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Department of
Agriculture

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Service**

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Environmental Assessment

South Fork McKenzie River Enhancement Project

McKenzie River Ranger District
Willamette National Forest
Lane County, Oregon

Legal Locations: T.18S and 19S, R.5 and 5 1/2E. W.M.

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Table of Acronyms

ACOE	Army Corps of Engineers
ACS	Aquatic Conservation Strategy
BA	Biological Assessment
BE	Biological Evaluation
BMP	Best Management Practice
DN/FONSI	Decision Notice/Finding of No Significant Impact
EA	Environmental Assessment
EDT	Ecosystem Diagnosis and Treatment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
IDT	Interdisciplinary Team
LAA	Likely to Adversely Affect
LRMP	Land Resource Management Plan
MA	Management Area
MIS	Management Indicator Species
MSA	Magnuson-Stevens Fisheries Conservation and Management Act
MWC	McKenzie Watershed Council
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NWFP	Northwest Forest Plan
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ORV	Outstandingly Remarkable Value
OSHA	Occupational Safety and Health Administration
OSU	Oregon State University
PETS	Proposed, Endangered, Threatened, Sensitive species
PFMC	Pacific Fishery Management Council
ROD	Record of Decision
SHPO	State Historic Preservation Office
SOPA	Schedule of Proposed Actions
TES	Threatened, Endangered and Sensitive Species
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WA	Watershed Analysis
WSR	Wild and Scenic River
WNF	Willamette National Forest

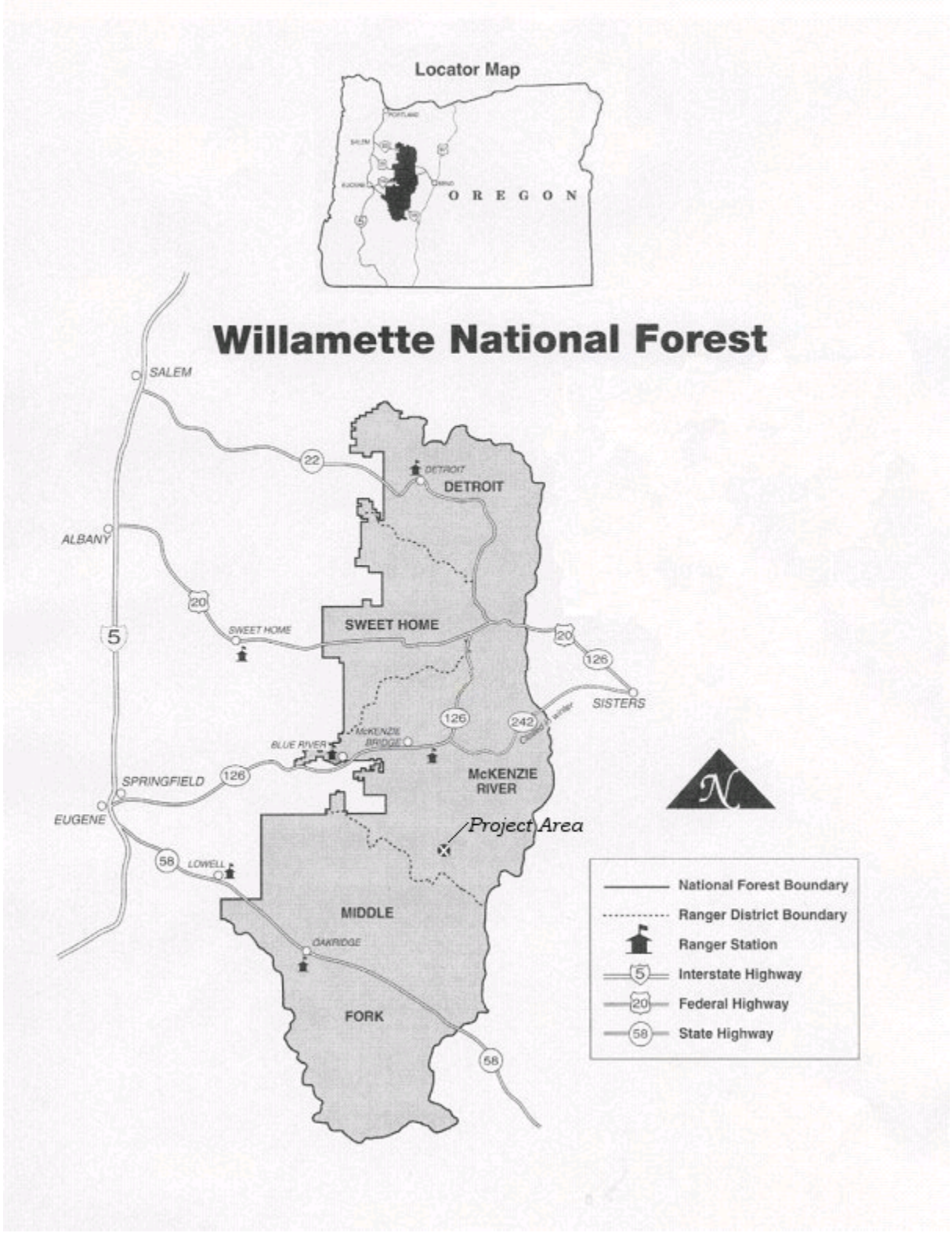
Chapter 1 – Purpose and Need

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- **Introduction:** The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- **Comparison of Alternatives, including the Proposed Action:** This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- **Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by significant issue. Within each section, the affected environment is described first, followed by the effects description.
- **Agencies and Persons Consulted:** This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the McKenzie River Ranger District; McKenzie Bridge, Oregon.


Locator Map
OREGON
Willamette National Forest
SALEM
ALBANY
SPRINGFIELD
EUGENE
SWEET HOME
DETROIT
BLUE RIVER
McKENZIE BRIDGE
SISTERS
LOWELL
OAKRIDGE
MIDDLE FORK
McKENZIE RIVER
Project Area
N
National Forest Boundary
Ranger District Boundary
Ranger Station
Interstate Highway
Federal Highway
State Highway

Background

The South Fork McKenzie River Enhancement Project Area is located on McKenzie River Ranger District of the Willamette National Forest (Figure 1). The proposed enhancement project is located within the South Fork McKenzie River Watershed, upstream of Cougar Reservoir. Proposed actions would occur within and adjacent to the South Fork McKenzie River reach immediately upstream (east) of Homestead Campground, ending just west of the confluence of Elk Creek with the South Fork McKenzie River, a distance of 8.0 miles, and within and adjacent to the lower ½ mile of Roaring River. The river elevations range from 2,200 ft. at Homestead Campground, to 2,250 ft. near Elk Creek confluence with the South Fork McKenzie River. The South Fork McKenzie River Enhancement Project originated with scoping at the McKenzie River Ranger District in November of 2005. The legal description of the project area: T.18S., R.5E., Sec. 25, 26, 36; T.18S, R.5 ½ E, Sec. 31, 32, 33; T.19S, R.5E, Sec. 1 and 2; Willamette Meridian. The proposed action is a continuation of enhancement work conducted during 1996 and 1998.

Purpose and Need for Action

The purpose for action is to enhance habitat and water quality conditions for spring Chinook salmon and bull trout to meet direction in the Willamette National Forest Plan as amended, and move toward recovery of both Threatened species as directed by the Endangered Species Act.

The need for action was documented in findings of the South Fork McKenzie Watershed Analysis (USFS 1994) where loss of early life habitat for bull trout and spring Chinook salmon in the upper South Fork McKenzie River and lower Roaring River was found. Recommendations from the South Fork McKenzie Watershed Analysis place highest priority on recovery of aquatic habitat in the South Fork McKenzie River. As a Tier 1 Key Watershed, the South Fork McKenzie River is highest priority under the Northwest Forest Plan for protecting and restoring aquatic habitat.

This project seeks to restore habitat prioritized by McKenzie sub-basin partners in the McKenzie Watershed Council (MWC). Sub-basin assessments conducted by the MWC found the lower McKenzie River and South Fork McKenzie River as highest priority for restoration though Ecosystem Diagnosis and Treatment (EDT) evaluation (Primozich and Bastach, 2004).

Currently, a permanent trap-and-haul facility is planned by Army Corps of Engineers to collect adult spring Chinook salmon and bull trout below Cougar Dam. The facility will reconnect, through physical transport, migrating spring Chinook and bull trout to the river above the dam. Utilization of naturally produced and migrating spring Chinook and bull trout is expected to benefit South Fork McKenzie specific fish populations and assist in perpetuating local adaptation. The Cougar Dam trap-and-haul facility is expected to be complete in 2009.

Proposed Action

The District Ranger on the McKenzie River District proposes to supplement existing in-stream large woody material for aquatic habitat enhancement within an 8.5 mile reach of the South Fork McKenzie River and lower Roaring River. This project would place large diameter trees with root-masses attached into the stream channel to mimic natural log jams. Enhancement activities involve tipping into the river approximately 40 live trees that are adjacent to the river to serve as "Key Features". Approximately 300 pieces of woody material would then be imported from other locations in the area to provide for log jam accumulations behind the key features. Any previously-placed woody material within this reach would be repositioned.

To improve water quality, the proposed action includes the closure of 12 non-system, native surfaced road segments that currently access dispersed camping sites.

Implementation of this proposal, represented as Alternative A in Chapter 2, would begin in the summer of 2007.

Decision Framework

The Responsible Official for this proposal is the McKenzie River District Ranger. Given the purpose and need stated above, the Responsible Official reviews the proposed action and the other alternative actions in order to make the following determinations:

- The proposed actions as analyzed, comply with the applicable standards and guidelines found in the Willamette Forest Plan and all laws governing Forest Service actions.
- Sufficient site-specific environmental analysis has been completed.
- The proposed actions benefit the public and are in their best interest.

With these assurances the Responsible Official must decide:

- Whether or not to accept the proposed actions in Alternative A or the No-Action Alternative; and what, if any, additional actions should be required.

Tiering and Incorporating by Reference

In order to eliminate repetition and focus on site-specific analysis, this EA is tiered to the following documents as permitted by 40 CFR 1502.20:

The Willamette National Forest Land and Resource Management Plan (Forest Plan) FEIS and Record of Decision (ROD) dated July 31, 1990, and all subsequent NEPA analysis for amendments, including the April 1994, Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Spotted Owl, or Northwest Forest Plan (USDA Forest Service and USDI Bureau of Land Management. 1994), and the accompanying Land and Resource Management Plan, as amended. The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Willamette National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

This EA is also tiers to a recent broader scale analysis for invasive plants (the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS) (USDA Forest Service. 2005). The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Willamette National Forest Plan by adding management direction relative to invasive plants. This project is intended to comply with the new management direction. The proposed action would also incorporate measures contained in the December 1988, Record of Decision and FEIS for Managing Competing and Unwanted Vegetation, and the requirements of the Mediated Agreement, signed May 24, 1989 by USFS, NCAP, OFS, et al.

Watershed Analysis

The Aquatic Conservation Strategy in the Northwest Forest Plan includes two designations for Key Watersheds: Tier 1 and Tier 2. The project area is located in the upper South Fork McKenzie River watershed and is classified as a Tier 1 Key Watershed, which includes a conservation emphasis.

The South Fork McKenzie Watershed Analysis, completed in October 1994, developed and documented a scientifically based understanding of the processes and interactions occurring within the watershed. The South Fork McKenzie River contributes directly to conservation of Endangered Species Act (ESA) listed Upper Willamette spring Chinook salmon and bull trout. The South Fork McKenzie River above and below Cougar Dam is designated Critical Habitat for spring Chinook salmon. The amended Forest Plan requires that actions be designed to maintain or restore aquatic habitat and riparian ecosystems in accordance with the Aquatic Conservation Strategy objectives found in the Northwest Forest Plan ROD. A high priority recommendation from the South Fork McKenzie River Watershed Analysis is to improve aquatic habitat for bull trout and spring Chinook salmon in the South Fork McKenzie and Roaring River, upstream of Cougar Reservoir.

