U.S. Department of the Interior
Bureau of Land Management

Lakeview District Office
HC10 Box 337, 301 South G. Street
Lakeview, Oregon 97630

April 2003

Draft-Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments

Summary

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Lakeview District Office
HC10 Box 337, 301 South G. Street
Lakeview, Oregon 97630

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/PL-02/038+1792

Cover Photo: Klamath River Canyon at Hells Corner

List of Abbreviations and Acronyms

ACEC - Area of Critical Environmental Concern
ACS - Aquatic Conservation Strategy
AUM - Animal Unit Month
BLM - Bureau of Land Management
BMP - Best management practice
CA - Conservation Agreement
CAA - *Clean Air Act*
CDFG - California Department of Fish and Game
CEQ - Council on Environmental Quality
CFR - Code of Federal Regulations
CFS - Cubic Feet per Second
COE - Corps of Engineers (Corps)
CSWRCB - California State Water Resources Control Board
CWA - *Clean Water Act*
CWD - Coarse Woody Debris
DEQ - Department of Environmental Quality
DSL - Division of State Lands
EA - Environmental Assessment
EIS - Environmental Impact Statement
EPA - Environmental Protection Agency
ESA - *Endangered Species Act*
ESU - Evolutionary Significant Unit
FACA - *Federal Advisory Committee Act*
FERC - Federal Energy Regulatory Commission
FLPMA - *Federal Land Policy and Management Act*
FONSI - Finding of No Significant Impact
FTZ - Fuel Treatment Zones
GIS - Geographic Information System
HABS/HAER - Historic American Buildings Survey/ Historic American Engineering Record
HCP - Habitat Conservation Plan
IAC - Intergovernmental Advisory Committee
IBLA - Interior Board of Land Appeals
ICBEMP - Interior Columbia Basin Ecosystem Management Project
JITW - Jobs in the Woods
KFRA - Klamath Falls Resource Area
KFRMP - Klamath Falls (Resource Area) Resource Management Plan
KPAC - Klamath Provincial Advisory Committee
LAC - Limits of Acceptable Change
LCDC - Land Conservation and Development Commission
LSR - Late-Successional Reserve
LUP - Land Use Plan
MOA - Memorandum of Agreement
MOU - Memorandum of Understanding
NCA - National Conservation Area
NEPA - *National Environmental Protection Act*
NFMA - *National Forest Management Act*
NFP - Northwest Forest Plan
NHPA - *National Historic Preservation Act*
NMFS - National Marine Fisheries Service
NOA - Notice of Availability
NOAA - National Oceanic Atmospheric Administration
NOI - Notice of Intent
NPS - National Park Service
NRCS - Natural Resources Conservation Service
NRHP - National Register of Historic Places
NRI - Natural Resources Inventory
O&C - *Oregon & California Lands Act*
ODA - Oregon Department of Agriculture
ODEQ - Oregon Department of Environmental Quality
ODF - Oregon Department of Forestry
ODFW - Oregon Department of Fish and Wildlife
ODOT - Oregon Department of Transportation
ODSL - Oregon Division of State Lands
OHV - Off-Highway Vehicle (also known as Off-Road Vehicle)
ONHP - Oregon Natural Heritage Program
OPRD - Oregon Parks and Recreation Department
ORV - Outstandingly Remarkable Value
OWRD - Oregon Water Resources Department
PAC - Provincial Advisory Council
PDF - Project Design Feature
PFC - Proper Functioning Condition
PFW - Partners for Wildlife
PRIA - *Public Rangelands Improvement Act*
RC&D - Resource Conservation and Development
RIEC - Regional Interagency Executive Committee
REO - Regional Ecosystem Office
RMP - Resource Management Plan
RM - River Mile
ROD - Record of Decision
ROS - Recreation Opportunity Spectrum
RRMP - Redding Resource Management Plan
SONCC - Southern Oregon/Northern California Coastal
SHPO - State Historic Preservation Office
SMA - Special Management Area
SRMA - Special Recreation Management Area
SWCD - Soil and Water Conservation District
T&E - Threatened and Endangered
TES - Threatened, Endangered, and Sensitive (Species)
TMDL - Total Maximum Daily Load
TNC - The Nature Conservancy
USBR - U.S. Bureau of Reclamation
USDA - United States Department of Agriculture
USDI - United States Department of Interior
USFS - United States Forest Service
USFWS - United States Fish and Wildlife Service
USGS - United States Geological Survey
VRM - Visual Resource Management
WQS - Water Quality Standards
WSR - Wild and Scenic River
WSRA - *Wild and Scenic Rivers Act*
WQRP - Water Quality Restoration Plan

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Klamath Falls Resource Area
2795 Anderson Avenue, Building 25
Klamath Falls, Oregon 97603-7891
Phone: (541)883-6916 | Fax: (541)884-2097
E-Mail Address: Username@kfra.or.blm
Website: http://www.or.blm.gov/Lakeview/kfra/index.htm

IN REPLY REFER TO:
1610 (014)

February 26, 2003

Dear Interested Party:

Enclosed for your review and comment is the Draft Upper Klamath River Management Plan and Environmental Impact Statement (EIS) and Resource Management Plan Amendments. This document outlines management options and environmental consequences for managing lands administered by the Bureau of Land Management (BLM) in southern Oregon and northern California along the upper Klamath River system. This EIS will amend both the BLM Redding (California) and the Klamath Falls Resource Area (Oregon) Resource Management Plans. It also proposes classification and rules affecting all non-federal lands within the designated Oregon's State Scenic Waterway.

There are four resource management alternatives proposed in this DEIS. The alternatives were designed to provide different management actions that protect, maintain, restore and/or enhance river values, resources, and ecological processes while providing opportunities for the public to enjoy this unique area. In compliance with Code of Federal Regulations (CFR) § 1610.4-7, Alternative 3 was identified as the preferred alternative. Although a preferred alternative is identified, it is recognized that parts of the other alternatives would also meet management goals or possibly new information will be identified that could change the preferred alternative. As a result, dialogue and comments received on this draft plan will be heavily relied upon in the formulation of the Proposed Final Upper Klamath River Management Plan/Environmental Impact Statement.

Written comments should be sent to Larry Frazier, Project Team leader, Bureau of Land Management, 2795 Anderson Avenue, Building 25, Klamath Falls, Oregon, or via email (krmp@or.blm.gov). All written comments will be fully considered and evaluated in the preparation of the final Upper Klamath River Plan and EIS.

Your review and comments are requested at this time to ensure that your interests are adequately considered in the planning process. A 90-day public comment period is being provided for review of this document. Public meetings will be held in Klamath Falls, Oregon, and Yreka and Copco, California, during the comment period. Additional meetings may be held in other locations if there is sufficient interest. The comment period closing date and specific dates and locations of public meetings will be announced through the local news media, news letters, and the BLM website (www.or.blm.gov/Lakeview/kfra/index.htm).

Written comments on the State Scenic Waterway portion of the plan (Chapter 3) should be sent to Jan Houck, Program Coordinator, Oregon State Parks and Recreation Department, 20300 Empire Avenue, Suite B-1, Bend, Oregon, or via email (jan.houck@state.or.us).

Comment letters to the BLM, including names and street addresses of respondents, will be available for public review at the Klamath Falls Resource Area office during regular business hours 8:00 a.m. to 5:00 p.m., Monday through Friday, except holidays, and may be published as part of the Final EIS. 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 prominently at the beginning of your written comments. Such requests will be honored to the extent allowed by law. Anonymous comments will be considered. All submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety.

We appreciate your help in this planning effort and look forward to your continued interest and participation. For additional information or clarification regarding this document or the planning process, please contact Larry Frazier or Don Hoffheins at (541) 883-6916.

Sincerely,

Teresa A. Raml

Teresa A. Raml, Manager
Klamath Falls Resource Area

DRAFT UPPER KLAMATH RIVER MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT and RESOURCE MANAGEMENT PLAN AMENDMENTS

Klamath Falls Resource Area Field Manager Recommendation

I recommend release of the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment. It has been prepared following direction in BLM Handbook H-1601-1 (Land Use Planning) and BLM Manual 8351 (Wild and Scenic Rivers). The Draft River Plan addresses issues raised by the public, and proposes land use allocations and management actions for Bureau administered lands and resources that would protect or enhance river values throughout the Upper Klamath River.

Teresa A Raml

Teresa A. Raml, Field Manager

Redding Resource Area Field Manager Recommendation

I recommend the release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Charles M. Schultz, Field Manager

Lakeview District Manager Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Steven A Ellis

Steven A. Ellis, Lakeview District Manager

Oregon/Washington State Director Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Elaine M. Brong

Elaine Marquis-Brong, Oregon/Washington State Director

California State Director Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Mike Pool, California State Director

Oregon State Parks and Recreation Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Michael Carrier

Michael Carrier, Oregon Parks and Recreation Director

Summary

Draft Upper Klamath River Management Plan

Environmental Impact Statement And Resource Management Plan Amendments

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Chapter 1 - Introduction

Background

This Draft Environmental Impact Statement (EIS) refers specifically to a planning area on the upper Klamath River. The upper portion of the Klamath River is the stretch between Lake Ewauna, at Klamath Falls, Oregon, south to Irongate Dam in California. The lower Klamath River section is from Irongate Dam to the Pacific Ocean.

Management of this river corridor is quite complex, owing to its unique combination of private and public land ownership, and multiple land use management designations covering portions of two states.

Numerous factors affect management efforts for the area, the greatest of these being the presence of J.C. Boyle Powerhouse that uses river water diverted at J.C. Boyle Dam to generate electricity for a public utility. Other factors include public use for recreation, especially for a local whitewater rafting industry, the success of which is directly tied to water releases from the dam. Specific designations have been applied to parts of the upper Klamath River that by law require special management plans be developed.

The BLM's Klamath Falls Resource Area (Oregon) and the Redding Field Office (California)0 staff contributed to the creation of this plan, as well as the Oregon Parks and Recreation Department employees.

Purpose and Need, and Decisions to be Made

This planning effort is being undertaken because the current recreation plan, completed in 1983 by the BLM Medford District, is outdated. There are now overlapping jurisdictions and designations that did not exist 20 years ago. The *Wild and Scenic Rivers Act* and administrative guidance for implementing management of the Area of Critical Environmental Concern require preparation on management plans.

This DEIS is *not a decision document*. Its primary purpose is to disclose the environmental consequences that could occur through implementation of the alternatives being considered. However, decisions will be based on the analysis disclosed here.

A Record of Decision (ROD), or numerous RODs, will be signed by the state directors of Oregon/Washington and California State BLM offices. In addition, the Governor of Oregon will review the document and make a decision on adoption of administrative rules for the State Scenic Waterway.

There are two types of decisions that the BLM can make related to this plan – land use decisions and implementation level decisions. Land use decisions establish the type of appropriate management needed for the land. Implementation decisions prescribe specific actions that should be taken with respect to those lands.

When this planning effort is complete, there will be one Upper Klamath River Management Plan (henceforth called the River Plan) and Final Environmental Impact Statement that will guide and coordinate all federal and state land management activities along the river. This new River Plan would amend the current BLM resource management plans and will be completed in 2004.

For this DEIS, Alternative 3 has been identified as the “Preferred” Alternative. The analysis presented in this DEIS will be used by BLM State Directors for Oregon/Washington and California to decide on a final plan, which will be documented in one or more Records of Decision.

The River Plan also reviews classification and rules affecting all non-federal lands within the designated Oregon’s State Scenic Waterway. The classification and rules are in Chapter 3 of the DEIS.

The Planning Area

The area covered by the plan is within Klamath County, Oregon, and Siskiyou County, California, and is located about 25 miles southwest of Klamath Falls, Oregon.

The planning area for the River Plan extends about 20 miles from the J.C. Boyle Dam in Oregon (owned by PacifiCorp), southwest to the slackwater of Copco Reservoir in northern California (see Map 1).

The Oregon portion of the planning area is about 15 miles long and encompasses approximately 6,000 acres of public BLM-administered lands. The California portion is about five miles long and covers approximately 200 acres of public BLM-administered lands.

The river is divided into three sections within the planning area, Segments 1, 2, and 3, which extend north to south along the river corridor. Segments 1 and 2 are in Oregon, and Segment 3 is in California.

Existing Management Direction

The River Plan, while based on input from a variety of sources, both scientific and opinion-based, must also conform to existing laws and plans, on both the federal and state level.

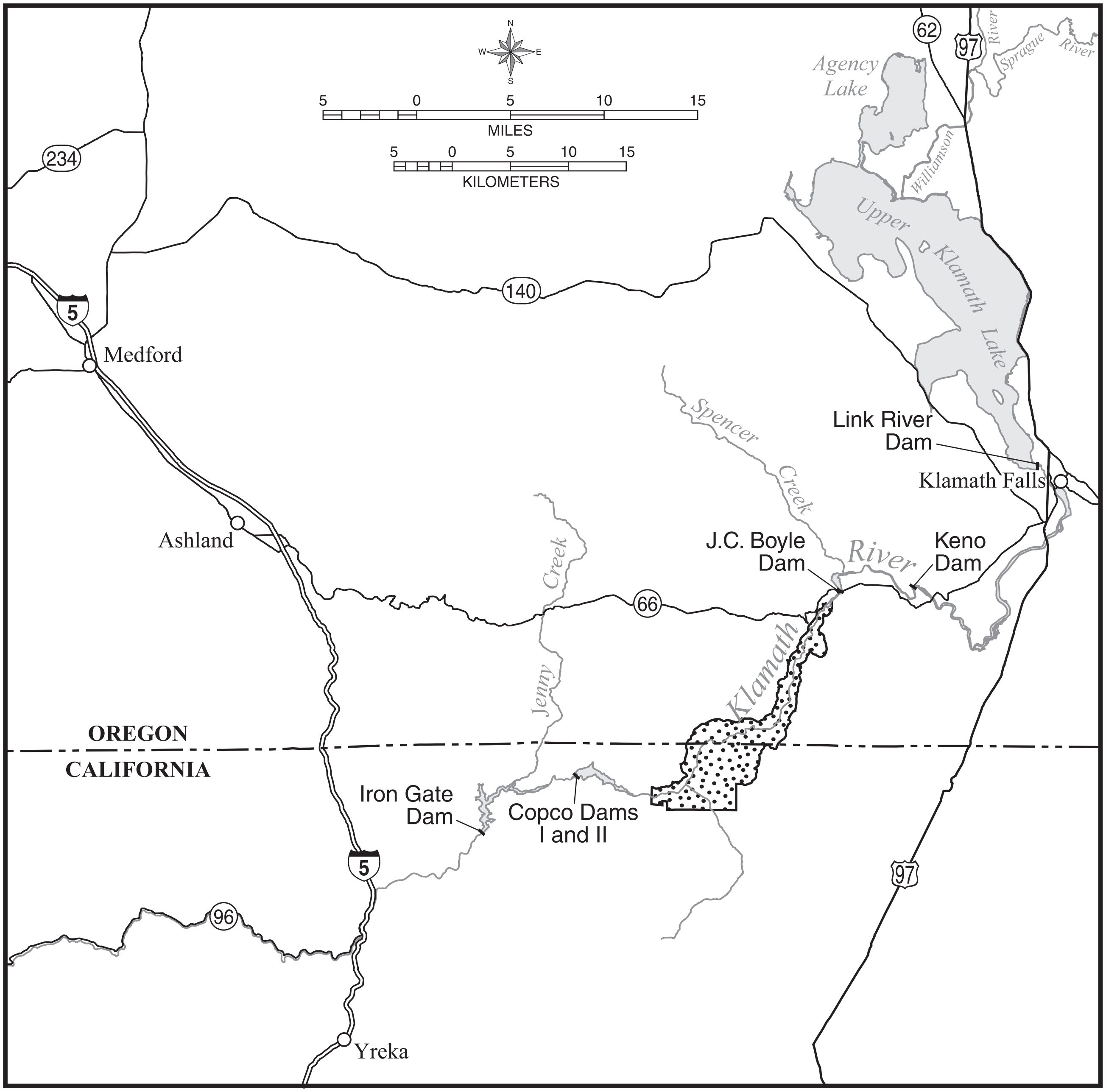
Federal and State Laws

The Klamath Falls Resource Area is responsible for determining if the River Plan conforms to applicable state and federal law, and will make this determination in a subsequent ROD.

Designations within the Planning Area

Oregon Scenic Waterway

The Oregon Scenic Waterways System was created by ballot initiative in 1970. Scenic waterways are defined as including the designated river and related adjacent lands within 0.25 mile of the bank on either side of the river. In 1988 an 11-mile section (located in Segment 2) of the Klamath River in Oregon was designated a State Scenic Waterway.



Legend

Planning Area

5 Interstate

97 US Highway

96 State Highway

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area

CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments
2003

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

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Oregon State Office

Map 1: Upper Klamath River, Regional Transportation, and Major Population Centers

National Wild and Scenic River Designation

In 1994, the Klamath River from J.C. Boyle Dam Powerhouse to the California/Oregon border (including a 0.25-mile corridor on either side) was designated a wild and scenic river under the *Wild and Scenic Rivers Act* (1968).

Upper Klamath River Area of Critical Environmental Concern

The BLM has designated an Area of Critical Environmental Concern (ACEC) in the Klamath River Canyon, from J.C. Boyle Powerhouse to the Oregon and California state line, extending from rim-to-rim.

Management Goals for the Plan

Overall management goals of the River Plan are:

- Maintain and restore river-related scenic and natural resources
- Provide diverse recreational experiences.
- Promote visitor understanding and enjoyment
- Protect and enhance cultural resources

Public Involvement and Scoping

Scoping is the process of determining the scope of the environmental analysis to be completed.

The scoping process for the River Plan was initiated in late 2000, and involved a variety of outreach methods; including meetings with relevant committees, organizations, government entities, and the public; consultations with the Tribes; news releases; and scoping documents mailed to people or businesses on a project mailing list.

Identification of Issues

By the end of the initial scoping period on January 31, 2001, the BLM had received 36 written responses. Comments from these letters have been consolidated into 57 different public issue statements, addressing 15 topics.

In addition, PacifiCorp sent a letter (dated May 2, 2001) requesting that about 6,000 acres of their private lands located within the planning area be considered in the River Plan for possible land tenure adjustments. PacifiCorp is considering several management options for these lands that are surplus to their needs for power production. PacifiCorp requested the BLM to consider their lands for exchange for other BLM lands, or purchase, or that BLM and PacifiCorp enter into a mutually beneficial land management arrangement of these lands. PacifiCorp and BLM natural resource specialists have cooperated to gather resource information on PacifiCorp lands for inclusion in the plan.

The analysis and potential projects developed as part of this planning effort may be used by PacifiCorp to help determine desired long-term management of the lands, and potentially identify offsite mitigation opportunities for the FERC relicensing process.

Wild and Scenic River and ACEC Values as They Apply to the Issues

The BLM has developed a set of criteria to determine outstandingly remarkable values during the eligibility process for inclusion into the national wild and scenic river system. Values identified in the "Final Eligibility and Suitability Report for the Klamath Wild and Scenic River Study" (1990) and in the National Park Service's "Klamath Wild and Scenic River

Eligibility Report and Environmental Assessment" (August 1994) were used to support the designation of the river found in Segment 2 of the planning area. These values are: wildlife, fish, prehistoric, historic, scenic quality, and Native American traditional use. The BLM's resource management planning process also stipulates identification of values that need to receive special management emphasis for designation of an ACEC.

Protection and enhancement of wild and scenic river and ACEC values within the planning area are the primary objectives of this plan. The wild and scenic river outstandingly remarkable values appear below with an asterisk (*).

Scenic Quality *

The river's scenic quality is one of its outstandingly remarkable values. How to best maintain or enhance scenic qualities is a management concern, including consideration of new facilities, fuel treatments, prescribed fire, utility development, and roads.

Recreation Activities*

With respect to recreation on the river, two issues relating primarily to whitewater rafting are of great importance: recreational carrying capacity and river flows.

There is also concern about the management of other recreational uses within the river corridor, such as fishing, hiking, and off-highway vehicle (OHV) use.

Recreation Facilities

The improvement or construction of recreational facilities along the river is also an issue. Facilities may need to be removed or relocated to reduce impacts on other resources. Proposed trails, cultural resources, fish habitat, and vandalism are all pertinent issues.

