the Endangered Species Act that may be found on the Siuslaw National Forest. Because the planning area is outside the range or contains no suitable habitat for the Oregon silverspot butterfly, brown pelican, Nelson's sidalcea (checker mallow), western lily, or western snowy plover, none of the alternatives affect these species. Formal consultation with the U.S. Fish and Wildlife Service (FWS) has been completed for activities that potentially may cause

nesting disturbance (FWS reference number 1-7-04-F-1113) as well as for activities that may modify suitable habitat (FWS reference number 1-7-02-F-958).

Bald eagle, northern spotted owl, or marbled murrelet—Alternative 1 (no action) is not expected to affect habitat or populations of these species.

Bald eagle suitable habitat and disturbance—Under Alternatives 2 and 3, portions of the project area do occur in bald eagle suitable habitat, but no known eagle nest sites exist within the project area. Although suitable habitat along the proposed activity areas has not been surveyed, it is highly likely that, if a nest did exist, it would have been discovered and documented, considering the number of year-round residents. Tree selection criteria are designed to prevent removal of suitable nest trees. Because of these criteria (appendix A) and the low potential for unknown bald eagle nest sites being affected, removing trees for placement in streams may affect, but is not likely to adversely affect bald eagle suitable habitat.

Project activities under Alternatives 2 and 3 are proposed in areas considered suitable for bald eagle nesting (within one mile of a major river or ½ mile of a major tributary). The likelihood of an unknown nest occurring within suitable habitat is low. Because the potential for the presence of nesting bald eagles in proximity to project activities is low, Alternatives 2 and 3 may affect, but are not likely to adversely affect, nesting bald eagles due to disturbance.

Northern spotted owl suitable and designated critical habitat—Because of tree selection criteria (appendix A), removing individual mature trees for in-stream placement under Alternatives 2 and 3 may affect, but is not likely to adversely affect, spotted owl habitat. Alternatives 2 and 3 may affect designated critical habitat; however, no suitable nest trees will be removed. The application of project design criteria and the dispersed nature of individual tree removal areas across the landscape will serve to minimize adverse affects to spotted owl critical habitat.

Other activities associated with Alternatives 2 and 3 include thinning about two acres of a dense young conifer stand and releasing about five acres of conifer from alder competition in the Beamer Creek area, and culvert and fill removal. These actions will have no effect on spotted owl suitable or designated critical habitat. Thinning will have no effect because canopy closures above 40 percent will be retained.

Northern spotted owl disturbance—All project activities included under Alternatives 2 and 3 occur within ¼ mile of unsurveyed owl suitable habitat. Tree felling will be limited to the period after September 15, with helicopter large-wood placement to be limited to the period of October 1 through October 31. Tree felling may affect, but is not likely to adversely affect nesting spotted owls due to disturbance. Tree placement will have no effect on nesting spotted owls due to disturbance because treatments will occur outside the nesting season.

Noncommercial thinning (2 acres) and conifer release (5 acres) in the Beamer Creek area is expected to occur between October 1 and February 28, avoiding the critical portion of the spotted owl-nesting season. Therefore, these activities will have no effect on nesting spotted owls due to disturbance.

Removing culverts from the two abandoned roads and landing fill in the Beamer restoration area will occur outside the critical portion of the nesting season. Thus, these activities may affect, but are not likely to adversely affect nesting owls.

Table 4 summarizes the effects related to northern spotted owls for all proposed activities.

Table 4. Spotted owl effects by activity

Spotted Owl	Operating Period and Effects Determination* for Disturbance							
Activity	July 8 – Aug.5		Aug. 6 - Sept. 15		Sept. 16 - Sept. 30		Oct. 1 - Feb. 28	
	MA-LAA		MA-NLAA		MA-NLAA		NE	
	alt 2	alt 3	alt 2	alt 3	alt 2	alt 3	alt 2	alt 3
Tree Felling (no. trees)					750	403		
Tree Placement (no. trees)							750	403
Thinning and Release (ac.)							7	7
Road Decommission (miles)	2	2						
Fill Removal (sites)	1	1						

* MA-LAA = May affect, Likely to Adversely Affect; MA-NLAA = May Affect, Not Likely to Adversely Affect; NE = No Effect

Marbled murrelet suitable and designated critical habitat—Because of the tree selection criteria in appendix A, removing individual mature trees for in-stream placement under Alternatives 2 and 3 may affect, but is not likely to adversely affect, murrelet suitable habitat. Alternatives 2 and 3 may affect designated critical habitat; however, no suitable nest trees will be removed, and the application of project design criteria and the dispersed nature of individual tree removal areas across the landscape will serve to minimize effects on marbled murrelet critical habitat.

Other activities associated with Alternatives 2 and 3, such as noncommercial thinning (2 acres) and conifer release (5 acres) in the Beamer Creek area and culvert and fill removal, will have no effect on murrelet suitable or designated critical habitat. Thinning will have no effect because canopy closures above 40 percent will be retained.

Marbled murrelet disturbance—All project activities included under Alternatives 2 and 3 occur within ¼ mile of unsurveyed suitable habitat. Tree felling will be limited to the period after September 15, with helicopter in-stream tree placement to be limited to the period of October 1 through October 31. Tree felling and tree placement will have no effect on nesting murrelets due to disturbance because treatments will occur outside the nesting season.

Noncommercial thinning and conifer release in the Beamer Creek area is expected to occur between October 1 and February 28, avoiding the critical portion of the murrelet-nesting season. Therefore, these activities will have no effect on nesting murrelets due to disturbance. No suitable or designated critical habitat will be affected.

Removing culverts from the two abandoned roads and landing fill in the Beamer restoration area will occur during the critical portion of the nesting season. Thus, these activities may affect, and are likely to adversely affect murrelets.

Table 5 summarizes effects related to murrelets for all proposed activities. Tree felling, removing culverts and fill, and release treatments are subject to daily activity restrictions (appendix A).

Table 5. Marbled murrelet effects by activity

Marbled Murrelet	**Operating Period and Effects Determination* for Disturbance**							
Activity	**July 8 – Aug.5**		**Aug. 6 - Sept. 15**		**Sept. 16 - Sept. 30**		**Oct. 1 - Feb. 28**	
	MA-LAA		MA-NLAA		MA-NLAA		NE	
	alt 2	**alt 3**	**alt 2**	**alt 3**	**alt 2**	**alt 3**	**alt 2**	**alt 3**
Tree Felling (no. trees)					750	403		
Tree Placement (no. trees)							750	403
Thinning and Release (ac.)							7	7
Road Decommission (miles)	2	2						
Fill Removal (sites)	1	1						

* MA-LAA = May affect, Likely to Adversely Affect; MA-NLAA = May Affect, Not Likely to Adversely Affect; NE = No Effect

Candidates for federal listing—Distribution of the fisher is expected to occur well south of the project area (Csuti et al. 1997). Alternatives 1, 2, and 3 are not expected to impact this species.

Sensitive species—Alternative 1 will not affect local populations of Siuslaw National Forest sensitive species, including the Pacific shrew, the southern torrent salamander, the Pacific fringe-tailed bat, and the western pond turtle.

Large wood placement and thinning and release in the Beamer Creek area under Alternatives 2 and 3 is expected to enhance habitat for Pacific shrews, because large down logs are an important habitat element for them (Csuti et al. 1997). Because existing down logs in riparian areas will not be removed and other activities will not impact Pacific shrew habitat, no adverse effects on local populations of this species are expected.

Habitat for the southern torrent salamander consists of very cold and clear springs, seeps, headwater streams, and waterfall splash zones (Corkran and Thoms 1996). Large-wood placement locations are not expected to occur in suitable habitat. Fill removal activities may cause temporary increases in siltation, but are expected to maintain or improve long-term water quality for this species. None of the alternatives are expected to negatively impact local populations of this species.

Christy and West (1993) describe fringe-tailed bats as using caves, mines, and buildings for hibernation, maternity, and solitary roosts. None of these structures will be affected by actions under Alternatives 2 and 3. These bats feed predominately on moths along forest edges, roads, or

open areas in the forest. Guenther and Kucera (1978) stated that this species also uses, but is not dependent upon snags and down material. None of the other proposed actions are expected to affect this species.

Western pond turtles inhabit marshes, sloughs, lakes, ponds, and slow-moving portions of creeks and rivers. Both fresh and brackish water may be used. This species generally requires such emergent basking sites as partially submerged logs, vegetation mats, rocks, or mud banks. It also seems to favor sites providing underwater refuge, like undercut banks, submerged boulders, and roots. The only sites in the planning area with potential to support pond turtles are associated with two man-made ponds in a plantation located below road 5872. Although no formal surveys have been conducted to determine the presence or absence of this species, informal surveys have not found pond turtles. Treatments associated with this project propose to explore methods that would reduce water levels at one pond, yet retain standing water. No change in hydrological function is proposed for the second pond. Due to retention of standing water at both ponds under Alternatives 2 and 3, no impact on potential western pond turtles is expected. None of the other proposed activities are expected to affect western pond turtles.