The Forest Plan

The Willamette Forest Plan, as amended, provides resource management goals and gives direction for at-risk species recovery and habitat restoration. Table 1 displays Management Areas within the South Fork McKenzie project area designated in the 1990 Willamette Forest Plan, and also includes the overlying land allocations from the 1994 Northwest Forest Plan (Congressionally Reserved Areas, Late-Successional Reserves, Adaptive Management Areas, Administratively Withdrawn, Riparian Reserves and Matrix). Management Areas (MAs) are units of land with boundaries that can be located on the ground, each having specific direction for management as detailed in the Forest Plan. Management Area direction consists of an emphasis statement, goals, desired future condition, and a description of Standards and Guidelines. In addition, the Forest Plan contains Forest-wide standards and guidelines that apply to all management areas unless specifically exempted by Management Area direction.

Table 1: Willamette Forest Plan Management Areas

Willamette Forest Plan Management Areas	Northwest Forest Plan Land Allocations
MA-15 – Riparian Area	Riparian Reserve
MA-6C – South Fork McKenzie River Wild & Scenic Study River (Recreation)	Administratively Withdrawn
MA-5A – South Fork Corridor Special Interest Area	Administratively Withdrawn
MA-9D – Special Habitat Area (Winter Elk Habitat)	Administratively Withdrawn
MA – 11A – Scenic Modification Middleground	Matrix

MA-15 Riparian Reserves

The primary goal in this management area is to maintain the role and function of rivers, streams, wetlands, and lakes in the landscape ecology. Riparian Reserves are one of the six designated management areas identified in the Northwest Forest Plan. Riparian Reserves usually include at least the water body, inner gorges, all riparian vegetation, 100-year floodplain, landslides, and landslide-prone areas. Reserve widths are based on some multiple of a site-potential tree, or a prescribed slope distance, whichever is greater. Along the South Fork McKenzie and Roaring River, the Riparian Reserve width is two site-potential tree widths, or 360 feet. Reserve widths may be adjusted based on watershed analysis to meet Aquatic Conservation Strategy (ACS) objectives from the Northwest Forest Plan. The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands by maintaining and restoring ecosystem health at watershed and landscape scales. The intent is to protect habitat for fish and other riparian-dependent species and to restore currently degraded habitats. The proposed action is located largely within the Riparian Reserve. Temporary storage of large woody material and a helicopter service site are located on existing landings outside the Riparian Reserve in MA-9D and MA-11A, described below

MA-6C, Wild and Scenic Study River – South Fork McKenzie River

Wild and Scenic Rivers Act: The South Fork McKenzie River is a Wild and Scenic Study River (WSR) because it possesses several Outstandingly Remarkable Values (ORV's) such as: prominent recreational opportunities, spectacular scenery, diverse fish populations and prehistoric values. The South Fork McKenzie River was found to be eligible for designation in an Eligibility Determination (USDA Forest Service, Willamette National Forest 1992). It has not yet been designated a Wild and Scenic River.

For the purpose of classification, the river is divided into three segments. Segment 1 originates in the Three Sisters Wilderness and is classified as *Wild* and ranges from its headwaters downstream to the wilderness boundary. Segment 2 and Segment 3 are paralleled by Forest Road

19 and are classified as *Recreation*. Segment 2 ranges from the Three Sisters Wilderness boundary downstream to the head of Cougar Reservoir. Segment 3 is located downstream of Cougar Dam to the South Fork McKenzie confluence with McKenzie River. The proposed enhancement project occurs within the channel and Riparian Reserve of Segment 2 (upstream of Cougar Reservoir) in a recreation emphasis Wild and Scenic reach.

Although the South Fork McKenzie has not been designated a Wild and Scenic River, Willamette National Forest plan direction requires it be managed as though it were until its WSR designation is decided. This analysis will examine potential project effects to the Outstandingly Remarkable Values of the Wild and Scenic Study River. An analysis of potential project effects to the Outstandingly Remarkable Values of the Wild and Scenic Study River (South Fork McKenzie Wild and Scenic Section 7 Analysis; Appendix A) has occurred with this project proposal.

Oregon State Scenic Waterway

The South Fork McKenzie River is designated an Oregon Scenic Waterway, a State of Oregon designation. The Oregon Scenic Waterway program is administered by the Oregon State Parks and Recreation Department. Goals of the program include: 1) protecting the free-flowing character of Oregon state rivers that are designated scenic waterways for fish, wildlife and recreation; 2) protect and enhance scenic aesthetic, natural recreation, scientific, and fish and wildlife values along scenic waterways; and 3) encourage other local, state, and federal agencies to act consistently with the goals of the program. The Oregon State Parks and Recreation Department reviews plans and decisions made by other agencies to ensure consistency with the Scenic Waterway program. The Oregon State Parks and Recreation Department was involved in evaluation of the South Fork's resources and qualities using Oregon Scenic Waterway standards. Concurrence of project effects to Oregon Scenic Waterway values with Oregon State Parks and Recreation Department is necessary prior to project implementation.

MA-5A, Special Interest Area

The goal of this management area is to preserve lands that contain exceptional scenic, cultural, biological, geological or other unusual characteristics, and to foster public use and enjoyment in selected special interest areas through facility development. The area and goals of Wild and Scenic Rivers (MA-6C) and Riparian Reserve (MA-15) overlap with MA-5A in the project area. The most restrictive standard and guidelines among the three management areas in the project area are used to guide management activities.

MA-9D, Special Habitat Area

The goal of this management area is to protect or enhance unique wildlife habitats and botanical sites which are important components of healthy, biological diverse ecosystems. The Special Habitat Area in the South Fork McKenzie is recognized for its value as winter elk habitat.

MA-11A, Scenic Modification Middleground

The goal of this management area is to create and maintain desired visual characteristics of the forest landscape through time and space. This area will also be managed for other resource goals including timber production, recreation opportunities, watershed protection, and maintenance of wildlife habitats.

Public Involvement

The South Fork McKenzie River Enhancement Project preliminary analysis began in November 2005 when it was scoped among McKenzie River Ranger District staff and specialists. The project was first listed in the April 1, 2006 issue of the Forest Focus - the quarterly schedule of proposed actions (SOPA) for the Willamette National Forest.

On August 28, 2006, a scoping letter was mailed to individuals and organizations who have expressed an interest in similar projects on the McKenzie River District. Using the comments received from the public and other agencies, the interdisciplinary team developed a list of issues to address.

Comments received were related to the historic condition of the South Fork McKenzie River and recovery of spring Chinook salmon and bull trout in the South Fork McKenzie watershed. Mr. Cole Gardiner of Portland, Oregon provided a pre-management description of the South Fork McKenzie River channel. Mr. Gardiner had fished the South Fork McKenzie River as a youth in the 1930's and continued as an adult into the 1950's. His description of in-stream wood volume and angled species distribution support the findings of the South Fork McKenzie Watershed Analysis and watershed analysis recommendations for habitat restoration. Comments supporting restoration of habitat for bull trout and spring Chinook were received from the McKenzie River Trust, ODFW and ACOE. The IDT considered all comments during issue development and analysis of the proposed action for this project.

Issues

Scoping is the process for determining issues relating to a proposed action and includes review of written and telephone comments, distribution of information about the project, Interdisciplinary Team (IDT) meetings and correspondence with the public, Tribes, government agencies, and elected officials (Chapter 4, Consultation with Others). The interdisciplinary team and responsible official considered these pertinent issues and have determined which are significant to the project. Two Significant Issues drove the development of the alternatives. Their description is followed by criteria for measuring alternative effects. The Significant Issues are tracked through issue identification in this Chapter and environmental consequences in Chapter 3. Non-significant issues and reasons regarding their categorization as non-significant are described below.

Significant Issues

1. Water Quality/Aquatic Resources

Past management activities have resulted in impacts to the riparian and aquatic resources of the analysis area. Proposed activities can adversely affect water quality and aquatic and riparian habitat through the reduction of large wood available for input to streams, through removal of streamside vegetation, and/or through increases in sedimentation. These effects can result in simplification of aquatic habitat important to native and listed fish species and degradation of water quality with respect to elevated stream temperatures or increases in sedimentation. Analysis of this issue addresses project impacts on Wild and Scenic Study River ORV of fish. The effects of this project on water quality and stream habitat will be evaluated by the following criteria:

To evaluate a net increase or decrease of riparian habitat and in-stream large wood the following will be analyzed:

Criteria: Amount of riparian habitat altered, and changes to in-stream large wood quantities.

Unit of Measure: Acres riparian habitat; pieces of LWM per mile.

To evaluate change in stream shade and potential to increase river temperatures, the following will be analyzed:

Criteria: Potential increase in river temperature using Brown's model to evaluate.

Unit of Measure: Degrees Fahrenheit change.

2. Recreational Opportunity

The proposed action may affect recreational camping opportunity through treatment of non-system roads. Restriction of vehicle access to some riparian areas may alter dispersed camping opportunity where roads cross live channels or wet areas. The proposed action may beneficially affect the opportunity for a high quality recreational experience within the project area. The proposed action may affect recreational kayaking opportunity through restoration of large woody material to the South Fork McKenzie and Roaring River channels. Analysis of this issue addresses project impacts on Wild and Scenic Study River ORV of recreation.

The effects of this project on recreational opportunity will be evaluated by the following criteria:

Criteria: Amount of dispersed camping opportunity altered.

Unit of Measure: Number of roads blocked. Number of dispersed campsites not accessible by vehicle.

Criteria: Amount of kayaking opportunity altered.

Unit of Measure: Length of channel modified through addition of large woody material.

Other Issues

Forest Service regulations [1950, chapter 11(3)] require that issues that are not significant to the project or that have been covered by prior environmental review be identified and eliminated from detailed study. Discussion of these issues should be limited to a brief statement of why they will not have a significant effect on the human environment or a reference to their coverage

elsewhere. The following issues were identified during scoping as being non-significant issues but are required to be evaluated by regulations (40 CFR 1502-16) or management direction.

3. Threatened, Endangered, Sensitive Plant and Wildlife Species

Activities that remove or degrade forest habitats might possibly affect a variety of wildlife and botanical species. Activities that create noise above ambient levels may also impact a variety of wildlife species.

This issue was not considered significant because all actions that remove or degrade forest habitat would be required to follow conservation and protection guidelines provided by the Willamette Forest Plan to avoid adverse affects on listed species. Activities that generate noise above ambient levels near nest sites of threatened or endangered or sensitive wildlife species would be seasonally restricted. Design measures and mitigation measures address this issue in Chapter 2. The effects of the proposed action and the other alternatives on TES species are addressed in Chapter 3.

4. Hydroelectric Operations

Cougar Reservoir, operated by Army Corps of Engineers, is located downstream of the proposed project area. Proposed activities could potentially interfere with reservoir operation through the migration of restoration material. These effects can result in increased reservoir maintenance costs. ACOE and USDA Forest Service share periodic maintenance of the reservoir surface, sweeping it of floating debris generally deposited during flood events, to reduce interference with flood control/hydroelectric operations. This issue is not significant to the proposed action due to the low likelihood of material migration to the reservoir and the action agency's shared responsibility for reservoir sweeps.

5. Visual Quality

Visual quality in the project area could be impacted by the action alternative through creation of openings from tipping of riparian reserve trees. The viewshed of the project area includes the South Fork McKenzie Wild and Scenic Study River corridor (MA-6c) and Oregon State Scenic Waterway. This issue is not significant to the proposed action because use of Riparian Reserve trees within MA-6c would be in a dispersed fashion and would not create visually apparent openings (single tree utilization from a stand). Maintenance of the visual quality adjacent to the river corridor and natural character within the channel would be maintained. Project impacts on Wild and Scenic Study River ORV of scenery are described in Appendix A.