Roads and Access

There are numerous roads on public land within the river canyon, and OHV use has resulted in increased erosion and sedimentation into the river, as well as damage to significant prehistoric and historic sites, and Native American traditional use areas. These concerns need to be balanced with public OHV use, the ultimate goal being to provide for this type of recreational use while protecting resources.

Cultural Resources/Prehistoric Sites

The river canyon contains many cultural sites, some of which receive intensive recreation use, and have endured resulting damage. This plan would aim to reduce vandalism and increase public awareness to prevent further damage to sensitive cultural areas.

Native American Traditional Uses*

Native Americans have used the river canyon for thousands of years, and the area has spiritual significance for tribal members. Current roads and access have led to OHV damage in Native American traditional use areas. This plan will address OHV issues, as well as forest health management and prescribed fire practices as a means of maintaining traditional food-gathering sites.

Historic Sites*

Historic sites are rapidly deteriorating and have been vandalized; this has raised concerns about how to protect and manage these structures.

Watershed Values

Different sections of the upper Klamath River have been listed as "water quality limited," in accordance with Section 303(d) of the *Clean Water Act*. The listings are because of the impacts of nutrients, low dissolved oxygen and elevated stream temperatures on beneficial uses, such as fish habitat.

Water quality also affects other values, such as recreation, for which the river was designated a State of Oregon scenic waterway, and national wild and scenic river. This plan identifies possible ways of protecting and enhancing water quality within the planning corridor in support of other resource values.

Erosion caused by roads, water flows, lack of riparian vegetation, and impaired watershed processes has contributed to limited water quality.

Wildlife*

There are threatened and endangered species that use the river corridor. Habitat for these species would be evaluated to determine the types of management needed.

Fisheries*

Fisheries is one of the outstandingly remarkable values that earned the Klamath River its designation as a national wild and scenic river. In addition, the river has been classified by the states of Oregon and California as a wild trout fishery. The planning area is also within the historic range of the threatened and endangered coho salmon.

There are recreational trout fishing concerns surrounding the lack of large fish in the river. Daily fluctuating flows from the J.C. Boyle Powerhouse may be a factor.

Fire and Fuels

This plan addresses the need for effective fuel reduction treatments and the potential loss of scenic characteristics from wildfire.

Vegetation and Biological Diversity

This plan evaluates how vegetation (including wildlife and fish habitat, and Native American traditional use food-gathering areas) would be managed. This includes control or eradication of exotic or noxious species.

Air Quality

Prescribed fires could affect air quality within and outside of the planning area. A smoke management plan will be included in the final River Plan/EIS.

Socioeconomics

Potential management actions could affect the local economy, such as individuals, businesses, outfitters, minority and low-income populations, and tribes. These factors will be analyzed and considered in the plan.

PacifiCorp's Power Generating Facilities

PacifiCorp operates a series of hydroelectric power generation facilities on the upper Klamath River. The River Plan identifies the effect these operations have on river resources and values.

Land Tenure

As the major private landowner in the planning area, PacifiCorp has requested that the BLM explore possible land tenure adjustments in the development of the River Plan. Adjustments could include land trade, acquisition, or mutually beneficial land management arrangements.

Private Land

The plan addresses the State of Oregon's Administrative Rules for private land in the Scenic Waterway portion (located in Segment 2) of the planning area (see Chapter 3). The effects on adjacent private land from BLM proposed actions are also addressed.

There are management concerns regarding how the federal government can ensure adequate recreational access to the river if it does not administer the land. Other potential impacts on private land adjacent to BLM administered land are also addressed.

Grazing

Livestock grazing effects on rangeland health, recreation, cultural, riparian, and wildlife habitat issues are analyzed.

Cumulative Impacts

The cumulative impacts of management actions proposed or recommended within the planning area, plus other actions on public and private land not a part of this plan, are also considered in this DEIS.

Chapter 2 – Affected Environment

General Setting and Access

The Klamath River lies within the High Cascades Physiographic Province and borders the Basin and Range Province on the west. Topography varies from flat to gently sloping along the river benches to some almost vertical canyon walls. The canyon rim rises 1,000 feet above the river. Precipitation is 15-20 inches, coming mostly in fall, winter, and spring. Temperatures range from low 20s in winter to high 80s-90s in summer. Canyon air quality is generally good, thanks to the planning area's location far from urban and industrialized areas.

Geological characteristics include volcanic flows, cinder cones, and fault patterns. Seismic activity is low in the planning area. No economically valuable mineral deposits are known to exist in the area.

The upper Klamath River is readily accessible from the four major population centers in southern Oregon and northern California. The main transportation route to the river is State Highway 66 (Green Springs Highway), which runs east/west between U.S. Highway 97 in the Klamath Basin, and Interstate 5, in the Rogue River Valley (see Map 1).

Scenic Resources

The visual quality of a landscape is based on landscape character. The stronger the influence of form, line, color, and texture, the more interesting the landscape; the more visual variety in a landscape, the more aesthetically pleasing it is. An assessment of landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications is used to classify the scenic quality of the area. During the rating process, each of these factors is ranked on a comparative basis with similar features within the planning area. A visual resource management (VRM) class rating is then made to manage the quality of the visual environment and to reduce the visual impact of development activities (BLM Handbook H-8410-1).

The upper Klamath River Canyon was evaluated by the BLM in 1977 and 1981 and received a "Scenic Quality Class A" evaluation – the highest scenic quality classification possible.

Recreation

The planning area is host to 10,000 visitors annually. Major recreational activities within the planning area include whitewater boating, fishing, hunting, and camping. Additional activities include sightseeing, hiking, photography, picnicking, wildlife observation, driving for pleasure (OHV use limited to designated roads and trails), trapping, and horseback riding.

Whitewater Boating

One of the unique features of the upper Klamath River is the extended season for whitewater boating opportunities provided as a result of year-round releases from the J.C. Boyle Dam/Powerhouse system. Most river systems in the Pacific Northwest are raftable only during high spring flows.

The primary rafting season on the upper Klamath River extends from Memorial Day through Labor Day, which makes it one of the few rivers in the northwest that can be floated throughout the summer.

Since the summer of 1998, PacifiCorp has varied the water release schedule to include more releases that start later in the day, starting the release as late as 2-4 p.m. This change in scheduling reflects changing market conditions for wholesale electric power, as well as anticipated regional electric power shortages during summer heat waves.

This shift in water release start times has impacted whitewater boating opportunities by either forcing boaters to launch their trips later in the day, or to cancel or postpone their trips due to the timing of the water release.

Recreation Sites and Facilities

Public recreation sites and facilities are located throughout the planning area. The remote river canyon offers campers a semi-primitive experience with several day use sites.

Camping facilities are provided at Topsy Recreation area, Klamath River Campground, and five additional fire-safe sites are available along the river's edge. There are several primitive campsites at Frain Ranch (PacifiCorp lands).

PacifiCorp offers fishing and day use access at six locations in the California section of the river and allows dispersed camping in the Frain Ranch Area.

Fishing

The upper Klamath River within the planning area is managed as a wild trout river in both Oregon and California. The river provides an excellent trout fishery and is among one of the better flyfishing rivers in Oregon.

Hunting

Hunting occurs primarily on open benches along the river and in draws along the canyon rim. Game includes black-tailed deer, silver-gray squirrels, mountain and valley quail, and turkey. Additional recreational hunting occurs in spring and early summer for ground squirrels and marmots.

Roads and Access

Public access to the planning area is currently on the Topsy and J.C. Boyle Powerhouse roads. These roads provide the majority of access in the planning area. There are some other roads that cross private land, where the discretion of the landowner determines access.

Cultural Resources/Traditional Use

Cultural resources within the planning area are divided into three categories (1) prehistoric, (2) historic, and (3) current Native American traditional use.

There are about 100 known prehistoric sites in the upper Klamath River canyon. There are fishing, gathering, and hunting camps, and pit house villages (pit houses are circular depressions reflecting a semi-subterranean prehistoric house structure).

The area was home to a variety of cultural groups at different times, including the Shasta Nation of northern California, the Modoc and Klamath Tribes of the Klamath Basin, the Takelma of the upper Rogue River, and possibly the Pit River Indians of northeastern California.

Europeans have used the upper Klamath River Canyon extensively since the 1850s, settling on terraces and flood plains along the river and several meadow areas. There are numerous historic ranches that have structures still standing that were constructed between the late 1800's and early 1900's.

Today, members of the Klamath Tribe and the Shasta Nation continue to use the canyon for spiritual purposes, hunting, fishing, gathering, and other cultural activities. Many of the traditional use areas can be considered traditional cultural properties.

Vegetation and Soils

Special Status Plant Species

There are no documented sites of federally listed threatened or endangered plants in the planning area. Limited surveys have been conducted, but there have been no systematic surveys covering the entire planning area. Species of special concern that have been documented in the planning area include the mountain lady slipper orchid (*Cypripedium montanum*), Greene's mariposa lily (*Calochortus greenei*), Bolander's sunflower (*Helianthus bolanderi*), red-root yampah (*Perideridia erythrorhiza*), Howell's false-caraway (*Perideridia howellii*), and Lemmon's catchfly (*Silene lemmonii*).

Noxious Weeds

Noxious weeds are plant species designated under federal, state, or local laws and ordinances that cause economic loss and/or harm the environment.

Populations of Russian knapweed (*Acroptilon repens*), yellow starthistle (*Centuarea solstitialis*), poison hemlock (*Conium maculatum*), Scotch broom (*Cytisus scoparius*), St. John's wort (*Hypericum perforatum*), yellow toadflax (*Linaria vulgaris*), Himalayan blackberry (*Rubus discolor*), and puncture vine (*Tribulus terrestris*) have been documented and mapped within the planning area through incidental surveys by BLM staff and university researchers.

Plant Communities

The planning area contains a mixture of the following vegetation types. The following table (Table S-1) lists plant communities and the approximate percent coverage in the planning area.

Table S-1. Plant Communities of the Planning Area

Vegetation Community Type	Percent of Planning Area
Conifer forest and woodland	43
Oak woodlands	27
Juniper woodland	1
Mixed shrub	17
Rabbitbrush/Sagebrush	4
Dry meadow	4
Riparian communities	2
Irrigated meadow	2

Soils

The primary soil series in the Oregon portion of the planning area are the Bogus, Greystoke, McMullin, and Skookum series. Descriptions of the soils can be found in the “Soil Survey of Jackson County Area, Oregon” (USDA-SCS 1993).

Soils within the Oregon portion of the planning area generally have slow infiltration rates when wet. This is a consequence of moderately high proportions of clay, especially in subsurface horizons. Despite the potential for surface runoff, most soils in the planning area have a low susceptibility to sheet and rill erosion of surface horizons. This is due to the high proportion of coarse fragments on the soil surface.

The primary soil series in the California portion of the planning area are the Bogus, Jenny, Lassen-Kuck complex, Lithic Haploxerolls-Rock outcrop complex, and Medford. Descriptions can be found in the “Soil Survey of Central Siskiyou County California Central Part” (USDA-SCS 1983).

Soils within the California portion of the planning area generally have slow infiltration rates when wet (for the same reasons as the soils within the Oregon portion).

Terrestrial Species and Habitat Management

Birds

There are 197 species of birds within the planning area, some year-round residents, others seasonal or migratory.

Some important species include: bald eagle (Threatened), golden eagle, osprey, peregrine falcon (Oregon State Sensitive), prairie falcon, red-tailed hawk, American kestrel, sharp-shinned hawk, Coopers hawk, great horned owl, long-eared owl, western screech owl, northern goshawk (Oregon State Sensitive Species), northern pygmy owl (Oregon State Sensitive Species), northern spotted owl (endangered), wild turkey, redlegged partridge, warbling vireo, yellow warbler, lazuli bunting, lesser goldfinch, and Wilson’s warbler.

Mammals

The canyon provides habitat to support a great variety and abundance of mammals.

A partial listing of species is: silver-gray squirrel, beaver, muskrat, wild pigs, Townsend’s big-eared bat, Raccoon, river otter, mink, long- and short-tailed weasel, ringtail (Oregon State Sensitive Species), coyote, gray fox, bobcat, mountain lion, Roosevelt elk, black bear, cougar, blacktailed deer, and mule deer.

Herptiles

Eighteen species of reptiles and amphibians (collectively referred to as herptiles) have been identified in the planning area: western rattlesnake, common and western terrestrial garter snake, gopher snake, striped whipsnake, rubber boa, ringneck snake, yellow-bellied racer, western fence lizard, southern alligator lizard, sagebrush lizard, western skunk, western toad (Oregon State Sensitive Species), Pacific tree frog, California mountain king snake (Oregon State Sensitive Species), sharptail snake (Oregon State Sensitive Species), northern sagebrush lizard (Oregon State Sensitive Species), and western pond turtle (Oregon State Sensitive Species).

Watershed Values

Watershed values are a key component in shaping animal and plant communities in the planning area, and in providing recreational opportunities. The Klamath River fills many roles relating to human and wildlife needs.

Beneficial Uses

Among those roles are "beneficial uses," as determined by Oregon Department of Environmental Quality. Established beneficial uses for the upper Klamath River in Oregon include public and private domestic water supply; industrial water supply; irrigation; livestock watering; salmonid rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing, boating, and water contact recreation; and aesthetic quality.

The North Coast Regional Water Quality Control Board has established beneficial uses for the California portion of the Klamath. Broad categories include water supply, recreation, fish and wildlife, power generation, and scientific study.

Energy Generation and Transmission

The planning area includes the portion of the Klamath River between two hydroelectric facilities: J.C. Boyle Dam in Oregon and Copco 1 Reservoir in California. The J.C. Boyle Dam 88-megawatt power generation plant is 4.3 river miles below the dam. This facility has turbine generators that supply power during high use (peak) periods.

Water Rights

Water use in the Klamath River Basin upstream from, and within, the planning area affects streamflows in the Klamath River. An adjudication process now being conducted by the Oregon Water Resources Department (OWRD) will determine surface water rights associated with the designated wild and scenic river. This process will establish water right claims submitted by BLM.

Klamath River Instream Flows

Within Segments 1 and 2, PacifiCorp is licensed to divert up to 2,500 cfs of Klamath River water to generate hydroelectric power. The utility also has two permits that allow a small diversion from the dam for irrigation, stock and domestic use.

The BLM has filed a claim for instream flows in Segment 2 of the planning area based on the *Wild and Scenic Rivers Act* of 1968. In the Act, Congress expressly reserved water for flow-dependent outstandingly remarkable values. Flows were claimed (Federal Reserve Claim 376, 1999) for three outstandingly remarkable values: fisheries (625 cfs from April 1 through June 15, and 525 cfs for the rest of the year) and recreation (whitewater rafting, 1,500 cfs between Memorial Day and September 30) (see Table 2-12). The BLM water right claim on the River is pending in the Klamath Basin Adjudication.

Other Water Rights

Other entities also have water claims and/or rights on the Klamath River, including the Oregon Department of Parks and Recreation, the Bureau of Indian Affairs (on behalf of the Klamath Tribes), the Oregon Department of Forestry, and private landowners. The Klamath River Basin Compact also provides guidance, along with other applicable laws, for water rights administration in the Klamath Basin (see River Plan for further details).

The Oregon Department of Forestry has a permit to use up to 10,000 gallons of water daily for dust abatement on an unnamed tributary in Segment 2.

Streamflows

The upstream end of the Klamath River drainage encompasses about 4,080 square miles of surrounding land. Snowmelt in this drainage area flows mostly to Upper Klamath Lake, which creates late winter and spring naturally occurring peak flows to the Klamath River.

Summer flows come from the Link River Dam (on Upper Klamath Lake), and groundwater discharges. Elevated flows in fall are caused by return flow from irrigated areas south and west of Klamath Falls.

The other primary cause of streamflow variance is the operation of the J.C. Boyle hydroelectric facilities. Flow varies according to water availability, instream flow requirements for salmon (listed under the Endangered Species Act) downstream from Iron Gate Dam, and PacifiCorp's FERC license.

Flows in Segment 1 are not subject to the daily fluctuations that occur in Segments 2 and 3 from powerhouse operations.

Energy demand (and subsequent hydroelectric plant use) can determine the amount of flow in the river. When daily average natural river flows are less than around 3,300 cfs, the facility can increase flows to produce power during peak energy demand periods which is called "peaking". On days when the J.C. Boyle complex is operated for peaking power, stage (change in river surface elevation) can be raised or lowered about 2.2 feet over a 6-hour period.

Water Quality

Water quality, which as previously mentioned, is designated "water quality limited" under terms of the *Clean Water Act*, is affected by upstream point and nonpoint pollutant sources in the area.

Some examples of characteristics that limit water quality in the planning area are high algal content, high pH, temperature, chlorophyll-a, and dissolved oxygen. These may detrimentally affect beneficial uses and outstandingly remarkable values (including fisheries, recreation, and wildlife).

Stream channel morphology

Stream channel morphology, that is, width, depth, substrate, and channel gradient, etc., is affected by natural flows and releases from J.C. Boyle facilities.

Increased discharge and/or decreased sediment (gravel) supply can cause channel widening, incision and bed armoring.

Aquatic Species/Habitat

The dams on the Klamath River have affected fish species distribution throughout the Klamath Basin. Historically, the Klamath River was a passageway for anadromous fish, salmon, steelhead, and Pacific lamprey as they migrated to various tributaries of the Klamath River and Upper Klamath Lake (ODFW 1997). These fish runs were halted in 1910 by the construction of Copco I Dam, completed in 1917, which permanently blocked fish passage (City of Klamath Falls 1986). Five more dams were built on the upper Klamath River;Copco II and lrongate are located in California, and Link River, Keno, and J.C. Boyle Dams are located in Oregon (PacifiCorp 2000). J.C. Boyle, Keno, and Link River Dams have fish ladders intended for trout migration, each varying in function. Only J.C. Boyle Dam has a screening facility to prevent entrainment of fish into the power diversion canal.

The hydroelectric project on the upper Klamath River will be assessed for reintroduction of anadromous species through the hydroelectric facilities as part of the Federal Energy Regulatory Commission relicensing process.

The upper Klamath River is inhabited by 10 known native fish species. Three species of note are: redband trout – the primary game fish in the Klamath River, Lost River sucker – (state and federally listed endangered species), and shortnose sucker – (state and federally listed endangered species).

Other native species are Klamath smallscale sucker, blue and tui chub, Klamath specked dace, sculpin species, and lamprey species.

At least fourteen exotic species occur in the river and reservoirs. Yellow perch, fathead minnows, Sacramento perch, and golden shiner typically favor slower water habitats including slackwater shoals close to Copco Reservoir, and generally are not found in swift flowing portions of the river (USDI-BLM 1990). Although not documented by fisheries specialists, there have been at least two reports of white sturgeon in the planning area. White sturgeon was planted in Upper Klamath Lake in 1956 (ODFW 1997). Brown trout, planted in Copco Reservoir, inhabit and migrate through the California reach to spawn in Shovel Creek (CDFG 2000). Steelhead, planted into Copco Reservoir 1971-1981 (excepting 1975, 1977, and 1978) has been reported from the California portion of the Klamath in the past.

Range Resources

Cattle, wildlife, and a small herd of wild horses currently compete for forage in the planning area. U.S. Timberlands, PacifiCorp, and BLM-administered lands are used for grazing in and around the planning area. Hay production is also common on privately-owned (PacifiCorp) meadows in the planning area in California.

Grazing has affected the natural vegetative composition throughout much of the planning area. Factors causing this change include early spring grazing, historical burning, natural erosion, trampling and soil compaction by livestock, and repeated livestock use. These conditions favor the weedy annual species that easily take over the native perennial plants and grasses (see the Noxious Weeds section for more information).

Two studies, one by the Medford District BLM in 1981 and the other for the proposed Salt Caves Hydroelectric Project by the City Of Klamath Falls in 1984 and 1986 determined the rangelands to be in poor condition. However, the "Edge Creek Rangeland Health Standards Assessment" concluded that current BLM management (grazing and nongrazing) practices were making significant progress toward meeting rangeland standards. Present day livestock use was not considered a factor in the suppressed conditions, nor was it found to be slowing down gradual improvements.

Two BLM grazing allotments exist within the planning area; Edge Creek Allotment (#0102) and Laubacher Lease Allotment (#0155), and grazing occurs on private lands.

Private Lands - Within the planning area, about 95 percent of grazing use takes place on privately owned land, primarily the property of PacifiCorp.

