ENVIRONMENTAL ASSESSMENT

for the

Sucker Creek Restoration Project

(EA# OR110-00-22)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
GRANTS PASS RESOURCE AREA

July 2000

Dear Reader:

We appreciate your interest in the BLM's public land management activities. We also appreciate your taking the time to review this environmental assessment (EA). If you would like to provide us with written comments regarding this project or EA, please send them to Doug Lindsey, Grants Pass Field Manager, at 3040 Biddle Road, Medford, OR 97504.

If you would like to comment, but confidentiality is of concern to you, please be aware that comments, including names and addresses of respondents, will be available for public review or may be held in a file available for public inspection and review. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this clearly state at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or officials of organizations or businesses will be made available for public inspection in their entirety.

Douglas C. Lindsey
Field Manager
Grants Pass Resource Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: Grants Pass FY & REPORT # EA Number OR-110-00-22

ACTION/TITLE: Sucker Creek Restoration Project
LOCATION: T. 40S., R. 7 W., Section 1 Willamette Meridian

FOR FURTHER INFORMATION CONTACT:

Doug Lindsey
Medford District Office, BLM
3040 Biddle Road
Medford, Oregon 97504
(541) 770-2303

INTERDISCIPLINARY PREPARERS	TITLE	RESOURCE VALUES ASSIGNED
Frank Hoeper	Forester	EA Writer
Matt Craddock	Realty Specialist	Minerals, Lands, and Cultural
Leslie Welch *	Wildlife Biologist	Prime or Unique Lands, Wildlife, Grazing
Dave Maurer *	Soil Scientist	Team Leader, Floodplains, Wetlands, Soils, and Water
Jon Raybourn *	Fisheries Biologist	Fisheries
Jeanne Klein	Recreation Planner	Recreation, Cultural, VRM
Jon Hall / Jim Roper	Engineer	Roads, Quarries, Road Agreements, Easements
Linda Mazzu	Botanist	T&E Plants
Leanne Mruzik	Fuels Specialist	Fire, Slash Treatment
Frank Betlejewski *	Forester	Vegetation, Silviculture

* Project Planning Core Team Member

GRANTS PASS RESOURCE AREA
ENVIRONMENTAL ASSESSMENT

TABLE OF CONTENTS

Page

Chapter 1
Purpose of and Need for Action 1
A. Introduction 1
B. Purpose and Need for the Proposal 1
C. Project Location 2
D. Issues Relevant to the Project 3

Chapter 2
Proposed Action and Alternatives 4
A. Introduction 4
B. Alternative 1: No Action Alternative 4
C. Proposed Action Alternatives 5
1. Introduction 5
2. Alternative 2 5
a. Hydrologic Function Improvement 5
b. Within-Stream Restoration / Fisheries Enhancement 6
c. Vegetation Treatments 7
d. Terrestrial Wildlife Habitat restoration / Enhancement 8
e. Roads 8
3. Alternative 3 8
a. Hydrologic Function Improvement 9
b. Within-Stream Restoration / Fisheries Enhancement 9
c. Vegetation Treatments 9
d. Terrestrial Wildlife Habitat restoration / Enhancement 10
e. Roads 10
4. Project Design Features 10

Chapter 3
Environmental Consequences 13
A. Introduction 13
B. Site Specific Beneficial or Adverse Effects of the Alternatives 13
1. Resource: Soil / Water 13
2. Resource: Fisheries 16
3. Resource: Botany 22
4. Resource: Vegetation 24
5. Resource: Wildlife 26
6. Resource: Fire and Fuels 32
7. Resource: Recreation/Cultural/VRM 32

Chapter 4
Agencies and Persons Consulted / Comment Procedures 34

A. Public Involvement / Agencies Consulted 34
B. Availability of Document and Comment Procedures 34

Appendices

Appendix A: Project Maps 35
Appendix B: Issues and Alternatives Considered but Eliminated 44
Appendix C: Aquatic Conservation Strategy Objectives - Consistency Evaluation 45
Appendix D: Acronyms and Glossary of Terms 46

List of Tables

Table 1: Seasonal Operating Restrictions 10
Table 2: Soil and Hydrologic Effects 15
Table 3: Current WS Conditions (Estimated) 16

List of Maps

Map 1 - Project Location Map 36
Map 2 - Site Map 37
Map B1 - Alternative 2: PROPOSED ACTION 38
Map B2 - Alternative 2: PROPOSED ACTION 39
Map B3 - Alternative 2: PROPOSED ACTION 40
Map B4 - Alternative 2: PROPOSED ACTION 41
Map C1 - Alternative 3: PROPOSED ACTION 42
Map C2 - Alternative 3: PROPOSED ACTION 43

Chapter 1
Purpose of and Need for Action

A. Introduction

The purpose of this environmental assessment (EA) is to assist in the decision making process by assessing the environmental and human affects resulting from implementing the proposed project and/or alternatives. This EA will also assist in determining if an environmental impact statement (EIS) needs to be prepared and if a finding of no significant impact (FONSI) is appropriate.

This EA tiers to the following documents:

(1) the Final EIS and Record of Decision dated June 1995 for the Medford District Resource Management Plan dated October 1994 (RMP-ROD);
(2) the Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl dated February 1994; and
(3) the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its attachment A entitled the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl dated April 13, 1994 (NFP-ROD).

In addition to the documents cited and tiered to above, the planning of this project drew from the ideas, information and recommendations of the following documents:

(1) Southwest Oregon Late Successional Reserve Assessment (October 1995);
(2) USFWS Biological Opinions (#1-7-96-F-392 (10/18/96) and #1-7-98-F-321 (09/18/98));
(3) NMFS Biological Opinion (March 18, 1997);
(4) Watershed Analysis for the Grayback/Sucker watershed (April 1995);
(5) BLM Port-Orford Cedar Management Guidelines (October 1994)
(6) Sucker Creek Water Quality Management Plan/ TMDL (March 1999)

B. Purpose and Need for the Proposal

The two project sites on Sucker Creek have been mined for gold for at least the past 120 years. The sites are dominated by a highly disturbed, churned, eroded mix of alluvial materials. Much of the fines have been lost from the soil and the sites are largely denuded of vegetation. Approximately 0.7 miles of Sucker Creek are in this condition at these sites and have essentially no riparian vegetation or stream shading. At both sites Sucker Creek is in a “not properly functioning” condition.

Water temperature monitoring in 1999 recorded a warmest 7 day average of 62.1°F upstream of Site 1 and 64.3°F downstream. This provides an indication of the effect of site conditions on stream temperatures. Water temperatures may be affected downstream to Grayback Creek, although this has not been monitored. Water temperatures of 64°F are a 303(d) listing threshold.

The portion of Sucker Creek watershed upstream of Grayback Creek, which includes the project area is a Tier 1 watershed. Approximately 1,330 acres of BLM land is within this Tier 1 watershed. Key

watersheds (Tier 1 and 2) serve as refugia that are crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. They are to receive the highest priority for restoration (pg C-7, NFP).

Coho salmon within the Sucker Creek watershed are part of the Southern OR/Northern CA (SONC) Coho ESU (Evolutionarily Significant Unit), which was listed as threatened on May 6, 1997 (Fed. Reg./Vol. 62, No. 87). Most of the coho in this ESU are in the Rogue River Basin, with the largest remaining population in the Illinois River (Stouder et. al. 1997). Sucker Creek produces 30% or more of the coho in the Illinois River (USDA 1997). Sucker Creek provides habitat designated by the National Marine Fisheries Service (NMFS) as critical to the recovery of the SONC ESU (May 5, 1999 Federal Register notice).

In 1997, the Governor's Salmon Recovery Science Team designated 27 core habitat areas in Southwest Oregon for protection and restoration. Core areas are defined as reaches or watersheds that are judged to be of critical importance to the maintenance of salmon populations that inhabit those basins. Core areas were designated by the State of Oregon to protect and enhance critical habitat and meet federal obligations under the Endangered Species Act (RVCOG 1997a). Sucker Creek is one of these core areas for coho salmon (RVCOG 1997a).

Freshwater anadromous fish habitat conditions are often described in key attributes or habitat indicators, which characterize overall carrying capacity (USDA 1991). These attributes can collectively be used to qualitatively rate the habitats available to anadromous salmonids. The present trend of Habitat Indicators for Sucker Creek is documented in the Southwest Oregon Salmon Restoration Initiative (RVCOG 1997a). For Sucker Creek as a whole, the condition of habitat indicators such as temperature, low flow, large woody debris, and pool frequency are limiting for salmonid production. Indicators such as sediment, riparian quality, and canopy cover indicate that Sucker Creek is “at-risk” relative to salmonid production.

The purpose of the present Sucker Creek Restoration Project is to restore stream processes and aquatic systems, and repair highly degraded fish and riparian habitat at the two heavily mined sites which are now withdrawn from mineral entry.

References

RVCOG. 1997a. Southwest Oregon Salmon Restoration Initiative: A Planning Effort in Support of the Coastal Salmon Recovery Initiative: Phase 1: A Plan to Stabilize the Native Coho Population From Further Decline. Rogue Valley Council of Governments, Box 3275, Central Point Oregon. February 1997.

Stouder, D. J., P. A. Bisson, and R. J. Naiman. eds. 1997. Pacific salmon and their ecosystems, status and future options. Chapman & Hall.

USDA. 1991. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. Edited by William R. Meehan, U.S. Department of Agriculture, Forest Service. American Fisheries Society Special Publication 19. Library of Congress Catalog Card Number: 91-55216.

USDA. 1997. West Fork of the Illinois Watershed Analysis. USDA, Forest Service, Siskiyou National Forest.

C. Project Location

The general location of the proposed project is in T40S,R7W, Section 1 as shown on Map 1: Project Vicinity Map. (All maps are located in Appendix A.) There are two project sites: Site 1, upstream and south; and Site 2, downstream and north.

D. Issues Relevant to the Project

A variety of issues were raised during the initial scoping of this project. These were raised by interested individuals or groups outside of the BLM, by the project planning team, and resource area's Interdisciplinary (ID) team or have been drawn from some of the documents noted above.

For the purposes of this document an "Issue" is defined as something that is *unique* to the project area that may need to be given particular consideration in the design of the project or in the evaluation of environmental consequences. In some cases an issue raised is raised at the onset by the planning team and then eliminated from further consideration because it was not judged something that was within the scope of the project or proposed action(s). These issues are summarized in Appendix B.

The primary issues identified pertinent are:

1. Past mining activity straightened the channel of Sucker Creek in the project area. This and berming of the stream created a non-functioning or partially functioning stream channel and flood plain. Other alterations of the fluvial (flood plain) landscape have created poor fish spawning and rearing habitat and reduced natural connections with cold water sources.

2. There is very little large wood material in the stream. Past mining removed virtually all of the large trees and large wood that would have provided a source of large wood for the stream.

3. Wetlands/ponds resulting from the mining process (Site 1) are currently disconnected from stream and flood plain processes. These isolated water bodies and wetlands have little if any connection with the stream except during high flood periods.

4. Portions of the riparian areas and adjacent uplands are largely denuded of vegetation. The lack of shade has contributed to stream temperatures being elevated above DEQ standards for salmonid fish rearing (64° F). Lack of riparian vegetation also means the absence of habitat for riparian dependent terrestrial plants and animals.

5. Port-Orford cedar (POC) occurs in the project area. An estimated 25% of the trees show signs of being currently infected by *Phytophthora lateralis* (PL).

Chapter 2
Proposed Action and Alternatives

A. Introduction

This chapter describes the proposed action and alternatives that are addressed and analyzed in this EA. The alternative address two separate sites (see map in Appendix A) which are characterized as follows:

Site 1 is composed of a stream channel that has been diverted around the east edge of the gently sloping (2%) flood plain for mining purposes. Dikes or berms are aligned adjacent to the channel to keep high water flowing in the channel though floods commonly flow through the flood plain by passing over the low bank at the stream ford in the upstream part of the site. There are also a few high mounds in the flood plain that are apparently stockpiles from past mining operations. Four ponds/wetlands are located on the downstream end of the site. These were used in the mining operation for trapping sediment. Two of the ponds are full of sediment and two ponds still hold water. The ponds are elevated above the stream surface except during floods.

Site 2 is composed of a stream channel that has been diverted around the west north edge of the near level (1%) flood plain for mining purposes and a new stream channel that formed in the New Years Day Flood of 1997. Dikes and broad berms are aligned adjacent to the mining channel that have failed to restrict high water to the mining channel. Now, the main stream flows in the new channel. The flood plain is widest in the upstream end, but constrained by fill material, footslopes and the point of a dike in the down stream part of the mid-section, and widens at the downstream end of site 2. Braiding of the stream channel has occurred in the mid section and in a small part of the down stream end. Site 2 differs from Site 1 in that at Site 2 Sucker Creek corrected itself in the 1997 flood and reestablished a profile and meander that is more typical of this type of site.

B. Alternative 1: No Action Alternative

In this EA document the "no-action" alternative is defined as not implementing any aspect of the proposed action alternative(s). Defined this way, the no action alternative also serves as a baseline or reference point for evaluating the environmental effects of the action alternatives. Inclusion of this alternative is done without regard to whether or not it is consistent with the Medford District RMP.

It should be pointed out that the no action alternative is not a "static" alternative. Implicit in it is a continuation of the environmental conditions and trends that currently exist or are occurring within the project area. This would include trends such as vegetation succession and consequent wildlife habitat changes, road condition / deterioration, rates of erosion, disease spread, continuation of current road densities, trends in fire hazard changes, OHV use, *etc*.

C. Proposed Action Alternatives

1. Introduction

Two action alternatives are described in this section. Alternative 2, designed by the planning team, is a limited engineering solution aimed at facilitating hydrologic corrections when high water flows

occur. Alternative 3, designed by Cascade Earth Sciences, an independent consulting firm hired by the BLM, is a more intensively engineered solution. Both alternatives similarly address the issues of PL and vegetation establishment and fish habitat enhancement.

The project design features noted in the next section are an integral part of both action alternatives. It is anticipated that implementation of either alternative would be staged over a three year period.

2. Alternative 2

The overall design objectives for this alternative are to reduce the impediments to natural stream and flood plain processes by using limited or minimal engineering and heavy equipment to set the stage for Sucker Creek to reestablish itself and use of the full flood plain; to expedite the reestablishment of riparian reserve vegetation; to implement Port-Orford cedar root disease control strategies; and to do within stream restoration of fish habitat.

a. Hydrologic Function Improvement

1) Objectives

Restore elements of Sucker Creek and associated flood plain areas within the project area to a fully functioning ("proper functioning") condition. Re-establish functional flood plain that will allow stream dynamics to form a more natural stream sinuosity, with structure where appropriate (utilizing boulders and woody debris), creating an effective stream profile without mechanically re-aligning the stream channel.

2) Description

a) Site 1

See Map B1. The existing riparian vegetation (predominately alder, willow and cottonwood) located at the stream edge would be protected from disturbance to the greatest extent possible. Dikes, berms and other unnatural obstructions to flood flows above the bankfull level would be removed. Any material moved would be placed above flood level at base of slope on the west side of the site. The existing beaver channel would be deepened to enhance its value as groundwater-fed rearing habitat for fisheries. Large boulders would be stockpiled at the upper part of site (see Map B1) to be placed in the main channel for instream structures to create flow variations and fish habitat. Work would be done using heavy earth moving equipment such as tractors, front end loaders, excavators and dump trucks.

b) Site 2

Dikes, berms, fill material and other unnatural obstructions to flood flows above the bankfull level would be removed. The point dike at the constrained area would be removed. Any material removed would be placed above flood level adjacent to the old mining channel.

Excavate a new diversion channel through mined material to connect the existing mine channel with the main stream channel. In conjunction with stream-side planting, large woody debris placed in and

over the connection will ultimately provide shade and cover. This will allow cold water to flow into the main channel.

Large boulders would be stockpiled at the upper part of site (see Map B3) to be placed in the main channel for instream structures to create flow variations and fish habitat. Work would be done using heavy earth moving equipment such as tractors, front end loaders, excavators and dump trucks.

b. Within-Stream Restoration / Fisheries Enhancement

1) Objectives

Improve spawning and rearing habitat in the currently over-straightened and minimally shaded stream channel in the project area. Improve spawning and rearing habitat in the off-channel areas. Restore a functioning flood plain. Accelerate the development of riparian reserve vegetation and ultimately late-successional forest.