6. Noxious Weeds

Proposed actions may introduce or spread noxious and non-native invasive plants. Ground disturbance and openings in the forest canopy from this proposal can provide an opportunity for noxious and non-native plants to establish and out-compete desired native vegetation. Spotted knapweed (*Centaurea maculosa*) is the most serious noxious threat to native plant populations within the watershed. Spotted knapweed has a broad ecological tolerance, prolific growth, and abundant seed production. It is spread primarily by vehicular traffic and has quickly become established along State Highways 126 and U.S. Highway 20.

This issue is not significant to the proposed action due to prevention measures used to limit expansion of existing populations. Prevention measures used in the watershed include: manual or mechanical weed removal, competitive planting, chemical treatments to specific populations. Cleaning project equipment and closure of dispersed camping access roads to vehicle traffic are expected reduce potential spread.

7. Soil Erosion

Ground disturbance that occurs during tree tipping may result in an increased risk of soil erosion and transport of sediment to stream channels. This issue is not significant to the proposed action due to project mitigations requiring ground-disturbing equipment remain on roads and prohibited from non-road portions of the Riparian Reserve. Trees tipped adjacent to river channels would be accomplished in a dispersed fashion with a small cumulative area of disturbance. Potential project generated sedimentation of aquatic habitat is addressed under the significant issue of Water Quality/Aquatic Resources.

8. Management Indicator Species

Proposed actions could affect Management Indicator Species located within the project area as listed and described in the Willamette Forest Plan. The Forest MIS species list includes the northern spotted owl, pileated woodpecker, marten, elk, deer, cavity excavators, bald eagle, and peregrine falcon; along with anadromous fish species spring Chinook salmon and resident fish species rainbow trout and cutthroat trout. Through Region-wide coordination each Forest identified the minimum habitat distribution and habitat characteristics needed to satisfy the life history needs of MIS. Management recommendations to ensure the viability of Management Indicator Species were incorporated into all action alternatives analyzed in the 1990 Willamette Forest Plan FEIS.

This issue was not considered significant because action alternatives from this project meet applicable Standards and Guidelines from the Willamette Forest Plan, and are designed to protect these species. The effects of the proposed action and other alternatives on MIS are addressed in Chapter 3.

9. Neotropical Migratory Land Birds

This project could affect Neotropical Migratory Birds and their habitat, which varies broadly for this large group of species. Required-protection for these species is outlined in Executive Order 13186 on January 11, 2001, titled “Responsibilities of Federal Agencies to Protect Migratory Birds.”

This issue was not considered significant because the tipping of trees associated with this project, which may unintentionally affect individual migratory birds, is not expected to have a measurable negative effect of bird populations because of the limited extent of the habitat removal. The effects of the proposed action and other alternatives on migratory land birds are addressed in Chapter 3.

10. Survey and Manage Wildlife and Botanical Species

The proposed action could affect Survey and Manage Wildlife and Botanical species. This issue is not significant to the proposed action due to project scale and mitigations requiring ground disturbing equipment remain on roads and prohibited from non-road portions of the Riparian Reserve. Trees tipped adjacent to river channels would be accomplished in a dispersed fashion with a small cumulative area of disturbance.

11. Cultural Resources

Surveys conducted for this project did not uncover any new historic properties. However, previous surveys within this landscape have documented cultural resource sites. Proposed ground-disturbing activities would avoid these eligible or potentially eligible historic properties. This issue is not significant to the proposed action because avoidance of existing and subsequent discovery sites would be required during project implementation. The District Archeologist would evaluate any subsequent discoveries.

Chapter 2 – Alternatives

This chapter describes and compares the alternatives considered for the South Fork Project. It includes a description and map of alternatives considered. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

Alternatives

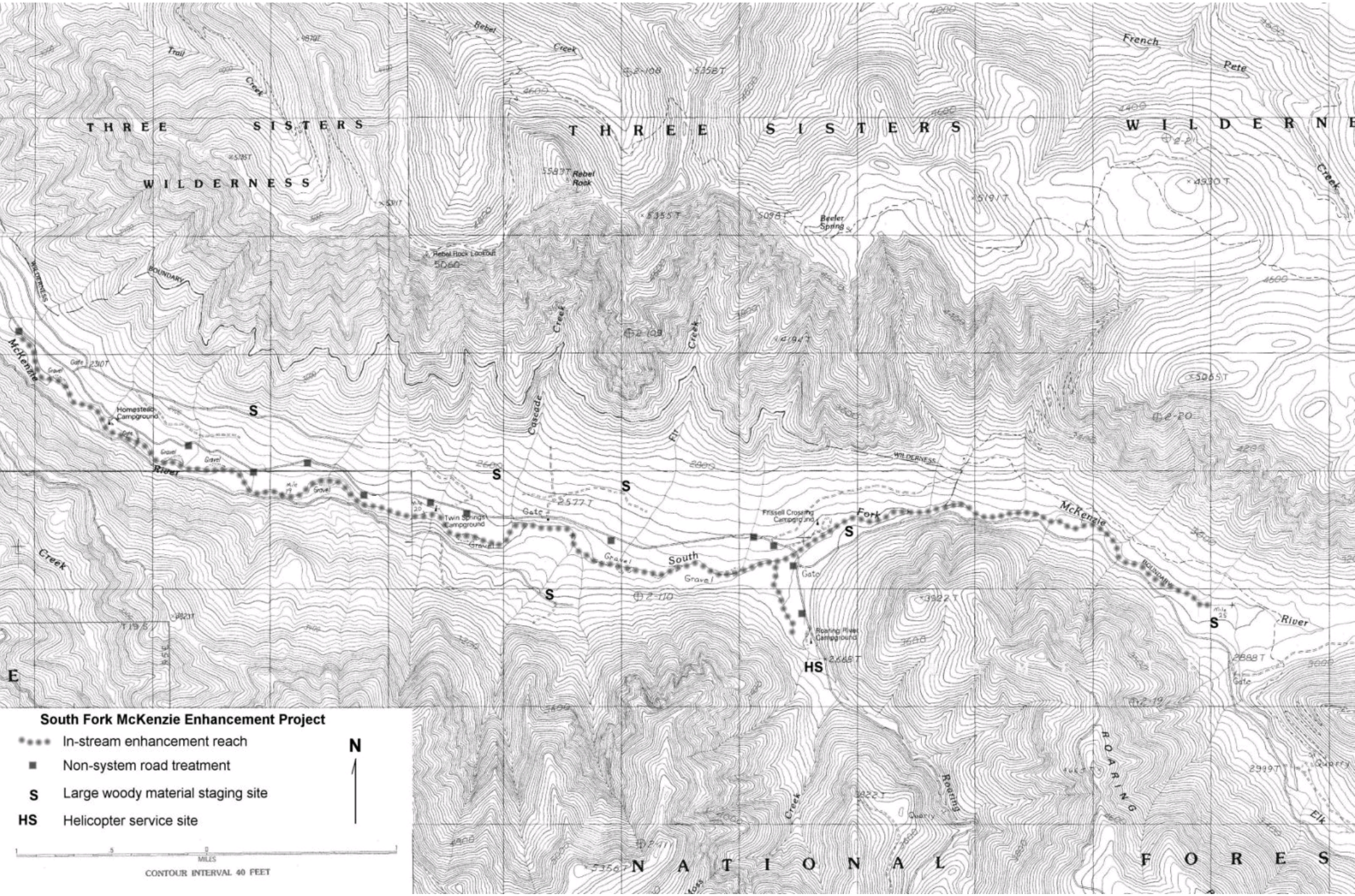
Alternative A – Proposed Action

The South Fork McKenzie River Enhancement Project (South Fork Project) proposes supplementation of existing woody material to act as flow deflection and develop off-channel habitat. The large woody material (LWM) would be placed in the South Fork McKenzie and Roaring River channel upstream of Homestead Campground (Figure 2). Existing large woody material would be supplemented with trees selected from the adjacent Riparian Reserve, and with imported woody material from nearby upland sources. The collection and staging of LWM from an upland source will be evaluated as part of this project.

Project methods to place woody material were selected to minimize impacts to other resources. Cables would be used to pull over live trees from the Riparian Reserve. Equipment used to tip live trees would work from Rd 1900-431, Rd 1964 and non-system roads. Following placement of key features, material would be imported using helicopter, or by hand-crews, to form accumulations. Helicopter or hand-crew placement provides full suspension to place imported material and presents minimal disturbance of the river bottom and adjacent riparian area. By importing approximately 300 pieces of LWM, the proposed final density of large woody material would be about 80 pieces in the 8.5 mile enhancement reach.

Approximately forty trees would be utilized from the adjacent Riparian Reserve to serve as "key" features behind which imported material would stabilize. Key features are large diameter trees, with root mass attached, selected for their ability to remain stable during most high flow events. The live trees selected to serve as key features are located at distances from the channel from stream bank to 50 feet from the active channel. The size of tree selected for key features ranges from 22 to 52 inches in diameter at breast height, averaging 32 inches in diameter. The trees selected for restoration of in-stream wood are dispersed through the 8.5 mile enhancement reach on each bank. Twenty-six trees are located along the left bank, looking downstream (Rd 431 and Rd 1964 side), and fourteen along the right bank (Rd 19 side).

Once key features are in place in the channel, helicopter and/or hand-crew placement of imported material would occur. Material would be added upstream of each key piece of woody material, to mimic natural accumulations or jams. Woody material jams would consist of 2-8 piece accumulations. Numerous opportunities exist for channel spanning accumulations. Tree tipping would occur during mid-summer and helicopter and/or hand-crew placement would occur following key wood placement, during late summer. All placement activity would occur during the ODFW in-stream work period and outside wildlife restriction periods for the project area,


THREE SISTERS WILDERNESS
THREE SISTERS WILDERNESS
Rebel Creek
Trail
Creek
French Pete
Creek
Rebel Rock
Beeler Spring
Rebel Rock Lookout
BOUNDARY
WILDERNESS
McKenzie River
Gate
Gravel
Homestead Campground
Cascade Creek
Elk Creek
WILDERNESS
Twin Springs Campground
Gate
Gravel
South Fork McKenzie
Frissell Crossing Campground
Gate
BOUNDARY
Roaring River Campground
Roaring River
Creek
Quarry
Elk
NATIONAL FORES
S
HS
South Fork McKenzie Enhancement Project
In-stream enhancement reach
Non-system road treatment
S Large woody material staging site
HS Helicopter service site
N
MILES
CONTOUR INTERVAL 40 FEET

July 15 through August 15, to minimize impacts to wildlife and fisheries. Project implementation is planned to occur beginning in summer season 2007 and is dependent upon equipment and crew availability.

An existing helicopter landing for refueling and service is located on Road 1900-985. Road 1900-985 is ¼ mile long, located adjacent to Roaring River. A spill containment structure would be required of potential helicopter use of Rd 1900-985 landing. Restoration material would be staged in landings on Rd 1900-425, Rd 1900-429, Rd 1900-431, Rd 1964 and Rd 1964-414. Restoration material destined for helicopter transport to the enhancement reach would be collected from road-side salvage and existing stockpiles and would consist of whole trees with root-mass intact and root-less tree boles. Enhancement material would be flown directly from the staging areas to the river reach. A Flight Safety Plan and Spill Plan will be required prior to flight operations. Timing requirements for implementation are estimated at 3-4 days for placement of stream adjacent trees and 1-2 days for aerial placement of staged material. Equipment cleaning precautions will be utilized to avoid potential introduction or spread of noxious plants from ground based equipment.

Maintenance of previously placed in-stream project wood would be accomplished with this proposal. Project work completed during 1996 and 1998 would be repositioned by helicopter or hand crews. Approximately 400 pieces of large woody material would be repositioned in the 8 mile South Fork McKenzie. Smaller sized material may be placed by hand to minimize disturbance to riparian and aquatic habitat. Previously placed small material that can be handled by a crew of 6-8 would be lifted from nearby river banks and transported to a channel destination. The option of using hand crews or helicopter in placing small material (500-800 pounds in weight) is dependent upon crew and equipment availability.