Wild Horses

A very small portion (<5 percent) of the Pokegama Wild Horse Herd Management Area is located within the planning area north of the Klamath River. The total herd management area is bounded by Copco Reservoir and the Klamath River on the south and east, Jenny Creek on the west, and State Highway 66 on the north. With the exception of State Highway 66, these natural boundaries appear to be physical barriers to movement of wild horses and, therefore, to habitat expansion. There other wild horses that drift occasionally from the adjacent Gavin Peak Herd Management Area, which lies to the south and east of the planning area. There are currently estimated to be 35–45 horses residing in the herd management area. The Gavin Peak herd, administered by the USFS Goosenest Ranger District, has minimal influence on the planning area.

Wildfire Management

Lightning occurrence in the Klamath River Canyon caused 20 lightning ignitions from 1990 to 1999. The fire return interval for the conifer forest/woodland type is every 10 to 20 years. The estimated fire return interval for oak woodlands in this type of canyon terrain is 5 to 15 years.

Exclusion of natural fire in the Klamath Canyon has resulted in high fuel loading and created conditions where the potential for wildfire occurrence is increased.

Air Quality

Air quality and visibility are important qualities with respect to the River Plan, because of the role they play in maintaining scenic values in the Klamath River Canyon. The Klamath River Basin enjoys relatively clean air.

Area sources of air pollution are industrial plants, highways, urban areas, and smoke from wildfires or prescribed burns. The steep-sided topography of the river canyon can trap air until winds move it out. Smoke and dust generated outside the planning area can accumulate in the canyon, causing haze.

Land Tenure

PacifiCorp is the major private landowner in the planning area. PacifiCorp has requested, in writing, that BLM explore the possibility of land tenure adjustments during the development of the EIS.

PacifiCorp has submitted a map to the BLM that identifies parcels of their land in Oregon and California to be considered for possible land trade, acquisition, or a mutually beneficial land management arrangement.

Socioeconomics

Three counties, Jackson and Klamath Counties in Oregon, and Siskiyou County in California, are in the vicinity of the planning area. Total area population (2000 Census): 289,345, Jackson County: 181,269, Klamath County: 63,775, and Siskiyou County: 43,301.

Major population centers are Ashland (population 20,085), Klamath Falls (population 40,000 including surrounding county urban area), Medford (population 62,030), and Yreka (population 7,500).

The major sources of income are agriculture, government, and tourism. The Oregon Employment Department in its 1999 annual employment report, estimated civilian labor force in Jackson County to be 89,160 and 28,760 in Klamath County. The California Employment Development Department estimated civilian labor force in Siskiyou County to be 17,760, and trade (3,280). Unemployment rates in the individual counties were: Jackson, 6.6 percent; Klamath, 8.7 percent; and Siskiyou, 9.5 percent.

Description of Potential Area of Critical Environmental Concern

An ACEC designation highlights an area where BLM special management attention is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes; or to protect human life and safety from natural hazards (BLM Regulations, 43 CFR 1610).

An ACEC has been designated in the Klamath River Canyon from rim to rim extending from J.C. Boyle Powerhouse to the Oregon/California state line (Segment 2). The values for which the ACEC was designated were for fish, wildlife, cultural, and scenic qualities.

This plan will also evaluate extending the existing ACEC to Segment 1 (below J.C. Boyle Dam to the powerhouse) of the planning area. To be considered as a potential ACEC, an analysis and evaluation report must consider the relevance and importance of resource values indentified within the area which has been nominated as an ACEC. The report can be found in Appendix I of the River Plan.

Chapter 3 – Oregon Scenic Waterways Administrative Rules

The Oregon Scenic Waterways System was created by ballot initiative in 1970. Scenic waterways are defined as including the designated river and related adjacent lands within 0.25 mile of the bank on either side of the river.

The *Oregon Scenic Waterway Act* describes conditions under which activity can occur within the corridor of a state scenic waterway. The Act specifies the development of a management plan, in coordination with other state and local agencies.

The goal of the Scenic Waterway management planning process is to maintain the scenic "status quo" of a designated area without turning back the clock on existing land uses.

Scenic waterway management plans (administrative rules) are developed to protect or enhance the aesthetic and scenic values of scenic waterways, while allowing compatible agriculture, forestry and other land uses.

Existing Condition

The Klamath River from the J.C. Boyle Powerhouse to the Oregon-California state line was designated a scenic waterway in 1988. Ownership within this corridor is 75 percent BLM, 23 percent private, and 2 percent State of Oregon.

Klamath County has zoned the private lands within the scenic waterway corridor as "forestry."

To date, uses in the canyon have been primarily recreation, range, and timber management.

Classification for the Klamath River Scenic Waterway

The Oregon Parks and Recreation Department established a classification of "Scenic" for the entire 11-mile segment of the Klamath River Scenic Waterway. The management goal of this classification is to allow existing uses while protecting the scenic character of the river.

Land Management Rules for the Klamath River Scenic Waterway

This Scenic River area shall be administered consistent with the standards set by Oregon Administrative Rules 736-040-0035 and Oregon Administrative Rules 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e., forest-related dwellings) shall comply with Klamath County land use regulations.

The following land management rules are addressed in the River Plan DEIS:

- New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation.

- If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years).

- Commercial public service facilities, including resorts, motels, lodges, and trailer parks that are visible from the river shall not be permitted.

- New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in Oregon Revised Statutes 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation.

- New roads may be permitted only when totally screened from view from the river by topography and/or vegetation. The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the new road.

- Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall be totally screened from view from the river.

- Visible tree harvest or other vegetation management may be permitted provided that:

  - The operation complies with relevant *Forest Practices Act* rules

  - Harvest and management methods with low visual impact are used

  - Harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). Within this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

- Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

- Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

- Whenever standards of Oregon Administrative Rules 736-040-0035 are more restrictive than Klamath County's land use and development ordinances, scenic waterway regulations shall apply.

Chapter 4 – Resource Issues and Alternatives

This River Plan presents four alternatives for managing the canyon, based on data analysis and input from various sources, including residents, landowners, and the general public.

The first step in developing alternatives involved interdisciplinary team identification of desired future conditions (listed in the EIS as resource goals). The team then developed a set of management actions that are important in managing the type of resources in the Klamath River canyon. Four different themes were considered that would help to meet planning objectives and resolve conflicts that had been identified for the area.

Overview of Proposed Alternatives

Alternative 1 – Existing Management/"No Action"

This alternative is named "no action" although actions are proposed. Existing management policies would remain in place and implementation of actions would take place based on direction in the BLM Klamath Falls Resource Area and Redding Resource Management Plans. However, no action is proposed to modify any of the existing direction.

The goal of this alternative would be to maintain the existing wild and scenic river (scenic classification) outstandingly remarkable values and ACEC values.

Alternative 2 – Improvement of Resources and Opportunities

This alternative was developed in response to direction in the *Wild and Scenic Rivers Act*. This option advocates policies that would maintain and enhance the river's "wild and scenic" status, and "the values which caused it to be included, without…limiting other uses that do not substantially interfere with public use and enjoyment of these values."

The goal of this alternative would be not just to maintain, but to enhance where possible the area's outstandingly remarkable values, while resolving resource management conflicts that might occur.

Alternative 3 (Preferred Alternative) – Natural Resource Enhancement/Restoration

This alternative proposes that the BLM manage the river canyon in a more natural condition.

The goal of this alternative is to maintain and enhance all outstandingly remarkable values, while placing emphasis on restoration and enhancement of natural resources.

Alternative 4 – Expand Human Use Opportunities

This alternative emphasizes recreation more heavily that the other three options.

The goal of this alternative is to maintain and enhance all outstandingly remarkable values, while placing emphasis on management that contributes to human use of the river corridor. This use should not conflict significantly with management of other values and resources.

Description of Alternatives by Resource Topic

Table S-2 provides an abbreviated summary of resource actions proposed for BLM lands with each alternative. Proposed actions are also listed for PacifiCorp land (at the request of PacifiCorp), but are only made as recommendations. Decisions on this plan will only be made for BLM-administered land. For a complete review of the specific actions by alternative refer to Appendix H in the draft River Plan.

• • • • • •	• • • • • • 2 bridges (J.C. Boyle Dam and Klamath River Campground) • 50 miles of designated OHV routes	• • • • • •	• • • • • • 2 bridges (J.C. Boyle Dam and Klamath River Campground) • 50 miles of designated OHV routes

13.3

Alternative 1	Alternative 2	Alternative 3

Terrestrial Species

Watershed Values

Alternative 1	Alternative 2	Alternative 3	Alternative 4

Chapter 5 – Environmental Consequences

The potential environmental consequences from implementation of the management alternatives proposed in the River Plan, are summarized in the following section (see Table S-3). The interdisciplinary team has made the assumption that actions that are only recommended for implementation on PacifiCorp land, would occur. This allowed a more complete assessment on impacts to natural and social resources, in general, but more importantly allowed them to consider the potential cumulative impacts of management in the Klamath River canyon.

than Alternative 3

• Instream flows sufficient for favorable channel conditions and fish passage are emphasized • No Changes in ramp rates • Daily flow fluctuations: No	• Increased baseflows would enhance fish migration in Segment 1 • Provide sufficient flows for adult and juvenile stages for trout • Reduce ramp rate • Modify run-of-the-river flow regime would result	• Increased baseflows would enhance fish migration and ecological processes in Segment 1 • Increased baseflows provide for all 3 life stages of trout • Reduce ramp rate, if peaking occurs • Run-of-the-river flow regime would result	• Increased baseflows would enhance recreational fishing and fish migration in Segment 1 • Flows optimize whitewater rec opportunities while providing flows sufficient for adult and juvenile stages of trout • Reduce ramp rate

action, except as regarding minimum flows • No Changes in recreation releases • No flow changes anticipated unless as a result of the FERC relicensing process • Adjudicated water rights secured for recreation and fisheries instream flows	• Schedule powerhouse releases would resemble timing, volume and duration that occurred at the time of Wild and Scenic designation • Instream flows revised as necessary, through the FERC relicensing process and other studies • Adjudicated water rights secured for recreation and fisheries instream flows	• Daily flow fluctuation: No releases would be made to support whitewater recreation • Instream flows revised as necessary, through the FERC relicensing process and other studies • Adjudicated water rights secured for recreation and fisheries instream flows	• Daily flow fluctiation: No action, except as regarding minimum flows and ramp rates • Scheduled powerhouse releases would enhance whitewater opportunities • Instream flows revised as necessary, through the FERC relicensing process and other studies • Adjudicated water rights secured for recreation and fisheries instream flows

Alternative 1	Alternative 2	Alternative 3	
	• Extend existing ACEC to Segment 1	• Extend existing ACEC to Segment 1	• Extend existing ACEC to Segment 1

Chapter 6 – Coordination and Consultation

The Draft Upper Klamath River Management Plan/EIS (henceforth called the River Plan) was prepared by an interdisciplinary team of resource specialists from the BLM, Lakeview District, Klamath Falls Resource Area Office with cooperation from the BLM, Redding Field Office and the Oregon Parks and Recreation Department. The official start of the preparation of the River Plan was initiated with the publishing of a "Notice of Intent" to prepare a Draft Environmental Impact Statement in the *Federal Register* on November 27, 2000. This notice also included an invitation to the public to suggest issues to be addressed in the River Plan and to provide comments concerning the management of the public lands. The planning process began in earnest in early 2001 with scoping meetings with the public, local governments, and organizations.

The River Plan is quite complex and requires extra coordination due to the fact that the planning area covers portions of two states. Multiple federal, state, and local government agencies were coordinated with to ensure that regulations would be adhered to during the preparation of this plan. In addition, PacifiCorp coordinated with the BLM in sharing natural resource information on their lands that are considered in the River Plan.

Coordination

The BLM is coordinated with the following federal, state, and county agencies or committees: U.S. Fish and Wildlife Service, U.S. Forest Service, Environmental Protection Agency, Bureau of Reclamation, and National Resource Conservation Service, the Regional Interagency Executive Committee, Klamath Provincial Advisory Committee, Klamath Basin Ecosystem Restoration Office, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Oregon Department of Agriculture, Oregon Water Resources Department, Oregon Division of State Lands, Oregon State Marine Board, Oregon Parks and Recreation Department, State Historic Preservation Office (California and Oregon), Oregon Department of Environmental Quality, California Department of Fish and Game, California Department of Environmental Quality, California Departments of Forestry, California Water Resources Control Board, and the Klamath and Siskiyou Counties.

For more detailed information regarding the agencies BLM has coordinated with, see Chapter 6 in the DEIS.

Consultation

US Fish and Wildlife Service – The 1973 Endangered Species Act identified on a National List, any plant, animal or fish that is in danger of extinction throughout all or a significant portion of its range. Species that are threatened, proposed and candidate status have a consultation process for projects with the USFWS, which administers the National List. A Biological Opinion (BO) will be prepared on the final preferred alternative that will make a determination on endangered fish or wildlife species and habitat. This opinion evaluates the potential impacts to species from a specific project and provides recommendations for protection of the viability of the species. To date, consultation with the USFWS has been informal through discussions with BLM staff.

Tribes - The Lakeview District is in the process of developing a Memorandum of Understanding (MOU) between the BLM and the Klamath Tribes. It is anticipated the MOU will be finalized in FY 2003. The KFRA has consulted with the Klamath Tribes on the Klamath River Management Plan/EIS. Government-to-government meetings have been held that have included presentations to the Tribal Council. Regular updates have been given to the Tribes Cultural and Heritage Resource specialists during bi-monthly meetings.

Government-to-government consultation meetings were also held with various Tribes in California. The KFRA has consulted with the Shasta Nation (both Oregon and California groups), Hupa, Karuk, and Yurok Tribes regarding the proposed River Plan.

Chapter 7 – Implementation and Monitoring

Implementation

A detailed implementation time schedule will be developed in the FEIS. For the River Plan/DEIS, it was assumed that actions identified in Appendix H would be implemented in ten years with annual maintenance needed there after. The life span of this plan is estimated to be twenty years.

The total cost estimates for implementing the specific actions for each alternative are displayed in Table S-4. BLM has prepared cost estimates for the recommended actions that occur on PacifiCorp lands. This was done to abide by PacifiCorp's written request to consider their lands in this River Plan/DEIS.

There were common assumptions made when developing the cost estimates for implementing each alternative.

Cost estimates were based on contracting all work to complete the specific actions.

No cost estimates were made for land tenure acquisitions.

Maintenance costs were determined to be critical after the ten-year implementation period. Maintenance costs were determined by estimating 10% of the total cost per alternative per year. Maintenance costs are for recreation facilities, roads, and vegetation treatments.

Monitoring

BLM is required to monitor land use plan decisions (43 CFR 1610.4-9) and to adopt a monitoring program for any mitigation incorporated into decisions based on environmental impact statements (40 CFR 1505.2[c]). In addition, protection and enhancement of outstandingly remarkable river values is a mandate of the Wild and Scenic Rivers Act. In order to verify the trend of river resource conditions and to guide future management decisions, it is desirable to systematically sample public land, file the data in an organized fashion, and provide for periodic evaluation of the information obtained.

The monitoring plan identifies three levels of monitoring that could be conducted. These monitoring levels are described for each monitoring action and alternative (see Appendix M). The following reviews the three levels of monitoring that could be completed after projects implementation.

Implementation Monitoring **—** When determining whether a course of action is having the desired effects, the first step to take is implementation monitoring. This type of monitoring answers the question: "Were the actions detailed in the Record of Decision accomplished as designed?" Implementation monitoring will be conducted on each mitigation measure incorporated into the Klamath River Management Plan, and disclosure of accomplished actions will be documented in achievement reports. For many mitigation measures, such as standard Best Management Practices, the only monitoring necessary would be implementation monitoring.

Effectiveness Monitoring — If more monitoring information is desired, the second phase of monitoring is to determine whether the actions documented in the implementation phase of monitoring are having any effect. This phase answers the question: "Did the actions accomplished meet the objectives in the Record of Decision?" Thus, effectiveness monitoring includes obtaining field observations that meet approved protocol, and evaluating the data gathered to determine whether conditions remain within the bounds and intent of Plan direction.

Validation Monitoring — The validation phase of monitoring seeks to resolve whether the course of action is having the desired effects. Validation answers the question: "Were the initial assumptions used to develop the Klamath River Management Plan correct?" The validation phase also forms the background for adaptive management, and would become the initial data set for the next round of decision making.

Table S-4. Summary of Implementation, Monitoring, and Annual Maintenance Costs

Management Actions	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	BLM	PC*	BLM	PC*	BLM	PC*	BLM	PC*
Implementation Cost/Decade**	$ 1,106	$ 267	$2,978	$4,531	$4,062	$11,030	$4,326	$4,072
Monitoring Activities Cost/Decade***	384	N/A	857	N/A	765	N/A	796	N/A
Total Cost/Decade	$1,490	$ 267	$3,835	$4,531	$4,827	$11,030	$5,122	$4,072
Annual Maintenance after first decade (the implementation period)	105	27	298	453	400	400****	433	407

** PC = PacifiCorp (Costs are estimated using the same method as for BLM land. Private landowners may be able to accomplish work at a different rate.)*
*** All cost totals are in $1,000 and displayed for a ten year time period*
*** Monitoring costs calculated only for BLM lands for a ten year time period*
**** Annual maintenance costs based on less than 10% factor*

U.S. Department of the Interior
Bureau of Land Management

Lakeview District Office
HC10 Box 337, 301 South G. Street
Lakeview, Oregon 97630

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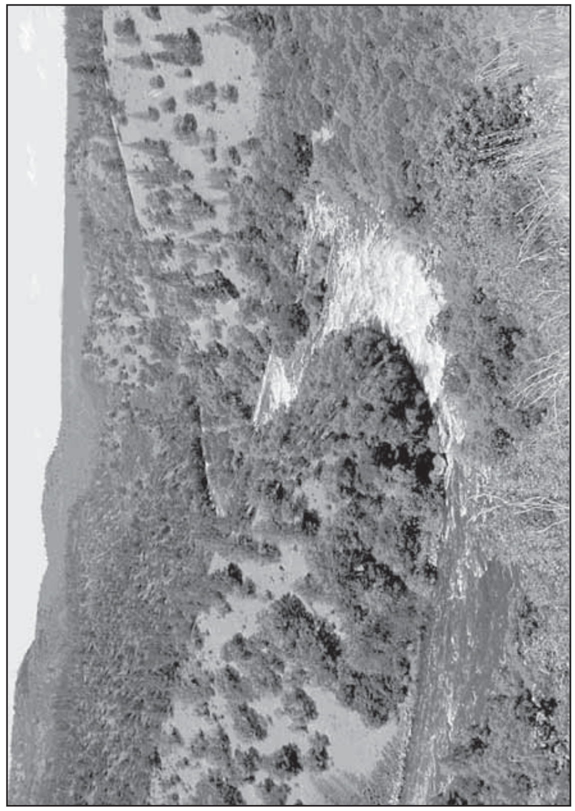
Draft-Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments

Volume 1 - Chapters



Draft-Upper Klamath River Management Plan/Environmental Impact Statement and Resource Management Plan Amendments — *Volume 1 - Chapters*