2) Description

a) Site 1 and 2

Restore a functioning flood plain by removing berms and other artificially elevated surfaces that confine and restrict stream flow pattern (see hydrologic restoration proposals). Enhance rearing habitat in the main Sucker Creek channel and existing off-channel habitat by placing boulders and large woody debris and widening / deepening the off-channel in spots. Create additional off-channel habitat by constructing a connecting channel in the mined material in Site 2. Reconnect the cold water sources to the main Sucker Creek channel to provide high water refuge and rearing habitat for anadromous fish until a more stable stream channel is established through natural adjustment. (See also vegetation treatment proposals.)

Place boulders and stockpiled POC trees for additional in-stream structure to add flow variation and fish habitat. Port-Orford cedar trees will be used as large woody debris and will be placed in the creek using an excavator or tractors and winches. This material would not be anchored in place but would be allowed to shift with water flows. Skidding of any logs or trees would be restricted to existing roads and on gravel bars to the greatest extent possible. Some limited use of tractors or excavator in Sucker Creek may be necessary to properly place or move large wood or boulders.

c. Vegetation Treatments

1) Objectives

Re-vegetate barren areas within the project area with a mix of native hardwood and conifer species consistent with the potential vegetation (plant association) of the site to accelerate the development of stream shading and stream side habitats. Treat Port-Orford cedar to control the potential spread of *Phytophthora lateralis*.

2) Description

a) Sites 1 and 2

(1) Planting

Denuded areas will be planted with a mixture of alder, cottonwood, dogwood, Douglas-fir, incense cedar, Oregon ash, and Ponderosa pine. Planting spacing will be variable with tighter spacing along the stream. Planting will be approximately 700 trees per acre on approximately 4 acres each on sites 1 and 2. Hardwood species will generally be planted closer to the water with the conifers planted upslope. Potential planting sites for large plants may be supplemented with finer material / top soil from elsewhere on the site where overburden was piled during some of the mining operations. Plantings would commence the first fall / winter / spring after earthwork is completed.

(2) *Phytophtora lateralis* control / Port-Orford Cedar sanitation

All infected or at risk Port-Orford Cedar would be killed. At risk cedar are those that (1) are within 3 crown radii of an infected POC tree, or (2) are trees within 3 crown radii of the bankfull width (Rosgen standard) of Sucker Creek, or (3) POC that has a branch overhanging an area deemed to be infested with PL (within 3 crown radii of an infected tree). Trees less than 6" DBH will be slashed, handpiled and burned. Port-Orford cedar less than 1" DBH will be removed by grubbing.

Port-Orford cedar 6"+ DBH will be felled, girdled and left standing, or will be excavated to provide trees with root wads for use in instream enhancement work. Felled trees, and up to 15 trees excavated in Site 1, would be used for large wood additions in the stream. No trees would be excavated in Site 2. Excavated trees will be removed with the root wad intact. Trees would be excavated if all the following criteria are met:

(a) the tree is either already dead or within one crown radii of a dead or infected Port-Orford cedar, and

(b) the excavation occurs at least one crown radii away from any tree other than Port-Orford cedar which has a diameter equal to or greater than the tree being excavated, and

(c) the tree roots do not currently provide undercut stream bank habitat (i.e., partially washed out root system), and

(d) the tree is not within a non-ground disturbance buffer for a Survey and Manage species, and

(e) is determined by the wildlife biologist to be a POC tree that is not immediately adjacent to a large tree suitable for NSO or murrelet nesting; one that contributes effective shade or cover or has interlocking crowns with the potential nest tree.

d. Terrestrial Wildlife Habitat restoration / Enhancement

1) Objectives

Maintain/enhance ponds within the Site 1 of the project area as wetland habitat. Accelerate the development of riparian reserve forest habitat conditions.

2) Description

a) Site 1 and 2

In Site 1, reduce the existing berms to permit inflows of cool, fresh water from Sucker Creek into the ponds while striving to prevent them from being destroyed or adversely impacted by high water. (See also vegetation proposals.)

e. Roads

Equipment access will be provided by an existing BLM road, 40-7-1, that runs from FS 4612 two miles to site 1. There is a mining easement on this road. It is gated at the FS road. The road will have basic maintenance performed over the entire 2.01 miles. This basic maintenance includes blading as well as installing 18" or 24" culverts and constructing water dips were necessary. It is estimated that no more than 3 culverts will be installed and approximately 30 to 40 water dips will be constructed. No major soil disturbances besides the installation of culverts is expected. Road maintenance includes improved drainage through regrading or the placement of additional cross drains (water dips and water bars)and stabilizing the fill slope at MP 0.66.

The existing road on and between Sites 1 and 2 will be decommissioned after final entry in order to bring back surface infiltration and erosion/sedimentation to near normal condition. The existing spur road / river crossing site in Site 1 that fords Sucker Creek will be used as a low water ford to access the northwest side of the stream. A single temporary crossing / low water ford will also be used in Site 2 for access to the northwest side of Sucker Creek.

3. Alternative 3

The overall design objectives for this alternative are (1) to provide a fully engineered site reconfiguration, stream channel maintenance and stream restoration; (2) to expedite the reestablishment of riparian reserve vegetation; (3) to implement Port-Orford Cedar root disease control strategies; and (3) to do within stream restoration of fish habitat.

a. Hydrologic Function Improvement

1) Objectives

Stabilize channel of Sucker Creek within the project area so that the channel will remain in place during most flood events.

2) Description

a) Site 1 and 2

Construct a newly realigned channel that is stabilized by placing hardpoints, dikes, rip rap, and using natural bedrock hard points at critical locations (See Maps C1 and C2). The constructed channel would create greater stream sinuosity, with engineered structures and large woody debris where appropriate creating an effective stream profile. Some existing constraints to flood flow would be removed but other constraints would be added to enhance stability of the channel or containing the creek flow, thus altering the flood plain and its dispersal of energy.

Any material moved would be placed above flood level as in Alternative 2. Large boulders would be stockpiled as in Alternative 2 for subsequent placement in the main channel for instream structures to create flow variations and fish habitat. Work would be done using heavy earth moving equipment such as tractors, front end loaders, excavators and dump trucks.

b. Within-Stream Restoration / Fisheries Enhancement

1) Objectives

Increase winter rearing habitat in the currently over-straightened channel and increase flood plain function and shade in degraded riparian areas. Restore a functioning stream.

2) Description

Within stream structures (trees, rocks) would be placed and located as shown on Maps C1 and C2. Create off-channel winter rearing habitat by excavating a new channel, plugging the heads of existing channel sections, constructing boulder weirs and rock barbs, and installing log deflectors.

c. Vegetation Treatments

1) Objectives

Same as for Alternative 2.

2) Description

Same as for Alternative 2.

d. Terrestrial Wildlife Habitat restoration / Enhancement

1) Objectives

Same as for Alternative 2.

2) Description

Same as for Alternative 2.

e. Roads

Same as Alternative 2.

4. Project Design Features

Project design features (PDFs) are included in the proposed action for the purpose of reducing potential adverse environmental impacts which might stem from the implementation of the proposal. The PDFs noted below would be a part of both of the action alternatives.

a. Vehicle/Equipment Washing (for control of *P. lateralis*)

All vehicles and heavy equipment will be washed before entering the project area and prior to leaving it in accordance with the BLM Port-Orford cedar management guidelines. A designated washing site is shown on Map B1 for use when leaving the project area. Water used at this site will be treated with bleach prior to use.

b. Seasonal Operation Restrictions

Table 1 outlines the seasonal operating restrictions that would apply:

Table 1: Seasonal Operating Restrictions

Location	Restricted Activities	No Operations between:	Reasons / Comments
Sites 1 and 2	*All mechanical ground disturbance*	*9/30 - 8/1 of the following year*	*Restricts activities to periods of low stream flow to minimize sedimentation and erosion, and compaction.*
Site 1 and 2	*All felling, yarding, heavy equipment, power auger, and chainsaw operations*	*3/1 - 6/1 or as late as September 30*	*Sites 1 and 2 are within 0.25 miles of a designated spotted Owl core area. No activities between 3/1 and 9/30 if it is determined that a nest is active or young are present.*

Some variations in these dates would be permitted dependent upon weather, soil moisture, and stream flow conditions.

c. Stream and Riparian Habitat Protection

All mechanical equipment will avoid existing stream banks and associated riparian vegetation wherever possible. For each tree removal, the method chosen for removal, yarding and placement in the stream will be the one which causes the least amount of site disturbance.

Riparian reserve widths would conform with the Standards and Guidelines in the NFP (p. C-30). And the RMP. The project area is within the riparian reserve of Sucker Creek, a Class 1 stream. Reserve width is 300 feet.

d. Botanical Resource Protection

If any Survey and Manage Component 1 or 2 species are found, a no-harvest, no-ground disturbance protection buffer will be implemented around each population. Actual buffer size will be dependent on microsite conditions required to maintain habitat as required by Northwest Forest Plan Management Recommendations.

If federal or state listed, candidate or Bureau Sensitive species are found, a minimum 100-foot radius no-harvest, no-ground disturbance protection buffer will be required. For other Special Status species, a protection buffer will be decided upon on a case-by-case basis, depending on the species' habitat requirements.

For all protection buffers in the POC treatment area, trees will be directionally extracted away from buffer edges. Any infected or at risk POC located within such buffers that meets the criteria for excavation will be girdled instead of excavated.

e. Wildlife Resource Protection

Del Norte salamander habitat will be treated as if it were occupied and protected from ground disturbance. RTV and survey and manage mollusc sites will be buffered per the current management guidelines.

f. Leak and Spill Prevention

Prior to entry in the project area all seals and plugs on earth moving machinery will be carefully inspected for lubricant and hydraulic leaks. Any worn or leaking plug or seal will be replaced and reinspected to assure that equipment does not leak on the work site. A BLM approved spill plan will be prepared for the site / operation. All operators and inspectors will be made aware of the spill plan and how to activate necessary actions in case an accidental spill of petroleum product.

g. Soil Compaction Amelioration

On primary pathways used by heavy equipment for hauling soil materials, the soil will be ripped to a minimum depth of 18 inches.

h. Fire Prevention

Southwest Oregon District Industrial Fire Precaution Levels (IFPL) restrictions and operating requirements for power driven machinery will be followed.

i. Smoke Management

Prescribed burning would be managed in a manner consistent with the requirements of the Oregon Department of Forestry's Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. A prescribed fire plan would be prepared to address burning objectives and operational concerns.

Chapter 3
Environmental Consequences

A. Introduction

Only substantive site specific environmental changes that would result from implementing the proposed action or alternatives are discussed in this chapter. If an ecological component is not discussed, it should be assumed that the resource specialists have considered affects to that component and found the proposed action or alternatives would have minimal or no affects. Similarly, unless addressed specifically, the following were found not to be affected by the proposed action or alternatives: air quality; areas of critical environmental concern (ACEC); cultural or historical resources; Native American religious concerns; prime or unique farmlands; floodplains; endangered, threatened or sensitive plant, animal or fish species; water quality (drinking/ground); wetlands/riparian zones; wild and scenic rivers; and wilderness. In addition, hazardous waste or materials are not directly involved in the proposed action or alternatives.

This project is not located within the Oregon State Coastal Management Zone (CMZ). Unless otherwise noted it has been judged not to have any direct affects on the resources within the management zone nor has it been identified by the State of Oregon's LCDC as a project (by type and geographic location) outside of the CMZ but still needing a consistency review. Thus a consistency determination and review by the State of Oregon LCDC is not needed.

General or "typical" affects from projects similar in nature to the proposed action or alternatives are also described in the EISs and plans this EA is tiered to.

B. Site Specific Beneficial or Adverse Effects of the Alternatives

1. Resource: Soil / Water

a) Affected Environment

This project area is located on Sucker Creek, about a quarter mile upstream from the confluence of Cave Creek and Sucker Creek. Sucker Creek flows from that confluence about 1 1/4 miles to its confluence with Grayback Creek. The project area is located within the Upper Sucker Creek 6th field watershed, a part of the Sucker Creek 5th field watershed (WS). The Sucker Creek WS encompasses approximately 62,100 acres. The Upper Sucker Creek WS includes roughly 40% of this (25,000 acres). BLM and private land comprise less than 15% of the Upper Sucker Creek WS with the remainder administered by the Forest Service.

The Upper Sucker Creek WS is largely characterized by long, very narrow valley bottoms with very steep ridges dissected by tributary streams on each side. Main streams meander in the valley bottoms with class 3 and 4 tributaries flowing off the ridge slopes. Annual precipitation, in the form of rainfall with some snowfall at higher elevations, averages about 60 inches.

Soils in the undisturbed upland areas of the project area are predominately Beekman-Colestine complex (6F) on slopes east of the sites and Speaker-Josephine complex west of sites (SCS, Soil Survey of Josephine County). Beekman is well drained with very gravelly loam surface layers and

subsoil. Colestine is well drained with gravelly loam surface layers over gravelly clay loam subsoil. Beekman and Colestine soils have an effective rooting depth of 20 to 40 inches. Speaker and Josephine soils are well drained with gravelly loam surface layers over gravelly clay loam subsoil. Speaker has an effective rooting depth of 20 to 40 inches and Josephine's effective depth is 40 to 60 inches. All the above upland soils formed in colluvium predominately from altered sedimentary and volcanic. Metamorphic rock is the underlying bedrock.

Soils in the lowland areas are churned alluvium materials.

Currently Sucker Creek below its confluence with Grayback Creek is rated as water quality limited (DEQ 303(d) list) due to high 7 day average maximum summer temperatures of 64°F or greater. This is downstream from the restoration project area. BLM monitored 1999 summer stream temperature in the project area in the upper part of site 1 and near the upper part of site 2. 7-day average maximums were 62.1°F at the upstream site and 64.3°F at the downstream site. This increase through the project area is a reflection of the lack of shade along the stream in the site 1 area.

Upper Sucker Creek is a moderately steep gradient stream with a typical rapid/pool or riffle/pool configuration with moderately low sinuosity. Observed bed material is cobble and boulders in site 1, gravel and cobbles in site 2. The existing stream channel in site 1 is an entrenched mining diversion channel. The existing stream channel in site 2 is a new channel formed in the flood plain after the 1997 New Years Day Flood when a small debris jamb slowed stream velocity into the mining diversion channel causing settling of the bedload. Stream flow then skipped past that point over to the east side of the flood plain. The main source of recent sediment to the stream are landslides associated primarily with forest management practices (ref.: USFS Watershed Analysis).

b) Environmental Consequences

1) Short and Long Term

Table 2 below provides ratings for local soil and hydrologic effects as compared to current condition for the proposed alternatives.

Table 2: Soil and Hydrologic Effects					
6th Field WS	**Term**	**Type of Effect**	**Alt. 1 (No Action)**	**Alt. 2**	**Alt. 3**
Upper Sucker Creek	Short (1-5 yrs)	Disturbance / Erosion	Min.-*	Slight-	Slight-
		Added Compaction	0	Slight+	Min.-
		Productivity	0	Slight+	0
		Sedimentation from access and tractor roads, levy slopes, and other bare surfaces	Slight -*	Slight-	Slight-
		Stream Temperature	0	Min. +	Min. +
	Long (5-20 yrs)	Disturbance / Erosion	Min.-*	0	0
		Compaction	0	Slight+	Min.+
		Productivity	0	Slight+	0
		Sedimentation from access and tractor roads, levy slopes, and other bare surfaces	Mod. -*	0	0
		Stream Temperature	Min. +	Mod. +	Mod. +

Footnote: Effects ratings - (-) = negative effect; (+) = positive effect; (0) = neutral effect
Min. = minimal; very little, limited to few sites;
Slight = little distributed over most affected area or high on local site;
Moderate = mid level distributed over most affected area or very high on local site
*There is a strong likelihood that the existing dikes and berms adjacent to the stream will continue to erode into the stream as the stream continues to undercut the high banks and adjusts its location. This will result in pulses of sediment reaching the stream.