Large woody material placed in the restoration reach will not be attached by artificial means such as cable. The placement of whole trees, with a portion on the bank, particularly trees with root-mass intact, is expected to contribute to in-stream structure stability. A pre-project record of the restoration reach was made through low elevation photography. Currently existing large wood was tagged during field surveys conducted by Oregon State University during September 2001. Material of natural and human-placed origin and side channel development would be monitored through periodic low elevation aerial photography.

Treatment of 12 non-system roads through barrier placement or campsite delineation would result in alteration of access to 12 dispersed campsites. Road accesses that travel through the South Fork McKenzie and Roaring River floodplains would be modified to exclude vehicle entry into stream channels and wet areas. Treatment would involve delineation of vehicle access using boulders or berms. Where necessary, a seedbed on road surfaces would be prepared through scarification or ripping. Approximately 3,000 feet of road surfaces would be seeded and planted using native plants following soil preparation. On roadbeds re-vegetating naturally, or in wet areas, treatment of road surfaces would not be necessary. Several campsites require rehabilitation to address degraded site conditions, such as denuded stream banks, eroding soils and drainage problems. Proposed treatments include planting campsite perimeters, drainage improvement and water-barring, and importing organic material to stabilize soils. There would be no change in

access to 14 dispersed campsites, with modification of access to 12 dispersed campsites. The 12 dispersed campsites would continue to exist and be accessible to foot traffic.

Alternative A – Implementation and Effectiveness Monitoring

Implementation monitoring by project personnel during project activities would consist of contract administration to ensure contract requirements are met. Surveys of the magnitude and extent of disturbance and application of mitigation measures (such as treatment of disturbed soils) would follow implementation to minimize project adverse effect.

Effectiveness monitoring would consist of evaluation of pre- and post-project aerial photography to quantify off-channel habitat development. Ground verification of aerial photographs would occur. Forest Service cooperative monitoring of biological response with ODFW (redd surveys to monitor spawning populations) and ACOE (juvenile spring Chinook salmon migrant trapping) would be expected to reflect changes in aquatic habitat quality.

Alternative A – Estimated Project Cost

Project implementation costs are estimated at $175,000 and include tree tipping, helicopter placement, road treatment and application of mitigation measures. Project effectiveness monitoring is estimated to cost $3,000-6,000 per year monitored and would occur in post-project Year 1 and following flood events exceeding 10 year recurrence interval. Estimated monitoring costs include periodic aerial photography that would also follow 10 year or greater flood events. Total effectiveness monitoring costs are estimated to range from $9,000-12,000. Forest Service cost of cooperative biological monitoring is part of the District Fisheries Program and occurs independently of the proposed action (approximately $900 annually).

Alternative B – No Action

The No Action alternative continues with the current management situation and would not implement actions to restore in-stream large woody material in the South Fork McKenzie project area. Aquatic habitat degradation and water quality impacts presented by continuing use of non-system roads in wet areas would continue. This alternative allows low in-stream wood density and simplified habitat to continue untreated and dependant upon natural rates of input to replenish existing condition. Under the No Action alternative, current management plans would continue to guide management of the project area. Alternative B would not affect recreational opportunity. The No Action alternative provides a basis for describing the environmental effects of the proposed action.

Mitigation Common to All Alternatives

In response to public and resource management objectives regarding the proposed action, mitigation measures were developed to ease impacts the action alternative may cause.

Soil, Watershed, and Fisheries Protection:

- Ground-based systems employed to tip live trees into the river channel would operate from existing road surfaces. The objectives are to maintain water quality and fish habitat, and to limit impacts to sensitive soils and ecosystems.
- Oregon Department of Fish and Wildlife guidelines for timing of in-water work will be followed to avoid impacts to presence of spring Chinook and bull trout adults (implementation would occur July 15 to August 15).
- Areas of disturbance and road bed preparation will be seeded with native perennial species and planted with native conifers.
- Spill plans will be in place prior to project equipment near aquatic habitat.

Wildlife:

- Protect snags greater than 12 inches diameter at breast height throughout the project area.
- A seasonal restriction on tree tipping and helicopter use is required from January 1 – July 15 to avoid disturbance to spotted owls, peregrines, and harlequin ducks.

Botany - Noxious Weeds:

- All equipment utilized in restoration activity would be pressure washed to remove all dirt and debris prior to entering National Forest System lands.
- Post treatment survey and control of noxious weeds would be applied to all disturbed areas within the project area to ensure any new infestation are eradicated in a timely manner.
- Survey and Manage Wildlife, Vascular Plants, Lichens, Bryophytes, and Fungi: A 180 or 360 foot no-disturbance buffer would be placed around each survey and manage species site.
- Bare soil will be rehabilitated with native vegetation appropriate for the area and designated weed-free mulch materials.

Heritage Resources:

- Cultural resource discoveries made during project operation will necessitate avoidance of the site until the cultural resources in question can be evaluated by the Zone Archeologist. Known cultural resource sites will be avoided with a 100 foot safety buffer.

Recreation and Human Safety:

- Project activities will be done in a manner that ensures public and operational safety. Prior to project operations, the project area will be posted for public notification of temporary closure. Traffic control will be required of contractors conducting tree tipping, flight operations and non-system road decommissioning. During operations, non-project personnel will be prohibited from the vicinity of operations. Public reoccupation of the project area will occur only following cessation of operations and inspection of the area. Areas found unsafe for reoccupation will be closed to the public until the hazard is remedied.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2: Comparison of Alternative by Key Issue

Alternative A (Proposed Action)

Key Issue	Measurement Criteria	Project Proposal
Water Quality/Aquatic Resources	Riparian habitat altered (acres)	Less than 1 acre (including roads treatment)
	LWD volume (LWD/mile)	Increase to 80 LWD/mile
	Stream shade/temperature (^{o}F)	Potential increase 0.007^{o}
Recreational Opportunity	Number of non-system roads blocked	12
	Dispersed campsites not accessible by vehicle	1.4 sites per mile (12 dispersed campsites) No change in access to 14 dispersed campsites
	Length of channel modified (kayak opportunity)	8.5 mile reach

Alternative B (No Action)

Key Issue	Measurement Criteria	Project Proposal
Water Quality/Aquatic Resources	Riparian habitat altered (acres)	No change in riparian habitat
	LWD volume (LWD/mile)	Natural recruitment to supplement existing 29 LWD/mile
	Stream shade/temperature (^{o}F)	No change in stream temperature
Recreational Opportunity	Number of non-system roads blocked	No change in non-system roads
	Dispersed campsites not accessible by vehicle	No change in 26 sites accessible by road in the project area
	Length of channel modified (kayak opportunity)	No project modification of channel

Chapter 3 – Affected Environment and Environmental Consequences

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

The cumulative effects discussed in this section include an analysis and a concise description of the identifiable present effects of past actions. The cumulative effects of the proposed action and the alternatives in this analysis are based on the aggregate effects of the past, present, and reasonably foreseeable future actions. Individual effects of past actions are not listed or analyzed, and are not necessary to describe the cumulative effects of this proposal or the alternatives. (CEQ Memorandum, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005.)

Water Quality/Aquatic Resources - Affected Environment

Affected Environment

The South Fork McKenzie Project analysis area considers the 137,500 acre South Fork McKenzie River 5th field watershed (area of the South Fork McKenzie Watershed Analysis) which is located nearly entirely on federally managed land. Timber harvest, salvage and road building has been a dominant disturbance on the forested landscape for the past 50 years impacting approximately 46% of the area considered in the analysis. Prescribed burning, wildfires, windthrow, and insect and disease have had much less affect during that time.

Status of Listed Species

Spring Chinook salmon utilize habitat in the McKenzie River and South Fork McKenzie River, which flows through and downstream of the project area. Salmon are part of the Upper Willamette spring chinook salmon Evolutionarily Significant Unit (ESU), as designated by the National Oceanic and Atmospheric Administration (NOAA) Fisheries with a July 10 Federal Register notice, effective September 8, 2000. The McKenzie River and South Fork McKenzie River are included in the designation of Critical Habitat for the Upper Willamette spring Chinook salmon ESU. Streams occupied by spring Chinook salmon within the McKenzie River and South Fork McKenzie River below Cougar Dam are also designated as Essential Fish Habitat (EFH) by National Marine Fisheries Service (NMFS) under the Magnuson-Stevens Fishery Conservation and Management Act. Essential Fish Habitat is not designated above Cougar Dam.

Bull trout utilize habitat in the South Fork McKenzie and Roaring River, within and downstream of the project area. Bull trout were listed as Threatened by the U.S. Fish and Wildlife Service with a June 12, 1998 Federal Register notice to protect the Columbia River Distinct

Population Segment (DPS), and are protected under the Endangered Species Act. Critical Habitat for bull trout is designated in the mainstem McKenzie River, downstream of the confluence of South Fork McKenzie River. There is no Critical Habitat designation for bull trout in the South Fork McKenzie River.

The project area reach located between Homestead Campground and Elk Creek confluence and lower Roaring River is known habitat for spring Chinook salmon and bull trout. Roaring River is used by bull trout and spring Chinook salmon as spawning and rearing habitat. Bull trout utilize the South Fork McKenzie River as juvenile and sub-adult rearing and foraging habitat, and adult foraging habitat. Recent monitoring of the South Fork McKenzie bull trout population (Tranquilli et. al 2003) find the population is very low in number, estimated at 50-75 adults, and considered at high risk of extinction (Buchanan et. al 1997).

Completed in 1963 by Army Corps of Engineers, Cougar Dam was built primarily as a flood control project. The dam also serves as a hydroelectric project. Cougar dam is located 16 rivermiles downstream of the project area. Six mile long Cougar Reservoir serves as juvenile habitat for spring Chinook salmon and bull trout, and as adult foraging habitat for bull trout. The South Fork McKenzie population of bull trout is isolated upstream of Cougar Dam (separated by the dam from the McKenzie River bull trout population) and has adapted to a lake dwelling adult life history. Distribution of fish in this portion of the basin has changed dramatically over the past 45 years. The range of spring Chinook salmon has been altered with completion of the project. Approximately 25 miles of historic spring Chinook spawning and rearing habitat is no longer accessible in the South Fork McKenzie and Roaring River above Cougar Dam, to about the confluence of Elk Creek.

A run of 2,000 – 4,000 adult spring Chinook is estimated to have historically utilized habitat above Cougar Dam. The McKenzie Salmon Hatchery near Leaburg, Oregon is funded by ACOE as mitigation for loss of habitat and to supplement salmon runs. Loss of salmon migration in this portion of the basin may represent a significant loss of nutrient flow as current research pursues this question. ODFW has trucked adult spring Chinook salmon collected at McKenzie Salmon Hatchery around Cougar Dam since 1993, to restore a natural prey base for bull trout, to restore in-stream nutrients and to supplement natural chinook production (Table 3).

Currently, a permanent trap-and-haul facility is planned by ACOE below Cougar Dam. The facility will reconnect migrating spring Chinook and bull trout (through physical transport of fish collected at the base of Cougar Dam) with the river above the dam. Utilization of naturally produced and migrating spring Chinook and bull trout is expected to benefit South Fork McKenzie specific fish populations and assist in perpetuating local adaptation. The Cougar Dam trap-and-haul facility is expected to be complete in 2009.

Table 3: Summary of Adult Chinook Salmon Collected at McKenzie Salmon Hatchery and Transferred Above Cougar Reservoir by ODFW.

Year	Females	Males	Jacks	Total
1993	33	22	1	56
1994	0	0	0	0
1995	0	0	0	0
1996	68	51	3	122
1997	100	100	0	200
1998	153	165	9	327
1999	180	366	3	549
2000	695	801	10	1506
2001	765	1233	57	2055
2002	2047	2775	56	4878
2003	1374	1758	62	3194
2004	1263	2143	24	3430
2005	387	462	14	863
2006	243	765	10	1018

Currently, a density of LWM is 29 pieces of large wood per mile (>24 inch diameter by 50 foot length) in the enhancement reach. The reach between Homestead Campground and Elk Creek confluence is approximately 8 miles long, and is known rearing habitat for spring Chinook salmon (offspring of adult salmon transported above Cougar Dam) and bull trout. The low volume of sources of flow deflection is known to limit the opportunity for the South Fork channel to migrate laterally and develop off-channel habitats important to bull trout and spring Chinook salmon.