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BLM/OR/WA/PL-02/038+1792

Cover Photo: *Klamath River Canyon at Hells Corner*

List of Abbreviations and Acronyms

ACEC - Area of Critical Environmental Concern
ACS - Aquatic Conservation Strategy
AUM - Animal Unit Month
BLM - Bureau of Land Management
BMP - Best management practice
CA - Conservation Agreement
CAA - *Clean Air Act*
CDFG - California Department of Fish and Game
CEQ - Council on Environmental Quality
CFR - Code of Federal Regulations
CFS - Cubic Feet per Second
COE - Corps of Engineers (Corps)
CSWRCB - California State Water Resources Control Board
CWA - *Clean Water Act*
CWD - Coarse Woody Debris
DEQ - Department of Environmental Quality
DSL - Division of State Lands
EA - Environmental Assessment
EIS - Environmental Impact Statement
EPA - Environmental Protection Agency
ESA - *Endangered Species Act*
ESU - Evolutionary Significant Unit
FACA - *Federal Advisory Committee Act*
FERC - Federal Energy Regulatory Commission
FLPMA - *Federal Land Policy and Management Act*
FONSI - Finding of No Significant Impact
FTZ - Fuel Treatment Zones
GIS - Geographic Information System
HABS/HAER - Historic American Buildings Survey/ Historic American Engineering Record
HCP - Habitat Conservation Plan
IAC - Intergovernmental Advisory Committee
IBLA - Interior Board of Land Appeals
ICBEMP - Interior Columbia Basin Ecosystem Management Project
JITW - Jobs in the Woods
KFRA - Klamath Falls Resource Area
KFRMP - Klamath Falls (Resource Area) Resource Management Plan
KPAC - Klamath Provincial Advisory Committee
LAC - Limits of Acceptable Change
LCDC - Land Conservation and Development Commission
LSR - Late-Successional Reserve
LUP - Land Use Plan
MOA - Memorandum of Agreement
MOU - Memorandum of Understanding
NCA - National Conservation Area
NEPA - *National Environmental Protection Act*
NFMA - *National Forest Management Act*
NFP - Northwest Forest Plan
NHPA - *National Historic Preservation Act*
NMFS - National Marine Fisheries Service
NOA - Notice of Availability
NOAA - National Oceanic Atmospheric Administration
NOI - Notice of Intent
NPS - National Park Service
NRCS - Natural Resources Conservation Service
NRHP - National Register of Historic Places
NRI - Natural Resources Inventory
O&C - *Oregon & California Lands Act*
ODA - Oregon Department of Agriculture
ODEQ - Oregon Department of Environmental Quality
ODF - Oregon Department of Forestry
ODFW - Oregon Department of Fish and Wildlife
ODOT - Oregon Department of Transportation
ODSL - Oregon Division of State Lands
OHV - Off-Highway Vehicle (also known as Off-Road Vehicle)
ONHP - Oregon Natural Heritage Program
OPRD - Oregon Parks and Recreation Department
ORV - Outstandingly Remarkable Value
OWRD - Oregon Water Resources Department
PAC - Provincial Advisory Council
PDF - Project Design Feature
PFC - Proper Functioning Condition
PFW - Partners for Wildlife
PRIA - *Public Rangelands Improvement Act*
RC&D - Resource Conservation and Development
RIEC - Regional Interagency Executive Committee
REO - Regional Ecosystem Office
RMP - Resource Management Plan
RM - River Mile
ROD - Record of Decision
ROS - Recreation Opportunity Spectrum
RRMP - Redding Resource Management Plan
SONCC - Southern Oregon/Northern California Coastal
SHPO - State Historic Preservation Office
SMA - Special Management Area
SRMA - Special Recreation Management Area
SWCD - Soil and Water Conservation District
T&E - Threatened and Endangered
TES - Threatened, Endangered, and Sensitive (Species)
TMDL - Total Maximum Daily Load
TNC - The Nature Conservancy
USBR - U.S. Bureau of Reclamation
USDA - United States Department of Agriculture
USDI - United States Department of Interior
USFS - United States Forest Service
USFWS - United States Fish and Wildlife Service
USGS - United States Geological Survey
VRM - Visual Resource Management
WQS - Water Quality Standards
WSR - Wild and Scenic River
WSRA - *Wild and Scenic Rivers Act*
WQRP - Water Quality Restoration Plan

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Klamath Falls Resource Area
2795 Anderson Avenue, Building 25
Klamath Falls, Oregon 97603-7891
Phone: (541)883-6916 | Fax: (541)884-2097
E-Mail Address: Username@kfra.or.blm
Website: http://www.or.blm.gov/Lakeview/kfra/index.htm

IN REPLY REFER TO:
1610 (014)

February 26, 2003

Dear Interested Party:

Enclosed for your review and comment is the Draft Upper Klamath River Management Plan and Environmental Impact Statement (EIS) and Resource Management Plan Amendments. This document outlines management options and environmental consequences for managing lands administered by the Bureau of Land Management (BLM) in southern Oregon and northern California along the upper Klamath River system. This EIS will amend both the BLM Redding (California) and the Klamath Falls Resource Area (Oregon) Resource Management Plans. It also proposes classification and rules affecting all non-federal lands within the designated Oregon's State Scenic Waterway.

There are four resource management alternatives proposed in this DEIS. The alternatives were designed to provide different management actions that protect, maintain, restore and/or enhance river values, resources, and ecological processes while providing opportunities for the public to enjoy this unique area. In compliance with Code of Federal Regulations (CFR) § 1610.4-7, Alternative 3 was identified as the preferred alternative. Although a preferred alternative is identified, it is recognized that parts of the other alternatives would also meet management goals or possibly new information will be identified that could change the preferred alternative. As a result, dialogue and comments received on this draft plan will be heavily relied upon in the formulation of the Proposed Final Upper Klamath River Management Plan/Environmental Impact Statement.

Written comments should be sent to Larry Frazier, Project Team leader, Bureau of Land Management, 2795 Anderson Avenue, Building 25, Klamath Falls, Oregon, or via email (krmp@or.blm.gov). All written comments will be fully considered and evaluated in the preparation of the final Upper Klamath River Plan and EIS.

Your review and comments are requested at this time to ensure that your interests are adequately considered in the planning process. A 90-day public comment period is being provided for review of this document. Public meetings will be held in Klamath Falls, Oregon, and Yreka and Copco, California, during the comment period. Additional meetings may be held in other locations if there is sufficient interest. The comment period closing date and specific dates and locations of public meetings will be announced through the local news media, news letters, and the BLM website (www.or.blm.gov/Lakeview/kfra/index.htm).

Written comments on the State Scenic Waterway portion of the plan (Chapter 3) should be sent to Jan Houck, Program Coordinator, Oregon State Parks and Recreation Department, 20300 Empire Avenue, Suite B-1, Bend, Oregon, or via email (jan.houck@state.or.us).

Comment letters to the BLM, including names and street addresses of respondents, will be available for public review at the Klamath Falls Resource Area office during regular business hours 8:00 a.m. to 5:00 p.m., Monday through Friday, except holidays, and may be published as part of the Final EIS. 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 prominently at the beginning of your written comments. Such requests will be honored to the extent allowed by law. Anonymous comments will be considered. All submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety.

We appreciate your help in this planning effort and look forward to your continued interest and participation. For additional information or clarification regarding this document or the planning process, please contact Larry Frazier or Don Hoffheins at (541) 883-6916.

Sincerely,

Teresa A Raml

Teresa A. Raml, Manager
Klamath Falls Resource Area

DRAFT UPPER KLAMATH RIVER MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT and RESOURCE MANAGEMENT PLAN AMENDMENTS

Klamath Falls Resource Area Field Manager Recommendation

I recommend release of the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment. It has been prepared following direction in BLM Handbook H-1601-1 (Land Use Planning) and BLM Manual 8351 (Wild and Scenic Rivers). The Draft River Plan addresses issues raised by the public, and proposes land use allocations and management actions for Bureau administered lands and resources that would protect or enhance river values throughout the Upper Klamath River.

Teresa A Raml

Teresa A. Raml, Field Manager

Redding Resource Area Field Manager Recommendation

I recommend the release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Charles M. Schultz, Field Manager

Lakeview District Manager Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Steven A Ellis

Steven A. Ellis, Lakeview District Manager

Oregon/Washington State Director Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Elaine M. Brong

Elaine Marquis-Brong, Oregon/Washington State Director

California State Director Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Mike Pool, California State Director

Oregon State Parks and Recreation Concurrence

I concur with the recommendation to release the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments for public review and comment.

Michael Carrier

Michael Carrier, Oregon Parks and Recreation Director

Summary

Draft Upper Klamath River Management Plan

Environmental Impact Statement And Resource Management Plan Amendments

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Summary – Draft Upper Klamath River Management Plan/Environmental Impact Statement and Resource Management Plan Amendments

Chapter 1 - Introduction

Background

This Draft Environmental Impact Statement (EIS) refers specifically to a planning area on the upper Klamath River. The upper portion of the Klamath River is the stretch between Lake Ewauna, at Klamath Falls, Oregon, south to Irongate Dam in California. The lower Klamath River section is from Irongate Dam to the Pacific Ocean.

Management of this river corridor is quite complex, owing to its unique combination of private and public land ownership, and multiple land use management designations covering portions of two states.

Numerous factors affect management efforts for the area, the greatest of these being the presence of J.C. Boyle Powerhouse that uses river water diverted at J.C. Boyle Dam to generate electricity for a public utility. Other factors include public use for recreation, especially for a local whitewater rafting industry, the success of which is directly tied to water releases from the dam. Specific designations have been applied to parts of the upper Klamath River that by law require special management plans be developed.

The BLM's Klamath Falls Resource Area (Oregon) and the Redding Field Office (California)0 staff contributed to the creation of this plan, as well as the Oregon Parks and Recreation Department employees.

Purpose and Need, and Decisions to be Made

This planning effort is being undertaken because the current recreation plan, completed in 1983 by the BLM Medford District, is outdated. There are now overlapping jurisdictions and designations that did not exist 20 years ago. The *Wild and Scenic Rivers Act* and administrative guidance for implementing management of the Area of Critical Environmental Concern require preparation on management plans.

This DEIS is *not a decision document*. Its primary purpose is to disclose the environmental consequences that could occur through implementation of the alternatives being considered. However, decisions will be based on the analysis disclosed here.

A Record of Decision (ROD), or numerous RODs, will be signed by the state directors of Oregon/Washington and California State BLM offices. In addition, the Governor of Oregon will review the document and make a decision on adoption of administrative rules for the State Scenic Waterway.

There are two types of decisions that the BLM can make related to this plan – land use decisions and implementation level decisions. Land use decisions establish the type of appropriate management needed for the land. Implementation decisions prescribe specific actions that should be taken with respect to those lands.

When this planning effort is complete, there will be one Upper Klamath River Management Plan (henceforth called the River Plan) and Final Environmental Impact Statement that will guide and coordinate all federal and state land management activities along the river. This new River Plan would amend the current BLM resource management plans and will be completed in 2004.

For this DEIS, Alternative 3 has been identified as the “Preferred” Alternative. The analysis presented in this DEIS will be used by BLM State Directors for Oregon/Washington and California to decide on a final plan, which will be documented in one or more Records of Decision.

The River Plan also reviews classification and rules affecting all non-federal lands within the designated Oregon’s State Scenic Waterway. The classification and rules are in Chapter 3 of the DEIS.

The Planning Area

The area covered by the plan is within Klamath County, Oregon, and Siskiyou County, California, and is located about 25 miles southwest of Klamath Falls, Oregon.

The planning area for the River Plan extends about 20 miles from the J.C. Boyle Dam in Oregon (owned by PacifiCorp), southwest to the slackwater of Copco Reservoir in northern California (see Map 1).

The Oregon portion of the planning area is about 15 miles long and encompasses approximately 6,000 acres of public BLM-administered lands. The California portion is about five miles long and covers approximately 200 acres of public BLM-administered lands.

The river is divided into three sections within the planning area, Segments 1, 2, and 3, which extend north to south along the river corridor. Segments 1 and 2 are in Oregon, and Segment 3 is in California.

Existing Management Direction

The River Plan, while based on input from a variety of sources, both scientific and opinion-based, must also conform to existing laws and plans, on both the federal and state level.

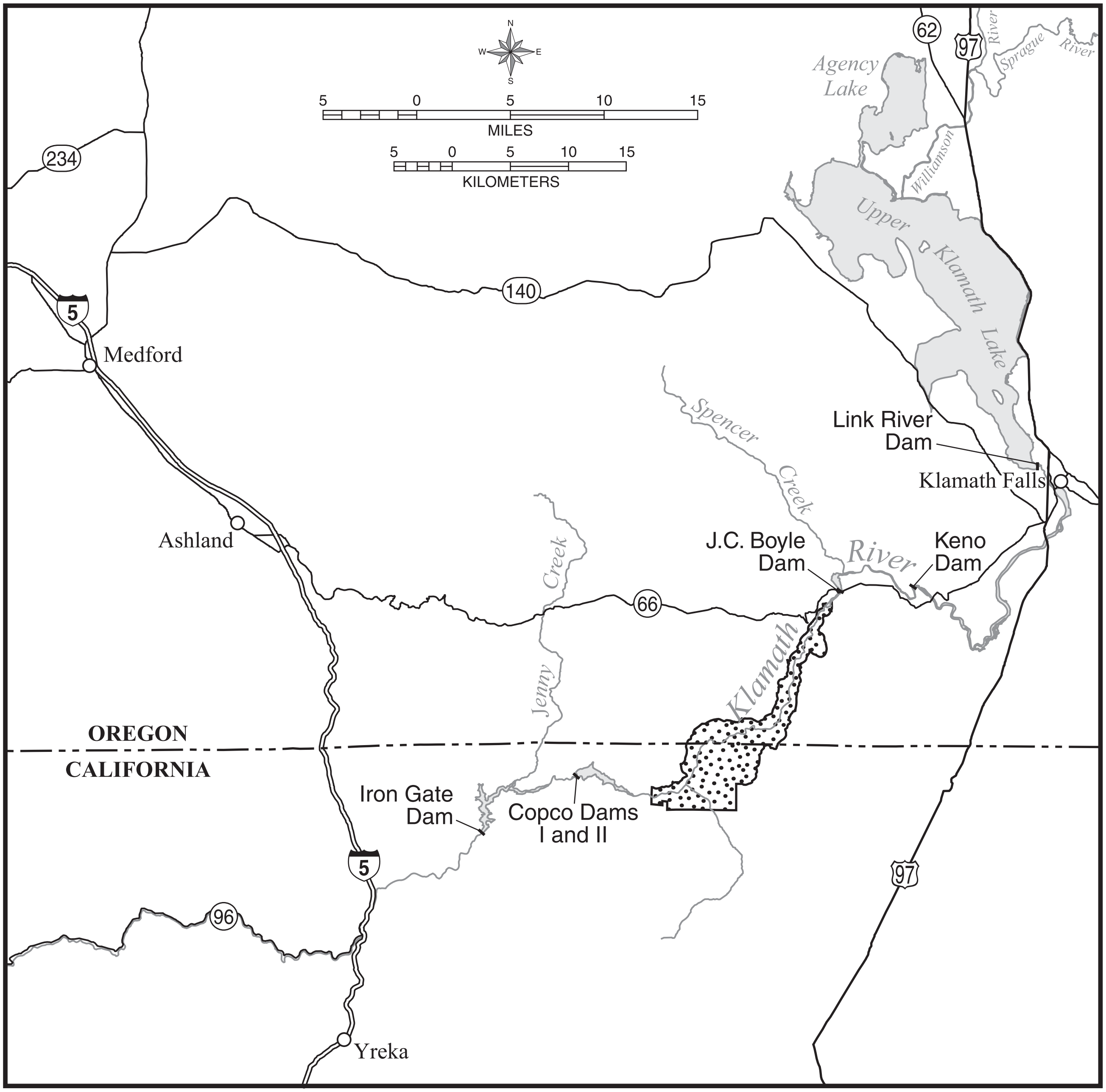
Federal and State Laws

The Klamath Falls Resource Area is responsible for determining if the River Plan conforms to applicable state and federal law, and will make this determination in a subsequent ROD.

Designations within the Planning Area

Oregon Scenic Waterway

The Oregon Scenic Waterways System was created by ballot initiative in 1970. Scenic waterways are defined as including the designated river and related adjacent lands within 0.25 mile of the bank on either side of the river. In 1988 an 11-mile section (located in Segment 2) of the Klamath River in Oregon was designated a State Scenic Waterway.



Legend

Planning Area

Interstate

US Highway

State Highway

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area

CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments
2003

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D12-05-01: MW:061702
Oregon State Office

Map 1: Upper Klamath River, Regional Transportation, and Major Population Centers

National Wild and Scenic River Designation

In 1994, the Klamath River from J.C. Boyle Dam Powerhouse to the California/Oregon border (including a 0.25-mile corridor on either side) was designated a wild and scenic river under the *Wild and Scenic Rivers Act* (1968).

Upper Klamath River Area of Critical Environmental Concern

The BLM has designated an Area of Critical Environmental Concern (ACEC) in the Klamath River Canyon, from J.C. Boyle Powerhouse to the Oregon and California state line, extending from rim-to-rim.

Management Goals for the Plan

Overall management goals of the River Plan are:

- Maintain and restore river-related scenic and natural resources
- Provide diverse recreational experiences.
- Promote visitor understanding and enjoyment
- Protect and enhance cultural resources

Public Involvement and Scoping

Scoping is the process of determining the scope of the environmental analysis to be completed.

The scoping process for the River Plan was initiated in late 2000, and involved a variety of outreach methods; including meetings with relevant committees, organizations, government entities, and the public; consultations with the Tribes; news releases; and scoping documents mailed to people or businesses on a project mailing list.

Identification of Issues

By the end of the initial scoping period on January 31, 2001, the BLM had received 36 written responses. Comments from these letters have been consolidated into 57 different public issue statements, addressing 15 topics.

In addition, PacifiCorp sent a letter (dated May 2, 2001) requesting that about 6,000 acres of their private lands located within the planning area be considered in the River Plan for possible land tenure adjustments. PacifiCorp is considering several management options for these lands that are surplus to their needs for power production. PacifiCorp requested the BLM to consider their lands for exchange for other BLM lands, or purchase, or that BLM and PacifiCorp enter into a mutually beneficial land management arrangement of these lands. PacifiCorp and BLM natural resource specialists have cooperated to gather resource information on PacifiCorp lands for inclusion in the plan.

The analysis and potential projects developed as part of this planning effort may be used by PacifiCorp to help determine desired long-term management of the lands, and potentially identify offsite mitigation opportunities for the FERC relicensing process.

Wild and Scenic River and ACEC Values as They Apply to the Issues

The BLM has developed a set of criteria to determine outstandingly remarkable values during the eligibility process for inclusion into the national wild and scenic river system. Values identified in the “Final Eligibility and Suitability Report for the Klamath Wild and Scenic River Study” (1990) and in the National Park Service’s “Klamath Wild and Scenic River

Eligibility Report and Environmental Assessment" (August 1994) were used to support the designation of the river found in Segment 2 of the planning area. These values are: wildlife, fish, prehistoric, historic, scenic quality, and Native American traditional use. The BLM's resource management planning process also stipulates identification of values that need to receive special management emphasis for designation of an ACEC.

Protection and enhancement of wild and scenic river and ACEC values within the planning area are the primary objectives of this plan. The wild and scenic river outstandingly remarkable values appear below with an asterisk (*).

Scenic Quality *

The river's scenic quality is one of its outstandingly remarkable values. How to best maintain or enhance scenic qualities is a management concern, including consideration of new facilities, fuel treatments, prescribed fire, utility development, and roads.

Recreation Activities*

With respect to recreation on the river, two issues relating primarily to whitewater rafting are of great importance: recreational carrying capacity and river flows.

There is also concern about the management of other recreational uses within the river corridor, such as fishing, hiking, and off-highway vehicle (OHV) use.

Recreation Facilities

The improvement or construction of recreational facilities along the river is also an issue. Facilities may need to be removed or relocated to reduce impacts on other resources. Proposed trails, cultural resources, fish habitat, and vandalism are all pertinent issues.

Roads and Access

There are numerous roads on public land within the river canyon, and OHV use has resulted in increased erosion and sedimentation into the river, as well as damage to significant prehistoric and historic sites, and Native American traditional use areas. These concerns need to be balanced with public OHV use, the ultimate goal being to provide for this type of recreational use while protecting resources.

Cultural Resources/Prehistoric Sites

The river canyon contains many cultural sites, some of which receive intensive recreation use, and have endured resulting damage. This plan would aim to reduce vandalism and increase public awareness to prevent further damage to sensitive cultural areas.

Native American Traditional Uses*

Native Americans have used the river canyon for thousands of years, and the area has spiritual significance for tribal members. Current roads and access have led to OHV damage in Native American traditional use areas. This plan will address OHV issues, as well as forest health management and prescribed fire practices as a means of maintaining traditional food-gathering sites.

Historic Sites*

Historic sites are rapidly deteriorating and have been vandalized; this has raised concerns about how to protect and manage these structures.

Watershed Values

Different sections of the upper Klamath River have been listed as "water quality limited," in accordance with Section 303(d) of the *Clean Water Act*. The listings are because of the impacts of nutrients, low dissolved oxygen and elevated stream temperatures on beneficial uses, such as fish habitat.

Water quality also affects other values, such as recreation, for which the river was designated a State of Oregon scenic waterway, and national wild and scenic river. This plan identifies possible ways of protecting and enhancing water quality within the planning corridor in support of other resource values.

Erosion caused by roads, water flows, lack of riparian vegetation, and impaired watershed processes has contributed to limited water quality.