The above effects are considered for the land treatments described in Chapter 2 including related earth movement. It also includes the maintenance that is scheduled on the BLM access road which will occur with or without this project. The road maintenance includes improved drainage, through regrading and additional cross drains (water dips and water bars)and stabilizing fill slope at milepost 0.66.

The above table only compares the current condition with the no action to the projected condition as a result of Alternatives 2 and 3. Currently sediment is reaching the stream from the stream banks extended by dike and berm slopes . This sedimentation will increase on site 1 as Sucker Creek makes geometric adjustments and continues to undercut the levy. Summer stream temperature is currently increasing as Sucker Creek flows through the sites due to exposure to solar radiation (lack of shade).

c) Cumulative Effects

Three indicators are used to reflect the existing conditions which includes the cumulative effects of past activities in the watershed. Table 3 summarizes the condition of each of these.

Table 3: Current WS Conditions (Estimated)				
6th Field WS	% Early Seral vegetation	% Compaction	Road Density (mi/sec)	Comments
Upper Sucker Creek	Mod. (8 to 15%)	Mod.(4 to 8%)	Mod. To High (3 to 6)	85% USFS land

Both % Early Seral vegetation and % Compaction are currently at moderate levels. Levels of both will remain the same (no net increase of either) as a result of the proposed alternatives. This means that:

a) There will be no stream yield increase due to reduction of evapotranspiration rates, and

b) There will be no increased surface flows due to a decrease in infiltration.

Road density is in the moderate to high range. High road density correlates to increased mid peak stream flows and slight reduction in low stream flows. Road densities at the 6th field watershed level will not change as a result of this project.

At the 5th and 6th fields watershed levels, there would be no apparent significant effects (either negative or positive) by this proposed action. There should be a slight improvement in overall stream temperature and sediment load although neither would be measurable at the 5th and 6th field levels.

2. Resource: Fisheries

a. Affected Environment

The portion of Sucker Creek watershed upstream of Grayback Creek, which includes the project area is a Tier 1 / Key watershed. Approximately 1,330 acres of BLM land is within this Tier 1 watershed. Key watersheds serve as refugia that are crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. They have the highest priority for restoration (pg C-7, NFP).

Chinook salmon are present within 2 miles downstream of the project area. Coho salmon and steelhead trout spawn and rear within the project area, and cutthroat trout are present and spawn in nearby smaller streams. Sculpin are found in the project area, and it is likely that Pacific lamprey and Klamath smallscale sucker use the area as well, though detailed information is lacking.

Coho salmon within the Sucker Creek watershed are part of the Southern OR/Northern CA (SONC) Coho ESU (Evolutionarily Significant Unit), which was listed as threatened on May 6, 1997 (Fed. Reg./Vol. 62, No. 87). Most of the coho in this ESU are in the Rogue River Basin, with the largest remaining population in the Illinois River (Stouder et. al. 1997). Sucker Creek produces an estimated 30% or more of the coho in the Illinois River (USDA 1997). Sucker Creek provides habitat designated by the National Marine Fisheries Service (NMFS) as critical to the recovery of the SONC ESU (May 5, 1999 Federal Register notice).

In 1997, the Governor's Salmon Recovery Science Team designated 27 core habitat areas in

Southwest Oregon for protection and restoration. Sucker Creek a core areas for coho salmon (RVCOG 1997a). Core areas are defined as reaches or watersheds that are judged to be of critical importance to the maintenance of salmon populations that inhabit those basins. Core areas were designated by the State of Oregon to protect and enhance critical habitat and meet federal obligations under the Endangered Species Act (RVCOG 1997a).

Freshwater anadromous fish habitat conditions are often described in key attributes or habitat indicators, which characterize overall carrying capacity (USDA 1991). These attributes can collectively be used to qualitatively rate the habitats available to anadromous salmonids. The present trend of Habitat Indicators for Sucker Creek is documented in the Southwest Oregon Salmon Restoration Initiative (RVCOG 1997a). For Sucker Creek as a whole, the condition of habitat indicators such as temperature, low flow, large woody debris, and pool frequency are limiting for salmonid production. Indicators such as sediment, riparian quality, and canopy cover indicate that Sucker Creek is "at-risk" relative to salmonid production.

The two project sites on Sucker Creek have been placer mined for gold for at least the past 120 years. The channel and floodplain are highly disturbed, and the substrate is a mix of eroded and churned alluvial materials. Much of the fines have been lost from the soil and the flood plain is largely denuded of vegetation. At both sites Sucker Creek is in a "not properly functioning" condition.

As noted above, water temperature monitoring in 1999 recorded a warmest 7 day average of 62.1°F upstream of Site 1 and 643°F downstream of the site. This provides an indication of the effect of site conditions on stream temperatures. Water temperatures may be affected downstream to Grayback Creek, although this has not been monitored. Water temperatures of 64°F are a 303(d) listing threshold, and temperatures in excess of 58°F are not optimal for salmonid survival.

b. Environmental consequences

1) Alternative 1: No Action

Under the No Action Alternative, current trends will continue within the project area. Stream temperatures will remain elevated for as long as it takes for riparian vegetation to recover from the effects of mining. Loss of Port-Orford cedar due to root disease will slow the recovery of a shade-producing overstory with diverse structure. The recruitment of large woody debris from the riparian forest will remain inadequate, with the exception of POC. As a result, the pool and channel formation associated with large wood will be limited. The straightened, riffle-dominated channel will continue to limit winter and summer rearing of salmonids. The continued erosion of berms and tailings leftover from mining disturbance will deliver sediment to the stream at levels which are in excess of normal range. Salmonid production and survival would continue to be limited by lack of large woody debris, the associated stream complexity, and summer water temperatures. The loss of shade resulting from POC mortality will have an effect on summer water temperatures as POC currently provide a portion of shade in some parts of the project area. Excessive sediment delivery has the potential to suffocate eggs in the gravels and cause a direct mortality. Additionally, excessive sediment delivery can produce indirect mortality to juvenile fish.

2) Alternative 2: Proposed Action

a) Short term (0 - 5 years)

Alternative 2 will have a short term benefit to salmonids at the project level and sub-watershed (Sucker Creek) scales.

Removing eroding berms and tailings will cause a slight increase in coarse sediment delivery to Sucker Creek which should have no effect on salmonid eggs and juveniles. The risk of direct or latent mortality to juvenile fish from sediment delivery is minimized when compared to the no action alternative. Restoring a connection between the channel and the floodplain will benefit salmonids at greater than the site level because sediment which would have been delivered downstream at excessive rates may be retained onsite longer and released more slowly.

Removing infected Port-Orford cedar trees and placing them instream will directly benefit salmonids on the project level. These trees will provide cover for juvenile salmonids, substrate for the production of invertebrate prey, and a mechanism for the formation of pools and channel complexity. Excavating backwaters, alcoves, and connecting channels will have an immediate and direct beneficial effect on juvenile salmonids. These off-channel areas will provide refuge from high water in winter and access to cooler water in summer. Placing boulders in areas such as the diversion channel in Site 2 and in riffle-dominated segments of the mainstem will increase pool habitat and result in improved rearing habitat.

Any sediment delivery to the stream as a result of equipment crossings, berm removal, POC removal, placement of large woody debris and boulders, and excavation of alcoves is anticipated to cause highly localized, short term impacts at the project level, and no impacts at greater scales (sixth and fifth field). Due to abundant flows in the project area and the predominance of cobble in the substrate, sediment disturbed by the actions listed above will dissipate quickly and any resultant turbidity outside of the project area will be insignificant. The minimal increase of sediment delivery produced from these proposed actions are not expected to appreciably affect the survival or production of salmonids.

The removal of individual infected POC trees and the associated shade could have a short term impact on stream temperatures and thereby an indirect effect on fish. However, it is anticipated that since fewer than 16 trees will be removed, the impact on temperature will be indiscernible from background levels. It is anticipated that the long term beneficial effects will be to restore habitat and improve salmonid survival and production and will far outweigh any impacts during project construction.

These effects are inclusive for direct and indirect adverse and beneficial effects to fish.

Project Design Features are included with the proposed action alternatives to minimize negative impacts to aquatic resources and are the same for both action alternatives. Stream crossings by equipment will be minimized. During the removal of POC and placement of large woody debris, equipment will operate on existing roads and unvegetated gravel areas whenever possible. It may be necessary to operate heavy machinery in the creek when transporting and/or placing instream material but these cases will be limited (see Project Design Features).

b) long term (> 5 years)

The removal of berms and tailings associated with mining disturbance will benefit salmonids directly on the project level and sub-watershed scales through the reduction of sediment delivery to the stream. The short term benefits to salmonids described above from sediment reduction and the restoration of a connection between the channel and the floodplain also apply to the analysis of long term benefits. Juvenile salmonids directly and indirectly benefit from the channel restoration because as the stream channel is reconnected to the floodplain, backwater and side channel areas form and provide rearing habitat. The decommissioning of roads in the project area also provides a long term benefit as precipitation is allowed to infiltrate through the road surface instead of becoming channelized and delivering sediment to the stream.

The removal of all live POC (girdled, felled, excavated) to control root disease should result in a long term benefit to salmonids on both the project level and the sub-watershed scale. The retention of the canopy and shade provided by a healthy POC component will minimize stream temperature elevation, improving conditions associated with higher juvenile survival. Juvenile salmonids also directly benefit from the recruitment of large woody debris that will result from the girdling of POC, the presence of a healthy POC component, and the placement of removed POC trees in the creek as instream habitat. Riparian planting provides a long term indirect benefit to salmonids on the project level and sub-watershed scales as it shades the stream and contributes to lower summer stream temperatures. Overhanging vegetation also provides cover for juvenile salmonids and improves rearing habitat. Improved rearing habitat resulting from lower summer water temperatures and increased pool quality associated with large woody debris would increase the probability for survival of juveniles.

The removal of individual infected POC trees and the associated shade could have a long term impact on stream temperatures and thereby an indirect effect on fish. However, it is anticipated that since fewer than 16 trees will be removed, the impact on temperature will be immeasurable and indiscernible from background levels, even on the project level. It will take more than 5 years for a diverse riparian canopy free of diseased POC to be re-established. The temporary loss of relatively few POC is preferable to the permanent loss of all POC in the infected area and will far outweigh any impacts during the interim. It is anticipated that the long term beneficial effects will be to restore habitat and improve salmonid survival and production.

These effects are inclusive for direct and indirect adverse and beneficial effects to fish.

c) Cumulative

No cumulative adverse effects are anticipated as a result of the proposed actions. Shade reduction associated with POC removal is not anticipated to have an adverse cumulative effect combined with forest management activities upstream because the temperature within the project area will be maintained at current levels during the period of recovery for the POC component.

Cumulative beneficial effects to salmonids on the watershed scale may result from the removal of infected POC within the project area as this will compliment any other root disease control programs that are implemented upstream within the watershed on Forest Service lands. The instream placement of whole POC trees and boulders will increase channel complexity and improve rearing habitat. This may have a beneficial cumulative effect on coho production and survival as

projects on private land lower in the watershed seek to return flows to Sucker Creek through irrigation withdrawal alternatives and to increase off-channel rearing habitat through channel restoration.

2) Alternative 3: Proposed Action

a) Short term (0 - 5 years)

Alternative 3 will result in a short term benefit to salmonids at the project level and sub-watershed (Sucker Creek) scales.

The short term benefits of Alternative 3 are similar to those of Alternative 2. Removing eroding berms and tailings will reduce sediment delivery to the project area and should directly benefit salmonid eggs and juveniles because the risk of egg suffocation will be lower. The risk of direct or latent mortality to juvenile fish from sediment delivery is minimized when compared to the no action alternative. Restoring a connection between the channel and the floodplain will benefit salmonids at greater than the site level because sediment which would have been delivered downstream at excessive rates may be retained onsite longer and released more slowly.

Removing infected Port-Orford cedars and placing them instream will directly benefit salmonids on the project level. These trees will provide cover for juvenile salmonids, substrate for the production of invertebrate prey, and a mechanism for the formation of pools and channel complexity. Excavating new channels and plugging existing ones to create backwaters will have an immediate and direct beneficial effect on juvenile salmonids. These off-channel areas will provide refuge from high water in winter. Some connections to cool water inputs from seeps may maintain cooler mainstem stream temperatures longer into the summer. Placing boulders in segments of the riffle-dominated mainstem will increase pool habitat and result in improved habitat complexity. In contrast to alternative 2, no instream work would take place in the diversion channel in Site 2, which is currently used by almost all of the coho in the project area.

Any sediment delivery to the stream as a result of equipment crossings, berm removal, berm and dike construction, POC removal, placement of large woody debris and boulders, and excavation and plugging of channels is anticipated to cause highly localized, unmeasurable short term impacts at the project level, and no impacts at greater scales (sixth and fifth field). The minimal increase of sediment delivery produced from these proposed actions are not expected to appreciably affect the survival or production of salmonids. In contrast to the previous alternative, Alternative 3 does not rely so heavily on natural processes, but seeks to restore a stable channel and connection to the floodplain via engineered techniques such as channel excavation, berm construction, rip-rap placement, and dike construction. As such, the earthmoving activity in this alternative is much greater than that of alternative 2, and as a result, the short term impacts during construction will be proportionately greater.

The proposed POC removal is the same for both action alternatives. The removal of individual infected POC trees and the associated shade could have a short term impact on stream temperatures and thereby an indirect effect on fish. However, it is anticipated that since very few trees will be removed, the impact on temperature will be immeasurable and indiscernible from background levels. It is anticipated that the long term beneficial effects will be to restore habitat and improve salmonid survival and production and will far outweigh any impacts during project construction.

These effects are inclusive for direct and indirect adverse and beneficial effects to fish.

b) long term (> 5 years)

The long term benefits of Alternative 3 are similar to those of Alternative 2. The removal of berms and tailings associated with mining disturbance will benefit salmonids directly on the project level and sub-watershed scales through the reduction of sediment delivery to the stream. The short term benefits to salmonids described above from sediment reduction and the restoration of a connection between the channel and the floodplain also apply to the analysis of long term benefits. Juvenile salmonids directly and indirectly benefit through channel restoration because as the stream channel is reconnected to the floodplain, backwater and side channel areas form and provide rearing habitat. The decommissioning of roads in the project area also provides a long term benefit as precipitation is allowed to infiltrate through the road surface instead of becoming channelized and delivering sediment to the stream.

As stated above, Alternative 3 does not rely heavily on natural processes, but seeks to restore a stable channel and connection to the floodplain via engineered techniques such as channel excavation, berm construction, rip-rap placement, and dike construction. The long term benefits of the project are dependent on the accuracy of the design and the ability of the constructed channel and floodplain to establish a system which works successfully with the hydrologic regime existing in the watershed. As a result of the inflexibility of this design, long term benefits may be diminished in contrast to the previous alternative where obstructions are removed from the floodplain and channel-forming processes are allowed to proceed.

The removal of POC to control root disease should result in a long term benefit to salmonids on both the project level and the sub-watershed scale. The recovery of the canopy and shade provided by a healthy POC component will reduce stream temperatures, improving conditions associated with higher juvenile survival. Juvenile salmonids also directly benefit from the recruitment of large woody debris that will result from the girdling of POC, the presence of a healthy POC component, and the placement of removed POC trees in the creek as instream habitat. Riparian planting provides a long term indirect benefit to salmonids on the project level and sub-watershed scales as it shades the stream and contributes to lower summer stream temperatures. Overhanging vegetation also provides cover for juvenile salmonids and improves rearing habitat. Improved rearing habitat resulting from lower summer water temperatures and increased pool quality associated with large woody debris would increase the probability for survival of juveniles.

The proposed action concerning POC removal is the same for both action alternatives. The excavation of individual infected POC trees and loss of the associated shade could have a long term impact on stream temperatures and thereby an indirect effect on fish. However, it is anticipated that since very few trees will be excavated, the impact on temperature will be indiscernible from background levels, even on the project level. It will take more than 5 years for a diverse riparian canopy free of diseased POC to be re-established. The retention of a healthy POC component as a result of the proposed additions maximizes the potential to develop large diameter POC which provide long lasting structure to both terrestrial and aquatic systems. It is anticipated that the long term beneficial effects will be to restore habitat and improve salmonid survival and production.