Survey-and-manage species—The two survey-and-manage terrestrial species that could be affected are the red tree vole (*Arborimus longicaudus*) and the Oregon megomphix (*Megomphix hemphilli*), which is a small snail. Removing 400 to 750 mature conifer trees for in-stream placement is not expected to adversely affect red tree vole habitat because trees to be removed are limited to individual trees scattered across the landscape and located adjacent to existing plantations or openings. Therefore, removal of mature trees is not expected to have substantial adverse effect on the species' habitat, life cycle, microclimate, or life support requirements (Biswell et al. 2002).

Alternatives 1, 2, and 3 will not affect the Oregon megomphix or its habitat, because no openings greater than ½ acre will be created in conifer stands, project activities will not remove more than 30 percent of the overstory in mature hardwood stands, and no big-leaf maple will be removed (USDA 2003 e; Duncan et al 2003).

Management-indicator species—Alternative 1 will not affect management indicator species, including martens, spotted owls, ruffed grouse, pileated woodpeckers, or primary cavity nesters. With the exception of mature-tree removal for in-stream placement, non-commercial thinning and conifer release in the Beamer Creek area are expected to benefit these species in the long term by speeding the development of mature forest conditions. Because of the scattered nature of mature tree removal, no effects on local management-indicator species are expected. Alternatives 2 and 3 will not remove suitable habitat and therefore are not expected to adversely affect local populations or habitats of these species. Other actions proposed by Alternatives 2 and 3 are not expected to impact local populations of these species.

Land birds—Alternative 1 will not affect land birds or their habitat. Some land birds that are expected in the project area include the olive-sided flycatcher, tree swallow, Swainson's thrush, and black-throated gray warbler.

Actions proposed under Alternatives 2 and 3 have the potential for physically disrupting land-bird nesting, through mature tree removal operations conducted during the breeding

season. However, the amount of acres being treated is small, resulting in a low potential for impacts to land-bird populations in the planning area. Mature tree removal would occur after most species have completed nesting (USDA 1992). Loss of habitat caused by mature tree removal is not expected to be substantial, because of project design criteria that are applicable to threatened and endangered species (appendix A). Other activities under Alternatives 2 and 3 are not expected to remove suitable land-bird habitat or affect nesting and are not expected to adversely impact local individuals or populations of land birds.

Plants *(Forest Botanist)*

Listed, sensitive, and survey-and-manage plants—This project was initiated in October 2002. The project area and activities of all alternatives were evaluated following S&M standards and guidelines in effect during the summer and fall of 2003. Under the recent Record of Decision (ROD) To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDA, USDI 2004), this project has fully complied with S&M mitigation measure standards and guidelines and special status plant species policies in effect at that time. Following ROD direction for ongoing and current management activities (page 9), no additional surveys are required.

Alternative 1 will not affect any listed (threatened and endangered) plants. No listed or sensitive plant species or potential habitat are known or suspected in or adjacent to proposed project sites. Thus, project activities under Alternatives 2 and 3 will have no effect on these species.

Loose-flowered bluegrass (*Poa laxiflora),* a species protected under a conservation strategy (USDA 1993), is known to exist in the planning area. Four protected conservation-strategy populations of this species have been identified in the Yachats watershed. While none of the conservation-strategy populations are located in areas where activities under Alternatives 2 and 3 are proposed, two of the conservation-strategy populations—Meek's Meadow population (# 45) and School Fork population (#42)—are located adjacent to proposed activity areas. Proposed activities are expected to minimally disturb these two population sites; consequently, Alternatives 2 and 3 are not expected to adversely affect the loose-flowered bluegrass populations.

The effects of proposed activities on survey-and-manage fungi, lichens, bryophytes, and vascular plant species (USDA, USDI 2001) were also evaluated. Alternative 1 will not affect these species. Sites, where mature trees would be removed for in-stream placement under Alternatives 2 and 3, contain potential habitat for six survey-and-manage plant species (categories A and C). These sites have been surveyed for the presence of these species. One category A survey-and-manage lichen site (*Ramalina thrausta*) was found in a mature conifer stand located in the Stump subwatershed. The project design criteria (appendix A) will require a 300-foot buffer around the site to protect it. Thus, activities under Alternatives 2 and 3 are not expected to have any direct or indirect effects on current survey-and-manage plant species categories A and C.

Noxious and undesirable weed—Ground-disturbing activities that expose mineral soil on sites with moderate to full sunlight exposure greatly increase the potential for noxious or undesirable weed colonization and establishment. Under Alternatives 2 and 3, culvert and fill removal, waste

area deposition, and operation of heavy equipment off the roadway, increases the potential for weed colonization and establishment.

Based on information gathered from a noxious weed survey of the Yachats watershed during the summer of 2002, the Forest noxious weed coordinator evaluated the potential for weed colonization of disturbed sites as a result of project actions proposed under Alternatives 2 and 3. Established weed species in the project vicinity that have potential to colonize at least some of the areas include Scot's broom (*Cytisus scoparius*), Himalaya berry (*Rubus procerus*), evergreen blackberry (*Rubus lacinatus*), bull thistle (*Circium vulgare*), Japanese knotweed (*Polygonum cuspidatum*) and tansy ragwort (*Senecio jacobaea*).

Alternative 1 would not increase the risk of weed colonization. The spread of weeds in the project area would continue at background levels, primarily along roads.

Under Alternatives 2 and 3, soil disturbances resulting from placing large wood in streams and noncommercial thinning and conifer release activities are expected to be minimal. Native vegetation is expected to recover quickly on disturbed sites. Thus, the risk of weeds colonizing these post-disturbance areas is low. The risk of weeds colonizing disturbed sites where culverts and fill are removed from two abandoned roads is considered moderate. The risk of weeds colonizing waste areas associated with fill deposition from the abandoned road sites and the Beamer restoration area is considered high.

Preventive measures in appendix A are expected to provide adequate resistance to noxious weed colonization over the majority of the project area. Based on these measures, the risk of noxious weed infestation resulting from project activities should be reduced to acceptable levels. By monitoring the effectiveness of preventive measures and conducting weed treatments, where warranted under the Forest general weed management program, infestation levels are not expected to exceed current levels. These levels may likely be reduced below current levels in the project area in the foreseeable future. In the long term, noxious weed infestation should decline in the project areas as tree-crown cover increases.

Public and Management Access (*Forest Transportation Planner*)

The two unclassified abandoned roads in the Upper Yachats subwatershed adjacent to Grass Creek and South Fork Yachats River currently are closed and not maintained. Proposed actions to remove the shallow culverts and associated fill material will not change the current condition of the roads. The Oregon Department of Fish and Wildlife will retain easements along these roads, because they may be used to facilitate managing the nearby big-game meadows.

Fire (*Forest Fuels/Fire Planner*)

Alternative 1 (no action) will not change existing fuel conditions in the watershed. Under Alternatives 2 and 3, placing logs in streams will not substantially change existing fuel conditions in the watershed because of proximity to streams. The humidity is higher near streams, resulting in higher fuel moisture content for large wood. The higher fuel moistures generally keep the risk of fire hazard low. Because proposed treatment sites (noncommercial

thinning and conifer release) in the Beamer Creek area are small and near areas with relatively high fuel moistures, risk of fire hazard at these sites are also low.

Human Uses and Influences

Heritage resources (Forest Archaeologist)—Alternative 1 will have no effect on heritage resources. Actions proposed under Alternatives 2 and 3 will generally take place on disturbed ground and not require field inventories or concurrence from the State Historic Preservation Office (SHPO) before implementation. No adverse effects are anticipated at known sites, because of protection and avoidance measures to be taken where large wood is placed in streams. These actions will be reviewed according to our programmatic agreement with the SHPO.

Recreation (District Resource Planner)—Alternative 1 will retain the existing dispersed recreational experience, including fishing and boating opportunities.

Under Alternatives 2 and 3, existing open roads will not be affected. Removing culverts from two abandoned roads will not change the current closed status. No known effects on the ability to fish or for boating opportunities will occur, because of project locations (maps 2 and 3) and design criteria (appendix A) for any proposed activities, such as large wood placement, abandoned road restoration, or those associated with the Beamer Creek area. Fishing success may increase in the long term, based on fish population responses to similar previous activities, such as those associated with the Tenmile Restoration Project that was implemented in October 1996.

Scenery (Forest Landscape Architect)—Alternative 1 retains the existing scenery. Alternatives 2 and 3 propose adding large wood to streams to improve the function of streams in the Yachats watershed. These actions are consistent with scenic-quality objectives for the area. Natural deposits of trees and rocks are preferable to those added in restoration projects for natural appearance, function, and distribution. By using whole trees instead of cabling and anchoring logs in streams, the two alternatives retain a more natural appearance. The proposed addition of whole trees to streams at natural accumulation points along stream systems is expected to improve their natural appearance and restore scenic integrity while enhancing scenic quality. Other proposed activities, such as road decommissioning or removing fill near streams are expected to result in a more natural appearance and function after native vegetation colonizes disturbed sites.