Wildlife*

There are threatened and endangered species that use the river corridor. Habitat for these species would be evaluated to determine the types of management needed.

Fisheries*

Fisheries is one of the outstandingly remarkable values that earned the Klamath River its designation as a national wild and scenic river. In addition, the river has been classified by the states of Oregon and California as a wild trout fishery. The planning area is also within the historic range of the threatened and endangered coho salmon.

There are recreational trout fishing concerns surrounding the lack of large fish in the river. Daily fluctuating flows from the J.C. Boyle Powerhouse may be a factor.

Fire and Fuels

This plan addresses the need for effective fuel reduction treatments and the potential loss of scenic characteristics from wildfire.

Vegetation and Biological Diversity

This plan evaluates how vegetation (including wildlife and fish habitat, and Native American traditional use food-gathering areas) would be managed. This includes control or eradication of exotic or noxious species.

Air Quality

Prescribed fires could affect air quality within and outside of the planning area. A smoke management plan will be included in the final River Plan/EIS.

Socioeconomics

Potential management actions could affect the local economy, such as individuals, businesses, outfitters, minority and low-income populations, and tribes. These factors will be analyzed and considered in the plan.

PacifiCorp's Power Generating Facilities

PacifiCorp operates a series of hydroelectric power generation facilities on the upper Klamath River. The River Plan identifies the effect these operations have on river resources and values.

Land Tenure

As the major private landowner in the planning area, PacifiCorp has requested that the BLM explore possible land tenure adjustments in the development of the River Plan. Adjustments could include land trade, acquisition, or mutually beneficial land management arrangements.

Private Land

The plan addresses the State of Oregon's Administrative Rules for private land in the Scenic Waterway portion (located in Segment 2) of the planning area (see Chapter 3). The effects on adjacent private land from BLM proposed actions are also addressed.

There are management concerns regarding how the federal government can ensure adequate recreational access to the river if it does not administer the land. Other potential impacts on private land adjacent to BLM administered land are also addressed.

Grazing

Livestock grazing effects on rangeland health, recreation, cultural, riparian, and wildlife habitat issues are analyzed.

Cumulative Impacts

The cumulative impacts of management actions proposed or recommended within the planning area, plus other actions on public and private land not a part of this plan, are also considered in this DEIS.

Chapter 2 – Affected Environment

General Setting and Access

The Klamath River lies within the High Cascades Physiographic Province and borders the Basin and Range Province on the west. Topography varies from flat to gently sloping along the river benches to some almost vertical canyon walls. The canyon rim rises 1,000 feet above the river. Precipitation is 15-20 inches, coming mostly in fall, winter, and spring. Temperatures range from low 20s in winter to high 80s-90s in summer. Canyon air quality is generally good, thanks to the planning area's location far from urban and industrialized areas.

Geological characteristics include volcanic flows, cinder cones, and fault patterns. Seismic activity is low in the planning area. No economically valuable mineral deposits are known to exist in the area.

The upper Klamath River is readily accessible from the four major population centers in southern Oregon and northern California. The main transportation route to the river is State Highway 66 (Green Springs Highway), which runs east/west between U.S. Highway 97 in the Klamath Basin, and Interstate 5, in the Rogue River Valley (see Map 1).

Scenic Resources

The visual quality of a landscape is based on landscape character. The stronger the influence of form, line, color, and texture, the more interesting the landscape; the more visual variety in a landscape, the more aesthetically pleasing it is. An assessment of landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications is used to classify the scenic quality of the area. During the rating process, each of these factors is ranked on a comparative basis with similar features within the planning area. A visual resource management (VRM) class rating is then made to manage the quality of the visual environment and to reduce the visual impact of development activities (BLM Handbook H-8410-1).

The upper Klamath River Canyon was evaluated by the BLM in 1977 and 1981 and received a "Scenic Quality Class A" evaluation – the highest scenic quality classification possible.

Recreation

The planning area is host to 10,000 visitors annually. Major recreational activities within the planning area include whitewater boating, fishing, hunting, and camping. Additional activities include sightseeing, hiking, photography, picnicking, wildlife observation, driving for pleasure (OHV use limited to designated roads and trails), trapping, and horseback riding.

Whitewater Boating

One of the unique features of the upper Klamath River is the extended season for whitewater boating opportunities provided as a result of year-round releases from the J.C. Boyle Dam/ Powerhouse system. Most river systems in the Pacific Northwest are raftable only during high spring flows.

The primary rafting season on the upper Klamath River extends from Memorial Day through Labor Day, which makes it one of the few rivers in the northwest that can be floated throughout the summer.

Since the summer of 1998, PacifiCorp has varied the water release schedule to include more releases that start later in the day, starting the release as late as 2-4 p.m. This change in scheduling reflects changing market conditions for wholesale electric power, as well as anticipated regional electric power shortages during summer heat waves.

This shift in water release start times has impacted whitewater boating opportunities by either forcing boaters to launch their trips later in the day, or to cancel or postpone their trips due to the timing of the water release.

Recreation Sites and Facilities

Public recreation sites and facilities are located throughout the planning area. The remote river canyon offers campers a semi-primitive experience with several day use sites.

Camping facilities are provided at Topsy Recreation area, Klamath River Campground, and five additional fire-safe sites are available along the river's edge. There are several primitive campsites at Frain Ranch (PacifiCorp lands).

PacifiCorp offers fishing and day use access at six locations in the California section of the river and allows dispersed camping in the Frain Ranch Area.

Fishing

The upper Klamath River within the planning area is managed as a wild trout river in both Oregon and California. The river provides an excellent trout fishery and is among one of the better flyfishing rivers in Oregon.

Hunting

Hunting occurs primarily on open benches along the river and in draws along the canyon rim. Game includes black-tailed deer, silver-gray squirrels, mountain and valley quail, and turkey. Additional recreational hunting occurs in spring and early summer for ground squirrels and marmots.

Roads and Access

Public access to the planning area is currently on the Topsy and J.C. Boyle Powerhouse roads. These roads provide the majority of access in the planning area. There are some other roads that cross private land, where the discretion of the landowner determines access.

Cultural Resources/Traditional Use

Cultural resources within the planning area are divided into three categories (1) prehistoric, (2) historic, and (3) current Native American traditional use.

There are about 100 known prehistoric sites in the upper Klamath River canyon. There are fishing, gathering, and hunting camps, and pit house villages (pit houses are circular depressions reflecting a semi-subterranean prehistoric house structure).

The area was home to a variety of cultural groups at different times, including the Shasta Nation of northern California, the Modoc and Klamath Tribes of the Klamath Basin, the Takelma of the upper Rogue River, and possibly the Pit River Indians of northeastern California.

Europeans have used the upper Klamath River Canyon extensively since the 1850s, settling on terraces and flood plains along the river and several meadow areas. There are numerous historic ranches that have structures still standing that were constructed between the late 1800's and early 1900's.

Today, members of the Klamath Tribe and the Shasta Nation continue to use the canyon for spiritual purposes, hunting, fishing, gathering, and other cultural activities. Many of the traditional use areas can be considered traditional cultural properties.

Vegetation and Soils

Special Status Plant Species

There are no documented sites of federally listed threatened or endangered plants in the planning area. Limited surveys have been conducted, but there have been no systematic surveys covering the entire planning area. Species of special concern that have been documented in the planning area include the mountain lady slipper orchid (*Cypripedium montanum*), Greene's mariposa lily (*Calochortus greenei*), Bolander's sunflower (*Helianthus bolanderi*), red-root yampah (*Perideridia erythrorhiza*), Howell's false-caraway (*Perideridia howellii*), and Lemmon's catchfly (*Silene lemmonii*).

Noxious Weeds

Noxious weeds are plant species designated under federal, state, or local laws and ordinances that cause economic loss and/or harm the environment.

Populations of Russian knapweed (*Acroptilon repens*), yellow starthistle (*Centuarea solstitialis*), poison hemlock (*Conium maculatum*), Scotch broom (*Cytisus scoparius*), St. John's wort (*Hypericum perforatum*), yellow toadflax (*Linaria vulgaris*), Himalayan blackberry (*Rubus discolor*), and puncture vine (*Tribulus terrestris*) have been documented and mapped within the planning area through incidental surveys by BLM staff and university researchers.

Plant Communities

The planning area contains a mixture of the following vegetation types. The following table (Table S-1) lists plant communities and the approximate percent coverage in the planning area.

Table S-1. Plant Communities of the Planning Area

Vegetation Community Type	Percent of Planning Area
Conifer forest and woodland	43
Oak woodlands	27
Juniper woodland	1
Mixed shrub	17
Rabbitbrush/Sagebrush	4
Dry meadow	4
Riparian communities	2
Irrigated meadow	2

Soils

The primary soil series in the Oregon portion of the planning area are the Bogus, Greystoke, McMullin, and Skookum series. Descriptions of the soils can be found in the "Soil Survey of Jackson County Area, Oregon" (USDA-SCS 1993).

Soils within the Oregon portion of the planning area generally have slow infiltration rates when wet. This is a consequence of moderately high proportions of clay, especially in subsurface horizons. Despite the potential for surface runoff, most soils in the planning area have a low susceptibility to sheet and rill erosion of surface horizons. This is due to the high proportion of coarse fragments on the soil surface.

The primary soil series in the California portion of the planning area are the Bogus, Jenny, Lassen-Kuck complex, Lithic Haploxerolls-Rock outcrop complex, and Medford. Descriptions can be found in the "Soil Survey of Central Siskiyou County California Central Part" (USDA-SCS 1983).

Soils within the California portion of the planning area generally have slow infiltration rates when wet (for the same reasons as the soils within the Oregon portion).

Terrestrial Species and Habitat Management

Birds

There are 197 species of birds within the planning area, some year-round residents, others seasonal or migratory.

Some important species include: bald eagle (Threatened), golden eagle, osprey, peregrine falcon (Oregon State Sensitive), prairie falcon, red-tailed hawk, American kestrel, sharp-shinned hawk, Coopers hawk, great horned owl, long-eared owl, western screech owl, northern goshawk (Oregon State Sensitive Species), northern pygmy owl (Oregon State Sensitive Species), northern spotted owl (endangered), wild turkey, redlegged partridge, warbling vireo, yellow warbler, lazuli bunting, lesser goldfinch, and Wilson's warbler.

Mammals

The canyon provides habitat to support a great variety and abundance of mammals.

A partial listing of species is: silver-gray squirrel, beaver, muskrat, wild pigs, Townsend's big-eared bat, Raccoon, river otter, mink, long- and short-tailed weasel, ringtail (Oregon State Sensitive Species), coyote, gray fox, bobcat, mountain lion, Roosevelt elk, black bear, cougar, blacktailed deer, and mule deer.

Herptiles

Eighteen species of reptiles and amphibians (collectively referred to as herptiles) have been identified in the planning area: western rattlesnake, common and western terrestrial garter snake, gopher snake, striped whipsnake, rubber boa, ringneck snake, yellow-bellied racer, western fence lizard, southern alligator lizard, sagebrush lizard, western skunk, western toad (Oregon State Sensitive Species), Pacific tree frog, California mountain king snake (Oregon State Sensitive Species), sharptail snake (Oregon State Sensitive Species), northern sagebrush lizard (Oregon State Sensitive Species), and western pond turtle (Oregon State Sensitive Species).

Watershed Values

Watershed values are a key component in shaping animal and plant communities in the planning area, and in providing recreational opportunities. The Klamath River fills many roles relating to human and wildlife needs.

Beneficial Uses

Among those roles are "beneficial uses," as determined by Oregon Department of Environmental Quality. Established beneficial uses for the upper Klamath River in Oregon include public and private domestic water supply; industrial water supply; irrigation; livestock watering; salmonid rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing, boating, and water contact recreation; and aesthetic quality.

The North Coast Regional Water Quality Control Board has established beneficial uses for the California portion of the Klamath. Broad categories include water supply, recreation, fish and wildlife, power generation, and scientific study.

Energy Generation and Transmission

The planning area includes the portion of the Klamath River between two hydroelectric facilities: J.C. Boyle Dam in Oregon and Copco 1 Reservoir in California. The J.C. Boyle Dam 88-megawatt power generation plant is 4.3 river miles below the dam. This facility has turbine generators that supply power during high use (peak) periods.

Water Rights

Water use in the Klamath River Basin upstream from, and within, the planning area affects streamflows in the Klamath River. An adjudication process now being conducted by the Oregon Water Resources Department (OWRD) will determine surface water rights associated with the designated wild and scenic river. This process will establish water right claims submitted by BLM.

Klamath River Instream Flows

Within Segments 1 and 2, PacifiCorp is licensed to divert up to 2,500 cfs of Klamath River water to generate hydroelectric power. The utility also has two permits that allow a small diversion from the dam for irrigation, stock and domestic use.

The BLM has filed a claim for instream flows in Segment 2 of the planning area based on the *Wild and Scenic Rivers Act* of 1968. In the Act, Congress expressly reserved water for flow-dependent outstandingly remarkable values. Flows were claimed (Federal Reserve Claim 376, 1999) for three outstandingly remarkable values: fisheries (625 cfs from April 1 through June 15, and 525 cfs for the rest of the year) and recreation (whitewater rafting, 1,500 cfs between Memorial Day and September 30) (see Table 2-12). The BLM water right claim on the River is pending in the Klamath Basin Adjudication.

Other Water Rights

Other entities also have water claims and/or rights on the Klamath River, including the Oregon Department of Parks and Recreation, the Bureau of Indian Affairs (on behalf of the Klamath Tribes), the Oregon Department of Forestry, and private landowners. The Klamath River Basin Compact also provides guidance, along with other applicable laws, for water rights administration in the Klamath Basin (see River Plan for further details).

The Oregon Department of Forestry has a permit to use up to 10,000 gallons of water daily for dust abatement on an unnamed tributary in Segment 2.

Streamflows

The upstream end of the Klamath River drainage encompasses about 4,080 square miles of surrounding land. Snowmelt in this drainage area flows mostly to Upper Klamath Lake, which creates late winter and spring naturally occurring peak flows to the Klamath River.

Summer flows come from the Link River Dam (on Upper Klamath Lake), and groundwater discharges. Elevated flows in fall are caused by return flow from irrigated areas south and west of Klamath Falls.

The other primary cause of streamflow variance is the operation of the J.C. Boyle hydroelectric facilities. Flow varies according to water availability, instream flow requirements for salmon (listed under the Endangered Species Act) downstream from Iron Gate Dam, and PacifiCorp's FERC license.

Flows in Segment 1 are not subject to the daily fluctuations that occur in Segments 2 and 3 from powerhouse operations.

Energy demand (and subsequent hydroelectric plant use) can determine the amount of flow in the river. When daily average natural river flows are less than around 3,300 cfs, the facility can increase flows to produce power during peak energy demand periods which is called "peaking". On days when the J.C. Boyle complex is operated for peaking power, stage (change in river surface elevation) can be raised or lowered about 2.2 feet over a 6-hour period.

Water Quality

Water quality, which as previously mentioned, is designated "water quality limited" under terms of the *Clean Water Act*, is affected by upstream point and nonpoint pollutant sources in the area.

Some examples of characteristics that limit water quality in the planning area are high algal content, high pH, temperature, chlorophyll-a, and dissolved oxygen. These may detrimentally affect beneficial uses and outstandingly remarkable values (including fisheries, recreation, and wildlife).

Stream channel morphology

Stream channel morphology, that is, width, depth, substrate, and channel gradient, etc., is affected by natural flows and releases from J.C. Boyle facilities.

Increased discharge and/or decreased sediment (gravel) supply can cause channel widening, incision and bed armoring.

Aquatic Species/Habitat

The dams on the Klamath River have affected fish species distribution throughout the Klamath Basin. Historically, the Klamath River was a passageway for anadromous fish, salmon, steelhead, and Pacific lamprey as they migrated to various tributaries of the Klamath River and Upper Klamath Lake (ODFW 1997). These fish runs were halted in 1910 by the construction of Copco I Dam, completed in 1917, which permanently blocked fish passage (City of Klamath Falls 1986). Five more dams were built on the upper Klamath River;Copco II and lrongate are located in California, and Link River, Keno, and J.C. Boyle Dams are located in Oregon (PacifiCorp 2000). J.C. Boyle, Keno, and Link River Dams have fish ladders intended for trout migration, each varying in function. Only J.C. Boyle Dam has a screening facility to prevent entrainment of fish into the power diversion canal.

The hydroelectric project on the upper Klamath River will be assessed for reintroduction of anadromous species through the hydroelectric facilities as part of the Federal Energy Regulatory Commission relicensing process.

The upper Klamath River is inhabited by 10 known native fish species. Three species of note are: redband trout – the primary game fish in the Klamath River, Lost River sucker – (state and federally listed endangered species), and shortnose sucker – (state and federally listed endangered species).

Other native species are Klamath smallscale sucker, blue and tui chub, Klamath specked dace, sculpin species, and lamprey species.

At least fourteen exotic species occur in the river and reservoirs. Yellow perch, fathead minnows, Sacramento perch, and golden shiner typically favor slower water habitats including slackwater shoals close to Copco Reservoir, and generally are not found in swift flowing portions of the river (USDI-BLM 1990). Although not documented by fisheries specialists, there have been at least two reports of white sturgeon in the planning area. White sturgeon was planted in Upper Klamath Lake in 1956 (ODFW 1997). Brown trout, planted in Copco Reservoir, inhabit and migrate through the California reach to spawn in Shovel Creek (CDFG 2000). Steelhead, planted into Copco Reservoir 1971-1981 (excepting 1975, 1977, and 1978) has been reported from the California portion of the Klamath in the past.

Range Resources

Cattle, wildlife, and a small herd of wild horses currently compete for forage in the planning area. U.S. Timberlands, PacifiCorp, and BLM-administered lands are used for grazing in and around the planning area. Hay production is also common on privately-owned (PacifiCorp) meadows in the planning area in California.

Grazing has affected the natural vegetative composition throughout much of the planning area. Factors causing this change include early spring grazing, historical burning, natural erosion, trampling and soil compaction by livestock, and repeated livestock use. These conditions favor the weedy annual species that easily take over the native perennial plants and grasses (see the Noxious Weeds section for more information).

Two studies, one by the Medford District BLM in 1981 and the other for the proposed Salt Caves Hydroelectric Project by the City Of Klamath Falls in 1984 and 1986 determined the rangelands to be in poor condition. However, the “Edge Creek Rangeland Health Standards Assessment” concluded that current BLM management (grazing and nongrazing) practices were making significant progress toward meeting rangeland standards. Present day livestock use was not considered a factor in the suppressed conditions, nor was it found to be slowing down gradual improvements.

Two BLM grazing allotments exist within the planning area; Edge Creek Allotment (#0102) and Laubacher Lease Allotment (#0155), and grazing occurs on private lands.

Private Lands - Within the planning area, about 95 percent of grazing use takes place on privately owned land, primarily the property of PacifiCorp.

Wild Horses

A very small portion (<5 percent) of the Pokegama Wild Horse Herd Management Area is located within the planning area north of the Klamath River. The total herd management area is bounded by Copco Reservoir and the Klamath River on the south and east, Jenny Creek on the west, and State Highway 66 on the north. With the exception of State Highway 66, these natural boundaries appear to be physical barriers to movement of wild horses and, therefore, to habitat expansion. There other wild horses that drift occasionally from the adjacent Gavin Peak Herd Management Area, which lies to the south and east of the planning area. There are currently estimated to be 35–45 horses residing in the herd management area. The Gavin Peak herd, administered by the USFS Goosenest Ranger District, has minimal influence on the planning area.

Wildfire Management

Lightning occurrence in the Klamath River Canyon caused 20 lightning ignitions from 1990 to 1999. The fire return interval for the conifer forest/woodland type is every 10 to 20 years. The estimated fire return interval for oak woodlands in this type of canyon terrain is 5 to 15 years.

Exclusion of natural fire in the Klamath Canyon has resulted in high fuel loading and created conditions where the potential for wildfire occurrence is increased.

Air Quality

Air quality and visibility are important qualities with respect to the River Plan, because of the role they play in maintaining scenic values in the Klamath River Canyon. The Klamath River Basin enjoys relatively clean air.

Area sources of air pollution are industrial plants, highways, urban areas, and smoke from wildfires or prescribed burns. The steep-sided topography of the river canyon can trap air until winds move it out. Smoke and dust generated outside the planning area can accumulate in the canyon, causing haze.