These effects are inclusive for direct and indirect adverse and beneficial effects to fish.

c) Cumulative

No cumulative adverse effects are anticipated as a result of the actions proposed in Alternative 3. Shade reduction associated with POC removal is not anticipated to have an adverse cumulative effect when combined with other forest management activities upstream because the stream temperature within the project area will be maintained at current levels during the period of recovery for the POC component.

Cumulative beneficial effects to salmonids on the watershed scale may result from the removal of infected POC within the project area as this will compliment any other root disease control programs that are implemented upstream within the watershed on Forest Service lands. The instream placement of whole POC trees and boulders will increase channel complexity and improve rearing habitat. This may have a beneficial cumulative effect on coho production and survival as projects on private land lower in the watershed seek to return flows to Sucker Creek through irrigation withdrawal alternatives and to increase off-channel rearing habitat through channel restoration.

3. Resource: Botany

a. Affected Environment

Most of the project area is a highly disturbed alluvial terrace with ponds and wetlands created by mining operations. Undercutting of the creek bank is occurring. Most of the herbaceous layer is non-native, with such species as *Meliolotus alba*, *M. officinalis* (white and yellow clover), *Verbascum blattaria* (moth mullein), *V. thapsus* (woolly mullein), *Verbena lasiostachys*, *Bromus tectorum* (cheatgrass) and *Centauria pratense* (meadow knapweed) dominating. The meadow knapweed, although not listed noxious in the state of Oregon, has the same invasive qualities of spotted knapweed. The tree and shrub layer is mostly native in the project area with such species as *Alnus rubra* (red alder), *Populus trichocarpa* (black cottonwood), *Fraxinus latifolia* (Oregon ash) and *Salix* (willow) species. Himalayan blackberry, an invasive shrub, is also present.

A small portion of the project area with POC treatment is riparian forest with bigleaf maple, Oregon ash, POC, Douglas-fir, tanoak, red alder and canyon live oak. For Site 1 this amounts to approximately 2 to 3 acres at the furthest upstream portion of the project area. In Site 2, a wetland of approximately one acre lies adjacent to the disturbed area (west of the creek) and is dominated by native sedges and red alder.

The disturbed portion of the area is fairly depauperate of lichen and bryophytes species except on the oak trees present. It does not have any fungi habitat. The POC treatment area is high quality habitat for lichens, bryophytes and fungi.

Surveys have been completed for vascular species in Site 1 and are anticipated to be completed for Phase 2 in summer 2001. Lichen and bryophyte surveys have been completed for Site 1 and it is anticipated that they will be completed for Site 2 and the POC treatment area by summer 2001. Fungi surveys will also be completed for the POC treatment area by summer 2001.

b. Environmental Consequences

1) Alternative 1- No Action:

Under the No Action alternative, the botanical resources would remain close to the current condition with non-natives thriving in the disturbed area and a very small native riparian component remaining that could easily be destroyed in a major flood event. In the areas with Port-Orford cedar, loss of POC canopy could change the temperature and humidity regimes causing the sites to become hotter and drier, adversely affecting the current high quality habitat for lichens, bryophytes and fungi.

2) Alternative 2 and 3

Effects on botanical resources would be the same for both action alternatives. Positive effects include the opportunity for native species to be restored to the floodplain. This will reduce the non-native component and reduce the possibility of the spreading of non-natives downstream of the project area under high water conditions.

New disturbance from project construction could have the negative consequence of enhancing the chances for the invasive species, meadow knapweed, to spread more aggressively. This species is known to develop mono-cultures in disturbed agricultural sites and roadsides. Follow-up work, such as pulling the species annually would be required to keep the meadow knapweed from invading the new floodplains created.

Proposed Mitigation Measure #1: Conduct an annual treatment (manual pulling) of the species until the desired vegetation is established.

Effects from the POC treatment will be a reduction in substrate and microsite conditions for non-vascular plants (lichens, bryophytes, fungi) in those areas where the treatment is applied. The Port-Orford cedar treatments would also retain some healthy Port-Orford cedar and the associated high quality habitat for lichen, bryophytes and fungi.

c. Cumulative Effects

Restoration efforts are on a very small scale in the vicinity of the project area. Cumulative effects should be positive if restoration efforts continue.

4. Resource: Vegetation

a. Affected Environment

Due to the past disturbance from mining, it is difficult to tell what plant communities originally existed on them mined portions of sites 1 and 2. However, existing vegetation adjacent to the mined sites (forested portions of Sites 1 and 2) can be used to provide some insight into the potential vegetation for the sites.

On the forested portion of site 1, the plant community is best described as the Port-Orford cedar - Douglas-fir - Alder/Vine Maple-Oregon Grape association. A late seral stand in this type (which occurs here) is characterized by 3 or more layers of trees (canopy) with an overstory of Douglas-fir and Port-Orford cedar, a middle canopy of Douglas-fir and Port-Orford cedar, and an understory of

primarily red alder. Pacific yew, vine maple, hazel, and swordfern also occur in the understory. Until now, this association has only been found on national forest land in California.

The mined portion of Site 2 has two different plant communities adjacent to it. The forested portion of Site 2 is similar to the Port-Orford cedar - Douglas-fir - Alder/Vine Maple-Oregon Grape association described above (west side of the creek). Adjacent to Site 2 is the Tanoak-Douglas-fir-Canyon Live Oak/Dwarf Oregon grape association (east side of the creek). A late seral forest in this association would contain an overstory of Douglas-fir, sugar pine, a middle canopy of Douglas-fir, tanoak, pacific madrone, and canyon live oak and an understory of Douglas-fir, tanoak, dwarf Oregon grape and salal. A blend of these two plant communities would be expected to develop on site 2.

Phytophthora lateralis presence has been confirmed both on the forested area of Site 1 (2-3 acres) and the forested portion of Site 2 (<1 acre). Both sites are currently sparsely vegetated (estimated at less than 25% cover) with small diameter (< 6"DBH) Douglas-fir, ponderosa pine, alder, willow, cottonwood, and dogwood.

b. Environmental Effects

1) Alternative 1: No Action

The mined areas would continue to slowly revegetate over time as seeding from adjacent trees and shrubs occurred. Canopy closure along the creek could take 50 to 100 years. Development of large wood (greater than 24" DBH) of any type could happen rapidly (perhaps within 60 years) as individual trees would be growing far apart (without crowns touching). This would result in few snags being created as there would be little competition (shading) between tree species due to the wide spacing.

A continuing decline of POC populations in the forested areas would be expected. Stands that are currently infected with *P. lateralis* will have the infection continue to spread down stream and possibly up hill through root grafting. These stands will continue to provide a source of spores that could be spread to other uninfested stands. Large, live POC could become a increasingly rare part of the forest. Upper canopy shading by POC, would be removed from plant communities. Habitat quality and diversity will continue to be degraded as the infestations continue.

2) Alternative 2: Proposed Action

a) Short term

Planting the denuded sites will set the area on a trajectory to quickly revegetate the site (perhaps in as little as 5 to 10 years). Root masses would hold the soil in place providing a level of stabilization. Litterfall into the creek from the planted stock will provide a nutrient input into the riparian reserve.

Uninfested forested areas would retain pockets of POC that would be physically separated form *P. lateralis* areas. Discontinuous POC populations have a lower likelihood of becoming infected by root grafting. The POC component of infested sites would be removed either by killing the tree and leaving it or by removing with rootwad intact to be used as structure in the stream channel. The

placement of infested trees in the channel would not have much effect on *Phytophthora* populations as the pathogen would continue to flow through the site from upstream sources outside of the project area. In either event, *P. lateralis* regeneration would be adversely impacted as the pathogen cannot reproduce in the absence of the host species.

The species composition on the site would shift away from the more Port-Orford cedar dominated site that exists today towards a more Douglas-fir and hardwood dominated site. Snag creation by girdling Port-Orford cedar would provide an immediate increase in snags and a subsequent increase in coarse wood as the snags decay over time and fall.

POC sanitation in infested riparian reserves will physically separate healthy POC from the pathogen. While this treatment will exclude POC from along infested streams, upslope POC will remain and contribute to the aquatic ecosystem (*e.g.*, litter fall, CWD, shading).

The washing stations allow for equipment and vehicles to work in POC and *P. lateralis* areas, confine infested and potentially infested soil and reduce potential for the infested soil to be moved to currently uninfested sites.

b) Long Term

After planting, the mined areas could develop a closed canopy in 10 to 15 years (sapling stage). Some stream shading would be achieved at this time. This would set the stage for additional treatments in the future (pre-commercial thinning) to hasten the development of large wood with a variety of species to choose from: both conifers and hardwoods. Those trees that remain after thinning would continue their rapid growth and reach suitable size for the desired coarse wood component (standing snags and coarse wood in the stream channel) more quickly.

Effects over the long term include retention of large POC as a viable functioning part of both terrestrial and riparian ecosystems. Treatments would accelerate the development of mature/late-successional habitat where it is currently lacking.

5. Resource: Wildlife

a. Affected Environment

The project area includes two distinct sites, Site 1 and Site 2. They are both located on the Sucker Creek stream channel, but are separated by a distance of approximately 1,000 feet. The project area includes 300 feet on either side of Sucker Creek (i.e., the riparian reserve) and any additional areas of past mining disturbance beginning approximately 500 feet upstream from Site 1.

At both Site 1 and Site 2, past mining activities have altered stream flows and flood patterns. When the stream channel was diverted for mining purposes, a broad flat disturbed area largely devoid of vegetation resulted. Additionally, Site 1 has four ponds/wetlands located on the downstream end of the site. These ponds are elevated above the stream surface except during floods.

Vegetation on the disturbed areas includes scattered shrubs and a wide range of non-natives including white and yellow clover, moth mullein, wooly mullein, cheatgrass and meadow

knapweed. Outside of the disturbed areas, there is well established riparian vegetation. The tree and shrub layer is mostly native and includes such species as red alder, black cottonwood, Oregon ash, willow species, Douglas fir and Port-Orford cedar.

The portion of the project with proposed POC treatment is riparian forest with bigleaf maple, Oregon ash, POC, Douglas-fir, tanoak, red alder and canyon live oak. This terrestrial habitat is entirely within the riparian reserve. The highly disturbed alluvial terrace supports trees and shrubs such as red alder, black cottonwood, Oregon ash, willow species and Himalayan blackberry. Because distribution of vegetation on this alluvial terrace is not well distributed, there are large openings devoid of vegetation.

1) Threatened and Endangered Species

The spotted owl is the only threatened wildlife species known to occur in the immediate vicinity of project area. The project area is adjacent to the Tiger Springs designated owl core. Surveys for the 2000 breeding season indicate that this core is currently occupied by a non-nesting pair. Previous surveys have been erratic, but do indicate that the territory has been reproductively active in past years.

Marbled murrelets are small, secretive sea birds that use large old growth trees for nesting. Suitable nesting habitat requires large limbs (six inches or greater in diameter) that are moss covered or provide some platform for a nest. Currently, the U.S. Fish and Wildlife Service (USFWS) considers any old growth conifer habitat within fifty miles of the coast as suitable habitat. The project area is within marbled murrelet Zone 2/Area D. The project area was surveyed for marbled murrelets in 1994. There were no marbled murrelet detections as a result of these surveys. However, all of the mature forest in the project area is suitable nesting habitat for marbled murrelets; the disturbed area is not.

2) Survey and Manage Species

Survey and manage species habitat occurring within the forested portions of the project area includes Del Norte salamanders, red tree voles and survey and manage molluscs. The disturbed areas do not provide suitable habitat for these S&M species.

Del Norte salamanders live in areas of coniferous or deciduous forests with logs or talus outcrops. Juveniles and adults live in moist talus or fractured rock outcrops, or in partially decayed logs (most commonly shaded by old-growth conifers or on north-facing slopes). Talus areas must possess complexity and depth sufficient to provide the interstitial spaces required by Del Norte salamanders. Surveys in the vicinity of the project area documented the occurrence of suitable talus and Del Norte salamanders.

There is potential red tree vole habitat in the forested portions of the project area. Carey (1991) identifies optimal habitat for red tree voles to be old-growth Douglas-fir forests. Although they have been found in younger forests, they most often are associated with the large, live, old-growth trees found in older forests (Aubry et al. 1991). They depend on conifer tree canopies for nesting, foraging, travel routes, escape cover, and moisture (Carey 1991). Douglas- fir needles provide the primary food and building materials for the nests. Red tree vole nests tend to be clumped in their distribution on the landscape and may range from areas with 30 or more nests in a stand down to

single isolated nest tree. There are potentially suitable nest trees in the project area.

Survey and manage molluscs with potentially suitable habitat in the project area include papillose tail-dropper (*Prophysaon dubium)* and blue-gray tail-dropper (*Prophysaon coeruleum)*. The blue-gray tail dropper is found in a wide range of moist and mixed conifer forests, including POC. It is usually located in sites with relatively higher shade and moisture levels than those of the general forest habitat. It is typically found in moist plant communities, such as big-leaf maple and sword fern. The papillose tail-dropper is strongly associated with hardwood logs and leaf litter. It has been found in sites that are similar to, but somewhat more exposed than those described for the blue-gray tail-dropper. Incidental observations include one blue-gray tail dropper.

b. Environmental Consequences

1) Alternative 1 (No Action)

Under Alternative 1, general impacts to habitat would include the following: 1) increased POC mortality (particularly in the larger trees). Gaps would be created and in some areas, unchecked POC mortality could result in up to an estimated 60% reduction of canopy closure depending on the amount of Port-Orford cedar present. The more Port-Orford cedar present, the greater the potential for canopy loss due to root disease. On the disturbed portions of Sites 1 and 2, the establishment of vegetation will be erratic and large areas will remain unvegetated.

a) Threatened and Endangered Species

For spotted owls, POC mortality would create snags suitable for perching opportunities. However, because snag densities within the area proposed for POC treatment are likely to meet or exceed RMP target levels, the value of additional snags within the area proposed for POC treatment may be reduced. The opportunity for POC snags to provide suitable nesting opportunities is negligible. In general, neither live or dead POC are utilized by spotted owls for nesting in the Siskiyous. POC snags would contribute to the dead and down component of the forest stand. Woody debris provides habitat for small mammals, an important prey item for spotted owls.

At the same time, if a significant portion of the POC along the stream in the project area is killed due to *Phytopthora lateralis*, this could result in decreased canopy closure and reduced habitat suitability for spotted owls. Suitable nesting, roosting and foraging spotted owl habitat is generally described as having canopy closure greater than 60% and with room to fly under the canopy (at least 15 feet).

Based upon the current distribution of POC in the project area, the anticipated POC mortality would result in canopy gaps and in some areas, could result in canopy closures below preferred habitat levels of 60%. Overall reductions in canopy closure would result in impacts to suitable spotted owl foraging and nesting habitat. In some cases, POC may be providing cover or shade for adjacent trees that are suitable for spotted owl nesting. Where this occurs, mortality would result in lost cover or shade important to potential spotted owl nest trees. The current trend and trajectory of POC mortality will result in reduced suitability of spotted owl habitat.

For marbled murrelets, potential POC mortality includes impacts similar to what might be

experienced for the spotted owl. Where mortality of POC results in canopy closure less than 60%, overall suitability of the habitat for marbled murrelet would be impacted. In some cases, POC may be providing cover or shade for adjacent trees that are potentially suitable for marbled murrelet nesting. Where this occurs, mortality would result in lost cover or shade important to marbled murrelet nest trees. The current trend and trajectory of POC mortality will result in reduced suitability of murrelet habitat.

b) Survey and Manage Species

For Del Norte salamanders, the anticipated POC mortality would result in canopy gaps and reductions of canopy closure. The majority of suitable habitat for Del Norte salamanders occurs outside of areas where POC is present. This reduces the level of potential impacts to Del Norte salamanders. POC snags that fall where suitable talus occurs would contribute to the woody debris component of the forest stand and enhance Del Norte salamander habitat.

For red-tree voles, the anticipated POC mortality would result in canopy gaps and reductions of canopy closure. Although red-tree voles typically utilize Douglas-fir trees as a food source and for nesting, the loss of POC in the project area may affect the suitability of the site as red-tree vole habitat. Reductions in canopy closure increase the risk of predation and the risk of nests to be damaged or lost during high wind events.