Other fish historically and currently present above Cougar Dam include mountain whitefish (*Prosopium williamsoni*). Mountain whitefish are also common in main stem McKenzie River and Cougar Dam fragments this population.

Native rainbow trout (*Oncorhynchus mykiss*), similar to distribution of whitefish, are river dwelling in South Fork McKenzie River and larger tributaries. ODFW ceased stocking catchable rainbow trout in the South Fork McKenzie River in 1997 to protect native stocks of rainbow, cutthroat and bull trout. The South Fork McKenzie River and tributaries have been protected by artificial fly and lure angling only and catch-and-release regulations since 1997 in an effort to conserve native fish. Native cutthroat trout (*Oncorhynchus clarki clarki*) are the most widely distributed fish in the project area, their range including nearly all perennial streams, rivers and Cougar Reservoir.

Historically, non-native brook trout (*Salvelinus fontinalis*) have been stocked in upper South Fork McKenzie basin lakes and streams. Where brook trout became self-sustaining populations, or where conflicts with native fishes were found, stocking has ceased. Even though there are no locations in the project area that continue to be stocked with brook trout, they are now found naturalized in wilderness lakes. The threat of brook trout hybridization with native bull trout is greatest where brook trout distribution overlaps with bull trout. The risk of brook trout

hybridization with native bull trout is believed low in the South Fork McKenzie watershed as brook trout range appears confined to Three Sisters Wilderness (South Fork McKenzie headwater lakes).

There are no water quality limitations in the mainstem South Fork McKenzie or Roaring River above Cougar Reservoir. Two tributaries to the South Fork McKenzie River are listed as water quality limited for temperature. Within the Hardy Creek/Rebel Creek sub-watershed, an un-named non-spawning tributary of Rebel Creek is 303(d) listed by Oregon Department of Environmental Quality as water quality limited based on water temperature during the summer season. The stream is listed for exceeding the summer temperature criteria of 16 degrees C. for core cold water habitat. Rush Creek, a non-spawning tributary to Cougar Reservoir is 303(d) listed under the same criteria. The South Fork McKenzie River downstream of Cougar Dam is 303(d) listed for exceeding salmon spawning and rearing habitat temperature criteria of 12.8 degrees C (ODEQ 2004-6 listings). The ACOE Temperature Control Project, designed to restore historic temperature regimes in the South Fork McKenzie and McKenzie River began its first year of operation in 2006.

Analysis of drainage area estimates peak flood discharges at Homestead Campground at 1,980 cubic feet per second (cfs) for a 2 year flood event, 3,550 cfs for a 10 year event, 5,070 cfs for a 50 year event, and 5,750 cfs for a 100 year event. The upper South Fork and Roaring River watershed is characterized by a mix of High Cascades and Western Cascades geology (approximately 60% and 40% respectively above Homestead Campground).

In upper South Fork McKenzie River, a large portion of flow is provided by cold, subsurface sources originating from High Cascades geology. High water quality and high elevation combine to provide habitat for specialized aquatic macroinvertebrates. The project occurs near the contact between Western Cascades and High Cascades geology. The Western Cascades are more steeply incised and bound the river to the north and south, and younger High Cascades are lower gradient lava flows that originated from the recent volcanism to the east. The process of debris transport (especially debris torrent) is more common in Western Cascade drainages. This process is important in providing woody material to stream channels and continuing large woody material migration into lower elevation river channels. However, Western Cascade drainages above the project area are often intercepted by roads, and the potential for recruiting large woody material via migration is reduced as a result. Streamside recruitment is generally a more common process of wood supply in High Cascade channels. Once wood has fallen into a channel, stream energy is usually insufficient to transport large-sized material downstream, due to stable spring-fed flows.

The stand of trees adjacent to the South Fork McKenzie and Roaring River restoration reach is described as predominately Douglas fir with a Douglas fir, hemlock and cedar understory. The stand is a multi-layered canopy with an old growth Douglas fir dominant overstory. The understory of the river adjacent stand in the project area is composed of Douglas fir, hemlock and cedar averaging 110 years old and measuring 125 feet tall. The river adjacent stand is considered fully stocked due to the following indicators: 1) Suppression of saplings is occurring with 1-4 inch diameter trees averaging 19 years old. 2) A suppressed rate of growth in all but dominant trees. 3)

A canopy more than 75% closed. 4) A stand density index reflecting a dominant suppressing overstory is inducing mortality in the understory.

Water Quality/Aquatic Resources - Effects

1. Riparian and Aquatic Habitat Quality (Including project effects on available stream shade/stream temperature, ESA species and habitat, sedimentation).

For clarity, effects are described separately under the following elements of water quality/aquatic resources: 1a. - Stream Shade/Stream Temperature; 1b. - ESA Species and Habitat; 1c. - Sedimentation.

1a. Stream Shade/Stream Temperature

Alternatives A as it Responds to the Significant Issue of Water Quality/Aquatic Resources:

Stream Shade and Water Temperature

Direct and Indirect Effects: Project effects on stream shade and water temperature are evaluated at the reach scale (adjacent to the 8.5 mile enhancement reach) as effects would be most perceptible at this scale. Potential direct and indirect effects would be expected at the site specific scale.

The 40 trees identified for providing key features in the project reach are dispersed along both banks of the South Fork McKenzie and Roaring River. The project would utilize .005% of the existing stand greater than 20 inch diameter (40 trees removed from 141 acres adjacent along both banks; approximately 60 trees/acre greater than 20 inch diameter) within 100 feet of the river channel. Utilization of stream adjacent trees would result in a potential reduction of 1.2% of existing shade in the reach. Placing 40 trees in a dispersed fashion in the enhancement reach would maintain the river adjacent stand through minimal modification of stem density and canopy. Calculating the influence of site latitude, critical time of year, height of adjacent vegetation, orientation of stream, stream width, maximum solar angle and changes in available shade, Brown's Model (EPA 1980) demonstrates falling trees in the enhancement reach would not result in a measurable increase in stream temperature. Evaluation of a 1.2% reduction of adjacent shade using Brown's Model calculates potential increases in water temperature through the enhancement reach. Results using the model yield a potential increase of 0.007^{o} Fahrenheit, an immeasurable difference between pre-project and post-treatment condition.

Change in canopy is modeled prior to importation of woody material by helicopter or hand crews. Shade provided by imported tree boles is expected to dampen potential project increase in solar exposure. Utilization of live trees would not adversely change the vegetative composition, age structure, quantity, or vigor of riparian stands. The action alternative includes Best Management Practices (BMP's) that provide for the protection of soil, water and fisheries as required project mitigation. The project provides for the retention of effective stream shading vegetation and adequate levels of large wood in project adjacent Riparian Reserves. Some

increase in riparian down wood will occur with the project. The project would result in a small change in stream adjacent canopy, too small to cause a measurable change in river temperature. Aerial placement of the majority of restoration material would avoid potential disturbance of riparian stands.

Long-term improvement in water temperature due to improved inter-gravel (hyporheic) flow from improved floodplain connectivity and through stored substrates is expected, but at levels too small to measure.

Stream Shade and Water Temperature

Cumulative Effects: The proposed project cumulative effects are evaluated at a larger scale than direct and indirect effects to shade and temperature described above. Project cumulative effects are evaluated at the 5th field watershed scale as past and present actions contributing to water quality limited waters occur at this scale.

Tributaries to the South Fork McKenzie River listed as 303(d) water quality limited for temperature by ODEQ are located downstream of the project area. Tributaries listed as water quality limited are beyond the influence of the proposed action. An immeasurable change in water temperature at the site specific scale would not add incrementally to waters listed as temperature limited at the 5th field watershed scale (the South Fork McKenzie River downstream of Cougar Dam). Cumulatively, the proposed action would not lead to diminishment of water quality.

Alternative B as it Responds to the Significant Issue of Water Quality/Aquatic Resources:

Stream Shade and Water Temperature

Direct and Indirect Effects: No Action effects on stream shade and water temperature are evaluated at the reach scale (adjacent to the 8.5 mile enhancement reach) as effects would be most perceptible at this scale. Potential direct and indirect effects would be expected at the site specific scale.

The No Action Alternative proposes no activities that would create additional risk to water resources. Riparian habitat quality would remain much as they currently exist. Available stream shade and stream temperature would be maintained. The rate of in-stream wood recruitment would depend upon the natural rate of stream adjacent blowdown and deadfall. Recruitment of wood from upstream of the project area (through in-stream migration of material) and shade provided by that material would be expected to remain lower than historic rates due to the interception of migrating wood at intersections of the road network with tributaries. The temperature benefits provided through improved inter-gravel flow through floodplain and stored substrates would not occur.

Stream Shade and Water Temperature

Cumulative Effects:

Cumulatively, no diminishment of water quality is expected with the No Action Alternative.

1b. ESA Listed Aquatic Species (Project effects on bull trout and spring Chinook salmon and their habitat)

Alternative A as it Responds to the Significant Issue of Water Quality/Aquatic Resources:

ESA Aquatic Species and Habitat

Direct and Indirect Effects: Project effects on ESA Aquatic Species and Habitat are evaluated at the reach scale (in the 8.5 mile enhancement reach) as effects would be most perceptible at this scale. Potential direct and indirect effects would be expected at the site specific scale.

Project implementation would likely have an effect upon the fish present in the channel at the time of implementation. Implementation timing would avoid the period adult bull trout and spring Chinook salmon are present in the restoration reach. However, the potential exists to impact juveniles rearing in the reach. The potential for harassment or harm of juvenile listed species is characterized as May Affect, Likely to Adversely Affect (LAA). While the likelihood of a tipped tree or helicopter-placed tree harming a juvenile is slim, a level of risk warrants an LAA assessment. The action alternative as designed is covered by programmatic Biological Opinion. The project meets the Project Design Criteria for Aquatic Habitat Projects described in the USFWS Biological Opinion regarding bull trout (April 11, 2003) and NOAA Fisheries Biological Opinion regarding spring Chinook salmon (February 25, 2003). The project findings are consistent with the findings of both Biological Opinions. An LAA assessment characterizes any enhancement action in which the wetted stream channel is entered or when listed species are present or turbidity is transmitted.

The placement of wood is designed to encourage a mostly straight, single channel to provide varying velocity breaks and allow lateral channel migration to resume in the project area. This would be achieved through increased channel roughness. By importing approximately 35 pieces of LWM per mile, the final density of large woody material would be about 80 pieces per mile in the project area. The South Fork McKenzie River channel, is described as a Rosgen type C3/4 channel, with channel materials dominated by gravels and cobbles, and slope range less than 2%. Type C3/4 channels are typically unconstrained by valley walls and characterized by broad flood plains. In the South Fork McKenzie River, enhancement wood is expected to provide areas of flow refuge of value to rearing spring Chinook salmon and bull trout. As wood placement will not utilize equipment in or near the channel, water quality parameters may be expected to remain high with no evident increase in turbidity. There would be some expected increase in nutrient retention through slower water velocities and the capturing nature of debris accumulations. Nutrient retention would not adversely affect water quality.

Project design may place full channel-spanning structures into the river. Full spanning structures would mimic existing large wood in the channel, but are subject to a greater frequency of migration due to the greater surface area exposed to high flows. Restoration wood would be expected to migrate during an extreme flood event. No artificial attachment would be used, rather imported wood will depend upon the mass and weight of an intact rootmass to stabilize material.

During a typical flow year (1.5 recurrence interval), minimal adjustment and settling of wood accumulations is expected. During high flow events, for example, the November 1996 event estimated at a 50 year recurrence event in the South Fork McKenzie River, 10% of restoration wood similarly placed was found to reposition for a distance of up to 300 feet. Restoring wood to estimated pre-salvage density would not affect the free-flowing character of the river, as natural conditions of flow would be maintained. Water quality would be maintained with enhancement of channel complexity.