Special forest products (District Resource Planner)—Alternative 1 does not affect the gathering of special forest products, such as mushrooms, ferns, moss, salal, etc. Proposed actions under Alternatives 2 and 3, like adding large wood to streams and decommissioning the two abandoned roads, are not expected to affect the ability to gather special forest products through required permits or leases because they will not change existing vehicle access.

Summary of Project Costs *(District Fish Biologist)*

The project will be done in conjunction with two other projects (North Fork Siuslaw near Florence and Sampson Creek near Hebo) on the Siuslaw National Forest to help save implementation costs.

Table 6 summarizes the costs of Alternatives 1, 2, and 3.

Table 6. Project costs by alternative

Activity	Alternative 1, No Action	Alternative 2, Proposed Action	Alternative 3
Adding large wood to streams (Alternative 2: 750 trees; Alternative 3: 403 trees)	0	$1,291,700	$801,500
Removing culverts from abandoned roads (350 cubic yards)	0	4,500	4,500
Restoring the Beamer Creek area:			
Removing landing fill and depositing it in a stable waste area (150 cubic yards)	0	$2,900	$2,900
Non-commercially thin conifer Plantation (2 acres)	0	$400	$400
Release existing conifer from alder competition(5 acres)	0	$1,000	$1,000
Total Costs	0	$1,300,500	$810,300

Other Predicted Effects

Cumulative Effects *(The Team)*

The Council on Environmental Quality defines cumulative effects on the environment as those that result from the incremental actions of a proposal added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes them (40 CFR 1508.7).

For purposes of analyzing cumulative effects, the geographic area potentially affected by Alternatives 2 and 3 is the 28,000-acre planning area in the Yachats River watershed. The Team considered the need to extend the geographic area for each of the affected resources, but we believed that effects were not meaningful or measurable beyond the project planning area.

The analyses provided for the three proposed projects in the Yachats watershed—this project, the Yachats Terrestrial Restoration Project, and the Yachats Roadwork Project—reflect the sum of most planning actions on federal lands in the near future, including the effects from changes in the transportation system for forest users and adjacent landowners. Under the Yachats Terrestrial Restoration Project, major activities include up to 8.5 miles of road decommissioning; about 2,000 acres of commercial thinning, including about 9 miles of temporary road reopening and 1.8 miles of temporary road building; and about 3,500 acres of noncommercial thinning. Under the Yachats Roadwork Project, about 8.3 miles of non-key forest roads are planned for decommissioning and about 34.8 miles of non-key Forest roads are planned for closure. Under the "Miscellaneous Small Projects" Decision Memo (USDA 2002b), about 40 acres of riparian planting and about 20 acres of riparian release are planned, with some of this work accomplished along Williamson Creek and South Fork Yachats River. Other likely future actions on federal lands in the project planning area include ongoing road maintenance, repair of key forest roads, harvesting of special forest products such as firewood, salal, sword fern, and moss, and ongoing use of Salmon and Reedy Creeks as municipal water sources for the City of Yachats and adjacent communities.

On state and county land, actions are expected to be limited to maintaining roads. Lincoln County—through the Mid-Coast Watershed Council—is replacing culverts that hinder fish passage, although none are planned for the Yachats River watershed in 2004.

On non-federal land, which comprises 23 percent of the project area, the Team expects private landowners to continue current practices and uses of their land and no changes to current county and state land-use regulations. Current uses include industrial timber harvesting, rural residential, farming, livestock grazing, and limited non-industrial timber harvesting. Based on local industrial timber management objectives and practices, we expect harvest activities on industrial lands before those stands reach 80 years of age. Currently, many of these stands are younger than 25 years. Based on current observations, industrial timber harvesting is occurring, primarily in the Lower Yachats subwatershed. Based on personal communications, management plans for future harvesting in the watershed include clear-cut harvesting of about 530 acres in the next two years—about 220 acres in the Lower Yachats, 30 acres in the North Yachats, and 280 acres in the Upper Yachats sub-basins; and about 900 acres in the next 3- to 10 years—all in the Lower Yachats sub-basin. Oregon Department of Fish and Wildlife will continue to manage about 100 acres of meadow near the Yachats River as elk forage. Cooperative actions with some private landowners are proposed for the near future under this project and may include placing large wood in North Fork Yachats and the upper portion of the Yachats River. Some landowners are making efforts to control noxious weeds on their properties.

Cumulative effects are measured relative to the baseline conditions described in chapter 1. Where specific effects are not described for a particular resource, cumulative effects are not expected to be measurably different from those under baseline conditions. When added to the effects of past, present, and reasonably foreseeable future actions on federal and non-federal lands in the watershed, Alternatives 1, 2, and 3 are expected to have the following cumulative effects:

Alternative 1, no action

Aquatic species habitat recovery will depend on natural processes and take much longer. Short-term cumulative effects on forest dwelling species will be limited to noise disturbance from maintaining and repairing key forest roads.

Alternatives 2 and 3

Aquatic species—When viewed as a whole, Alternatives 2 and 3 are likely to have minor adverse effects on aquatic species during project implementation and up to two years later. In the long term, net improvements to aquatic habitat are expected to accrue with increased stream complexity, increased spawning habitat for fish, and reduced sedimentation and risk of failure from abandoned roads. These actions are expected to substantially benefit aquatic species and reduce adverse cumulative effects that may result from other activities in the watershed.

Sediment production—Removing culverts and fill from the two abandoned roads and placing large wood in streams will increase sedimentation in the short term, but will reduce sedimentation in the long term. Overall, Alternatives 2 and 3 are not expected to measurably increase or decrease sediment production in the project planning area.

Water use—The Yachats-Blodgett Watershed Analysis indicates that water use is over allocated in the watershed, especially during low-flow periods. Although this condition may improve locally, the scale is too large to measure cumulative improvement. Alternatives 2 and 3 are not expected to measurably increase or decrease water flow.

Soil productivity—None of the proposed activities are expected to cumulatively affect soil productivity.

Stream flow—Adding large wood to streams help to disperse stream velocities associated with peak and storm flows, resulting in a net cumulative decrease over the long term.

Stream temperature--Based on project design, adding large wood to streams is expected to improve watershed function and lower stream temperatures, resulting in a cumulative decrease in temperature.

Terrestrial species (listed, sensitive, survey-and-manage, management-indicator)—In the short term, noise disturbances from activities, such as felling trees and placing them in streams, are likely to have minor adverse effects on all terrestrial species to some degree. The dispersal in timing and distribution of these actions across the watershed, however, are such that impacts are expected to be localized and not lead to adverse cumulative effects based on disturbance. Tree-removal sites for large wood are scattered across the landscape and are not expected to measurably add to the existing fragmented condition of late-successional forest habitat.

Fire—Project activities are not expected to cumulatively increase the risk of human-caused fire ignition in the watershed in the long term because cut trees will be in or near streams

where humidity levels are much higher than surrounding areas; high humidity levels substantially reduce risk of fire ignition.

Heritage resources—Adverse cumulative effects are not expected because proposed activities generally occur on previously disturbed ground, resulting in minimal risk to heritage resources.

Recreation—Proposed actions are not expected to cumulatively affect the existing recreation experience because proposed activities will maintain recreation opportunities for forest users.

Scenery—Some activities on other ownerships may cumulatively reduce visual quality in the watershed until the landscape recovers. Actions proposed under Alternatives 2 and 3 will be consistent with the scenic quality objectives for the planning area and are expected to improve the scenic quality of the area in the long term.

Public and management access—Proposed actions will not change public and management vehicle access to public lands because the abandoned roads are currently closed to vehicle use.

Listed, sensitive, and survey-and-manage plants—Based on project design criteria in appendix A, project activities are not expected to cumulatively impact listed, sensitive, and survey-and-manage plants.

Noxious weeds—Some activities on other ownerships may cumulatively increase the presence of noxious weeds in the watershed until the landscape recovers. Activities under Alternatives 2 and 3 will maintain current weed infestation levels on federal land. Infestation levels are expected to decline in the watershed in the foreseeable future as native vegetation recovers on disturbed areas and plantation trees grow, increasing shade over areas adjacent to roads.

In summary, considering other ongoing and likely actions on federal, state, county, and private lands in the Yachats River watershed, Alternatives 2 and 3 are expected to reduce the adverse cumulative effects on the landscape, thereby accruing net beneficial cumulative effects for most resources. The cumulative effects are generally beneficial over time and an improvement over existing conditions.