For survey and manage molluscs, the anticipated POC mortality would result in canopy gaps and reductions of canopy closure. Land snails are particularly vulnerable to changes in the micro climate because they cannot tolerate extremely dry conditions, have restricted ranges and are slow to disperse. Where reduced canopy closure results in excessive temperatures and low humidity, survey and manage mollusc habitat would be lost. In general, canopy cover less than 50% ($\pm$ 10%) is considered outside of what is recommended for survey and manage molluscs. Although POC snags that fall would contribute to the woody debris component of the forest stand and enhance survey and manage mollusc habitat, this would not likely be enough to offset the loss of overhead canopy.

2) Alternatives 2 and 3

Both Alternatives 2 and 3 include sanitation efforts. This sanitation could reduce the amount of POC mortality in the project area from that which would otherwise occur. However, sanitation can only reduce overall POC mortality and will not eliminate the loss of currently infected POC. With sanitation efforts implemented, there will still be resulting canopy gaps and a reduction in the amount of canopy closure.

In general, Alternatives 2 and 3 would result in reduced mortality. It would provide for potential excavation of up to 15 POC greater than 6" DBH which would be placed in the new stream channel to provide a long lasting coarse wood component. Sanitation through girdling would not create ground disturbance and allows for dead POC to remain on site as snags or down woody material. Wildlife values will essentially be the same whether the tree dies from girdling or from *Phytopthora lateralis*.

From the perspective of threatened/endangered and survey and manage habitat, the primary difference between the No Action Alternative and Alternatives 2 and 3 would be that sanitation

could potentially reduce the overall amount of POC mortality. Additionally, excavation and felling efforts could result in ground disturbance and remove from the stand POC that could potentially provide perching and nesting opportunities or habitat as down woody material.

For the threatened and endangered and survey and manage species considered likely occupants of the project area, they are not strongly associated with shrubby and small diameter riparian vegetation. The establishment of a well vegetated flood plain most likely represents a potential benefit to neotropical migrants, bats, and other species strongly associated with shrubby and small diameter riparian vegetation.

a) Threatened and Endangered Species

(1) Spotted Owl

If girdling reduces the amount of potential POC mortality and minimizes canopy gaps and reductions of canopy closure, this would be beneficial to spotted owl habitat. For spotted owls, girdling of POC will allow for dead trees to remain on site for perching opportunities. However, because snag densities within the area proposed for POC treatment are likely to meet or exceed RMP target levels, the value of additional POC snags may not be great.

The opportunity for POC snags to provide suitable nesting opportunities is negligible. In general, neither live or dead POC are utilized by spotted owls for nesting in the Siskiyous. POC snags would, however, contribute to the dead and down component of the forest stand. Woody debris provides habitat for small mammals, an important prey item for spotted owls.

Excavation or felling which removes POC, eliminates the opportunity for these trees to provide perching opportunities. Additionally, in some cases, POC may be providing cover or shade for adjacent trees that are potentially suitable for spotted owl nesting. Where this occurs, mortality may reduce cover or shade important to spotted owl nest trees. Excavation that removes these POC from the site would completely eliminate their ability to provide any shade or cover. To avoid this potential impact, POC immediately adjacent to large trees with branches and platforms suitable for nest structures will not be removed.

Project implementation will result in temporary disturbance associated with the operation of equipment on site. The disturbance would be short in duration, but would occur in short intervals over multiple years. The seasonal operating restrictions will minimize potential adverse impacts to reproductive success.

Alternatives 2 and 3 are likely to degrade 1-2 acres of suitable spotted owl habitat in the project area. There is no anticipated removal of suitable spotted owl habitat and reconsultation is not necessary.

It is anticipated that the proposed sanitation included in Alternatives 2 and 3 will minimize the adverse impacts associated with projected POC mortality. By reducing the number of trees potentially infected with *Phytophtora lateralis*, sanitation could provide long term benefits to the spotted owl habitat.

Proposed excavation would degrade suitable spotted owl habitat. Degradation of suitable habitat is

addressed in the programmatic BO and reinitiation of consultation with the USFWS is not required.

(2) Marbled Murrelet

If girdling reduces the amount of potential POC mortality and minimizes canopy gaps and reductions of canopy closure, this would be beneficial to marbled murrelet habitat. Snag recruitment in the stand will not benefit marbled murrelets.

In some cases, POC may be providing cover or shade for adjacent trees that are potentially suitable for marbled murrelet nesting. Where this occurs, mortality may reduce cover or shade important to marbled murrelet nest trees. Excavation or felling that removes these POC from the site would completely eliminate their ability to provide any shade or cover. However, these trees are precluded from being cut.

Project implementation will result in temporary disturbance associated with the operation of equipment on site. The disturbance would be short in duration, but would occur in short intervals over multiple years. This minimize potential impacts to reproductive success. No seasonal or daily restrictions are required for marbled murrelets in Zone 2.

Alternatives 2 and 3 are likely to degrade, but not remove, 1-2 acres of suitable marbled murrelet habitat. Degradation of suitable habitat is addressed in the programmatic BO and reinitiation of consultation with the USFWS is not required.

b) Survey and Manage Species

The majority of suitable Del Norte salamander habitat occurs outside of areas where POC is present. Where Del Norte salamander habitat occurs and POC is present, girdling would reduce the amount of potential POC mortality and minimize canopy gaps and reductions of canopy closure. Where reduced canopy closure results in excessive temperatures and low humidity, Del Norte salamander habitat would be lost. Where suitable talus is present, no excavation would be permitted therefore, the species would not be impacted. POC snags that fall where suitable talus occurs, would contribute to the woody debris component of the forest stand and enhance Del Norte salamander habitat. Sanitation treatments that reduce POC mortality in areas of suitable habitat would reduce the impact of the current mortality trend (no action).

For survey and manage molluscs, the anticipated POC mortality would result in canopy gaps and reductions of canopy closure. Where reduced canopy closure results in excessive temperatures and low humidity, survey and manage mollusc habitat would be lost. In general, canopy cover less than 50% ($\pm$ 10%) is considered outside of what is recommended for survey and manage molluscs. Land snails are particularly vulnerable to changes in the micro climate because they cannot tolerate extremely dry conditions, have restricted ranges and are slow to disperse. Girdling would reduce the amount of potential POC mortality and minimize canopy gaps and reductions of canopy closure. Although POC snags that fall would contribute to the woody debris component of the forest stand and enhance survey and manage mollusc habitat, this would not likely be enough to offset the loss of overhead canopy. Sanitation treatments that reduce POC mortality in areas of suitable habitat would reduce the impact of the current mortality trend (no action).

For red-tree voles, the anticipated POC mortality would result in canopy gaps and reductions of canopy closure. Although red-tree voles typically utilize Douglas-fir as a food source and for

nesting, the loss of POC in the project area may affect the suitability of the site as red-tree vole habitat. Reductions in canopy closure increase the risk of predation and the risk of nests to be damaged or lost during high wind events. Excavation, felling or girdling of POC are not likely to contribute to habitat changes outside of those already incurred from the current and anticipated POC mortality.

Aubry, K.B., M.J. Crites, and S.D. West. 1991. Regional patterns of small mammal abundance and community composition of Oregon and Washington, Pages 285-94 *In* L.F. Ruggiero, K.B. Aubry, A.B. Carey, and M.H. Huff, tech.. coords. Wildlife and vegetation of unmanaged Douglas fir forests. USDA For. Serv. Gen. Tech. Rep. PNW-285. Portland, OR.

Carey, A.B. 1991. The biology of arboreal rodents in Douglas fir forest. Gen. Tech. Report GTR-276. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 46 p. (Huff, Mark H.; Holthausen, Richard. S.; and Aubry, Keith B., tech. coords. Biology and management of old growth forests.)

Johnson, M.L. and S.B. George. 1991. Species limits within the *Arborimus longicaudus* species complex (*Mammalia:Rodentia*) with a description of a new species in California. Contributions in Science #429. Natural History Museum of Los Angeles County. 15pp.

Manning, Tom and Chris C. Maguire. 1999. A new elevation record for the red tree vole in Oregon: implications for National Forest Management. Amer. Mid. Nat. 142: 421-423.

6. Resource: Fire and Fuels

a. Affected Environment

Hazard is defined as the existence of a fuel complex that constitutes a threat of wildfire ignition, unacceptable fire behavior and severity, or suppression difficulty. *Risk* is the source of ignition be it human or lightening.

The project area is currently characterized by a low level of both risk and hazard due to the low levels of vegetation and restricted access to the site.

b. Environmental Consequences

Removal and slashing of Port-Orford cedar trees will have no appreciable impact on current or future fuel hazard. Size and scope of the proposal does not create significant amounts of down fuel to have any impacts on current fuel hazard or to alter future trends of fuel hazard build-up. Wildfire risk associated with mechanical equipment use will be minimal due to site location. Increased snag densities resulting either from girdling or root disease could increase the potential for spotting in the event a wildfire occurs at the site.

Fuel hazard (slash) increase created by this project would have little to no impact on the landscape, watershed, or sub-watershed levels. This is due to the low amount of slash created and minimal amount of burning needed to remove the slash placed in hand piles. Slash created by this project would have the potential to increase the immediate hazard in the general project area. This increase should be minimal and of short duration due to the location, and extent of the slash created from the proposed actions.

7. Resource: Recreation/Cultural/VRM

a. Affected Environment

The proposed project is in an area that is not known to be heavily used for recreation. The access road to the site is gated, so the only access to the site is by hiking. Recreation opportunities include fishing and hiking. The project is in a VRM Class III zone. Objectives therefore include "partially retaining the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer." (BLM Manual 8431-1, 1986)

The area has been mined extensively in the past and there is intact evidence of mining activity at the site. There are two recorded cultural sites within Site 2 and three sites adjacent to sites 1 and 2.

b. Environmental effects

1) Alternative 1: No Action

In the no action alternative, the site would continue to receive light to no recreation use. There would be no change to the visual resource. There would be no impact to the cultural sites. User impacts would be dispersed throughout the area.

2) Alternatives 2 and 3

Effects of the action alternatives would include increased potential for recreational activities, especially fishing, in the area. Increased opportunities could increase the demand to access the site by vehicle. However, this would be a minimal effect, as the site is well away from a population center. Even though the site would be visible from BLM road 40-7-1, VRM objectives would continue to be met.

None of the identified cultural sites would be affected by the proposed actions.

Chapter 3
Agencies and Persons Consulted / Comment Procedures

A. Public Involvement / Agencies Consulted

All public input was considered by the planning and ID teams in developing the proposal and alternatives and in preparing this EA. Changes in the preliminary plan, as well as the proposed project design features, may be based, in part, on information received from the public.

The project and elements of project design were discussed with representatives of the Forest Service, US Fish and Wildlife Service (Brendon White), Oregon Department of Forestry (Dave Haight), West Fork Illinois River Watershed Council, Southwest Oregon Forest Insect and Disease Service Center (Don Goheen).

B. Availability of Document and Comment Procedures

Copies of the EA document will be available for formal public review in the BLM Medford District Office. Written comments concerning the EA will be accepted for 21 calendar days after the announcement of the EA availability appears in the Grants Pass Daily Courier newspaper.

Appendix A: Project Maps

Map 1
Project Location Map

Map 2
Site Map

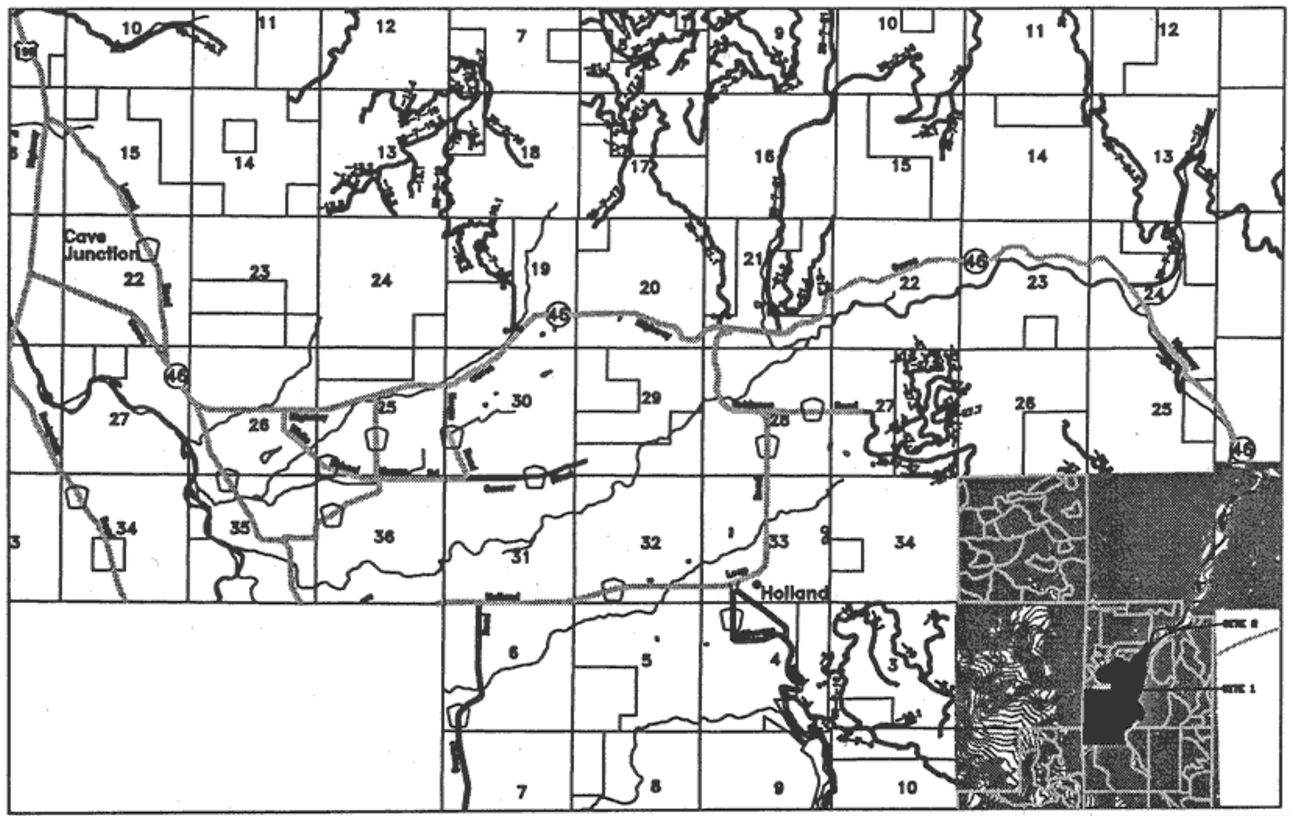
Maps B1, B2, B3, and B4
Alternative 2: PROPOSED ACTION