Land Tenure

PacifiCorp is the major private landowner in the planning area. PacifiCorp has requested, in writing, that BLM explore the possibility of land tenure adjustments during the development of the EIS.

PacifiCorp has submitted a map to the BLM that identifies parcels of their land in Oregon and California to be considered for possible land trade, acquisition, or a mutually beneficial land management arrangement.

Socioeconomics

Three counties, Jackson and Klamath Counties in Oregon, and Siskiyou County in California, are in the vicinity of the planning area. Total area population (2000 Census): 289,345, Jackson County: 181,269, Klamath County: 63,775, and Siskiyou County: 43,301.

Major population centers are Ashland (population 20,085), Klamath Falls (population 40,000 including surrounding county urban area), Medford (population 62,030), and Yreka (population 7,500).

The major sources of income are agriculture, government, and tourism. The Oregon Employment Department in its 1999 annual employment report, estimated civilian labor force in Jackson County to be 89,160 and 28,760 in Klamath County. The California Employment Development Department estimated civilian labor force in Siskiyou County to be 17,760, and trade (3,280). Unemployment rates in the individual counties were: Jackson, 6.6 percent; Klamath, 8.7 percent; and Siskiyou, 9.5 percent.

Description of Potential Area of Critical Environmental Concern

An ACEC designation highlights an area where BLM special management attention is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes; or to protect human life and safety from natural hazards (BLM Regulations, 43 CFR 1610).

An ACEC has been designated in the Klamath River Canyon from rim to rim extending from J.C. Boyle Powerhouse to the Oregon/California state line (Segment 2). The values for which the ACEC was designated were for fish, wildlife, cultural, and scenic qualities.

This plan will also evaluate extending the existing ACEC to Segment 1 (below J.C. Boyle Dam to the powerhouse) of the planning area. To be considered as a potential ACEC, an analysis and evaluation report must consider the relevance and importance of resource values indentified within the area which has been nominated as an ACEC. The report can be found in Appendix I of the River Plan.

Chapter 3 – Oregon Scenic Waterways Administrative Rules

The Oregon Scenic Waterways System was created by ballot initiative in 1970. Scenic waterways are defined as including the designated river and related adjacent lands within 0.25 mile of the bank on either side of the river.

The *Oregon Scenic Waterway Act* describes conditions under which activity can occur within the corridor of a state scenic waterway. The Act specifies the development of a management plan, in coordination with other state and local agencies.

The goal of the Scenic Waterway management planning process is to maintain the scenic "status quo" of a designated area without turning back the clock on existing land uses.

Scenic waterway management plans (administrative rules) are developed to protect or enhance the aesthetic and scenic values of scenic waterways, while allowing compatible agriculture, forestry and other land uses.

Existing Condition

The Klamath River from the J.C. Boyle Powerhouse to the Oregon-California state line was designated a scenic waterway in 1988. Ownership within this corridor is 75 percent BLM, 23 percent private, and 2 percent State of Oregon.

Klamath County has zoned the private lands within the scenic waterway corridor as "forestry."

To date, uses in the canyon have been primarily recreation, range, and timber management.

Classification for the Klamath River Scenic Waterway

The Oregon Parks and Recreation Department established a classification of "Scenic" for the entire 11-mile segment of the Klamath River Scenic Waterway. The management goal of this classification is to allow existing uses while protecting the scenic character of the river.

Land Management Rules for the Klamath River Scenic Waterway

This Scenic River area shall be administered consistent with the standards set by Oregon Administrative Rules 736-040-0035 and Oregon Administrative Rules 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e., forest-related dwellings) shall comply with Klamath County land use regulations.

The following land management rules are addressed in the River Plan DEIS:

- New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation.

- If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years).

- Commercial public service facilities, including resorts, motels, lodges, and trailer parks that are visible from the river shall not be permitted.

- New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in Oregon Revised Statutes 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation.

- New roads may be permitted only when totally screened from view from the river by topography and/or vegetation. The condition of “total screening,” as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the new road.

- Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall be totally screened from view from the river.

- Visible tree harvest or other vegetation management may be permitted provided that:

    - The operation complies with relevant *Forest Practices Act* rules

    - Harvest and management methods with low visual impact are used

    - Harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). Within this paragraph, “enhance” means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

- Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

- Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

- Whenever standards of Oregon Administrative Rules 736-040-0035 are more restrictive than Klamath County’s land use and development ordinances, scenic waterway regulations shall apply.

Chapter 4 – Resource Issues and Alternatives

This River Plan presents four alternatives for managing the canyon, based on data analysis and input from various sources, including residents, landowners, and the general public.

The first step in developing alternatives involved interdisciplinary team identification of desired future conditions (listed in the EIS as resource goals). The team then developed a set of management actions that are important in managing the type of resources in the Klamath River canyon. Four different themes were considered that would help to meet planning objectives and resolve conflicts that had been identified for the area.

Overview of Proposed Alternatives

Alternative 1 – Existing Management/"No Action"

This alternative is named "no action" although actions are proposed. Existing management policies would remain in place and implementation of actions would take place based on direction in the BLM Klamath Falls Resource Area and Redding Resource Management Plans. However, no action is proposed to modify any of the existing direction.

The goal of this alternative would be to maintain the existing wild and scenic river (scenic classification) outstandingly remarkable values and ACEC values.

Alternative 2 – Improvement of Resources and Opportunities

This alternative was developed in response to direction in the *Wild and Scenic Rivers Act*. This option advocates policies that would maintain and enhance the river's "wild and scenic" status, and "the values which caused it to be included, without…limiting other uses that do not substantially interfere with public use and enjoyment of these values."

The goal of this alternative would be not just to maintain, but to enhance where possible the area's outstandingly remarkable values, while resolving resource management conflicts that might occur.

Alternative 3 (Preferred Alternative) – Natural Resource Enhancement/Restoration

This alternative proposes that the BLM manage the river canyon in a more natural condition.

The goal of this alternative is to maintain and enhance all outstandingly remarkable values, while placing emphasis on restoration and enhancement of natural resources.

Alternative 4 – Expand Human Use Opportunities

This alternative emphasizes recreation more heavily that the other three options.

The goal of this alternative is to maintain and enhance all outstandingly remarkable values, while placing emphasis on management that contributes to human use of the river corridor. This use should not conflict significantly with management of other values and resources.

Description of Alternatives by Resource Topic

Table S-2 provides an abbreviated summary of resource actions proposed for BLM lands with each alternative. Proposed actions are also listed for PacifiCorp land (at the request of PacifiCorp), but are only made as recommendations. Decisions on this plan will only be made for BLM-administered land. For a complete review of the specific actions by alternative refer to Appendix H in the draft River Plan.

•	• 2 bridges (J.C. Boyle Dam and Klamath River Campground) • 50 miles of designated OHV routes	•	• 2 bridges (J.C. Boyle Dam and Klamath River Campground) • 50 miles of designated OHV routes

13.3

Alternative 1	Alternative 2	Alternative 3

Terrestrial Species

Watershed Values

Alternative 1	Alternative 2	Alternative 3	Alternative 4

Chapter 5 – Environmental Consequences

The potential environmental consequences from implementation of the management alternatives proposed in the River Plan, are summarized in the following section (see Table S-3). The interdisciplinary team has made the assumption that actions that are only recommended for implementation on PacifiCorp land, would occur. This allowed a more complete assessment on impacts to natural and social resources, in general, but more importantly allowed them to consider the potential cumulative impacts of management in the Klamath River canyon.

than Alternative 3

• Instream flows sufficient for favorable channel conditions and fish passage are emphasized • No Changes in ramp rates • Daily flow fluctuations: No	• Increased baseflows would enhance fish migration in Segment 1 • Provide sufficient flows for adult and juvenile stages for trout • Reduce ramp rate • Modify run-of-the-river flow regime would result	• Increased baseflows would enhance fish migration and ecological processes in Segment 1 • Increased baseflows provide for all 3 life stages of trout • Reduce ramp rate, if peaking occurs • Run-of-the-river flow regime would result	• Increased baseflows would enhance recreational fishing and fish migration in Segment 1 • Flows optimize whitewater rec opportunities while providing flows sufficient for adult and juvenile stages of trout • Reduce ramp rate

action, except as regarding minimum flows • No Changes in recreation releases • No flow changes anticipated unless as a result of the FERC relicensing process • Adjudicated water rights secured for recreation and fisheries instream flows	• Schedule powerhouse releases would resemble timing, volume and duration that occurred at the time of Wild and Scenic designation • Instream flows revised as necessary, through the FERC relicensing process and other studies • Adjudicated water rights secured for recreation and fisheries instream flows	• Daily flow fluctuation: No releases would be made to support whitewater recreation • Instream flows revised as necessary, through the FERC relicensing process and other studies • Adjudicated water rights secured for recreation and fisheries instream flows	• Daily flow fluctiation: No action, except as regarding minimum flows and ramp rates • Scheduled powerhouse releases would enhance whitewater opportunities • Instream flows revised as necessary, through the FERC relicensing process and other studies • Adjudicated water rights secured for recreation and fisheries instream flows

Alternative 1	Alternative 2	Alternative 3	
	• Extend existing ACEC to Segment 1	• Extend existing ACEC to Segment 1	• Extend existing ACEC to Segment 1

Chapter 6 – Coordination and Consultation

The Draft Upper Klamath River Management Plan/EIS (henceforth called the River Plan) was prepared by an interdisciplinary team of resource specialists from the BLM, Lakeview District, Klamath Falls Resource Area Office with cooperation from the BLM, Redding Field Office and the Oregon Parks and Recreation Department. The official start of the preparation of the River Plan was initiated with the publishing of a "Notice of Intent" to prepare a Draft Environmental Impact Statement in the *Federal Register* on November 27, 2000. This notice also included an invitation to the public to suggest issues to be addressed in the River Plan and to provide comments concerning the management of the public lands. The planning process began in earnest in early 2001 with scoping meetings with the public, local governments, and organizations.

The River Plan is quite complex and requires extra coordination due to the fact that the planning area covers portions of two states. Multiple federal, state, and local government agencies were coordinated with to ensure that regulations would be adhered to during the preparation of this plan. In addition, PacifiCorp coordinated with the BLM in sharing natural resource information on their lands that are considered in the River Plan.

Coordination

The BLM is coordinated with the following federal, state, and county agencies or committees: U.S. Fish and Wildlife Service, U.S. Forest Service, Environmental Protection Agency, Bureau of Reclamation, and National Resource Conservation Service, the Regional Interagency Executive Committee, Klamath Provincial Advisory Committee, Klamath Basin Ecosystem Restoration Office, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Oregon Department of Agriculture, Oregon Water Resources Department, Oregon Division of State Lands, Oregon State Marine Board, Oregon Parks and Recreation Department, State Historic Preservation Office (California and Oregon), Oregon Department of Environmental Quality, California Department of Fish and Game, California Department of Environmental Quality, California Departments of Forestry, California Water Resources Control Board, and the Klamath and Siskiyou Counties.

For more detailed information regarding the agencies BLM has coordinated with, see Chapter 6 in the DEIS.

Consultation

US Fish and Wildlife Service – The 1973 Endangered Species Act identified on a National List, any plant, animal or fish that is in danger of extinction throughout all or a significant portion of its range. Species that are threatened, proposed and candidate status have a consultation process for projects with the USFWS, which administers the National List. A Biological Opinion (BO) will be prepared on the final preferred alternative that will make a determination on endangered fish or wildlife species and habitat. This opinion evaluates the potential impacts to species from a specific project and provides recommendations for protection of the viability of the species. To date, consultation with the USFWS has been informal through discussions with BLM staff.

Tribes - The Lakeview District is in the process of developing a Memorandum of Understanding (MOU) between the BLM and the Klamath Tribes. It is anticipated the MOU will be finalized in FY 2003. The KFRA has consulted with the Klamath Tribes on the Klamath River Management Plan/EIS. Government-to-government meetings have been held that have included presentations to the Tribal Council. Regular updates have been given to the Tribes Cultural and Heritage Resource specialists during bi-monthly meetings.

Government-to-government consultation meetings were also held with various Tribes in California. The KFRA has consulted with the Shasta Nation (both Oregon and California groups), Hupa, Karuk, and Yurok Tribes regarding the proposed River Plan.

Chapter 7 – Implementation and Monitoring

Implementation

A detailed implementation time schedule will be developed in the FEIS. For the River Plan/DEIS, it was assumed that actions identified in Appendix H would be implemented in ten years with annual maintenance needed there after. The life span of this plan is estimated to be twenty years.

The total cost estimates for implementing the specific actions for each alternative are displayed in Table S-4. BLM has prepared cost estimates for the recommended actions that occur on PacifiCorp lands. This was done to abide by PacifiCorp's written request to consider their lands in this River Plan/DEIS.

There were common assumptions made when developing the cost estimates for implementing each alternative.

Cost estimates were based on contracting all work to complete the specific actions.

No cost estimates were made for land tenure acquisitions.

Maintenance costs were determined to be critical after the ten-year implementation period. Maintenance costs were determined by estimating 10% of the total cost per alternative per year. Maintenance costs are for recreation facilities, roads, and vegetation treatments.

Monitoring

BLM is required to monitor land use plan decisions (43 CFR 1610.4-9) and to adopt a monitoring program for any mitigation incorporated into decisions based on environmental impact statements (40 CFR 1505.2[c]). In addition, protection and enhancement of outstandingly remarkable river values is a mandate of the Wild and Scenic Rivers Act. In order to verify the trend of river resource conditions and to guide future management decisions, it is desirable to systematically sample public land, file the data in an organized fashion, and provide for periodic evaluation of the information obtained.

The monitoring plan identifies three levels of monitoring that could be conducted. These monitoring levels are described for each monitoring action and alternative (see Appendix M). The following reviews the three levels of monitoring that could be completed after projects implementation.

Implementation Monitoring — When determining whether a course of action is having the desired effects, the first step to take is implementation monitoring. This type of monitoring answers the question: "Were the actions detailed in the Record of Decision accomplished as designed?" Implementation monitoring will be conducted on each mitigation measure incorporated into the Klamath River Management Plan, and disclosure of accomplished actions will be documented in achievement reports. For many mitigation measures, such as standard Best Management Practices, the only monitoring necessary would be implementation monitoring.

***Effectiveness Monitoring* —** If more monitoring information is desired, the second phase of monitoring is to determine whether the actions documented in the implementation phase of monitoring are having any effect. This phase answers the question: "Did the actions accomplished meet the objectives in the Record of Decision?" Thus, effectiveness monitoring includes obtaining field observations that meet approved protocol, and evaluating the data gathered to determine whether conditions remain within the bounds and intent of Plan direction.

Validation Monitoring — The validation phase of monitoring seeks to resolve whether the course of action is having the desired effects. Validation answers the question: "Were the initial assumptions used to develop the Klamath River Management Plan correct?" The validation phase also forms the background for adaptive management, and would become the initial data set for the next round of decision making.

Table S-4. Summary of Implementation, Monitoring, and Annual Maintenance Costs

Management Actions	**Alternative 1**		**Alternative 2**		**Alternative 3**		**Alternative 4**	
	BLM	PC*	BLM	PC*	BLM	PC*	BLM	PC*
Implementation Cost/Decade**	$ 1,106	$ 267	$2,978	$4,531	$4,062	$11,030	$4,326	$4,072
Monitoring Activities Cost/Decade***	384	N/A	857	N/A	765	N/A	796	N/A
Total Cost/Decade	$1,490	$ 267	$3,835	$4,531	$4,827	$11,030	$5,122	$4,072
Annual Maintenance after first decade (the implementation period)	105	27	298	453	400	400****	433	407

**   PC = PacifiCorp (Costs are estimated using the same method as for BLM land. Private landowners may be able to accomplish work at a different rate.)*
***   All cost totals are in $1,000 and displayed for a ten year time period*
***   Monitoring costs calculated only for BLM lands for a ten year time period*
**** Annual maintenance costs based on less than 10% factor*

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Chapter 1 – Klamath River Drainage in California

Chapter 1 – Introduction

About this Document

The Klamath Falls Resource Area (KFRA) has initiated the planning process to develop the "Draft Upper Klamath River Management Plan/ Environmental Impact Statement and Resource Management Plan Amendments" (hereinafter referred to as the River Plan/DEIS). This document was prepared to provide you, the reader, an opportunity to review the information and analysis that the Bureau of Land Management (BLM) has in relation to this topic. This document is intended to comply with the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act of 1969 (40 Code of Federal Regulations (CFR) Parts 1500-1508). Planning guidance also comes from land use planning requirements established by Sections 201 and 202 of the Federal Land Policy and Management Act of 1976 (FLPMA, 43 U.S.C. 1711) and the regulations in 43 CFR 1600.

Resource management and planning are complex tasks. Resource management is based on both biological and social sciences and there is a lot of technical "jargon" that comes with those sciences. A document of this scope does by necessity include many of the related technical terms. The BLM has tried to use common language, but when that is not easily accomplished, specific terms are explained, typically when first mentioned, and in the Glossary that appears in Appendix A. In order to reduce some length of the document we have also used abbreviations or "acronyms" that are made up of the initial letters of the words in the title. A list of Common Acronyms is included on the back cover.

If you find that some sections are unclear and you need a fuller explanation, we encourage you to contact any one of the BLM "resource experts" (see Appendix B for a List of Preparers) through our Receptionist at 541-883-6916.

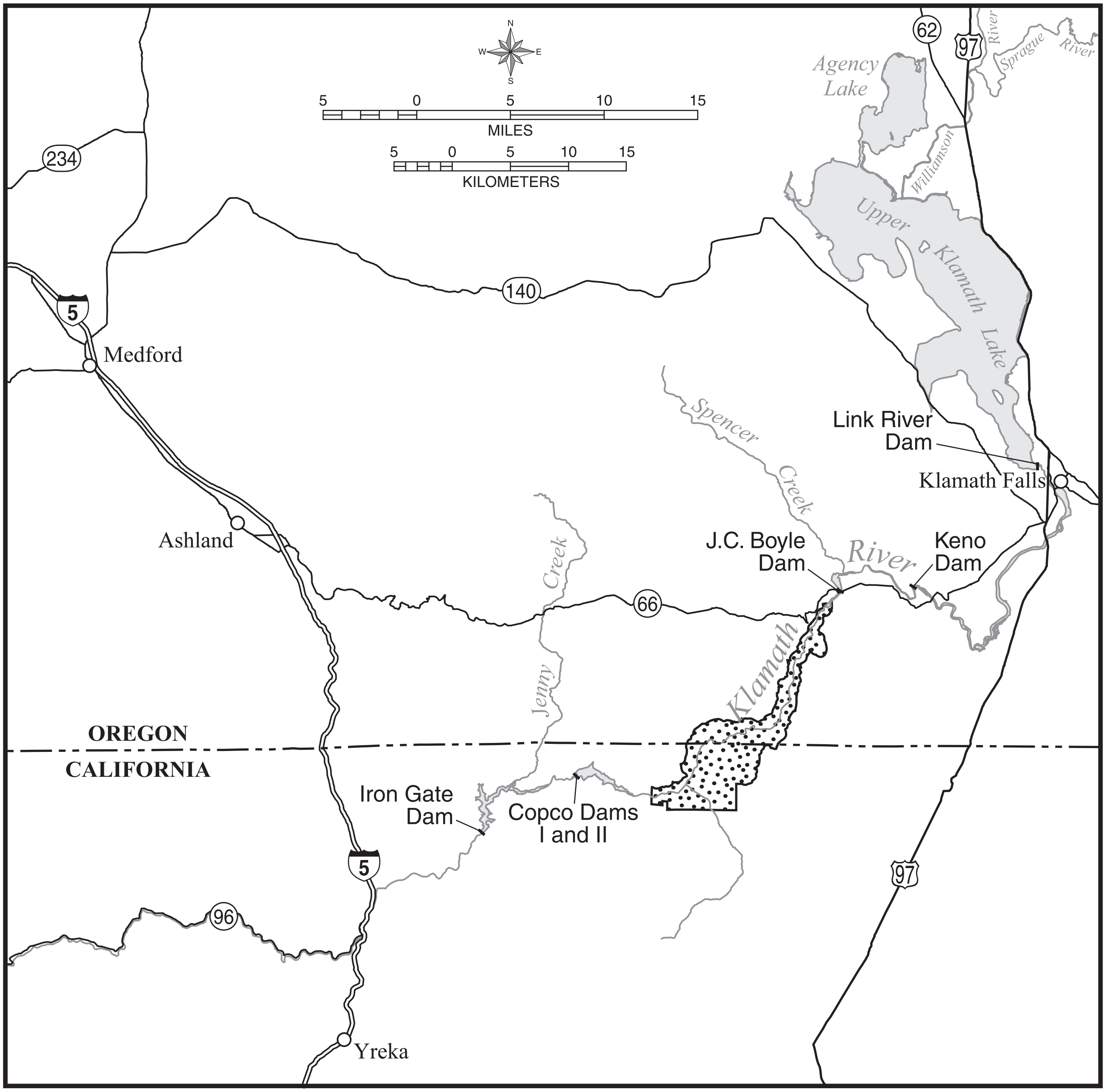
Background

The Klamath River has been and continues to be an important feature in the ecosystem of southern Oregon and northern California. Ownership and management of lands surrounding the Klamath River is highly varied.