Aquatic Conservation Strategy *(The Team)*

On March 22, 2004 the USDA Under Secretary for Natural Resources and the Environment signed Record of Decision (ROD) amending the Northwest Forest Plan. The decision clarifies provisions relating to the application of the ACS. Specifically, the amendment removes the need for deciding officials to certify that individual projects meet ACS objectives at the site-specific level and short time frames. Instead, the ROD requires individual projects to meet ACS standards and guides and that ACS objectives be met at watershed or larger scales (5^{th} field hydrologic fields or greater) and over longer time periods of decades or more. Project records must also demonstrate how the decision maker used relevant information from watershed analysis to provide context for project planning.

The Yachats Aquatic Restoration Project is designed to meet the ACS standards and guides. ACS objectives will be met in the short term and long term at the 5th-field watershed scale.

The Yachats-Blodgett Watershed Analysis describes the existing conditions in the watershed, including those that are having adverse effects on watershed health (page 3). The Yachats Aquatic Restoration Project is designed to restore watershed health, addressing many of the existing conditions described in the watershed analysis.

Short-Term Uses and Long-Term Productivity (*The Team*)

The use or protection of natural resources for long-term, sustained yield is the legislated basis of management and direction for the Forest Service (USDA, USDI 1994a, p. 321). Short-term uses include actions such as road decommissioning. The design criteria were developed to incorporate the standards and guides of the Siuslaw Forest Plan as amended by the Northwest Forest Plan. We expect that applying them to the proposed management actions will reduce the potential for long-term loss in productivity of forest soils that may result from short-term uses. They will also allow for the long-term development of late-successional habitat and restoring aquatic ecosystems.

Unavoidable Adverse Effects (*The Team*)

Implementing any alternative would result in some adverse environmental effects that cannot be avoided. The design criteria, along with Forest standards and guides, are intended to keep the extent and duration of these effects within acceptable rates, but adverse effects cannot be completely eliminated. The following adverse environmental consequences would be associated to some extent with Alternatives 2 and 3:

- Short-term, localized reductions in air quality from dust, smoke, and vehicle emissions resulting from management actions and forest users.
- Disturbance to wildlife when their habitat is disturbed by management actions or recreation activities.
- Temporary increase in large vehicle traffic during large-wood addition and road decommissioning operations.

Irreversible Resource Commitments (*The Team*)

Irreversible commitments of resources are actions that disturb either a non-renewable resource (for example, heritage resources) or other resources to the point that they can only be renewed over 100 years or not at all. The design criteria—along with Forest standards and guides—are intended to reduce these commitments, but adverse effects cannot be completely eliminated. For example, the continued use of existing roads that access the Forest is an irreversible commitment of the soil resource because of the long time needed for a road to revert to natural conditions.

Irretrievable Commitment of Resources (*The Team*)

An irretrievable commitment is the loss of opportunities for producing or using a renewable resource for a period of time. Almost all activities produce varying degrees of irretrievable resource commitments. They parallel the effects for each resource discussed earlier in this chapter. They are not irreversible because they could be reversed by changing management direction. The irretrievable commitment of resources, such as removal of trees for large wood placement in streams, would be associated to some extent with alternatives 2 and 3.

Environmental Justice (*Resource Planner*)

Based on local knowledge, small pockets of low-income populations live in the planning area and some augment incomes through actions such as gathering firewood and picking brush to sell. Some farms exist in the planning area and domestic-use water systems include individual wells and spring-fed systems.

Proposed activities are not expected to affect opportunities for gathering firewood or commercially harvesting shrubs. Some proposed actions in the Yachats watershed may provide opportunities for jobs. None of the proposed actions are expected to physically affect farms or water quality of domestic-use water systems.

In summary, effects of alternatives on the human environment (including minority and low-income populations) are expected to be similar for all human populations regardless of nationality, gender, race, or income. No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations are expected as a result of implementing actions described for Alternatives 2 and 3.

Other Disclosures (*The Team*)

Based on the Team's evaluation of the effects, we concluded:

- ⇨ None of the alternatives would affect minority groups, women, and consumers differently from other groups. These groups may benefit from employment opportunities that proposed activities will provide; the no-action alternative would have neither adverse nor beneficial effects. None of the alternatives adversely affects civil rights. All contracts that may be awarded as a result of implementation would meet equal employment opportunity requirements.
- ⇨ None of the proposed activities will affect known prehistoric or historic sites because no new disturbance on previously undisturbed ground is expected. As outlined in the American Indian Religious Freedom Act, no effects are anticipated on American Indian social, economic, subsistence rights, or sacred sites.
- ⇨ No adverse effects on wetlands and flood plains are anticipated. No farmland, parkland, rangeland, wilderness, or wild and scenic rivers will be affected.
- ⇨ This environmental assessment is tiered to the Siuslaw Forest Plan FEIS, as amended by the Northwest Forest Plan, and is consistent with those plans and their requirements.
- ⇨ Proposed activities are not in or adjacent to an inventoried roadless area.
- ⇨ Proposed activities are consistent with the Coastal Zone Management program.

- ⇨ None of the proposed activities are expected to substantially affect human health and safety.
- ⇨ Proposed activities are consistent with the Clean Air Act.
- ⇨ The proposed activities are not expected to measurably affect global warming. The USDA Forest Service will continue an active leadership role in agriculture and forestry regarding the reduction of greenhouse gas emissions.
- ⇨ These actions do not set a precedent for future actions because they are similar to actions implemented in the past.

What are the environmental effects?

Who was consulted about this project? CHAPTER 4

NOAA Fisheries has been consulted about effects of proposed actions on federally listed coho salmon through the Northwest Oregon Programmatic Biological Assessment (BA; USDA, USDI 2002). The programmatic BA indicates that placing large wood in streams and removing culverts from the two abandoned roads are likely to adversely affect coho salmon. Other project activities, such as those associated with restoration of the Beamer Creek area, are not likely to adversely affect coho salmon. NOAA Fisheries has also determined that project activities will not adversely affect designated essential fish habitat.

In their biological opinions of the following Siuslaw National Forest biological assessments, the U.S. Fish and Wildlife Service (FWS) has concurred with our findings that the project will not jeopardize the existence of bald eagles, northern spotted owls, and marbled murrelets. The FWS terms and conditions will be applied to the project design criteria:

- Programmatic Biological Assessment: Fiscal Year 2004-2005 Projects in the North Coast Province Which Might Disturb Bald Eagles, Northern Spotted Owls, or Marbled Murrelets (FWS reference: 1-7-04-F-1113).

- Programmatic Biological Assessment of Fiscal Year 2003-2004 Projects in the North Coast Province Which Would Modify the Habitats of Bald Eagles, Northern Spotted Owls, or Marbled Murrelets. (FWS reference: 1-7-02-F-958).

The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw; and Siletz were informed of the proposed action during scoping. No comments on the proposed action were received from them.

The Oregon Department of Fish and Wildlife (Newport Field Office) fish biologists provided fish population data for the 5th-field Yachats watershed.

The Mid-Coast Watershed Council provided information on the limiting factors in the North Fork Yachats subwatershed.

Appendix A

Yachats Aquatic Restoration Project
Design Criteria

These design criteria for the Yachats Watershed Aquatic Restoration Project were developed to ensure that standards and guides of the 1990 Siuslaw Forest Plan (SFP) as amended by the 1994 Northwest Forest Plan (NFP) are met. Where applicable, pertinent standards and guides from these Plans are cited. The design criteria apply to all action alternatives, unless otherwise specified. Appropriate specialists will be consulted before any design criteria for proposed activities are changed.

I. Design Criteria Common to All Activities

1. Coho Salmon

NOAA Fisheries has been consulted about effects of proposed actions on federally listed coho salmon through the Northwest Oregon Programmatic Biological Assessment (BA) (USDA, USDI 2002). The Programmatic BA and NOAA Fisheries have determined that project activities are likely to adversely affect listed coho salmon in the short term. Project activities are expected to benefit coho salmon and their habitat in the long term. Project activities are not expected to adversely affect designated essential fish habitat.

2. Bald Eagle, Marbled Murrelet, and Northern Spotted Owl Habitat Modification

The U.S. Fish and Wildlife Service (FWS) has concurred with our findings that the project will not jeopardize the existence of bald eagles, northern spotted owls, and marbled murrelets. The FWS terms and conditions will be applied to the project design criteria.

- For individual removal of mature conifers, consultation with the FWS was conducted through the Programmatic Biological Assessment of FY 2003-2004 Projects in the North Coast Province Which Would Modify the Habitats of Bald Eagles, Northern Spotted Owls, and Marbled Murrelets. A Biological Opinion was issued that concurred with our determination of effects and authorized incidental take associated with individual tree removal for in-stream placement (FWS reference # 1-7-02-F-958, Dated Sept 30, 2002).