Map C1 and C2
Alternative 3: PROPOSED ACTION

Sucker Creek Restoration Map

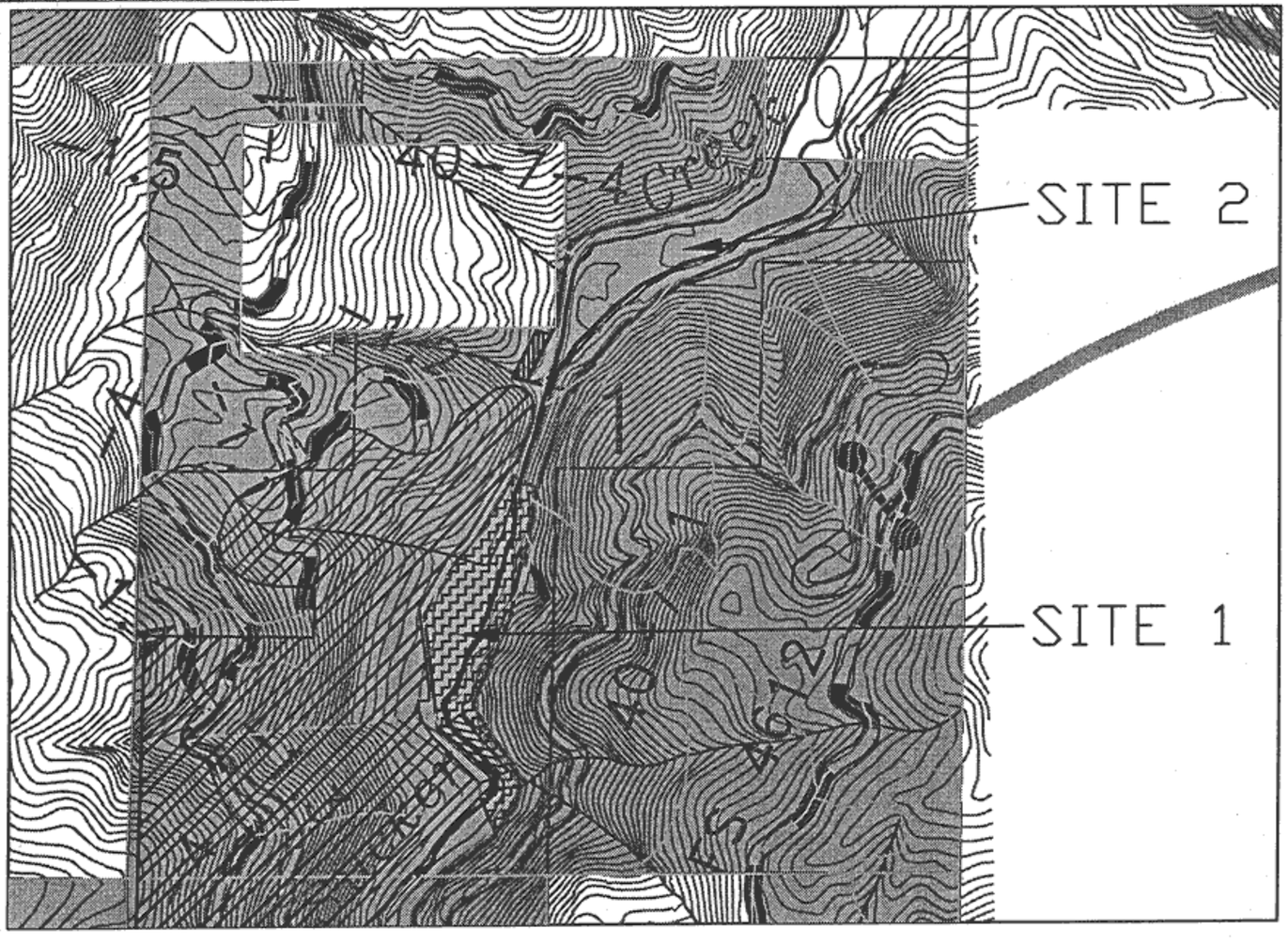
MAP 1

T40S R7W Section 1



Location map

Enlarged planning area



Legend

- Project Area
- BLM lands
- Forested Area
- Owl Core Area
- Streams
- Sucker Creek