The Klamath River begins in Lake Ewauna, just south of the city of Klamath Falls, Oregon (see Map 1), and flows southwesterly into California and then west to the Pacific Ocean. From the river's beginning to Irongate Dam in California, it is commonly known as the upper Klamath River. The section from Irongate Dam to the Pacific Ocean, it is known as the lower Klamath River.

The state of Oregon designated an 11-mile segment of the Klamath River as a State Scenic Waterway in 1988. The same 11-mile section of the Klamath River within Oregon was designated as a Wild and Scenic River with the classification of "Scenic," under Section 2 (a)(ii) of the *Wild and Scenic Rivers Act* (see Map 2).

This designation was made by the Secretary of the Interior, at the request of Oregon's governor in 1994. The *Wild and Scenic Rivers Act* requires that a management plan be developed to protect and enhance the outstandingly remarkable values for which the river was designated (see Map 2).



Legend

- Planning Area
- 5 Interstate
- 97 US Highway
- 96 State Highway

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area

CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments
2003

Map 1: Upper Klamath River, Regional Transportation, and Major Population Centers

D12-05-01: MW:061702
Oregon State Office

The 1995 "Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary" (RMP) identified an Area of Critical Environmental Concern (ACEC) for the full river canyon (rim-to-rim) for the designated 11-mile section of the river (see Map 2). An ACEC is a type of special land use designation designed to protect areas with important resource values that are in need of special management. The RMP provides direction to "Develop site-specific management plans . . ." for these special areas. Table 1-1 summarizes by year the significant actions related to the Klamath River designations within the planning area. The River Plan /DEIS will address requirements for each of these designations. Because of the long distance from Redding to the river, and nearer proximity to Klamath Falls, the Klamath Falls Resource Area manages recreation use on BLM lands along the section of the Klamath River in northern California.

The River Plan/DEIS is being prepared by Klamath Falls Resource Area staff, with input and review from Redding Field Office staff. In addition, Oregon Parks and Recreation has provided draft administrative rules for scenic waterways and review for this document, relating to the State of Oregon's Scenic Waterway designation.

The Planning Area

The planning area for the proposed Upper Klamath River Management Plan (River Plan) is from the J.C. Boyle Dam (in Oregon) southwest to the slackwater of Copco Reservoir in California.

The Oregon portion of the plan is about 15 miles long and encompasses about 6,000 acres of public lands; the California river segment is about five miles long and encompasses about 200 acres of public lands.

The proposed project is within Klamath County, Oregon, and Siskiyou County, California, and is located about 25 miles southwest of Klamath Falls, Oregon.

The "Final Eligibility and Sustainability Report for the Upper Klamath Wild and Scenic River Study (1990)," divided the river into three segments and analyzed the outstandingly remarkable values for each river segment.

The proposed planning area for this plan includes the river segments, plus some surrounding landscape, including the (ACEC) designated under the "Klamath Falls Resource Area Resource Management Plan" (KFRA/FEIS) (1995). For the purposes of this planning effort, the planning area is similarly divided into three segments described below (see Map 2 and Table 1-2).

Segment 1 (Oregon)

This segment was found to be neither eligible nor suitable for inclusion into the wild and scenic river system. However, this segment does possess recreation, wildlife, fishery, and visual quality aspects that need to be considered in the overall planning of the river system.

Segment 2 (Oregon)

The outstandingly remarkable values identified for this segment are recreation, wildlife, fish, prehistoric, historic, scenic, and Native American traditional use. A 0.25-mile boundary on each side of the river was designated a State of Oregon scenic waterway in 1988 and a national wild and scenic river in 1994.

The values for which this segment was designated a wild and scenic river need to be protected or enhanced when considering land management practices or resource activities.

Table 1-1. – Significant Actions Related to the Klamath River Designations

Year	Significant Actions
1969	The *Oregon Scenic Waterways Act (Oregon Revised Statutes 390.805 to 390.925)*, administered under the authority of the Oregon State Parks and Recreation Department, is a statewide law for river conservation that was established by a vote in 1969. The Oregon Scenic Waterways System was established through the act.
1983	The BLM developed guidance for management of recreation resources in the recreation area management plan for the Klamath River Special Recreation Management Area.
1988	In October 1988, the *Oregon Omnibus Rivers Act* directed the BLM to complete an eligibility and suitability report for the Upper Klamath Wild and Scenic River for possible inclusion into the national wild and scenic rivers system. This report was completed in 1990.
1988	In November 1988, Ballot Measure 7 was passed in Oregon, adding, among other rivers, the upper Klamath River (from the J.C. Boyle Dam Powerhouse southwest to the Oregon/California state line and 0.25 mile in width from the ordinary high water mark on each bank) to the Oregon Scenic Waterways System. The Oregon State Parks and Recreation Department has primary administrative responsibility for Oregon scenic waterways and explicit authority to regulate land use. The department has adopted general rules of land management applicable to all scenic waterways. Specific rules are adopted for individual scenic waterways.
1990	The BLM "Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River" was sent to Congress. This study report recommended that segments of the upper Klamath River be included into the national wild and scenic river system. This report identified an 11-mile segment in Oregon and five-mile segment in California as eligible and suitable for inclusion into the national wild and scenic river system.
1994	In response to a request by Oregon Governor Barbara Roberts to designate the Klamath River under Section 2(a)(ii) of the *National Wild and Scenic Rivers Act*, the National Park Service undertook the "Klamath Wild and Scenic River Eligibility Report and Environmental Assessment." The recommendations from this report were forwarded to Interior Secretary Bruce Babbitt. In September 1994, the upper Klamath River (11-mile segment) from the J.C. Boyle Powerhouse southwest to the Oregon/California state line was designated as a state-administered component of the national wild and scenic river system. In order for a river to qualify for the national system through Section 2(a)(ii) of the act, it must first be designated as a component of a state river protection system by, or pursuant to, an act of the legislature of that state.
1995	The federal lands along upper Klamath River are currently managed under the 1995 KFRMP/FEIS. The plan designated an 11-mile segment of the river (rim-to-rim along the river corridor) from J.C. Boyle Powerhouse to the Oregon/California state line as an ACEC.
2002	Oregon State Parks and Recreation Department (OPRD) has approved final classification of the Klamath River Scenic Waterway as a Scenic River. Final land management rules for the Klamath River Scenic Waterway were also approved by OPRD.

Table 1-2. – Upper Klamath River Segments and Designations

River Segment	Description	Designations	Miles
Segment 1	From J.C. Boyle to Powerhouse	• None	4
Segment 2	From Powerhouse to Oregon/California state line	• Area of Critical Environmental Concern (rim to rim) • Oregon State Scenic Waterway [1] • Wild and Scenic River [1]	11
Segment 3	From Oregon/California state line to slackwater of Copco Reservoir	• Found to be eligible and suitable for inclusion into the national Wild and Scenic River System (undesignated and under interim management)	5

[1] 0.25 miles each side of the river.

Some resource values are also significant beyond the 0.25-mile boundaries. The 1995 KFRMP/FEIS designated an ACEC for special management. Therefore, this plan will analyze these values from rim-to-rim within the river canyon.

Segment 3 (California)

The 1990 "Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study" (USDI-BLM) found this segment to be eligible and suitable for inclusion into the national wild and scenic river system. Congress has the authority to determine whether this river segment should be included into the national wild and scenic river systemæthis river segment is under protective management until a decision on designation is made.

This study identified recreation, wildlife, fish, historic, and scenic resources as the outstandingly remarkable values for this segment. These values are to be protected or enhanced when considering land management practices or resource activities. The planning area was expanded to include lands adjacent to the suitable/eligible river (rim-to-rim) in river Segment 3.

Purpose and Need, and Decisions Related to this Plan

Purpose and Need

This planning effort is being undertaken because the current recreation plan, completed in 1983 by the BLM Medford District, is outdated. There are now overlapping jurisdictions and designations that did not exist 20 years ago.

In 1994, river Segment 2 (in Oregon) was designated a scenic river under the *Wild and Scenic Rivers Ac*t. Under Section 3(d)(1) of the act, the federal agency charged with administration of a component of the national wild and scenic rivers system is required to prepare a comprehensive management plan for the protection of river values. This analysis would result in such a plan.

The KFRMP/FEIS designated river Segment 2 (from rim-to-rim within the river canyon) as an ACEC. Therefore, this plan will also develop a management activity plan to protect the values for which the ACEC was designated.

The Redding Resource Management Plan includes a "Management Action" (page 36) stating the need to, "Amend the existing river management plan for the Klamath River above Copco to reflect the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study and the recommendations or the Klamath Falls Resource Area Resource Management Plan.

At the conclusion of this planning effort, there will be one EIS and management plan that will guide and coordinate all land management activities along this upper section of the river. This EIS will amend both the BLM Redding (California) and the Klamath Falls Resource Area (Oregon) Resource Management Plans.

PacifiCorp is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for their Klamath River projects (Big Bend #2082), which include the J.C. Boyle Dam/Powerplant. This plan, scheduled for completion by 2003, will identify some resource concerns that need to be considered during the relicensing process. The BLM intends to submit this plan to PacifiCorp for inclusion in their draft relicensing application to FERC.

The draft PacifiCorp relicensing application will be submitted to FERC in 2004. The current FERC license expires in 2006. The BLM will also send this plan to FERC as supporting documentation to assist in the relicensing of the PacifiCorp power generating facilities on the upper Klamath River. FERC will use this plan to help complete *National Environmental Policy Act* (NEPA) requirements necessary for relicensing.

Decisions to Be Made

This DEIS is *not a decision document*. Its primary purpose is to disclose the environmental consequences that could occur through implementation of the alternatives being considered. However, decisions will be based on the analysis disclosed here.

For this DEIS, Alternative 3 has been identified as the "Preferred Alternative". A Record of Decision (ROD) or numerous RODs will be signed by the state directors of Oregon/Washington and California State BLM offices. In addition, the Governor of Oregon will review the document and make a decision on adoption of administrative rules for the State Scenic Waterway.

There are two types of decisions that the BLM can make related to this document – land use plan level decisions and implementation level decisions.

Land use decisions are those that affect land allocations, e.g., establishing the type of management that is appropriate for the land. Implementation decisions are those that allow or prescribe specific management actions that should occur on those lands.

Any subsequent decisions would identify the specific decision to be made, in order to clearly spell out which administrative appeal or protest procedures apply. Proposed land use decisions could be protested under 43 CFR 1610.5-2, while any implementation decisions could be appealed to the Interior Board of Land Appeals under 43 CFR 4.411. The decisions to be made in subsequent documents (typically records of decision) are listed by the type of decisions:

Land Use Decisions

- Whether to amend either or both the Klamath Falls Resource Area Resource Management Plan and the Redding Resource Management Plan
- Whether to extend the existing ACEC
- Whether to extend the existing land allocation for the Upper Klamath River Management Area (Redding RMP) to include additional planning-area lands – area depends on alternative selected
- Whether to pursue acquisition of lands within the planning area, both inside and outside of the existing designated river boundaries

Implementation Decisions

- What actions would be implemented on BLM lands to protect and enhance the outstandingly remarkable values and ACEC values
- What actions would be recommended to PacifiCorp for implementation on their lands, assuming that a long-term management agreement is developed for those lands.

Multiple decisions, based on the analysis in the EIS, would be made to implement specific management actions over a period of years. Some actions may be ready for implementation immediately following the publication of the final EIS and Record of Decision, including various road management actions. Other actions may require more pre-disturbance surveys or consultation with other agencies or other parties and vegetation treatments.

Management Direction and Management Goals

Existing Management Direction

Management direction is found in various federal, state and local laws and management plans.

Federal and State Level Legal Authorities

The KFRA is responsible for determining if the proposed DEIS conforms to state and federal laws. A listing of Legal Authorities (laws) is provided in Appendix C. This determination will be documented in a subsequent Record of Decision(s).

Federal Agency Plans

A number of land use or resource management plans have been developed by the BLM and other federal agencies which relate to or otherwise govern how management is currently carried out within the planning area.

The federal plans listed below have been identified as being applicable to the planning area. This DEIS is tiered to those documents with applicable sections “incorporated by reference”, and, unless otherwise noted, the DEIS is believed to conform to these plans.

Where appropriate, management direction and previous management decisions set forth in these documents are used to support analyses described in this plan. Some documents are incorporated by reference, and are therefore not reproduced in this document.

Pertinent decisions already established by these documents are not being revisited here, but are merely mentioned to give the reader an overview of management direction applicable to the planning area.

- The "Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary" (BLM 1995). Appendix D provides relevant direction from this plan.

- The "Redding Resource Management Plan and Record of Decision" (BLM 1993) - The KFRA adjoins the Redding Resource Area along the Oregon and California borders. Appendix D provides relevant direction from this plan.

The two offices operate under a memorandum of understanding that provides for the KFRA to manage the recreation and maintenance activities that occur on BLM lands along the upper Klamath River in California (see Appendix E).

By agreement with the California State Director and the Redding Field Manager, this DEIS includes descriptions and analysis of the California BLM-administered lands. However, a final decision on those lands will be made by the California State Director upon completion of the appropriate planning document(s).

- The appropriation of surface waters within the Klamath Basin is governed by Oregon and California law, and the "Klamath River Basin Compact" (Oregon Revised Statutes 542.620). The Compact became effective in 1957 upon ratification by Oregon and California and acceptance by the U.S. Congress. Article III of the Compact addresses beneficial uses in the Klamath River Basin.

- The "Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl" (BLM-USFS 1994)

- The "National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands" (BLM 2001)

- The "Western Oregon Transportation Management Plan" (BLM 1996, Updated 2002)

- "Klamath Wild and Scenic River Eligibility Report and Environmental Assessment" (National Park Service, 1994)

- "Vegetation Treatment on BLM Lands in Thirteen Western States Final Environmental Impact Statement" (BLM 1991b)

- "Northwest Area Noxious Weed Control Program Final Environmental Impact Statement" (BLM 1985)

- "Supplement to the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement" (BLM 1987)

- "Site-Specific Environmental Assessment Tiered to the 1987 Final Environmental Impact Statement for Rangeland Grasshopper Cooperative Management Program" (USDA-APHIS 1993). This EIS covers the periodic need to control grasshopper outbreaks in various rangeland and agricultural areas. The lead for this type of action rests with the USDA Animal and Plant Health Inspection Service, but the BLM does cooperate when treatment involves lands under its administration.

- "Rangeland Grasshopper Cooperative Management Program Final Environmental Impact Statement" (APHIS 1987)

- "Wildlife Damage Management in the Roseburg ADC District in Southwestern Oregon" (APHIS 1994). This report covers wildlife damage management activities in the KFRA. USDA-APHIS is the lead agency for this action. The BLM served as a cooperating agency in the preparation of this environmental assessment and decision.

- "Healthy Rangelands" (BLM and USFS 1994; BLM 1995a; 1997a;) and "Standards for Land Health for Lands Administered by the Bureau of Land Management in the States of Oregon and Washington" (BLM 1998a). These plans amend current grazing and other land management direction by applying new standards and guidelines.

- "Public Land Recreation, a Management Strategy for Special Recreation Management Areas in Oregon and Washington" (BLM 1988). This report outlines special management direction for special recreation management areas in Oregon and Washington, including the Klamath River Complex Special Recreation Management Area.

- The "Lost River and Shortnose Sucker Recovery Plan of the Klamath Basin: Lost River sucker (endangered) *Deltistes luxatus*, shortnose sucker (endangered) *Chasmistes brevirostris"* (USFWS 1993). This report outlines recovery strategies for two federally listed species. This direction will be considered common to all alternatives analyzed in this DEIS.

- The "Southern Oregon/Northern California Coastal (SONCC) Coho ESU (Evolutionarily Significant Unit) Recovery Plan" is currently under development. Under Section 4(d) of the Endangered Species Act (ESA), the Secretary of Commerce is required to adopt such regulations deemed necessary and advisable for the conservation of species listed as threatened. National Marine Fisheries Service (NMFS) has issued final ESA 4(d) rules adopting regulations necessary and advisable to conserve 14 listed threatened salmonid ESUs, including the SONCC coho salmon (FR Vol 65, No. 132, Pgs. 42422-42481). Actions that may affect the SONCC coho populations downstream of the planning area will comply with the ESA 4(d) rules under all alternatives.

- The "Final Draft Recovery Plan for the Northern Spotted Owl" (USFWS 1992) outlines recovery strategy for the federally threatened northern spotted owl *Strix occidentalli*. This direction will be considered common to all alternatives analyzed in this DEIS.

- "The Pacific Bald Eagle Recovery Plan" (USFWS 1986)" and "Working Implementation Plan for Bald Eagle Recovery in Oregon and Washington" (Washington Department of Wildlife 1990). This direction will be considered common to all alternatives analyzed in this DEIS.

- A number of activity-level plans have also been completed in recent years that address specific resource management issues within the Klamath River planning area.

  They are: the "Salt Caves Management Plan EA#OR-014-01-07", (BLM 2002), "Klamath Falls Resource Area Fire Management EA#OR-014-94-09" (BLM 1994); "Lakeview District Fire Management Plan" (BLM 1998), "Klamath Falls Resource Area Integrated Weed Control Plan" (BLM 1993), "Pokegma Wildhorse Habitat

Management Area Plan" (Medford BLM 1978); "Wild Horse Management Plan and Environmental Analysis Report for Gavin Peak (and Three Sisters) Herd" (Goosenest Ranger District, Klamath National Forest 1975).

- In addition, numerous (grazing) allotment management plans that have been completed and provide direction (Klamath Falls BLM). An existing process is in place for authorizing temporary nonrenewable livestock grazing use (BLM 1989). All of these documents are considered part of the existing management direction and will be included in the description of this DEIS where appropriate.

Relationship to the Northwest Forest Plan

The "Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old Growth Forest Related Species within the Range of the Northern Spotted Owl Record of Decision," known as the Northwest Forest Plan, was established in 1994.

This supplemental impact statement amended USFS and BLM management plans. The Northwest Forest Plan is an ecosystem-based strategy for managing all USFS- or BLM-administered lands within western Washington, Oregon, and northern California. The Northwest Forest Plan covers an area of 24 million acres.

Management direction consists of extensive standards and guidelines, including land allocations that comprise a comprehensive ecosystem management strategy.

Ecosystem management emphasizes the complete ecosystem instead of individual components, and looks at sustainable systems and products that people want and need. It is based on the premise that economic health cannot be sustained without ecological health.

The public lands within the upper Klamath River planning area are inside the Northwest Forest Plan boundary. The building blocks for this strategy are comprised of several land use allocations identified in the 1995 RMP/FEIS. Strategies and components of the Northwest Forest Plan that are applicable in the planning area are as follows:

Aquatic Conservation Strategy implementation

The Aquatic Conservation Strategy was developed (as part of the 1994 Northwest Forest Plan) to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands.

A set of Aquatic Conservation Strategy objectives was developed in the Northwest Forest Plan, to guide the review and implementation of management activities. The components of the Aquatic Conservation Strategy are (1) riparian reserves, (2) key watersheds, (3) watershed analysis, and (4) watershed restoration.

The four components are designed to work together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems. The following sections review the four components of the Aquatic Conservation Strategy.

*Riparian Reserves***:** Under the Aquatic Conservation Strategy, riparian reserves are used to maintain and restore riparian structures and functions, confer benefits to riparian-dependent and associated species, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed.

Key Watersheds: Key watersheds serve as the cornerstones of aquatic species recovery, and special guidelines apply to federal lands within key watersheds. No key watersheds are within the planning area.