Bald eagle, marbled murrelet, and northern spotted owl

a. For any activity that proposes to remove mature conifer, involve a wildlife biologist.

b. Except for hazard trees, do not remove individual known nest trees or trees with nesting structure from areas where, in the opinion of the unit biologist, the loss of such a tree would limit nesting. A known nest tree may be removed only when it is a hazard tree **and** when the tree is unoccupied by nesting birds or young (e.g., after the young have fledged).

c. Retain a minimum of 40% canopy closure in all conifer stands after thinning treatments.

d. Mature trees intended for in-stream use will not be removed from stands known to be occupied by marbled murrelets, or within 0.25 mile of known spotted owl nest sites.

Marbled murrelet

a. Comply with the standards of the 13 May 1997 biological opinion addressing the effects of implementing the Northwest Plan standards and guides on designated murrelet critical habitat (USDI 1996) for all individual tree removals that may affect critical habitat or suitable habitat of the marbled murrelet.

3. Bald Eagle, Marbled Murrelet, and Northern Spotted Owl Disturbance

Actions proposed in the Yachats aquatic project area, but not subject to inclusion under the Habitat Modification BA, that create an "effect" situation for federally listed species are included under the Programmatic Biological Assessment: Fiscal Year 2004-2005 Projects in the North Coast Province Which Might Disturb Bald Eagles, Northern Spotted Owls or Marbled Murrelets (Disturbance BA). A biological opinion was issued in January 2004 (FWS reference number 1-7-F-1113). Project activities covered under this BA include the following:

Road decommissioning
Conifer release
Noncommercial thinning
Fill removal (sites)

Bald eagle, marbled murrelet, and northern spotted owl

a. If a new nest site is discovered in the project area, evaluate any activity within 0.25 mile of the nest site (0.5 mile line-of-site for bald eagle nests) for potential effects. Restrict activities to prevent disturbances where necessary.

b. Do not begin helicopter operations until October 1 in any given year where operations will be within 0.5-mile of suitable occupied or unsurveyed suitable habitat.

c. Do not use blasting for part of any proposed action from March 1 through September 30.

Marbled murrelet and northern spotted owl

a. To minimize risk of attracting predators to activity areas, contain or remove all garbage (especially food products) in the vicinity of any activity.

Bald eagle

a. Do not implement any activity within 0.25 mile (0.5 mile for aircraft operations) or a 0.5-mile sight distance of a known bald eagle nest site between January 1 and August 31, unless a wildlife biologist has determined that the nest site is unoccupied.

Marbled murrelet

a. Do not implement activities within 0.25 mile of a known occupied marbled murrelet site during the critical nesting period of April 1 through August 5. The unit wildlife biologist may modify the distance and timing of activities based on site-specific information. Document all changes and notify the US Fish and Wildlife Service before actions are implemented.

b. Do not begin activities associated with projects within 0.25 miles (0.5 miles for aircraft operations) of occupied or unsurveyed suitable or potential marbled murrelet habitat between April 1 and September 15 until two hours after sunrise; end activities two hours before sunset.

c. Do not implement mature tree felling for in-stream use until after September 15.

Northern spotted owl

a. Do not implement activities within 0.25 mile of a spotted owl nest site or the activity center of any known pair (unless known to be unoccupied, as defined by protocol) during the critical nesting period of March 1 through July 7. The unit wildlife biologist may modify the distance and timing of activities based on site-specific information. Document all changes and notify the US Fish and Wildlife Service before actions are implemented.

4. Other Requirements

a. Follow Siuslaw Plan standards and guides (FW-114 through FW-118) to meet water-quality standards outlined in the Clean Water Act for protecting Oregon waters, and apply practices as described in General Water Quality Best Management Practices, Pacific Northwest Region, November 1988. Design criteria, including these practices, are incorporated throughout the project, such as in project location, design, contract language, implementation, and monitoring. The State has agreed that compliance with these practices will ensure compliance with State Water Quality Standards (Forest Service Manual 1561.5, R-6 Supplement 1500-90-12).

b. If the total oil or oil products storage at a work site exceeds 1, 320 gallons, or if a single container (e.g., fuel truck or trailer) exceeds a capacity of 660 gallons, the contractor shall prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. The SPCC plan will meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer. (SFP: FW-119, 120, 122).

c. The literature was searched for possible heritage resources (historical or archaeological sites) in the project planning area. No known sites were identified that could be affected by this project. All actions will be on previously disturbed ground and will not require field inventories. Should heritage resources be discovered as a result of any project activities, cease work in that area and consult with the Forest Archaeologist. Protect, preserve, and treat sites in accordance with the National Historic Preservation Act.

d. Required survey-and-manage protocols will follow 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).

e. Ensure that a professional fisheries biologist is involved in the design of all projects. Ensure that knowledgeable and trained personnel (e.g. fisheries biologist, hydrologist, and/or engineer) are involved with implementation.

f. Follow ODFW guidelines for timing of in-water work where relevant, except where the potential for greater damage to fish, water quality, and fish habitat exists. Request from the NOAA Fisheries exceptions to ODFW guidelines for timing of in-water work. Requests must be granted by the Services before operations can proceed. Maximize activities during late summer and early fall during dry conditions.

g. Stabilize potential erosion areas and control sedimentation. Minimize sedimentation potential by implementing appropriate measures to meet Oregon DEQ turbidity standards.

h. Rehabilitate and stabilize all disturbed areas by seeding and planting with native seed mixes or plants or otherwise compatible species.

i. Minimize the number and length of access points through riparian areas and disturbance of existing vegetation.

j. Clean heavy equipment and check equipment for leaks before operating in the stream channel.

k. During project design, develop appropriate measures to ensure protection of aquatic and riparian habitats.

Noxious Weed Prevention:

a. To prevent the spread of noxious and undesirable weeds, maintain canopy cover to the extent possible when removing culverts and fill from landing and roads. Seed disturbed sites lacking canopy cover (cut/fill slopes, waste areas, culvert removal sites, road barricades) with available native, certified weed-free grass and forb species.

b. To prevent the spread of noxious and undesirable weeds, clean all heavy equipment (including dump trucks) of soil, vegetative matter, or other debris that may contain or

hold weed seeds, prior to entering National Forest System lands.

c. Monitor project sites with a high risk of weed infestation for a period of three years following completion of the project. Monitoring should be conducted annually and focus on detection of new weed infestations.

Survey-and Manage Species:

a. Protect the survey-and-manage lichen site (*Ramalina thrausta*) located west of the 5491 road in the Stump sub-watershed by providing a 300-foot radius buffer around it. Trees outside the buffer, that will be felled for large wood and that have the potential to reach the buffer, should be directionally felled away from the buffer.

b. Conduct pre-disturbance surveys for Oregon megomphix north of the Lane County line if proposed treatments in deciduous forest stands create openings greater than ½ acre in size, or remove more than 30% of the deciduous overstory in mature hardwood stands. Conduct pre-disturbance surveys if treatments remove mature big-leaf maple.

II. Large Wood Placement Activities (NFP: RA-1 & FW-1; WR-1, 3; p. C-37)

1. In-stream Placement of Large Wood

a. In-stream placement of large wood must be consistent with the Programmatic Biological Opinion from NOAA Fisheries (USDC 2003) and the Division of State Lands General Authorization for Fish Habitat Enhancement (DSL 2004).

b. The project will be consistent with the Oregon Aquatic Habitat Restoration and Enhancement Guide (OPSW 1999) and A Guide to Placing Large Wood in Streams by the Oregon Department of Fish and Wildlife and Oregon Department of Forestry (ODFW, ODF 1995) as required by the Division of State Lands General Authorizations for Fish Habitat Enhancement in Oregon (DSL 2004).

c. Select large wood that has a length at least 1.5 times bank-full width and a diameter greater than 22 inches.

d. Place LWD in a manner to most closely mimic natural accumulations of LWD in each particular stream.

e. Limit in-stream activities to between July 15 and September 15 unless a waiver is obtained by ODFW (SFP: FW-117).

f. Avoid using ISC Type I and Type II helicopters within 0.5 mile of spotted owl or marbled murrelet occupied or unsurveyed suitable habitat during the critical breeding periods (spotted owl: March 1 through July 7; murrelet: April 1 through August 5).

2. Tree Selection

Survey-and-manage species—The required survey-and-manage species surveys have been completed. Protect the survey-and-manage lichen site (*Ramalina thrausta*) located west of the 5491 road in the Stump sub-watershed by providing a 300-foot radius buffer around it. Trees outside the buffer, that will be felled for large wood and that have the potential to reach the buffer, should be directionally felled away from the buffer.