Although a short-term adverse affect to listed fish is anticipated, no adverse modification to spring Chinook salmon Critical Habitat is expected as a result of project activities. A long-term beneficial effect to aquatic habitat quality is expected following project activities.

ESA Aquatic Species and Habitat

Cumulative Effects: Project cumulative effects on ESA Aquatic Species and Habitat are evaluated at the reach scale (in the 8.5 mile enhancement reach) as effects would be most perceptible at this scale.

Project implementation addresses cumulative degradation of aquatic habitat. Past management in Riparian Reserves has been found to contribute to loss of side channel area. Current low level of side channel area in the project area is believed outside the range of natural variability. Restoration of side channel area through addition of large woody material is an expected outcome of the proposed action. Improving floodplain connectivity, especially during high flow events, is expected to bring side channel area within the range of natural variability. Aquatic habitat quality is expected to improve following project activities with off-channel habitat area increasing to within the natural range of variability.

Reconnection of the upper South Fork McKenzie and Roaring River through a planned trap-and-haul facility at Cougar Dam would be expected to yield a greater level of ESA species production that reflects improved channel condition, as well as influence of other variables. The rate of production in the project area is dependant upon factors such as adult escapement, climate, occurrence of disturbance events, availability of rearing habitat, food supply, angler harvest, predation and flow regimes.

Alternative B as it Responds to the Significant Issue of Water Quality/Aquatic Resources:

ESA Aquatic Species and Habitat

Direct and Indirect Effects: Project effects on ESA Aquatic Species and Habitat are evaluated at the reach scale (in the 8.5 mile enhancement reach) as effects would be most perceptible at this scale. Potential direct and indirect effects would be expected at the site specific scale.

Factors suppressing the South Fork bull trout population, including habitat degradation, would continue to contribute to a high risk of extinction. Off-channel habitat availability for rearing spring Chinook salmon would remain near current levels. In-stream wood recruitment would depend upon natural rates of input. The rate of in-stream wood recruitment would depend upon the natural rate of stream adjacent blowdown and deadfall. Recruitment of wood from upstream of

the project area (through in-stream migration of material) would be expected to remain lower than historic rates due to the interception of migrating wood at intersections of the road network with tributaries. Channel response to low wood density during flood includes risk of continuing channel abandonment of floodplains and further loss of off-channel habitat.

ESA Aquatic Species and Habitat

Cumulative Effects: Project cumulative effects on ESA Aquatic Species and Habitat are evaluated at the reach scale (in the 8.5 mile enhancement reach) as effects would be most perceptible at this scale.

Channel response to low wood density during flood includes risk of continuing abandonment of floodplains and further loss of off-channel habitat. Reconnection of the upper South Fork McKenzie and Roaring River through a planned trap-and-haul facility at Cougar Dam would be expected to yield a level of ESA species production that reflects current channel condition and influence of other variables. The rate of production in the project area is dependant upon factors such as adult escapement, climate, occurrence of disturbance events, availability of rearing habitat, food supply, angler harvest, predation and flow regimes.

1c. Sedimentation

Alternative A as it Responds to the Significant Issue of Water Quality/Aquatic Resources:

Sedimentation

Direct and Indirect Effects: Since the actual occurrences of soil disturbing activity associated with this are project highly localized to treatment sites that are of limited number and extent, the area of analysis for sedimentation effects will be limited to the project area.

Lining equipment will be required to remain on existing roads and is mounted on rubber tires. It will also be stationary during actual lining operations, so that on native surface roads, traffic is not likely to result in meaningful sediment migration off of the roadway. In addition, the roads that will be used are generally no closer than 300 feet to the river, and are situated on flat, well vegetated terrain that possesses excellent capability to trap sediment. Consequently, increased transport of fine sediment to the river, resulting from equipment operations on gravel and native road surfaces is expected to be negligible.

Small areas of soil disturbance will occur where 40 trees will be uprooted over the 8.5 mile long reach. The trees will be tipped toward the river so that the resulting rootwads face away from the river. Soil and sediment falling from the rootwads will fall into the depression where the tree was uprooted, so that little opportunity for offsite migration of this material will be created. These disturbed sites will be further protected from erosion by placement of duff and litter over exposed soils and seeding with native grass species.

Only currently existing landings that are located 500 to 1000 feet from the river will be utilized by this project for helicopter service landings and material staging, and helicopter placement of imported woody material to the river is not a soil disturbing activity. Consequently,

increased transport of fine sediment to the river, resulting from material staging and helicopter operations is expected to be negligible.

Vehicle traffic would be eliminated on approximately 3000 feet of existing native surface roads that access 12 dispersed recreation sites in close proximity to the river. Management treatments, including boulder placement, berm construction, waterbar construction, and light scarification to prepare a seed bed will result in a short term increase in the risk of fine sediment transport to the river. However, seeding and planting with native plant and tree species will facilitate re-establishment of effective ground cover and rapidly eliminate project induced sedimentation risk. These treatments will also result in a substantial reduction of existing sediment transport from the project area as the 3000 feet of road and portions of the 12 dispersed recreation sites become permanently re-vegetated.

Sedimentation

Cumulative Effects: Since the actual occurrences of soil disturbing activity associated with this are project highly localized to treatment sites that are of limited number and extent, the area of analysis for sedimentation effects will be limited to the project area.

Detailed information about the extent and timing of past management activities that created disturbed soil conditions in the project area are not readily available. However, observation of the project area during this analysis indicated substantial activity over the past 50 to 60 years since management access to the area was established that resulted in disturbance and fine sediment transport to the river. The 3000 feet of road and 12 dispersed recreation sites that are proposed for treatment are a portion of this disturbance legacy. Over this time, fine sediment transport to the river likely fluctuated in proportion to disturbance in the project area, with levels peaking in the 1960's and 1970's when timber harvest and road construction were also peaking. Since then, and especially since implementation of the Willamette Forest Plan in 1990 when the area was established as an allocation where scheduled timber harvest was not permitted, fine sediment transport gradually declined to their current levels which are largely related to the existing, unregulated recreation traffic.

Based on professional experience with the sediment transport capacities of large rivers like the South Fork, it is unlikely that fine sediment has accumulated over the years as an incrementally additive effect. However, disturbance activities in the project area have resulted in a long chronological exposure of the river to these levels of fine sediment input. Alternative A provides treatments that will eliminate and reduce the levels of disturbance associated with unregulated dispersed recreation use of legacy roads and sites. This is likely to result in an additional decline in the amount of fine sediment that is chronically being transported to the river from the project area.

Alternative B as it Responds to the Significant Issue of Water Quality/Aquatic Resources:

Sedimentation

Direct and Indirect Effects: Since the actual occurrences of soil disturbing activity associated with this are project highly localized to treatment sites that are of limited number and extent, the area of analysis for sedimentation effects will be limited to the project area.

The No Action Alternative proposes no soil disturbing activities that could result in increased transport of fine sediment to the river. The reduction of existing sediment transport from 3000 feet of road and portions of the 12 dispersed recreation sites (as they re-vegetate) would not occur.

Sedimentation

Cumulative Effects: Since the actual occurrences of soil disturbing activity associated with this are project highly localized to treatment sites that are of limited number and extent, the area of analysis for sedimentation effects will be limited to the project area.

No Action, will not affect the chronic transport of fine sediment to the river from legacy disturbance and unregulated dispersed recreation use of the project area. Absence of road treatment and associated vehicle containment would present risk of continuing road and site enlargement in flat areas.

Recreation - Affected Environment

Human use in the South Fork McKenzie watershed includes fishing, boating, hiking, and camping. The Willamette National Forest manages four campgrounds with some level of development in the project area: Homestead, Twin Springs, Frissel Crossing and Roaring River Campgrounds with more than 23 individual campsites. Within the project area, an 8.5 mile long river adjacent Riparian Reserve, are located 26 dispersed campsites. Dispersed campsites are accessed by non-system roads built during past salvage operations or user constructed.

The forested slopes along the South Fork McKenzie and Roaring River form an important scenic backdrop to the Aufderheide National Scenic Byway (Road 19). The project area also includes the Oregon State Scenic Waterway designated portion of upper South Fork McKenzie and Roaring River. The South Fork McKenzie Wild and Scenic Study River eligibility (USDA Forest Service 1992) provides through Wild and Scenic Rivers Act for the protection and enhancement of resource values in the river corridor, and allows public use and enjoyment of those resources. Management goals strive for a balance of resource use and protection, and permitting other activities to the extent that they protect and enhance the river's special attributes. Human use in the South Fork McKenzie watershed includes timber production and harvest, as guided by the Willamette Land and Resource Management Plan.

Recreation – Effects

Recreational Opportunity (Project effects on dispersed camping and kayaking)

Alternatives A as it Responds to the Significant Issue of Recreational Opportunity:

Direct and Indirect Effects: Project effects on human use in the area are evaluated at the reach scale (along the 8.5 mile enhancement reach) as effects would be most evident at this scale. Potential direct and indirect effects would be expected at the site specific scale.

Non-system road closures, totaling 3,000 feet in length, in the South Fork Project are designed to meet the demand for a variety of recreation experience along the South Fork McKenzie and Roaring River. Currently a high frequency of dispersed campsite is accessible by vehicle (3.0 sites per mile). Following non-system road closures, 1.6 sites per mile would continue to be accessible by vehicle (14 sites in the project area) and 1.4 sites per mile would be accessible via trail (12 sites in the project area). Change in access would not change the number of established dispersed campsites. A variety of dispersed camping experience may be expected, ranging from those more readily accessible by vehicle to walk-in sites. Modification of improved campgrounds (23 campsites) would not occur in the project area.

On roads selected for blockage, vegetation screens are utilized where possible to allow vehicles to park out of view of Road 19. Road blockage points would be selected to allow a vehicle to remain out of view of those touring on Road 19 (Aufderheide Scenic Byway). This method of road closure is expected to maintain the visual quality of the scenic byway.

A short-term interruption of public use of the project would occur during 4-5 days of project implementation. This interruption would occur during weekdays as no project work would be conducted on holidays or weekends. The timing of interruption would be between July 15 and August 15.

A higher density of in-stream large woody material would modify potential recreational boating (kayaking) use in the enhancement reach. The entire length of the treatment reach (8.5 miles) would be less attractive as a boating destination than current condition. Exploration of the enhancement reach by members of Willamette Kayak and Canoe Club in 1998 found the reach to be low gradient and require too many portages to be considered a quality kayak destination. No modification of the high value kayaking reach beginning near French Pete Campground would be expected from project actions.

Utilization of riparian trees for aquatic enhancement in a dispersed manner would maintain a high level of canopy closure and placement in the river would remain natural in appearance (root mass intact, appearing as a wind thrown tree in the channel). Project activities would maintain the visual characteristics and the high level of scenic quality within the Wild and Scenic River corridor.

Cumulative Effects: Project effects on human use in the area are evaluated at the reach scale (along the 8.5 mile enhancement reach) as effects would be most evident at this scale. Potential direct and indirect effects would be expected at the site specific scale.

Considered in aggregate with past restoration projects, the proposed action may have restorative effects on recreational opportunities such as wildlife viewing and fishing. Restoration of historic channel condition is expected to improve aquatic production in the project area, with benefits to riparian wildlife species. Fishing opportunity would be expected to improve as channel conditions improve in response to multi-year in-stream projects. A moderate road density of about 2.5 miles/square mile in close proximity to the river is expected to continue and provide opportunity for a variety of dispersed camping experience.

Alternative B as it Responds to the Significant Issue of Recreational Opportunity:

Direct and Indirect Effects: Project effects on human use in the area are evaluated at the reach scale (along the 8.5 mile enhancement reach) as effects would be most evident at this scale. Potential direct and indirect effects would be expected at the site specific scale.