1000 500 0 1000 2000 3000 4000

SCALE IN FEET

36

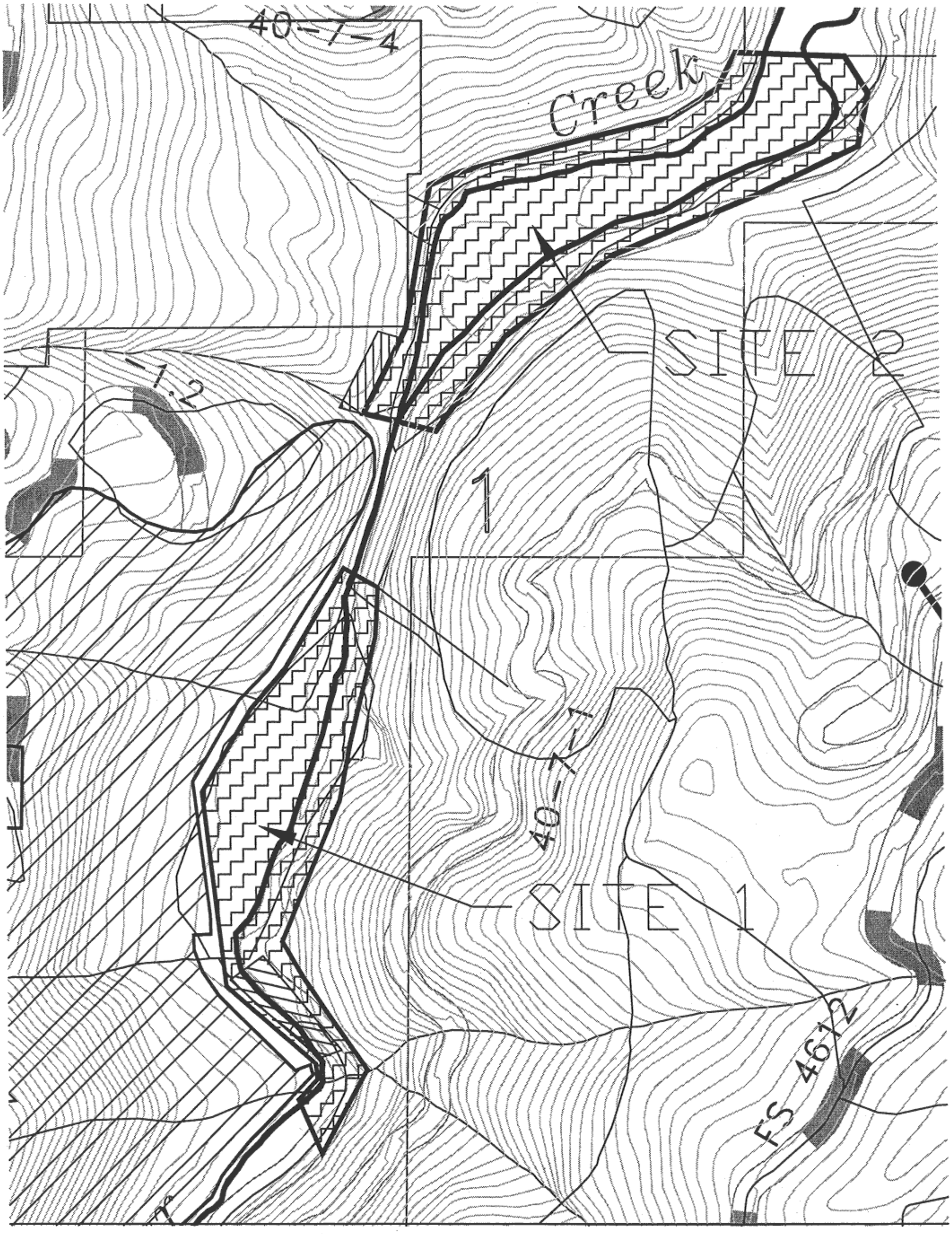
SUCKER CREEK RESTORATION
SITE MAP MAP 2

Project Area

Forested Area

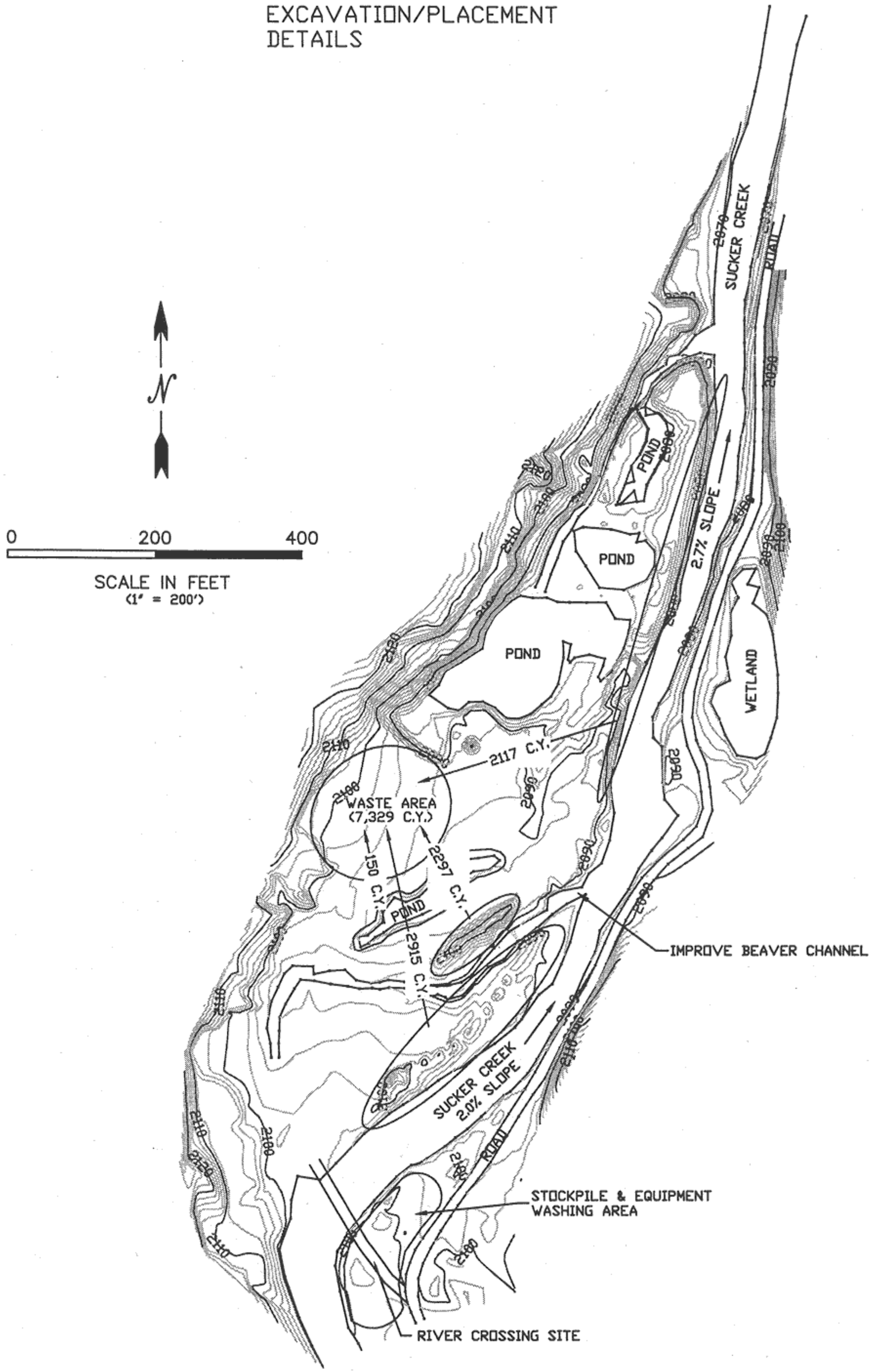
T40S R7W Sec. 1

Owl Core Area



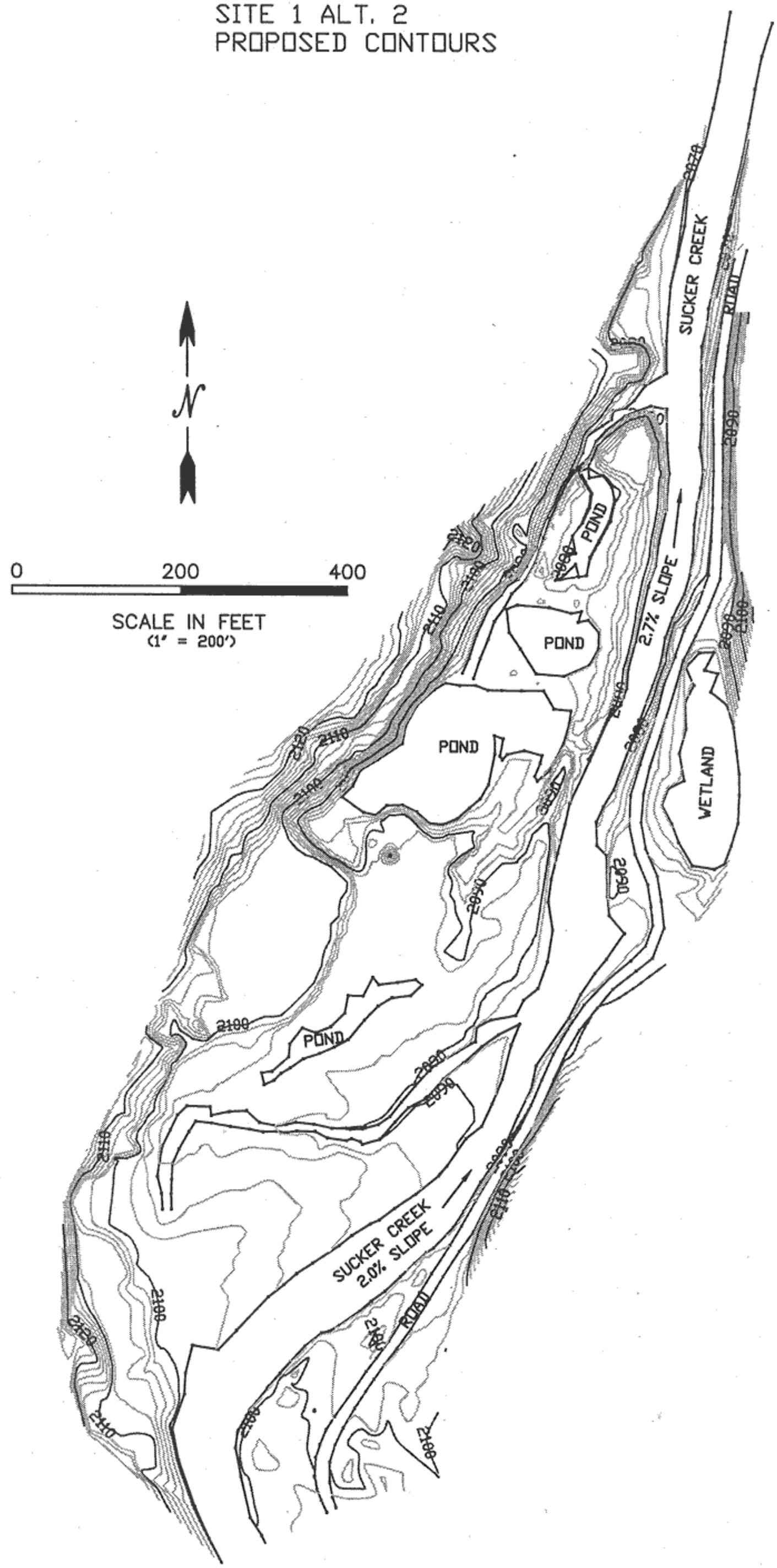
MAP B1

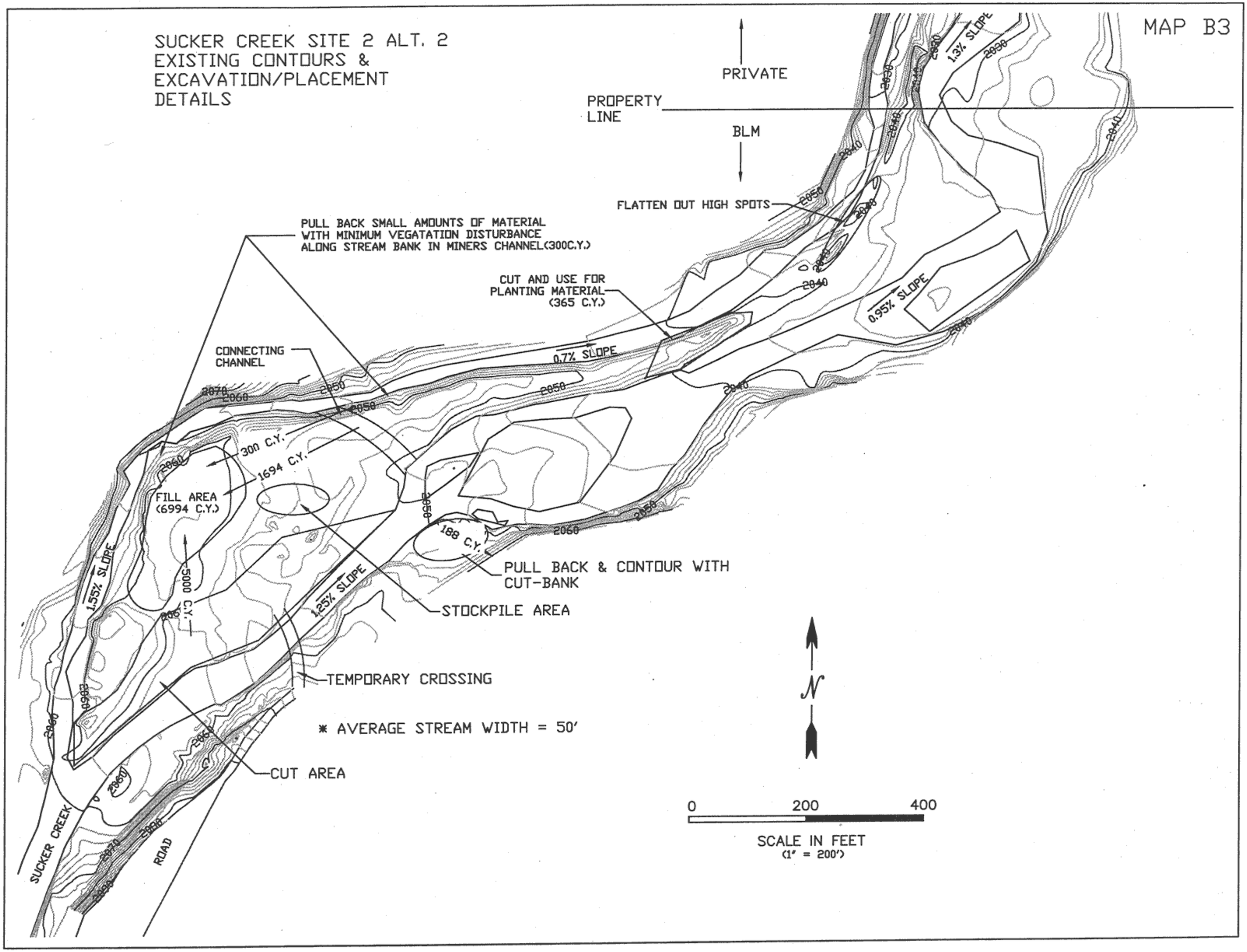
SUCKER CREEK SITE 1 ALT. 2
EXISTING CONTOURS &
EXCAVATION/PLACEMENT
DETAILS

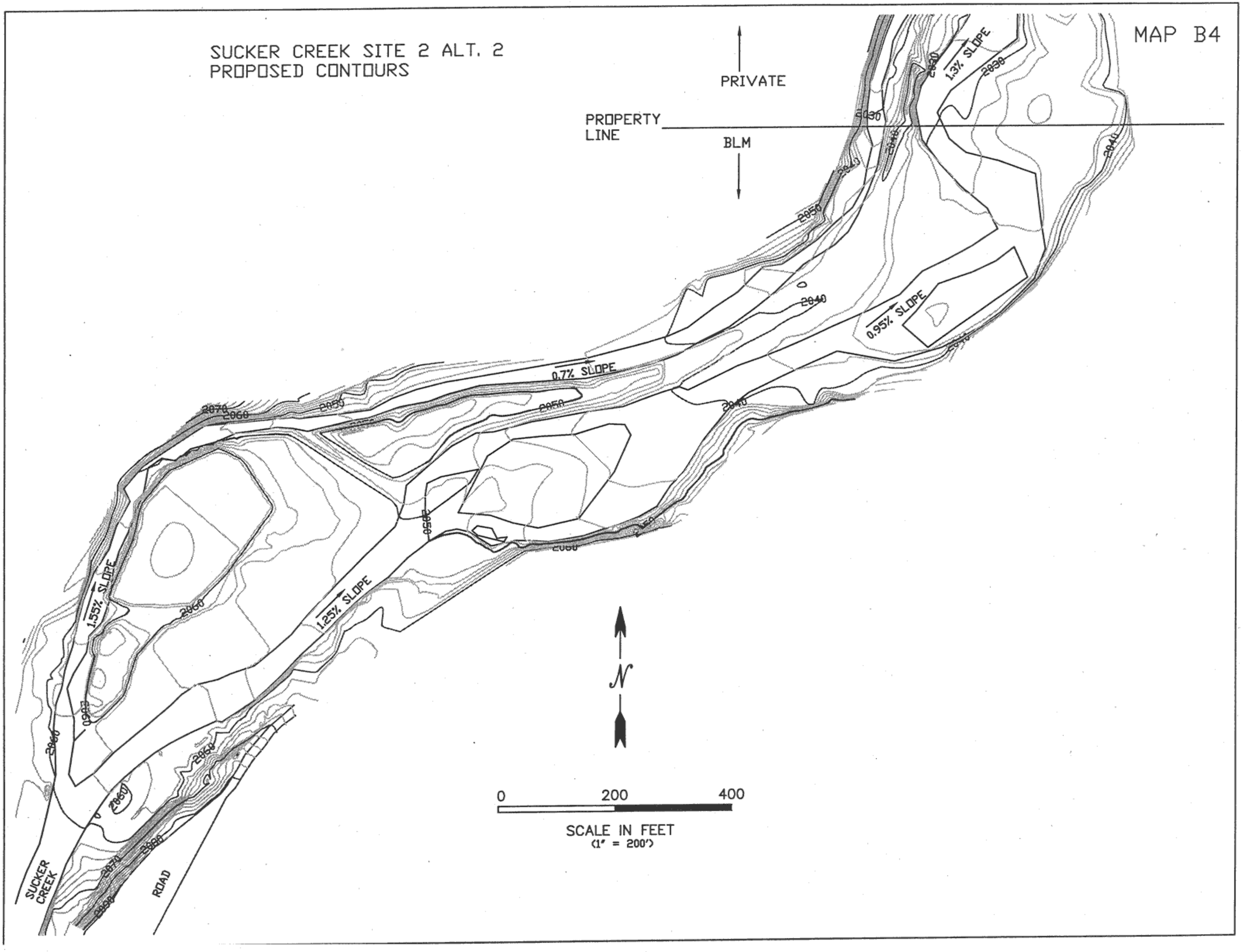


MAP B2

SUCKER CREEK
SITE 1 ALT. 2
PROPOSED CONTOURS

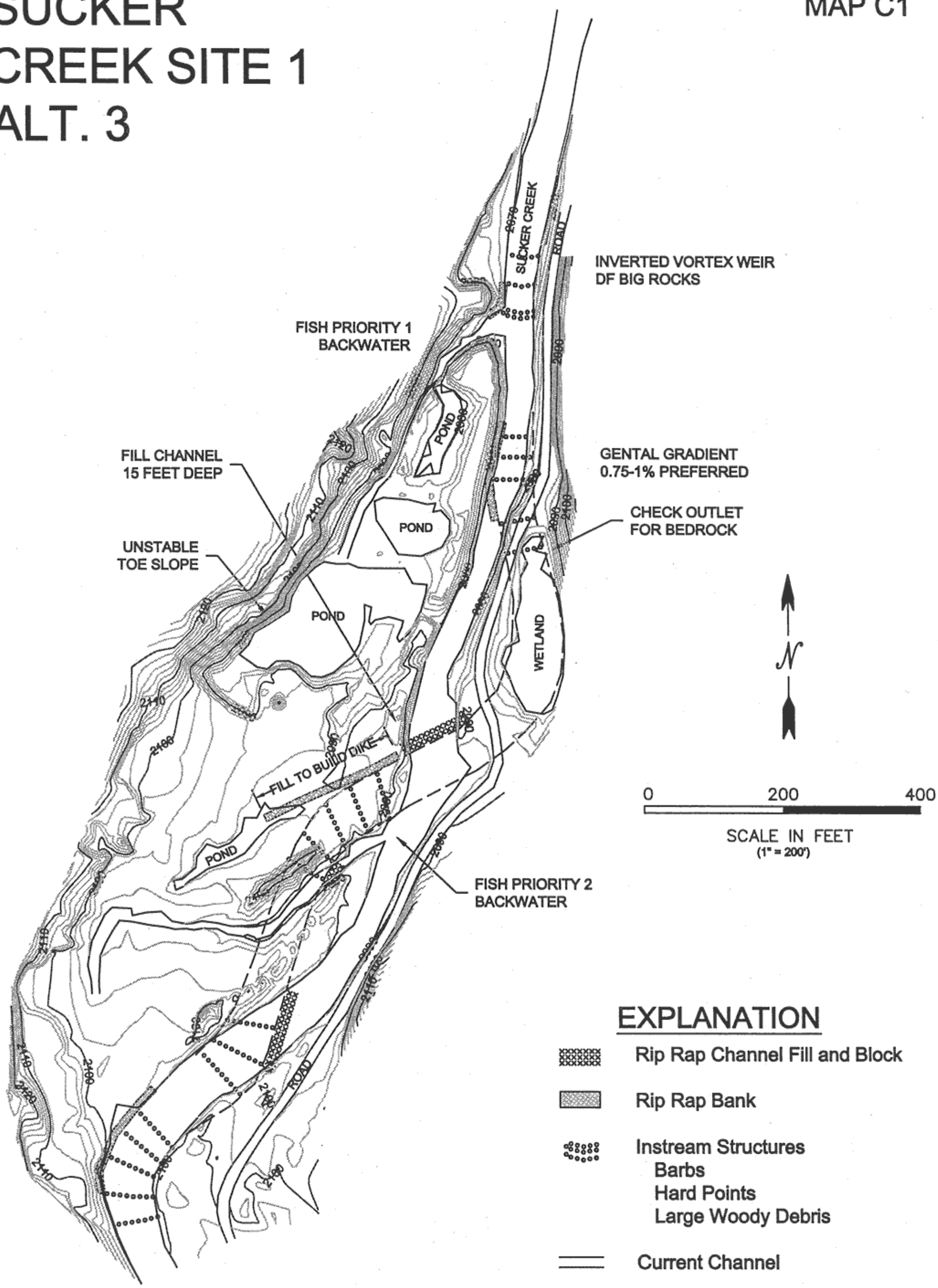



SUCKER CREEK SITE 2 ALT. 2
EXISTING CONTOURS &
EXCAVATION/PLACEMENT
DETAILS
MAP B3
PRIVATE
PROPERTY LINE
BLM
FLATTEN OUT HIGH SPOTS
PULL BACK SMALL AMOUNTS OF MATERIAL WITH MINIMUM VEGATATION DISTURBANCE ALONG STREAM BANK IN MINERS CHANNEL(300C.Y.)
CUT AND USE FOR PLANTING MATERIAL (365 C.Y.)
CONNECTING CHANNEL
0.7% SLOPE
0.95% SLOPE
1.3% SLOPE
300 C.Y.
1694 C.Y.
FILL AREA (6994 C.Y.)
5000 C.Y.
188 C.Y.
PULL BACK & CONTOUR WITH CUT-BANK
STOCKPILE AREA
1.55% SLOPE
1.25% SLOPE
TEMPORARY CROSSING
* AVERAGE STREAM WIDTH = 50'
CUT AREA
SUCKER CREEK
ROAD
N
0
200
400
SCALE IN FEET
(1" = 200')


SUCKER CREEK SITE 2 ALT. 2
PROPOSED CONTOURS
MAP B4
PRIVATE
PROPERTY LINE
BLM
1.3% SLOPE
0.95% SLOPE
0.7% SLOPE
1.25% SLOPE
1.55% SLOPE
2030
2040
2050
2060
2070
2080
SUCKER CREEK
ROAD
N
0
200
400
SCALE IN FEET
(1" = 200')

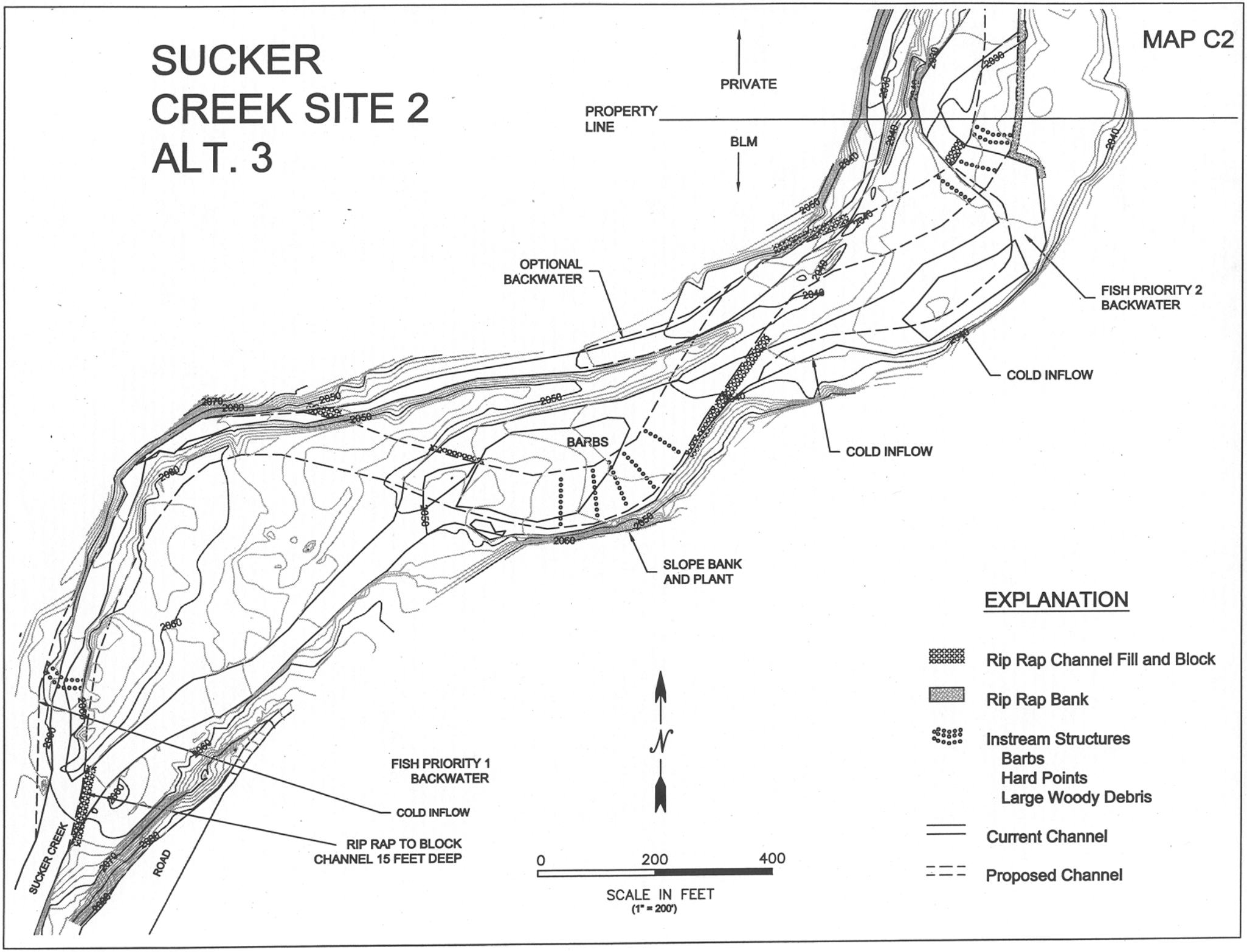
SUCKER CREEK SITE 1 ALT. 3

MAP C1



SUCKER CREEK SITE 2 ALT. 3

MAP C2



Appendix B: Issues and Alternatives Considered but Eliminated

1. An initial issue was that the old mine sites might have important cultural significance. A cultural survey and assessment concluded that the sites did not have great significance and that mining, while it has occurred on the sites for a long time, was also very active in rather recent times.

2. An initial issue was that the hazardous materials from the mining work may exist in the sediments on the site. Sediment sampling and testing did not indicate that there were significant amounts of hazardous materials on the site.

3. Equipment access will be provided by an existing BLM road, 40-7-1, that runs from FS 4612 two miles to site 1. Closure and decommissioning of this road was considered but eliminated because the road is encumbered by an easement providing access to a mining site.

Appendix C: Aquatic Conservation Strategy Objectives - Consistency Evaluation

The proposed actions are in compliance with the Aquatic Conservation Strategy (ACS) and will promote all nine of the ACS objectives specifically:

ACS 1: Channel restoration improves the diversity and complexity of watershed and landscape-scale features, protecting aquatic systems to which salmonid populations are adapted.

ACS 2: The proposed project restores connectivity between the stream and floodplain and provides unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

ACS 3: Removal of berms and tailings from mining disturbance restores the physical integrity of the site by allowing channel-forming processes to proceed naturally.