Listed terrestrial species—After the required surveys are completed (e.g., lichen surveys), wildlife biologists, with technical assistance from U.S. Fish and Wildlife Service biologists, will select trees to be placed in streams for enhancing hydrologic function and water quality. First priority for tree selection will be to use suitable hazard trees or trees blown down across key Forest (ATM) roads. To protect interior forest habitat, existing or potential nesting structure, and neighboring trees with nesting structure from incidental damage, use the following criteria to select additional trees for placement in streams:

1. Select trees that will be dispersed within the first two lines of trees along the periphery of permanent openings such as road rights-of-ways and power line corridors, or along the periphery of nonpermanent openings such as plantation edges or conifer-alder mixed plant associations adjacent to riparian areas;
2. Select trees that will be less than or equal to 36 inches DBH and lack existing or potential bald eagle, marbled murrelet, and northern spotted owl nesting structure—for owls, trees with cavities or other deformities that provide nesting structure; for murrelets, limbs or other platforms greater than or equal to four inches in diameter);
3. In general, select individual trees; however, if the wildlife biologist determines that selecting small groups of 2 to 4 trees will not decrease the amount and suitability of available owl or murrelet habitat in the affected stand, small groups may be selected; and
4. To the greatest extent possible, select trees to avoid any damage to existing or potential nesting structure in the stand during felling and removal operations.

The following trees will **not** be selected for removal:

a. Trees with potential nesting platforms or cavities suitable for bald eagles, murrelets, and northern spotted owls;
b. Known bald eagle, spotted owl or marbled murrelet nest trees or trees adjacent to known nest trees that provide protection for nest trees;
c. Trees within ¼-mile of a known spotted owl nest site;
d. Trees within a stand known to be occupied by murrelets;
e. Trees that maintain suitable nesting conditions by buffering trees with nesting structure;
f. The largest trees in areas where the number of large trees is limited; and
g. Trees with the best opportunity to develop future nesting structure.

A known nest tree may be removed only when it is an immediate hazard and when the tree is unoccupied by nesting birds or young (e.g., after the young have fledged).

To evaluate the effectiveness and feasibility of tree selection criteria associated with large wood for stream enhancement, the Forest Service will request technical assistance from the U.S. Fish and Wildlife Service before felling or removing any standing trees not posing an immediate hazard. This technical assistance may include meetings and field reviews as needed and would be both before and during the tree selection process. Additional assistance may also be needed during felling and helicopter operations.

3. Selections of Trees with Root Wads

a. Select plantation trees (25 to 50+ years old) adjacent to classified or unclassified roads, or in unclassified roads to be pulled over. The objective is to retain the root wad with the tree bole for placement in streams.

III. Beamer Creek Area Thinning and Release Activities (NFP: RA-1 & FW-1; WR-1, 3; p. C-37)

a. Thin (but do not harvest) the 2-acre conifer plantation to the appropriate TPA. Maintain a canopy cover of at least 40 percent. Develop thinning prescriptions governed by stream shading requirements and slope stability concerns. Use a silviculturist and a hydrologist or fish biologist in preparing prescriptions. Conduct thinning work between October 1 and February 28.

b. Release about 5 acres of conifer from alder competition so that conifer can receive adequate sunlight to grow and develop. Conduct release work between October 1 and February 28.

c. Along ephemeral, non-fish bearing, and intermittent streams, maintain an untreated or modified treatment area within 10 feet of the stream. Maintain a minimum 20-foot buffer on perennial streams. These actions will prevent any potential adverse affects to stream channel or water quality conditions.

IV. Abandoned Roads and Beamer Creek Area Landing Activities (NFP: RF-3c, 5, & 6; p. C-32, 33)

Use a team consisting of a fish biologist or hydrologist and engineer to review the abandoned roads project sites before preparing design plans. The team will review any changes in the design plans before the plans are incorporated into the contract.

1. Culvert Removal

a. Design fill-removal activities to minimize sediment entering stream channels. The objective is to restore stream processes and floodplain access by removing all fill material on the valley floor. Excavate slopes to approximate 1.5:1, where practical; do not encroach on natural slopes. Allow disturbed slopes to re-vegetate naturally or use erosion control measures (such as tree limbs and tops, native seed mixtures or plants), where a moderate to high potential for surface erosion exists. Where feasible, restore the natural

flood plain. Consult with watershed and/or fisheries staffs where technical feasibility or economics limit meeting fill removal objectives (SFP: FW-123).

b. Place woody debris, if locally available, in stream channels where sediment is expected to erode from channels at amounts that equal or exceed three (3) cubic yards. This strategy will help reduce sediment rates as streams adjust to gradients during the next year's high flows.

c. Transport off-site culverts removed from stream crossings and ditches to be recycled, reused, or disposed of at a landfill.

d. Do not apply specified reconstruction to roads used for access in removing culverts.

2. Waste Material

a. Place material excavated from stream crossings and unstable side-cast road/landing fills on stable areas at least 100 feet away from stream channels or active flood plains. Suitable areas include roadbeds adjacent to cut banks, or on previously designated waste areas (if locally available). Remove any alder or conifer from the cut bank before placing excavated material, to enhance soil-to-soil contact and long-term soil stability. Contour waste piles to approximate 1.5:1 to 2:1 slopes and allow re-vegetating naturally. Seed piles with a mixture of native species where a moderate to high potential exists for surface erosion, or where noxious weed infestation is likely. Avoid using straw except in extreme circumstances (SFP: FW-117, 171).

2. Sidecast Pullback

a. Stabilize unstable areas (such as road side-cast material) before a road is decommissioned, to prevent fine sediment from entering stream channels. Excavate side-cast fill material adjacent to stream crossings, where fill material could fail, enter streams, or both. Focus on areas where downhill slopes adjacent to roads are greater than 60%, and road fills are within 200 feet slope-distance of streams (SFP: FW-108, 117).

3. Road Surface Treatments

a. Install water bars on both sides of excavated stream banks to route surface water away from newly excavated slopes (SFP: FW-123).

b. Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage will not destabilize road fills. To keep streams within their channels when culverts are obstructed, build water bars immediately above existing culverts to become the overflow point. Use the Siuslaw National Forest Water Bar Construction Guide to determine water-bar spacing and design (SFP: FW-123).

c. Decompact surfaces of roads where necessary, to allow water to percolate through the soil and accelerate the recovery of woody vegetation. Although sub soiling is the

preferred method, use ripping if sub soiling is not feasible or economical. Consult a geotechnical specialist to determine feasibility of sub soiling (SFP: FW-162).

V. Monitoring Objectives

Monitoring items include those required for implementation and effectiveness monitoring. Implementation monitoring determines if the project design criteria and Siuslaw Forest Plan standards and guides, as amended by the Northwest Forest Plan, were followed. Effectiveness monitoring evaluates whether applying the management activities achieved the desired goals, and if the objectives of the standards and guides were met. Findings resulting from project observations and monitoring are expected to help influence designing future projects and developing future monitoring plans.

1. Implementation Monitoring

Forest Plan Standards and Guides

a. Before contracts are advertised, review them for consistency with the standards and guides of both the Northwest and Siuslaw Plans and project design criteria.

Contract and Operations

a. Involve appropriate specialists when developing project contracts or conducting District operations work to ensure activities are implemented as designed. The appropriate specialists will also participate periodically during contract work, especially when unusual circumstances arise that may require a contract modification.

b. Use key checkpoints, including a plan-in-hand review and a contract review of specifications before the next phase of work begins. This will ensure that key problem situations are addressed in the specifications.

2. Effectiveness Monitoring

Monitoring will be tiered to the Siuslaw Forest Plan.

Fish Habitat Treatments

a. Use Oregon Department of Fish and Wildlife and U.S. Forest Service stream surveys to assess changes from measured baseline data in fish habitat characteristics of streams where large wood was added.

Road Treatments

a. Field-review excavated slopes from road stabilization activities and note areas where eroded materials enter stream channels. Make observations after the first major rainfall and seasonally thereafter until vegetation reoccupies disturbed sites (about 2 to 5 years).

If the surface is eroding and could adversely affect fish habitat, take steps to eliminate or reduce erosion.

b. Observe road surface treatments such as water bars to determine effectiveness and effects on the stability of the outer portion of the road prism.

c. Review the effectiveness of road closures to determine whether another form or location of closure will be required at or near road entrances.

3. Project Tracking

Forest Service direction, regulations, and standards and guides for resource protection may change over time. Should changes occur prior to completion of any actions under this project, an addendum will be done for the EA and contract specifications will be modified, if necessary.