There would be no change in recreational opportunity with the No Action alternative. No trees would be pulled over or imported to the project area. Non-system roads contributing to degraded water quality would continue untreated. Interruption of public use of the area associated with project activities would not occur. A small visual improvement (re-vegetation of about 0.8 acre) associated with treatment of road surfaces would not occur.

Cumulative Effects: Project effects on human use in the area are evaluated at the reach scale (along the 8.5 mile enhancement reach) as effects would be most evident at this scale. Potential direct and indirect effects would be expected at the site specific scale.

Considered in aggregate with past events, the No Action alternative may contribute to diminishment of riparian condition. Absence of vehicle containment is expected to lead to expansion of non-system roads and enlargement of dispersed campsite area.

Effects on Other Issues:

3. Threatened, Endangered, and Sensitive Wildlife and Botanical Species

There are no listed Threatened or Endangered plant species on the Willamette National Forest. Other rare plants, often not associated with older forests, are compiled on a Regional Forester's Sensitive Species list for the Willamette National Forest. These species and their habitats are often rare and limited in distribution. The list of species that have potential habitat within the planning area, and results of site-specific, pre-disturbance surveys of proposed activity areas can be found in Appendix D. No sensitive species were located in the planning area.

Threatened, endangered and sensitive wildlife species that occur in the area include the spotted owl, bald eagle, and harlequin duck. Spotted owls nest within the landscape of the project area. Bald eagles forage in the nearby Cougar Reservoir. Harlequin ducks are known to successfully nest in the South Fork McKenzie River.

There would be no effects on TES wildlife with this alternative because removal of a limited number of green trees from the riparian area would not adversely alter the function of the forest habitat for TES species. Supplementation of woody material within the stream channel and on the bank will improve habitat for harlequin ducks by providing more cover and loafing areas. The project may also improve abundance of prey species for foraging bald eagles and harlequin ducks. Potential impacts to harlequin ducks from trees falling on nests would be avoided through seasonal

restrictions (April 1 – June 30) on felling activity. Potential for noise disturbance to spotted owls or peregrine falcons from helicopter and heavy equipment activity would be avoided through restricting that activity between January 1 and July 15.

There would be no negative effects to TES wildlife with a no action alternative. No trees would be pulled over or imported to the site. Noise disturbance from helicopters or heavy equipment would not occur. Benefits to bald eagles and harlequin ducks from aquatic and riparian habitat restoration would be expected to occur.

4. Hydroelectric Operations

The upper extent of Cougar Reservoir is about 14.5 miles downstream of the project area. Between the project area and Cougar Reservoir is a large channel obstruction that acts to filter most large woody material. There is no expected adverse impact to hydroelectric operations at Cougar Project from implementation of the action alternative. Forest Service continues to share in Cougar Reservoir maintenance responsibility (debris sweeps).

5. Visual Quality

Pulling over 40 trees in the Riparian Reserve would not change the texture or character of the visible forested landscape. Trees are selected in a dispersed manner and are not visible from the Scenic Byway corridor. The 40 stream adjacent trees selected for in-stream destination are dispersed over a 141 acre area (riparian area within 100 feet of the channel) and would not be apparent to the casual observer. In-stream wood of restoration origin visible from the unimproved trails would remain natural in appearance as woody material accumulations would mimic natural in-stream accumulations. Visual Quality Objectives of management areas would be maintained.

6. Noxious Weeds

The majority of weed populations found in the project area are located along roadsides and landings. Noxious weeds in the planning area include bull thistle (*Circium vulgare*), Canada thistle (*Circium arvense*), St. John's wort (*Hypericum perforaturm*), tansy rag-wort (*Senecio jacobaea*), Scotch broom (*Cytisus scoparius*), and the new invader species reed Canarygrass (*Phalaris arundinacea*), evergreen blackberry (*Rubus laciniata*), Himalayan blackberry (*Rubus discolor*), spotted knapweed (*Centaurea maculosa*), and diffuse knapweed (*Centaurea diffusa*). Noxious weeds and other invasive non-native plant populations serve as sources for seed dispersal and invasion. Weed seed can be dispersed by air currents, in contaminated road and fill material, vehicle travel, recreation activities, and wildlife movement.

Spotted knapweed is the most serious threat to native plant populations within the watershed. Spotted knapweed has a broad ecological tolerance, prolific growth, and abundant seed production. It is spread primarily by vehicular traffic and has quickly become established along roads of the watershed.

There are no expected impacts to noxious weeds from implementation of the action alternative because prevention measures would be used to minimize expansion of existing populations. Control methods used in the watershed include manual and mechanical removal and the selected use of herbicides. A provision requiring all equipment used in enhancement activity will be

washed prior to moving onto National Forest System lands would be included in project contracts to limit the introduction and distribution of non-native seed and propagules.

7. Soil Erosion

The soils of the project area are generally in good condition. Where past management activities have impacted long-term soil productivity is where temporary roads were constructed. Past management activity in the Riparian Reserve adjacent to the enhancement reach has consisted mostly of road construction and timber salvage. Previous harvest activity consisted of small scale salvage operations, removing downed trees from what is now the Riparian Reserve, and from South Fork McKenzie and Roaring River channels. Previous harvest activities were performed primarily by cable-yarding systems and did not result in adverse erosion, loss of effective ground cover, or slope instability, due to the small scale of salvage operations. The adverse effects of past ground-based yarding systems (compaction, displacement, loss of litter cover) have been minimal and within the Willamette National Forest Plan Standards and Guidelines (1990) within current Riparian Reserve. Degradation of temporary roads where they were intercepted by river or tributary channels, or pass through wetlands is the focus of road treatments in the proposed action. The objective of road treatments is to stabilize soils in those Riparian Reserve locations.

There is little potential for additional impacts to soils in the project area from implementation of the action alternative. Additional soil compaction, erosion, or puddling would not be expected. Ground-disturbing equipment would remain on road surfaces and would be prohibited off-road. Exposed soil would occur in the root system area of pulled trees, resulting in a small area of disturbance in the project area. Disturbed areas will be covered with organic material to minimize mobilization by rain and seeded with native plant seed following completion of the project.

8. Management Indicator Species

Background and Effects Summary: The Willamette Forest Plan has identified a number of terrestrial wildlife species with habitat needs that are representative of other wildlife species with similar habitat requirements for survival and reproduction. These management indicator species (MIS) include spotted owl, bald eagle, peregrine falcon, cavity excavators, pileated woodpecker, deer, elk, and marten. Spotted owls, bald eagles, and peregrine falcons are addressed in a separate Biological Evaluation. The other MIS have potential to occur in or near the project area and are addressed below. Activity associated with the proposed action is consistent with, or exceeds Willamette Forest Plan Standards and Guidelines as they pertain to MIS management.

Project activities could result in disturbance to MIS that may be present in or adjacent to the immediate area. However, any modification or disturbance that may occur associated with this project is not of a scale that would threaten the viability of any MIS to persist within the project area or throughout the range of these species.

Anadromous and resident salmonids (trout and salmon) are considered Management Indicator Species. In the South Fork McKenzie and Roaring River, the MIS are spring Chinook salmon, rainbow trout, bull trout, whitefish, and cutthroat trout. Effects of the proposed action to MIS are similar to impacts to bull trout and spring Chinook salmon. There is potential to harm individuals during the placement of material during project implementation, but impacts to populations of MIS

would be negligible. Over the long term, a benefit to salmonid habitat is expected as a result of the proposed action, with benefit to MIS fish populations.

9. Neotropical Migratory Land Birds

Land bird species exhibit a dramatic response to the height, seral stage, canopy structure, and spatial distribution associated with forest habitat where greater numbers of birds are associated with more complex heterogeneous forested landscapes (Altman 1999). The current amount of forested and open ecotonal habitat characteristic throughout the project area should be attractive for use by a variety of avian species (Gilbert and Allwine 1991). However effects from past management practices – specifically fire suppression – have resulted in simplification of habitat throughout this area.

Effects to Land Birds/Neotropical Migrants: Proposed activities would generally occur outside the breeding season for these species and/or at a time when many may have migrated from the area (Marshall et al. 2003, O'Neil et al. 2001, NatureServe 2005). The timing of activities would mitigate potential short-term (< 5 years) negative effects from habitat modification such as temporary loss of some potential nesting habitat, or disturbance such as temporary displacement of individuals or their prey from prescribed burning activities. The number of individuals and/or species potentially affected by proposed activities is unknown and considered unquantifiable without reliable survey data. Activities proposed by this project should not affect this group of species such that their ability to persist in the vicinity of the project area or throughout their ranges would be compromised.

Project effects to Land Birds/Neotropical Migrants are of no measurable consequence on an individual basis relative to the amount of habitat modified or disturbed against the amount available throughout the surrounding Forest. Project effects would result in negligible overall contribution, with respect to historic habitat and biodiversity, to cumulative effects that have occurred from past actions affecting the project area.

10. Survey and Manage Wildlife and Botanical Species

In 2004, the Record of Decision to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines was released (USDA Forest Service and USDI Bureau of Land Management. 2004a). As a result, some of the species that were formerly Survey and Manage are now managed under the interagency Special Status Species Program (SSSP) as sensitive species. A pre-field review of the project area was conducted to determine the presence of potential habitat for former Survey and Manage species. Surveys were not required for Survey and Manage and Protection Buffer wildlife species red tree vole and Crater Lake tightcoil snail.

Surveys for Survey and Manage plant species were conducted in areas proposed for ground disturbing activities. No Survey and Manage plants were found during these surveys. The list of species that have potential habitat within the planning area and Survey and Manage species located in the project area can be found in Wildlife and Botany Appendices. The absence of Survey and Manage species presence presents little risk or those with potential habitat have a low likelihood of adverse project effect. Modification of habitat or disturbance that may occur associated with this

project is of a scale that would not threaten the viability of Survey and Manage populations or their ability to persist within the project area or throughout their range.

11. Cultural Resources

Before the 1856 Dayton Treaty, west-side Indian tribes (likely ancestors of the Molalla and Kalapuya) used the area. Although there were no resident Indian bands in the South Fork McKenzie drainage at the time of white settlement, a band of Kalapuya Indians lived in a village at the mouth of the McKenzie, near its confluence with the Willamette River. They may have visited or traveled through the area during the summer. However, once they were relocated to the Grand Ronde or Siletz reservations (in the mid to late 1850s), they could not easily get to the area. From 1860 to 1920 bands from the Warm Springs Reservation visited the area, gathering huckleberries, hunting, and grazing ponies in the summer and early fall. The area was also used for sheep grazing at the turn of the century from 1880-1920.

Field surveys for the South Fork McKenzie River Enhancement project did not locate any new cultural sites. However previous surveys did located one historic site (Frissell Crossing) within the project area. This historic site is considered potentially eligible to the National Register of Historic Places (NRHP) and must be protected from project activities or evaluated to determine it's eligibility to the NRHP.

Implementation of Alternatives A and B would not directly nor indirectly affect heritage resources since there would be no change to the integrity of heritage resource sites. The potentially eligible site has been protected through complete avoidance. The District Archeologist would evaluate any subsequent discoveries.

Past Actions and Cumulative Effects

The analysis of cumulative effects considered past, present and reasonably foreseeable future actions on these lands.

The Hartz Project is a timber management/roads treatment project to the west (downstream) of this enhancement project. The thinning project would not increase sources of turbidity or sedimentation downstream of the enhancement reach, as thinning stands and roads are located at sufficient distances from adjacent channels to reduce potential sedimentation. Negligible quantities of sedimentation are expected from the road maintenance activities in the project area, conducted annually. Chronic sources of road related sediment are generated in the South Fork McKenzie 5th field watershed, from a road system near 2.5 miles/square mile. Road densities range from 3.6 miles/square mile downstream (west) of the project area within the Hardy Creek 6th field sub-watershed to less than 1.0 mile/square mile upstream (north) in areas that include Three Sisters Wilderness. The sources of sedimentation generated by the South Fork project would not add measurably to road related sedimentation. Best Management Practices would help mitigate proposed management actions in the watershed.