ACS 4: The proposed action restores water quality by re-establishing riparian vegetation and moving water temperatures back toward a normal range. Excavating connecting channels makes higher water quality (colder water) available to juvenile salmonids during summer months.

ACS 5: Removal of obstructions in the floodplain such as berms restores natural sediment regime and timing by allowing flooding over the banks and storage of sediment in the floodplain.

ACS 6: Removal of obstructions in the floodplain and the restoration of natural channel form moves to restore the natural timing and distribution of peak, high, and low flows by decreasing channelization and increasing the connection with the floodplain.

ACS 7: Through removal of floodplain obstructions and the artificial features resulting from mining disturbance such as tailings, the timing, variability, and duration of floodplain inundation is restored.

ACS 8: Management of root disease ultimately maintains the species diversity of the riparian forest by retaining the POC component. Planting in the Riparian Reserve will restore a diverse riparian plant community and eventually re-establish appropriate rates of bank erosion and channel migration and secure a future source of large woody debris.

ACS 9: Careful selection of POC trees for removal by excavation or girdling maintains distribution of populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Appendix D: Acronyms and Glossary of Terms

I. Acronyms/Abbreviations

CT	-	Commercial thinning
CWD	-	Coarse Woody Debris
DBH	-	Diameter at breast height
GFMA	-	General Forest Management Area
IDT	-	Interdisciplinary team
LUA	-	Land Use Allocation
NEPA	-	National Environmental Policy Act
OI	-	Operations Inventory
PCT	-	Precommercial thinning
RMP	-	Resource Management Plan
ROD	-	Record of Decision
T&E	-	Threatened and Endangered (species)
VRM	-	Visual Resource Management

II. Glossary (From Medford District RMP)

Age Class - One of the intervals into which the age range of trees is divided for classification or use.

Anadromous Fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon, steelhead, and shad are examples.

Aquatic Ecosystem - Any body of water, such as a stream, lake, or estuary, and all organisms and nonliving components within it, functioning as a natural system.

Aquatic Habitat - Habitat that occurs in free water.

Biological Diversity - The variety of life and its processes.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed or Bureau sensitive species.

Bureau Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the Fish and Wildlife Service (FWS) for listing as threatened or endangered. There are two categories that are of primary concern to BLM. These are:

Category 1. Taxa for which the Fish and Wildlife Service has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.

Category 2. Taxa for which the Fish and Wildlife Service has information to indicate that listing is possibly appropriate. Additional information is being collected.

Canopy - The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result.

Climax Plant Community - The theoretical, final stable, self-sustaining, and self reproducing state of plant community development that culminates plant succession on any given site. Given a long period of time between disturbances, plant associations on similar sites under similar climatic conditions approach the same species mixture and structure. Under natural conditions, disturbance events of various intensities and frequencies result in succession usually culminating as sub-climax with the theoretical end point occurring rarely of at all.

Coarse Woody Debris - Portion of tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter. FEMAT

Connectivity - A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Cover - Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

Critical Habitat - Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

Cultural Resource - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

Cultural Site - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.

Cumulative Effect - The impact which results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Diameter At Breast Height (DBH) - The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Ecosystem Diversity - The variety of species and ecological processes that occur in different physical settings.

Ecosystem Management - The management of lands and their resources to meet objectives based on their whole ecosystem function rather than on their character in isolation. Management objectives blend long-term needs of people and environmental values in such a way that the lands will support diverse, healthy, productive and sustainable ecosystems.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with National Environmental Protection Agency when no Environmental Impact Statement is necessary.

Environmental Impact - The positive or negative effect of any action upon a given area or resource.

Ephemeral Stream - Streams that contain running water only sporadically, such as during and following storm events.

Forest Canopy - The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Forest Health - The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human-caused stresses such as drought, insect attack, disease, climatic changes, flood, resource management practices and resource demands.

Forest Land - Land that is now, or is capable of becoming, at least ten percent stocked with forest trees and that has not been developed for nontimber use.

Forest Succession - The orderly process of change in a forest as one plant community or stand condition is replaced by another, evolving towards the climax type of vegetation.

General Forest Management Area - Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

Genetic Diversity - The variety within populations of a species.

Habitat Diversity - The number of different types of habitat within a given area.

Historic Site - A cultural resource resulting from activities or events dating to the historic period (generally post AD l830 in western Oregon).

Impact - A spatial or temporal change in the environment caused by human activity.

Intermittent Stream - Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Land Use Allocations - Allocations which define allowable uses/activities, restricted uses/activities, and prohibited uses/activities. They may be expressed in terms of area such as acres or miles etc. Each allocation is associated with a specific management objective.

Landscape Diversity - The size, shape and connectivity of different ecosystems across a large area.

Landscape Ecology - Principles and theories for understanding the structure, functioning, and change of landscapes over time. Specifically it considers (1) the development and dynamics of spatial heterogeneity, (2) interactions and exchanges across heterogeneous landscapes, (3) the influences of spatial heterogeneity on biotic and abiotic processes, and (4) the management of spatial heterogeneity. The consideration of spatial patterns distinguishes landscape ecology from traditional ecological studies, which frequently assume that systems are spatially homogeneous.

Landscape Pattern - The number, frequency, size, and juxtaposition of landscape elements (patches) which are important to the determination or interpretation of ecological processes.

Late-Successional Forests - Forest seral stages which include mature and old-growth age classes.

Late-Successional Reserve - A forest in its mature and/or old-growth stages that has been reserved.

Long-Term Soil Productivity - The capability of soil to sustain inherent, natural growth potential of plants and plant communities over time.

Matrix Lands - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mature Stand - A mappable stand of trees for which the annual net rate of growth has peaked. Stands are generally greater than 80-100 years old and less than 180-200 years old. Stand age, diameter of dominant trees, and stand structure at maturity vary by forest cover types and local site conditions. Mature stands generally contain trees with a small average diameter, less age class variation, and less structural complexity than old-growth stands of the same forest type. Mature stages of some forest types are suitable habitat for spotted owls. However, mature forests are not always spotted owl habitat, and spotted owl habitat is not always mature forest.

Mining Claims - Portions of public lands claimed for possession of locatable mineral deposits, by locating and recording under established rules and pursuant to the 1872 Mining Law.

Mitigating Measures - Modifications of actions which (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring - The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Multi-aged Stand - A forest stand which has more than one distinct age class arising from specific disturbance and regeneration events at various times. These stands normally will have multi-layered structure.

Multi-layered Canopy - Forest stands with two or more distinct tree layers in the canopy; also called multi-storied stands.

Multiple Use - Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. The use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife, fish, and natural scenic, scientific and historical values.

Mycorrhiza - underground fungi that provide a close physical association between the fungus and the roots of a plant, from which both the fungus and plant appear to benefit. A mycorrhizal root takes up nutrients more efficiently than one not associated with mycorrhiza. Mycorrhizal fungi (also known as ectomycorrhizal) are essential for host plant nutrient uptake and play important roles in nutrient cycling in many forests. Studies from the Pacific Northwest indicate that forest management activities can reduce populations of mycorrhizal fungi and forest regeneration success (Luoma, Eberhart, Amaranthus 1997).

Neotropical migrants - a wide variety of bird species, which breed in temperate North America but migrate to tropical habitats in Central and South America during winter.

Nonforest Land - Land developed for nontimber uses or land incapable of being ten percent stocked with forest trees.

Noxious Plant - A plant specified by law as being especially undesirable, troublesome, and difficult to control.

Off Highway Vehicle (OHV) - Any motorized vehicle capable of, or designed for, travel on land, water, or natural terrain. The term "Off Highway Vehicle" will be used in place of the term "Off Road Vehicle" to comply with the Purposes of Executive Orders 11644 and 11989. The definition for both terms is the same.

Old-Growth Conifer Stand - Older forests occurring on western hemlock, mixed conifer, or mixed evergreen sites which differ significantly from younger forests in structure, ecological function, and species composition. Old growth characteristics begin to appear in unmanaged forests at 175-250 years of age. These characteristics include (a) a patchy, multi-layered canopy with trees of several age classes; (b) the presence of large living trees; (c) the presence of larger standing dead trees (snags) and down woody debris, and (d) the presence of species and functional processes which are representative of the potential natural community.

For purposes of inventory, old-growth stands on BLM-administered lands are only identified if they are at least ten percent stocked with trees of 200 years or older and are ten acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions provided by Pacific Northwest Experiment Station publications 447 and GTR-285. This definition is summarized from the 1986 interim definitions of the Old-Growth Definitions Task Group.

Old-Growth Forest - A forest stand usually at least 180-220 years old with moderate high canopy closure; a multilayered, multi species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

Old-Growth-Dependent Species - An animal species so adapted that it exists primarily in old growth forests or is dependent on certain attributes provided in older forests.

Operations Inventory Unit - An aggregation of trees occupying an area that is sufficiently uniform in composition, age, arrangement and condition to be distinguishable from vegetation on adjoining areas.

Overstory - That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - A stream that has running water on a year-round basis under normal climatic conditions.

Planning Area - All of the lands within the BLM management boundary addressed in a BLM resource management plan; however, BLM planning decisions apply only to BLM-administered lands and mineral estate.

Plant Association - A plant community type based on land management potential, successional patterns, and species composition.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Prescribed Fire - A fire burning under specified conditions that will accomplish certain planned objectives.

Priority Habitats - Aquatic, wetland and riparian habitats, and habitats of priority animal taxa.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service or National Marine Fisheries Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Reforestation - The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial stocking.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Right-of-Way - A permit or an easement that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, reservoirs, and the lands covered by such an easement or permit.

Riparian Reserves - Designated riparian areas found outside Late-Successional Reserves.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness

characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots, lower soil density, and increased microbial and invertebrate activity.

Road - A vehicle route which has been improved and maintained by mechanical means to ensure relatively regular and continuous use. A route maintained solely by the passage of vehicles does not constitute a road.

Rural Interface Areas - Areas where BLM-administered lands are adjacent to or intermingled with privately owned lands zoned for 1 to 20-acre lots or that already have residential development.

Seral Stages - The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. There are five stages:

Early Seral Stage - The period from disturbance to the time when crowns close and conifers or hardwoods dominate the site. Under the current forest management regime, the duration is approximately 0 to 10 years. This stage may be dominated by grasses and forbs or by sprouting brush or hardwoods. Conifers develop slowly at first and gradually replace grasses, forbs, or brush as the dominant vegetation. Forage may be present; hiding or thermal cover may not be present except in rapidly sprouting brush communities.

Mid-Seal Stage - The mid-seral stage occurs from crown closure to the time when conifers would begin to die from competition; approximately age 10 to 40. Stands are dense and dominated by conifers, hardwoods, or dense brush. Grass, forbs, and herbaceous vegetation decrease. Hiding cover for big game is usually present.

Late Seral Stage - Late seral stage occurs when conifers would begin to die from competition to the time when stand growth slows; approximately age 40 to 80. Forest stands are dominated by conifers or hardwoods; canopy closure often approaches 100 percent. Stand diversity is minimal; conifer mortality rates and snag formation are rapid. Big game hiding and thermal cover is present. Forage and understory vegetation is minimal except in understocked stands or in meadow inclusions.

Mature Seral Stage - This stage exists from the point where stand growth slows to the time when the forest develops structural diversity; approximately age 80 to 200. Conifer and hardwood growth gradually decline. Developmental change slows. Larger trees increase significantly in size. Stand diversity gradually increases. Big game hiding cover, thermal cover, and some forage are present. With slowing growth, insect damage increases and stand breakup may begin on drier sites. Understory development is significant in response to openings in the canopy created by disease, insects, and windthrow. Vertical diversity increases. Larger snags are formed.

Old Growth - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. (Also see definitions of old-growth conifer stand and potential natural community.)

These definitions are used by BLM to separate age classes for analysis of impacts.

Silvicultural Prescription - A professional plan for controlling the establishment, composition, constitution and growth of forests.

Silvicultural System - A planned sequence of treatments over the entire life of a forest stand needed to meet management objectives.

Site Class - A measure of an area's relative capacity for producing timber or other vegetation.

Site Index - A measure of forest productivity expressed as the height of the tallest trees in a stand at an index age.

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment which is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil or microsite conditions, using biological, mechanical, or manual clearing, prescribed burns, herbicides or a combination of methods.

Skid Trail - A pathway created by dragging logs to a landing (gathering point).

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging.

Smoke Management - Conducting a prescribed fire under suitable fuel moisture and meteorological conditions with firing techniques that keep smoke impact on the environment within designated limits.

Smoke Management Program - A program designed to ensure that smoke impacts on air quality from agricultural or forestry burning operations are minimized; that impacts do not exceed, or significantly contribute to, violations of air quality standards or visibility protection guidelines; and that necessary open burning can be accomplished to achieve land management goals.

Smoke Sensitive Area - An area identified by the Oregon Smoke Management Plan that may be negatively affected by smoke but is not classified as a designated area.

Snag - Any standing dead, partially-dead, or defective (cull) tree at least ten inches in diameter at breast height (DBH) and at least six feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Snag Dependent Species - Birds and animals dependent on snags for nesting, roosting, or foraging habitat.

Soil Compaction - An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Displacement - The removal and horizontal movement of soil from one place to another by mechanical forces such as a blade.

Soil Productivity - Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

Special Status Species - Plant or animal species falling in any of the following categories (see separate glossary definitions for each):

- Threatened or Endangered Species
- Proposed Threatened or Endangered Species
- Candidate Species
- State Listed Species
- Bureau Sensitive Species

- Bureau Assessment Species

Species Diversity - The number, different kinds, and relative abundance of species.

Stand (Tree Stand) - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

Stand Density - An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

Stand-replacement Wildfire - A wildfire that kills nearly 100 percent of the stand.

State Listed Species - Plant or animal species listed by the State of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

Stream Class - A system of stream classification established in the Oregon Forest Practices Act. Class I streams are those which are significant for: 1) domestic use, 2) angling, 3) water dependent recreation, and 4) spawning, rearing or migration of anadromous or game fish. All other streams are Class II. Class II special protection streams (Class II SP) are Class II streams which have a significant summertime cooling influence on downstream Class I waters which are at or near a temperature at which production of anadromous or game fish is limited. Revised Forest Practices Act may have a new system within a year.

Stream Reach - An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of ½ to 1-1/2 miles in length unless channel character, confluence distribution, or management considerations require variance.

Structural Diversity - Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. In aquatic habitats, the presence of a variety of structural features such as logs and boulders that create a variety of habitat.

Succession - A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax. An example is the development of series of plant communities (called seral stages) following a major disturbance.

Suitable Woodland - Forest land occupied by minor conifer and hardwood species not considered in the commercial forest land ASQ determination and referred to as noncommercial species. These species may be considered commercial for fuelwood, etc. under woodland management. Also included are low site and nonsuitable commercial forest land. These lands must be biologically and environmentally capable of supporting a sustained yield of forest products.

Surface Erosion - The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills, or by dry ravel.

Thermal Cover - Cover used by animals to lessen the effects of weather. For elk, a stand of conifer trees which are 40 feet or more tall with an average crown closure of 70 percent or more. For deer, cover may include saplings, shrubs or trees at least five feet tall with 75 percent crown closure.

Threatened Species - Any species defined through the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range and published in the Federal Register.

Transportation System - Network of roads used to manage BLM-administered lands. Includes BLM controlled roads and some privately controlled roads. Does not include Oregon Department of Transportation, county and municipal roads.

Understory - That portion of trees or other woody vegetation which form the lower layer in a forest stand which consists of more than one distinct layer (canopy).

Viable Population - A wildlife or plant population that contains an adequate number of reproductive individuals to appropriately ensure the long-term existence of the species.

Viewshed - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

Visual Resources - The visible physical features of a landscape.

Visual Resource Management (VRM) - The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Water Quality - The chemical, physical, and biological characteristics of water.

Water Yield - The quantity of water derived from a unit area of watershed.

Wetlands or Wetland Habitat - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include, but are not limited to, swamps, marshes, bogs, and similar areas.

Wildlife Tree - A live tree retained to become future snag habitat.

Withdrawal - A designation which restricts or closes public lands from the operation of land or mineral disposal laws.

Woodland - Forest land producing trees not typically used as saw timber products and not included in calculation of the commercial forest land ASQ.