Yachats Aquatic Restoration Project

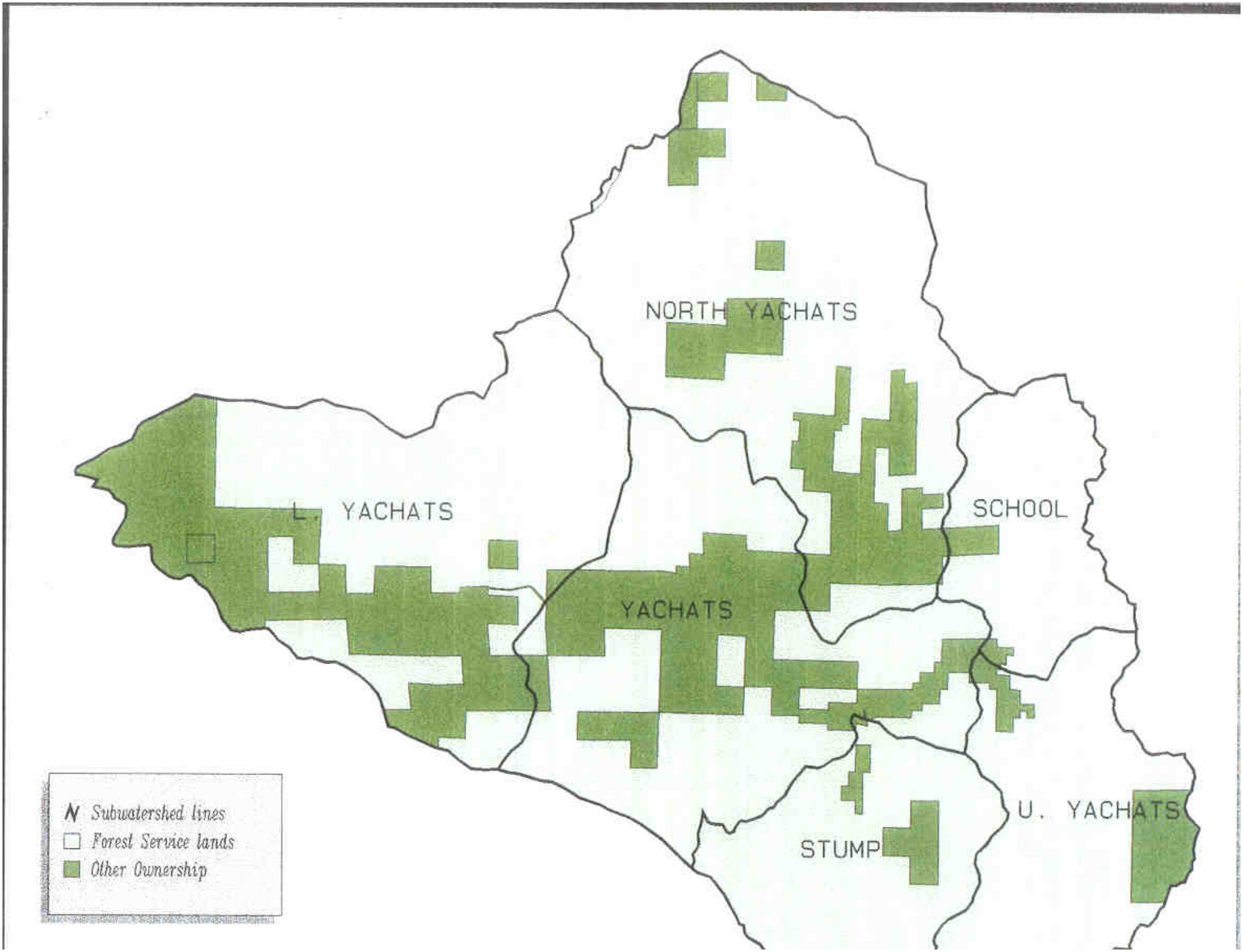
List of Preparers

The Team

Name	Position Title	Primary Responsibilities
Bruce Buckley	Resource Planner	Project coordinator, EA, NEPA process
Jessica Dole	Forest Landscape Architect	Scenery effects
Barbara Ellis	GIS Technician	GIS mapping
Edward Garza	Forest Fuels/Fire Planner	Fire hazard effects
Ken McCall	Forest Transportation Planner	Forest transportation system effects, roads analysis
Doug Middlebrook	District Wildlife Biologist	Wildlife effects; wildlife specialist report, including the biological evaluation
Karla Reeves	District Fish Biologist	Fisheries effects, fisheries biological assessment
Jan Robbins	District Hydrologist	Hydrologic and soils effects, system roads stability assessment, water quality restoration plan
Dan Segotta	Forest Botanist	Listed, sensitive, and survey-and-manage plant effects, effects on noxious and undesirable weeds
Phyllis Steeves	Forest Archaeologist	Heritage resource effects
Paul Thomas	Planning Manager	Team leader

Contributors

Name	Position Title	Primary Responsibilities
Karen Bennett	Forest Soils Scientist	Soils effects support
Al Brown	Forest Environmental Coordinator	NEPA guide
Bill Helphinstine	District Ranger	Process guide
Daniel Karnes	Silviculturist	Stand-treatment guide
Jack Sleeper	District Fish Biologist	Fisheries consultant
John Zapell	District Public Affairs Specialist	Public notification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SCHOOL
YACHATS
U. YACHATS
STUMP
N
Subwatershed lines
Forest Service lands
Other Ownership