Past projects in the vicinity of the proposed project include salvage projects. Most are older than 20 years in age. Past in-stream salvage and temporary road effects contributing to degradation of aquatic habitat and water quality are addressed in the proposed action. The

proposed action would decommission approximately 3,000 feet of river adjacent non-system road with an expected beneficial effect to water quality.

Cumulatively, these projects, including the current proposal, would not lead to incremental degradation of aquatic habitat or water quality. Stream shade would be largely maintained and not adversely influenced by the proposed action. Stream adjacent activities would be confined to road surfaces in efforts to maintain water quality.

Army Corps of Engineers reconnection of the upper South Fork McKenzie and Roaring River through a planned trap-and-haul facility at Cougar Dam would be expected to yield a greater level of ESA species production upstream of Cougar Dam. It is difficult to estimate the rate of production in the project area as it is dependant upon factors such as adult escapement, climate, the occurrence of disturbance events, availability of habitat, food supply, angler harvest, predation and flow regimes. When considered independently of other variables, proposed enhancement of habitat for early life history of spring Chinook salmon and bull trout is expected to contribute to conditions favoring survival.

This Environmental Assessment is tiered to the Final Environmental Impact Statement for the Willamette National Forest Land and Resource Management Plan as amended and the analysis of cumulative effects therein.

Compliance with Other Laws, Regulations and Executive Orders

This section describes how the action alternatives comply with applicable State and Federal laws, regulations and policies.

Federal Laws and Executive Orders:

The Preservation of Antiquities Act, June 1906 and the National Historic Preservation Act, October 1966 (amended 1979, 1980, and 1992) – Before project implementation, State Historic Preservation Office consultation is completed under the 1995 Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, amended June 2004. Field surveys where ground-disturbing activities would occur in the South Fork project area have been completed.

Protection measures resulted in a determination of **No Historic Properties Affected**. Because cultural resources would not be affected by proposed activities under the proposed action, there would be no effect to any historic property listed in, eligible, or potentially eligible to the National Register of Historic Places.

Should previously unknown sites be found during ground disturbing activities, contract provisions would provide protection and the McKenzie River District Archaeologist would be immediately notified.

The Endangered Species Act (ESA), December 1973 – The ESA establishes a policy that all federal agencies would seek to conserve endangered and threatened species of fish, wildlife and

plants. Biological Evaluations for plants and wildlife have been prepared, which describes possible effects of the proposed action on sensitive, and other species of concern that may be present in the project area.

The action alternative as designed is covered by programmatic Biological Opinion for bull trout and spring Chinook salmon. The project meets the Project Design Criteria for Aquatic Habitat Projects described in the USFWS Biological Opinion regarding bull trout (April 11, 2003) and NOAA Fisheries Biological Opinion regarding spring Chinook salmon (February 25, 2003). The project findings are consistent with the findings of both Biological Opinions.

Clean Air Act Amendments, 1977 – The alternatives are designed to meet the National Ambient Air quality standards through avoidance of practices that degrade air quality below health and visibility standards. This project is consistent with by the 1990 Clean Air Act and the 1977 Clean Air Act and its amendments.

The Clean Water Act, 1987 – This act establishes a non-degradation policy for all federally proposed projects. Compliance with the Clean Water Act would be accomplished through application of Best Management Practices (BMPs) and mitigation measures.

Streams in the South Fork Project Area listed by Oregon Department of Environmental Quality as 303(d), as water quality limited based on water temperature during the summer season are located in tributaries to the South Fork McKenzie and the South Fork McKenzie below Cougar Dam, all beyond the influence of project activities.

Magnuson-Stevens Fishery Conservation and Management Act, 1976 (MSA) –The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires the identification of habitat "essential" to conserve and enhance the federal fishery resources that are fished commercially. The Pacific Fishery Management Council (PFMC) designated Essential Fish Habitat (EFH) for Chinook, coho, and Puget Sound pink salmon in Amendment 14 to the Pacific Coast Salmon Plan, issued September 27, 2000. The interim final rule implementing the EFH provision of the MSA (62 FR 66531) requires federal agencies to consult with the NOAA Fisheries Service for any action that may adversely affect EFH. The South Fork McKenzie River channel downstream of Cougar Dam is included in the waters designated as EFH for spring Chinook salmon by the PFMC. The South Fork project area is located upstream of Cougar Dam which does not include waters designated as EFH for spring Chinook salmon by the PFMC. The proposed action is not likely to adversely modify aquatic systems, recreational fisheries, Critical Habitat for spring Chinook salmon or bull trout, or designated Essential Fish Habitat. The effects that are likely to occur are based on sound aquatic conservation and restoration principles for the benefit of recreational fisheries, as directed by Executive Order #12962. Since the project is not likely to adversely affect EFH, no further consultation under the Magnuson-Stevens Fishery Conservation and Management Act is required.

Wild and Scenic Rivers Act, 1968 – This proposal is designed to maintain the Outstandingly Remarkable Values of the South Fork McKenzie River Wild and Scenic Study River (South Fork McKenzie Wild and Scenic Section 7 Analysis; Appendix A).

Inventoried Roadless Areas and Wilderness – There are no actions proposed within Inventoried Roadless Areas (IRAs) or Wildernesses in the South Fork project area, and no actions would affect these designations.

Executive Orders 11988 and 11990: Floodplains and Wetlands – Executive Order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

Executive Order 11990 requires government agencies to take actions that minimize the destruction, loss, or degradation of wetlands. Project activities located in Riparian Reserves, seeps, springs, and other wet habitats in the South Fork project area are designed to restore floodplain function and recover off-channel habitat. These areas would be managed according to Riparian Reserve Management Guidelines to comply with amended Willamette Forest Plan Standards and Guidelines. Riparian reserves would also be protected with Mitigation Measures also detailed in Chapter 2. As a result, the proposed action is consistent with Executive Orders 11988 and 11990.

Executive Order 12898: Environmental Justice – Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of the proposed action or any of the alternatives, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area, and nearby communities would mainly be affected by economic impacts connected with contractors implementing tree tipping, road decommissioning, hand crew wood placement and planting, and helicopter wood placement activities. Racial and cultural minority groups could also be prevalent in the work forces that implement project activities. Contracts contain clauses that address worker safety.

Executive Order 12962: Recreational Fishing – The June 7, 1995, Executive Order requires government agencies to strengthen efforts to improve fisheries conservation and provide for more and better recreational fishing opportunities, and to develop a new policy to promote compatibility between the protection of endangered species and recreational fisheries, and to develop a comprehensive Recreational Fishery Resources Conservation Plan.

Executive Order 13186: Neotropical Migratory Birds – There are 85 bird species recognized as neotropical migrants on the Willamette National Forest. Thirty-five of these species found on the Willamette have been identified as species of concern (Sharp 1992). A Memorandum of Understanding was signed between the USFS and USFWS to complement the January 2001, Executive Order. The South Fork Project Area contains populations of migratory landbirds typical of the western Cascades.

The National Environmental Policy Act (NEPA), 1969 – NEPA establishes the format and content requirements of environmental analysis and documentation. Preparation of the South Fork McKenzie River Enhancement Project EA was done in full compliance with these requirements.

The National Forest Management Act (NFMA), 1976 – The proposed action meets the requirement of NFMA by maintaining forest habitats and diversity of plant and animal communities in the long-term. The South Fork Project is designed to remain consistent with

Willamette National Forest Plan guidelines and applicable resource management direction to meet NFMA direction. Proposed activities would comply with the requirements associated with vegetative manipulation (36 CFR 219.27(b)), riparian areas (36 CFR 219.27(e)), water quality (36 CFR 219.27(d)), fish and wildlife (36 CFR 219.19) and soil and water (36 CFR 219.27(f)).

Forest Plan Consistency – Actions analyzed in South Fork project EA are consistent with a broad range of Forest Plan Standards and Guidelines that have been discussed and disclosed throughout the document. Project activities (tree tipping, importing LWM, road treatments) associated with the project are consistent with the goals and management direction analyzed in the Willamette National Forest Land and Resource Management Plan FEIS and Record of Decision. Road treatments that address watershed restoration needs are designed to be consistent with the 1994 Northwest Forest Plan amendments to the Forest Plan and the Aquatic Conservation Strategy objectives.

Other Jurisdictions – There are a number of other agencies responsible for management of resources within the South Fork McKenzie watershed. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife has been contacted regarding this analysis.

Oregon State Scenic Waterway – Segments of the South Fork McKenzie River within this project area are also in portions of the Oregon State Scenic Waterway, which is administered by the Oregon State Parks and Recreation Department. Scenic Waterway Act and Commission rules require the evaluation of proposed development within ¼ mile from each side of the river. Consultation with the Oregon State Parks and Recreation Department about potential effects to the State Scenic Waterway, through Section 7 Analysis will occur prior to project implementation (Appendix A).

Joint permit (Section 404 of Clean Water Act) will be required of fill activities through Oregon Division of State Lands and U.S. Army Corps of Engineers.

Oregon State Forest Worker Safety Codes, The Oregon Occupational Safety and Health Code for Forest Activities would be met with implementation of the proposed action.

Energy Requirements and Conservation Potential – Some form of energy would be necessary for proposed project elements requiring use of mechanized equipment: Tree tipping and aerial placement of in-stream wood would involve heavy machines for moving trees during implementation. Projects such as road treatments could require heavy machinery for a small amount of time. Both possibilities would result in some energy consumption.

Unavoidable Adverse Effects – Implementation of the action alternative, including the No Action alternative, would inevitably result in some adverse environmental effects. The severity of the effects would be minimized by adhering to project design, mitigation measures, Best Management Practices and Standards and Guidelines in Chapter IV of the Willamette Forest Plan. These adverse environmental effects are discussed earlier in Chapter 3.

Irreversible and Irretrievable Effects – "Irreversible" commitment of resources refers to a loss of future options with nonrenewable resources. An "Irretrievable" commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

No new construction of temporary or permanent roads would occur. Temporary use of existing log landings would produce irretrievable changes in the natural appearance of the landscape for the period of wood storage. Boulders used to delineate campsites or block roads would be an irreversible commitment of mineral resources.

Concerning threatened and endangered plant, wildlife, and fish species, a determination has been made that the proposed action would not result in irreversible or irretrievable commitment of resources.

There are no irreversible and irretrievable commitments that would affect heritage resource by implementing the proposed action.

Chapter 4 – Consultation and Coordination

The following Federal, State, and local agencies, tribes and individuals responded to scoping during the development of this environmental assessment:

FEDERAL, STATE, AND LOCAL AGENCIES:

U.S. Army Corps of Engineers; Oregon Department of Fish and Wildlife; McKenzie River Trust; Cooperative project effectiveness monitoring through salmon smolt migration trapping downstream of the project area are being discussed with U.S. Army Corps of Engineers. Oregon Department of Fish and Wildlife, a project co-sponsor plans to continue pre- and post-project spawning surveys of spring Chinook salmon and bull trout in the project area. Bull trout adult population monitoring is expected to continue in the future.

INDIVIDUALS:

Mr. Cole Gardiner of Portland, Oregon provided descriptions of historic condition in the project area.

ID TEAM MEMBERS:

Core team members: Adrienne Launer, Engineering; Burtchell Thomas, Botany; Sam Swetland, Fire; John Harper, Recreation; Cara Kelly, Cultural Resources; Dave Kretzing, Hydrology; Shane Kamrath, Wildlife; Al Brown, NEPA Coordinator; Ruby Seitz, Wildlife; Dave Bickford, Fisheries. Consulting team members: Ray Rivera, Fisheries; Mike Cobb, Hydrology; Phil Raab, Hydropower Coordinator.

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Appendices

Appendix A South Fork McKenzie Wild and Scenic Section 7 Analysis

Appendix B Wildlife Biological Evaluation

Appendix C Wildlife Resource Report

Appendix D Botany Biological Evaluation

Appendix E Botanical Resource Report