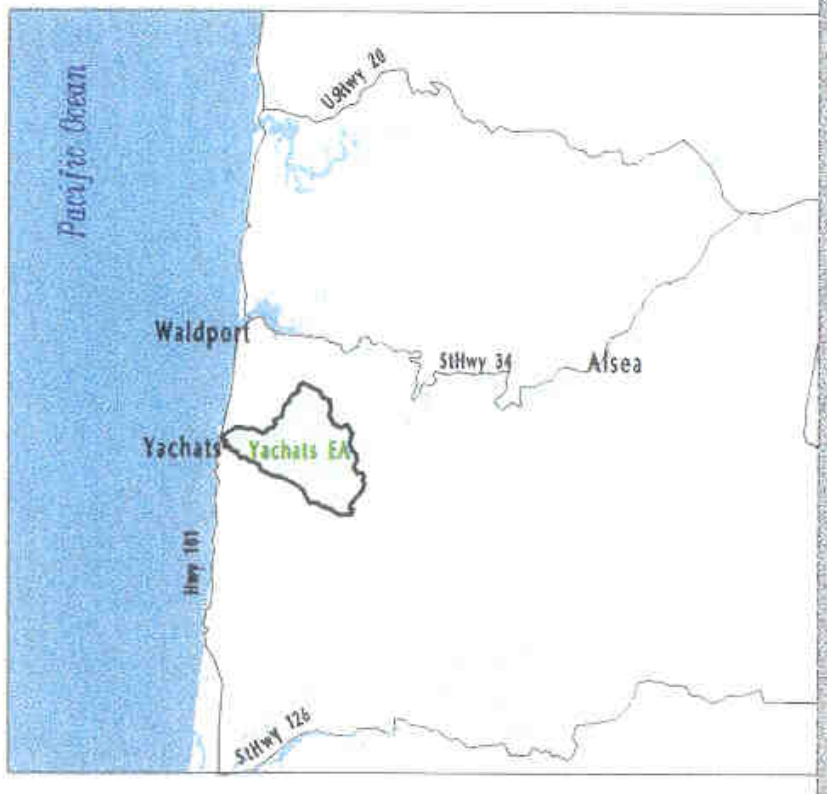
Map 1

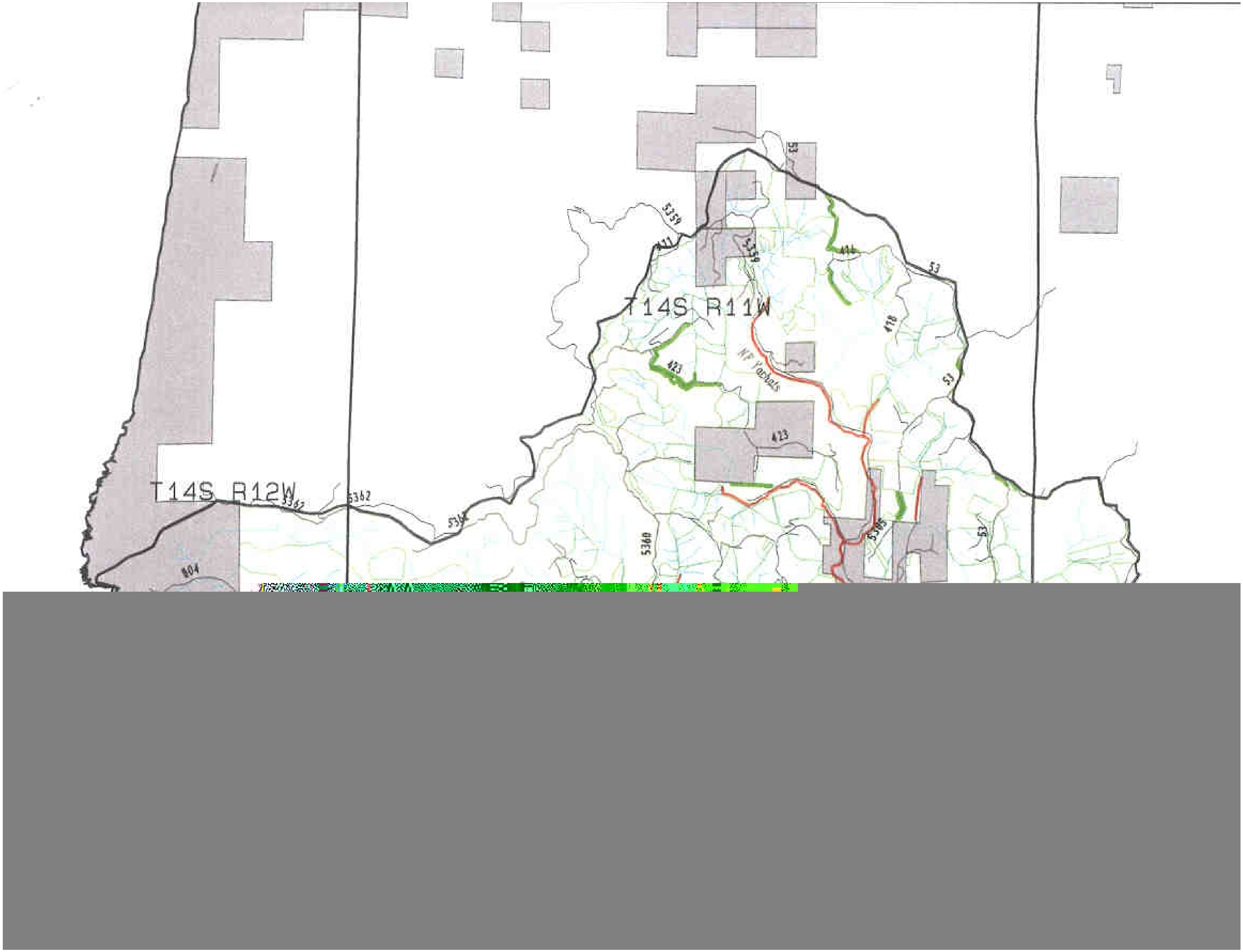
Yachats Aquatic Restoration Project

Vicinity Map

June 26, 2003

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Standards of the Office of Management and Budget. For specific data source dates and/or additional digital information contact the Forest Supervisor, Siuslaw National Forest, Corvallis, Oregon.





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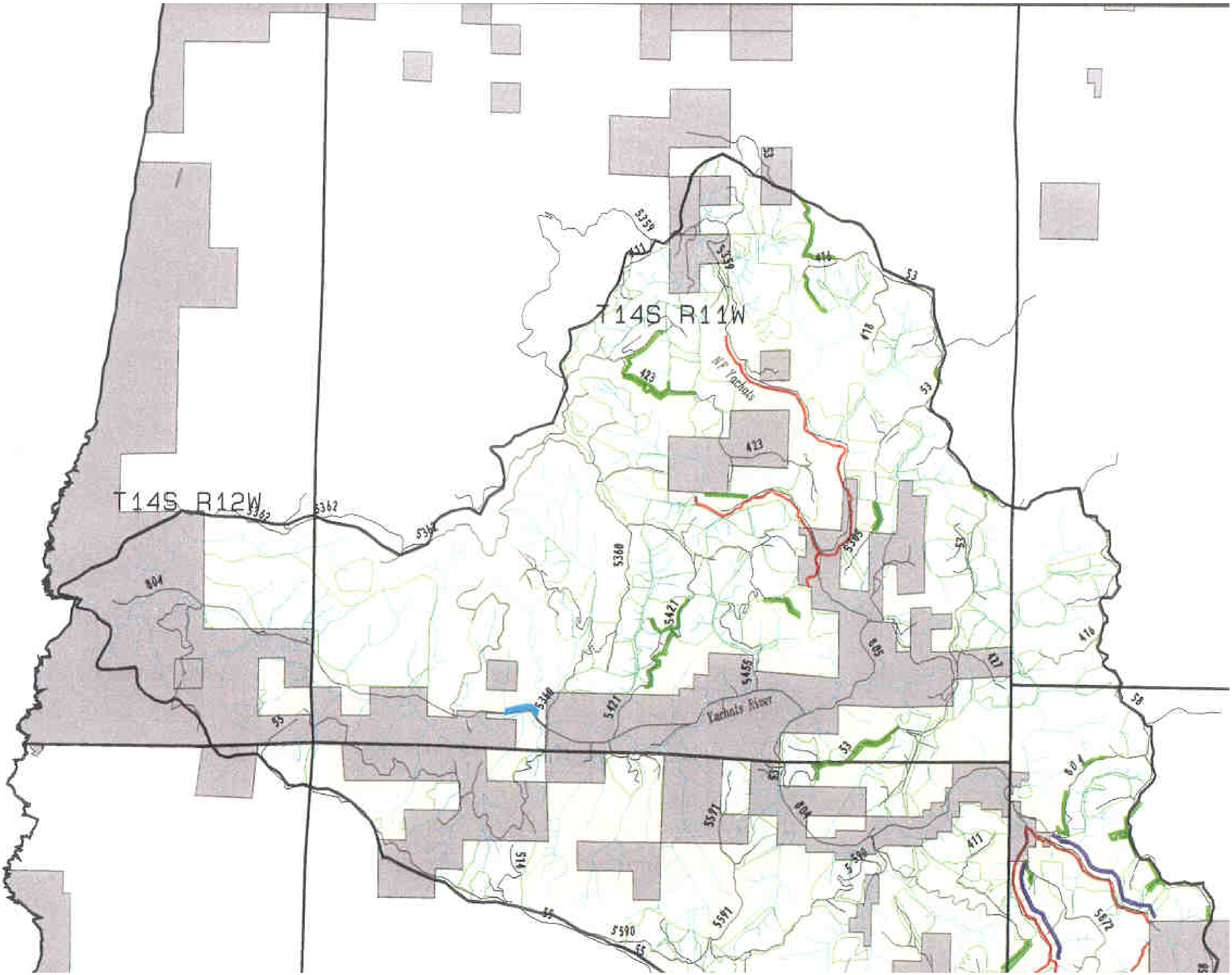
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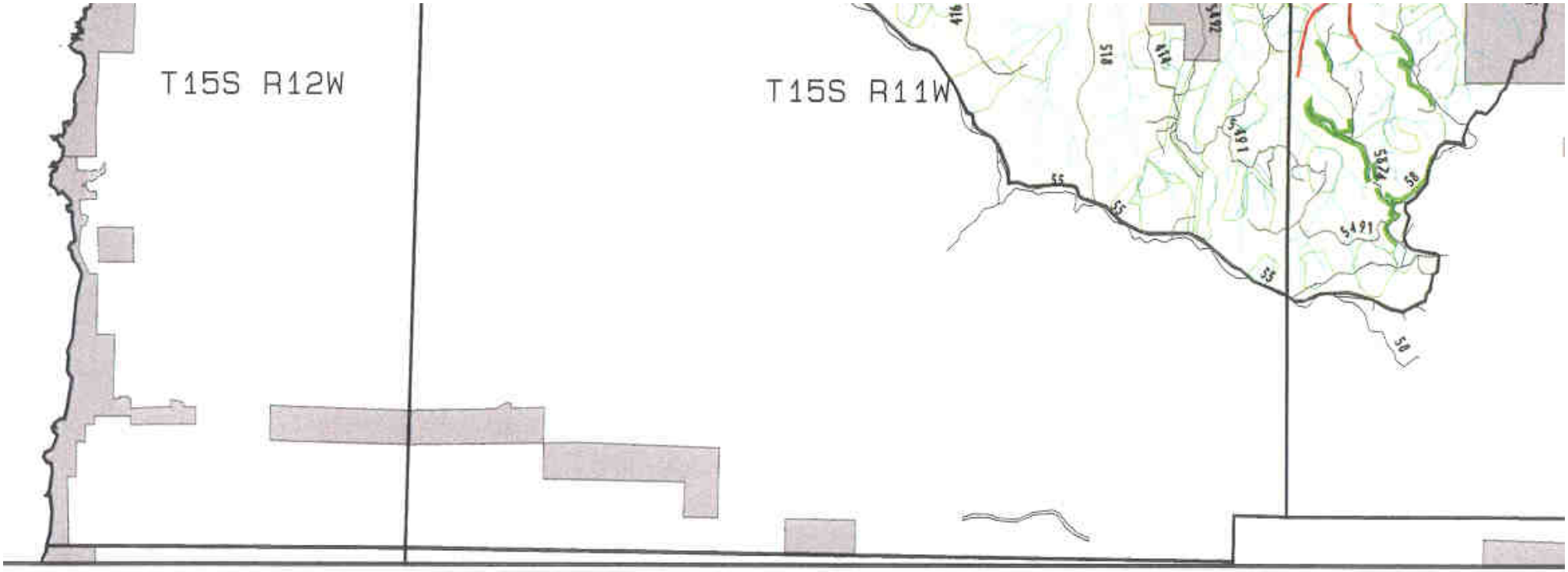

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May 14, 2004

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Yachats Watershed Aquatic Restoration Project

Alternative 3

- Large Wood Source
- Large Woody Debris
- Abandoned Roads
- Private
- Plantations
- Natural Stands
- Beamer Restoration