Watershed Analysis: Watershed analysis is required (Northwest Forest Plan) prior to implementing activities in key watersheds. Watershed analyses should also be conducted in other watersheds as a basis for ecosystem planning and management. The primary purpose is to provide decision makers with an understanding of the ecological structure, functions, processes, and interactions occurring in a watershed along with the wide spectrum of human uses.

The "Topsy-Pokegama Landscape Analysis" (USDI-BLM 1996) encompasses the river planning area in Oregon. There has not been a watershed/landscape analysis done in the California portion of the planning area because this area is not a key watershed, and limited public lands exist in the area.

Watershed Restoration: As part of the Aquatic Conservation Strategy, watershed restoration is an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality.

The most important components of watershed restoration are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of instream habitat complexity. Monitoring is an important component of restoration projects.

Relationships and Implications Regarding Klamath Basin Water Issues

PacifiCorp, the owners of the Klamath Hydroelectric Project (Big Bend #2082) are applying to the Federal Energy Regulatory Commission (FERC) for a new license. The current license was issued in 1956 for 50 years, and will expire in March of 2006. John C. Boyle Dam and power plant are located within the proposed River planning area boundary. The final River Plan will identify resource impacts and mitigations regarding the PacifiCorp operations of their facilities to fish, recreation, cultural, and wildlife resources. These impacts (both negative and positive) need to be considered during the FERC relicensing process. The final River Plan is scheduled to be completed in 2004 before FERC begins an Environmental Impact Statement (EIS) in 2004 on the relicensing of the Klamath Hydroelectric Project #2082. The final River Plan will contain important resource information and provide a basis for alternative development for FERC's EIS.

All water issues (both quantity and quality) and fisheries (both inland and anadromous fisheries) are controversial in the Klamath Basin. Water and fishery proposed actions are addressed in the River Plan and have no direct or indirect impacts that would influence the Bureau of Reclamation's Klamath River Anadromous Fish Restoration and Operation Plan or the Environmental Protection Agency/State Total Maximum Daily Load development process.

Relationship to State and County Plans

State Comprehensive Outdoor Recreation Plan

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) provides guidance to federal, state, and local units of government, as well as the private sector, in providing outdoor recreation resource opportunities in the State of Oregon.

The plan allows Oregon to remain qualified for the federal Land and Water Conservation Fund (LWCF). The LWCF program provides grants for the acquisition and development of public outdoor recreation areas and facilities.

The Oregon Parks and Recreation Department will be sent the River Plan to comment on its consistency with their approved plans and policies.

Oregon Statewide Plans

In 1973, Oregon created a statewide program for land use planning. The foundation of this program is a set of 19 statewide planning goals. The goals express the state's policies on land use and on related topics, such as citizen involvement, housing, and natural resources. Oregon's statewide goals are achieved through local comprehensive planning. The local comprehensive plans must be consistent with the statewide planning goals. State law requires each county to have a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect.

Oregon's statewide planning program is directed by the Land Conservation and Development Commission. BLM employees have met with various state agencies and county employees during the development of the River Plan to ensure that the River Plan compliments the statewide planning goals.

Klamath County Plan

Klamath County has an existing land use plan developed in response to the State of Oregon's requirements. The plan consists of a number of reports, ordinances, and subsequent amendments governing land use practices and policies within the county.

The Klamath County Commissioners have meet with BLM employees to review the issues and alternatives regarding the River Plan. The Commissioners are being provided with an opportunity to review the River Plan and comment on its consistency with their approved plans and policies.

Siskiyou County Plan

Siskiyou County has an existing land use plan developed to the State of California's requirements. The Siskiyou County Supervisors have meet with BLM employees to review the issues and alternatives regarding the River Plan. The Commissioners are being provided with an opportunity to review the River Plan and comment on its consistency with their approved plans and policies.

Designations within the Planning Area

Oregon Scenic Waterway (Klamath River Segment)

The Oregon Scenic Waterways System was created by ballot initiative in 1970. Scenic waterways are defined as including the designated river and related adjacent lands within 0.25 mile of the bank on either side of the river.

The original act designated 496 free-flowing miles in six different rivers. Rivers can be added to the system through ballot initiative or designation by the legislature or governor.

In 1988, Oregon voters passed a second ballot initiative, the "Oregon Rivers Initiative" (Ballot Measure #7), that added 573 river miles to the Oregon Scenic Waterways System, including 11 miles of the upper Klamath River. This segment begins at the J.C. Boyle Powerhouse and goes southwest downstream to the Oregon/California state line (see Map 2). This EIS would also provide a plan to meet the "Oregon Scenic Waterway Management Plan." The State of Oregon requires that a management plan be developed to protect or enhance the aesthetic and scenic values of scenic waterways while allowing compatible agriculture, forestry, and other land uses (Oregon Revised Statutes 390.805 to 390.925).

National Wild and Scenic River Designation

In 1994, the Klamath River from J.C. Boyle Powerhouse to the California/Oregon state line was designated a wild and scenic river. The boundaries of this designation are 0.25 mile on each side of the river (see Map 2). The 1968 *Wild and Scenic Rivers Act* requires that a river management plan be completed to determine how the outstandingly remarkable values for which the river was designated will be managed (Section 3[d][1]). The act specifically requires that the values be maintained or enhanced. The selected alternative of this plan will provide the basis for management of this wild and scenic river.

The BLM has developed a set of criteria to assess outstandingly remarkable values during the eligibility process for inclusion into the national wild and scenic river system. Values identified in the "Final Eligibility and Suitability Report for the Klamath Wild and Scenic River Study" (1990) and in the National Park Service's "Klamath Wild and Scenic River Eligibility Report and Environmental Assessment" (August 1994) were used to support the designation of wild and scenic river found in Segment 2 of the planning area. These values are: recreation, wildlife, fish, prehistoric, historic, scenic quality, and Native American traditional use.

Upper Klamath River Area of Critical Environmental Concern Designation

The KFRMP/FEIS designated an ACEC in the Klamath River Canyon from rim-to-rim extending from J.C. Boyle Powerhouse to the Oregon and California state line (see Map 2). An ACEC designation highlights an area where special management attention is needed by the BLM to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes; or to protect human life and safety from natural hazards (BLM Regulations, 43 CFR part 1610).

The ACEC designation indicates to the public that the BLM not only recognizes the area's significant values, but has also established special management measures to protect those values. This designation serves as a reminder that the significant values or resources must be accommodated during the BLM's consideration of subsequent management actions and land use proposals within an ACEC.

The cultural values (both prehistoric and Native American traditional use), scenic values, fish and wildlife (both populations and habitat) resources, and natural processes or systems (both priority plant species and vegetation) were found to be both relevant and important.

Management guidance outlined in the KFRA/FEIS specifies that this area: is not available for planned timber harvest, limits off-highway vehicle use to designated roads, allows no developments to enhance the potential for grazing, limits mineral leasing to no surface occupancy, and allows no hydroelectric development.

The area was to be managed for semi-primitive motorized recreation opportunities. A site-specific management plan for this ACEC will be developed as part of the final River Plan/EIS.

This plan will also evaluate extending the existing ACEC to river segment 1 in the planning area. A report that considers these important and relevant values was completed for river segment 1 (See Appendix I).

To be considered as a potential ACEC and, therefore, further evaluated in resource management plan alternatives, inventory data for the area must be analyzed to determine whether there are areas containing significant resources, values, systems or processes, or hazards. To be a potential ACEC, an area must meet relevance and importance criteria, as established and defined in BLM Regulations, 43 CFR 1610.7-2.

Management Agreements

There are also memorandums of understanding, as well as agreements with other agencies and private landowners, which provide for cooperative management of the upper Klamath River area. They are as follows:

- The Klamath Falls Resource Area (KFRA) of the Lakeview BLM District administers federally-owned BLM lands within the Klamath River Canyon from J.C. Boyle Dam to Copco Lake, California.

  Management of the California section is by memorandum of understanding with the BLM Redding Field Office (see Appendix E). The KFRA manages several recreation sites and issues and monitors special recreation permits for commercial whitewater rafting along this section of the river.

- The Oregon Parks and Recreation Department is a cooperative agency in management of the river and preparation of this river management plan. A cooperative management agreement (1997) was created to help guide and support the writing of this plan, and to manage the Klamath River until a final EIS is completed (see Appendix E).

- An additional memorandum of understanding, affirming a policy of cooperation and coordination among the BLM, landowners, and other public agencies is currently in place. This memorandum involves PacifiCorp, Oregon Department of Fish and Wildlife (ODFW), California Department of Fish and Game, Weyerhaeuser Company (as assigned to U.S. Timberlands Services Company, LLC) and the BLM, and establishes a mechanism for coordinating land management programs and planning among cooperating parties (see Appendix E).

- Due to the large number of commercial whitewater rafting permit requests and concerns regarding the carrying capacity on the upper Klamath River, the BLM issued a moratorium in 1996, freezing the number of river permits issued. This moratorium would be reevaluated after the completion of this river plan.

The existing memorandums of understanding and cooperative management agreements will continue to provide management coordination for the upper Klamath River until a new river management plan is developed to address specific resource concerns. After completion of this plan, all memorandums of understanding or agreements will be analyzed to determine if they need to be revised or terminated.

Management Goals and Planning Criteria for this Plan

Management Goals

1) *Maintain and restore river-related scenic and natural resources*: The upper Klamath River and surrounding area contains diverse plant and wildlife communities. Natural form and function of aquatic habitat, riparian areas and uplands shall be maintained and enhanced. Restoration activities shall strive to return habitat to more natural levels of complexity and diversity, while protecting the scenic characteristics of the viewshed.

2) *Provide diverse recreational experiences*: The Klamath River is a valuable recreational resource for visitors to the western United States. The River Plan will provide opportunities for enjoyable recreation experiences within the river's natural and cultural landscapes.

People with diverse interests and expectations will find a broad spectrum of opportunities, from solitude and quiet to group activities.

Appropriate access to the river canyon shall be provided; recreational facilities shall be maintained, enhanced, or designed to ensure protection of natural resource and cultural values.

3) *Promote visitor understanding and enjoyment:* Interpretation and education are valuable in enhancing visitor enjoyment and increasing understanding of the natural resources, processes, and events that help shape the Klamath River Canyon area. Visitors would be encouraged to learn about the cultural history and ecosystem of the area.

4) *Protect and enhance cultural resources*: The planning area has been inhabited for thousands of years, as evidenced by historical and archeological remains. This plan shall reduce recreational use conflicts that could negatively impact cultural and historical resources and, where practical, stabilize or rehabilitate historic sites.

5) *Meet existing state and federal laws, regulations, policies, and management direction:* The planning area encompasses portions of Oregon and California. State and federal laws and regulations shall be adhered to when developing management direction and implementation of future projects.

Planning Criteria

The interdisciplinary team assumed the task of addressing issues raised by the public, as well as internal management concerns and resource needs, to develop a series of management actions that address those issues. Management actions are listed in detail in Chapter 4 as part of the description of alternatives. Individual management actions and alternatives must, to some extent, meet the following criteria:

- Do actions meet laws, regulations, policy and existing management direction?
- Do the actions within the boundaries of the river corridor protect and enhance the outstandingly remarkable values?
- Are actions consistent with the Scenic classification of the river?
- Do actions that are considered water resources projects under Section 7 of the *Wild and Scenic Rivers Act* have a direct and adverse impact on the values for which the river was designated Scenic.
- Do the actions within the boundaries of the river corridor protect and enhance the ACEC values?

Additional Considerations: All proposed actions will be evaluated against the above criteria. If a proposed action meets these criteria, the BLM will apply additional considerations to (1) minimize an impact by locating facilities outside the river corridor if there is a feasible alternative; (2) designing facilities or actions to minimize or mitigate impacts to the river; and (3) avoiding, minimizing, or otherwise mitigating negative impacts to visitor experience.

The Planning Process

The planning process used for this project meets the intent of NEPA as amended, and the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA (1992). Some of the steps in this process are described below.

Cooperation and Coordination

The BLM is committed to a community-based planning process that respectfully considers the diverse opinions and needs of local, regional, and national interests. It is vital that a variety of stakeholders are represented, to help identify issues, develop a range of alternatives, and offer input about how the plan should be implemented.

This approach, which ideally coordinates all interests and jurisdictions efficiently and effectively in the context of an open and sharing public process, presents numerous challenges. The collaborative planning framework described below offers such an opportunity.

The collaborative planning process illustrated in Figure B-1 (Appendix B) is designed to allow for inter-governmental and general public interaction to identify issues and complete the planning process.

The Oregon Parks and Recreation Department is a cooperative agency in the preparation of this document, as is the BLM Redding Field Office in California. Memorandums of understanding and cooperative agreements were created to help guide the management of the Klamath River and support the writing of this DEIS. A detailed listing of the BLM River Plan Interdisciplinary Team, the Upper Basin Subcommittee of the Klamath Provincial Advisory Committee, and the Interagency Advisory Committee can be found in Appendix B.

Following is a brief description of the duties of each of the groups working to help complete the DEIS.

BLM and Multi-Agency Decision Makers: Federal, state, or other partners that have legal authorities to make decisions over affected lands.

Interdisciplinary Team: The interdisciplinary team of BLM resource specialists is primarily responsible for writing the DEIS, based on data and analysis. An interdisciplinary team has been established consisting of a team leader, wildlife, fisheries, botany, forestry, archaeology, recreation, hydrology, fire ecology, and planning specialists.

Interagency Advisory Committee: The objective of the interagency advisory committee, comprised of representatives from county, state, and federal agencies, was created to ensure that the project complies with regulatory processes in California and Oregon.

The Upper Basin Subcommittee of the Klamath Provincial Advisory Committee: The Klamath Provincial Advisory Committee, a chartered organization, created a subcommittee of its members, called The Upper Basin Subcommittee of the Klamath Provincial Advisory Committee, to help with this DEIS.

This subcommittee was created to provide advice and to assist the interdisciplinary team by gathering information from private river users, local private landowners, and other interested parties, to be used throughout the river planning process.

Public Involvement and Scoping

Scoping is the process of determining the scope of the environmental analysis to be completed, and it can be ongoing throughout the full phase of the analysis. Early in the analysis process, directed by NEPA, the analysis team identifies (1) the issues to be addressed, (2) significant issues to be used in the formulation of alternatives, (3) alternative actions, and (4) the depth and scope of the analysis. The scoping process for the River Plan/EIS was initiated in late 2000, with the following steps:

- Meetings conducted with the Upper Klamath Basin Subcommittee of the Klamath Provincial Advisory Committee
- Government-to-government consultations held with The Klamath Tribes
- Scoping document mailed to 225 people or businesses on a project mailing list
- News releases created and distributed, along with publication of a notice of intent in the Federal Register
- Interagency Advisory Committee meeting conducted
- Public scoping meetings held in Yreka, California and Klamath Falls, Oregon

Subsequent meetings and briefings occurred, including:

- Upper Klamath Basin Subcommittee meetings
- Government-to-government consultations and briefings with the Klamath, Hupa, Karuk, Yurok Tribes and with the Shasta Nation (not a federally recognized tribe)
- Briefings with local and regional organizations, recreation groups, and community groups
- Interagency Advisory Committee meetings
- Briefings with the BLM Oregon State Office, BLM California State Office, Lakeview District, Redding Field Office staffs, and Washington Office staff and directors
- Briefings with the Oregon and California congressional delegate field staffs
- An informational public meeting was held with the landowners and residents of Copco, California

In January 2002, the KFRA initiated streamlining consultation with the U.S. Fish and Wildlife Service (USFWS) regarding potential impacts of actions proposed in this River Plan/EIS on federally listed species or species proposed for listing.

Representatives for the USFWS were designated and sent River Plan/EIS material for review, with requests for their input. The USFWS sent the KFRA a list of species, either federally listed or proposed for listing, which may occur in the planning area. Species known to occur in the planning area are addressed in this DEIS. A biological opinion or concurrence will be requested on the proposed final EIS.

Identification of Issues

Public scoping meetings were held on January 16, 2001 in Yreka, California, and January 17, 2001 in Klamath Falls, Oregon (refer to the Public Involvement Plan – Appendix F). With the close of the initial scoping period on January 31, 2001, 36 written responses (including comments documented at two scoping meetings) had been received.

A comment letter from PacifiCorp (dated May 2, 2001) requested that approximately 6,000 acres of their private lands located within the planning area be considered in the plan for possible land tenure adjustments. PacifiCorp is considering several management options for these lands that are surplus to their needs for power production. PacifiCorp requested the BLM to consider their lands for exchange for other BLM lands, or purchase, or that BLM and PacifiCorp enter into a mutually beneficial land management arrangement of these lands. PacifiCorp and BLM natural resource specialists have cooperated to gather resource information on PacifiCorp lands for inclusion in the plan.

The analysis and potential projects developed as part of this planning effort may be used by PacifiCorp to help determine desired long-term management of the lands, and potentially identify offsite mitigation opportunities for their FERC relicensing process.

Individual comments within the public scoping letters have been consolidated into 57 different issue statements, addressing 15 topic areas. Comments and additional issues have been obtained throughout the scoping process.

A detailed listing of issues can be found in Appendix G. The list of significant issues recommended by the interdisciplinary team is based upon public and agency comments received. The following is a list of significant issues that have been used to develop alternatives**.** Issues are discussed in detail in Chapter 4

Wild and Scenic River and Area of Critical Environmental Concern Values as They Apply to the Issues

Protection and enhancement of these values are the primary objectives of this plan. These values are designated with an asterisk (*) and specifics about these values and issues are mentioned below.

Scenic Quality (*)

One of the outstandingly remarkable values identified is the river's scenic quality. The consideration of new recreational facilities, fuel treatments, prescribed fire, utility development, and roads could impact visual quality. How to best maintain or enhance scenic qualities is a management concern.

Recreation Activities (*)

Recreational Carrying Capacity: This issue could affect the recreational user's experience within the river canyon. Carrying capacity for whitewater rafting and camping is the major concern, although carrying capacity for other recreational activities (fishing, hiking, off-highway vehicle use, etc.) will also need to be identified.

As mentioned above, due to the many commercial whitewater rafting permit requests received and concerns regarding the carrying capacity on the upper Klamath River, the BLM issued a moratorium in 1996, freezing the number of river permits issued.

This was an effort to reduce potential impacts to other resources. There is also concern regarding the increasing number of other recreation uses within the river corridor. This river plan will evaluate the area's carrying capacity, including the number of permitted rafters, relative to potential impacts on the outstandingly remarkable values.

*River Flow*s: A primary recreational use is whitewater rafting below the J.C. Boyle Powerhouse. Whitewater rafting opportunities are dependent upon the timing and amount of river flow released by PacifiCorp. Whitewater rafting, an outstandingly remarkable recreation value, was identified as an issue.

If the timing of river flow is changed substantially, whitewater opportunities could be reduced or changed in ways that would significantly impact recreational opportunities and the local industry that supports them.

Diversity of other recreational activities (both on/off river) is also an issue. Recreational use could also increase the number of access points along the river, causing damage to riparian and upland habitat, and significant cultural sites.

Recreation Facilities

Associated with the recreational carrying capacity issue is the improvement or construction of new recreational facilities along the river. Some of these new projects could affect the integrity of cultural resources and fish habitat.

Proposed trails could lead to increased use within the river corridor. There will be a need to evaluate the potential for removal or relocation of facilities to reduce impacts to other resources. Vandalism of recreational structures is on the rise, and vegetation is being damaged by increased visitor use.

Roads and Access

There are numerous roads on public land within the river canyon, and the BLM has closed a number of these roads using barriers. While the intent was to protect cultural resources and reduce erosion, many closures are no longer effective. There is concern that off-highway vehicle (OHV) activity has led to increased erosion and sedimentation into the river, as well as damage to significant prehistoric and historic sites, and Native American traditional use areas.

Road location has also contributed to increased erosion that could be corrected. These are continuing problems that would need to be evaluated and addressed in the plan. These concerns need to be analyzed and balanced with public interest in OHV and driving for pleasure. The ultimate goal is to provide for this type of recreational use, while protecting critical resources.

Cultural Resources/Prehistoric Sites (*)

The Klamath River Canyon has many cultural sites. Several of these locations receive intensive recreation use, which has led to damage. The River Plan identifies ways to reduce recreation/cultural use conflicts. A monitoring plan would be developed to help protect against vandalism and looting of significant sites. The interpretation and protection of prehistoric or historic sites would aim to reduce vandalism and increase public awareness to prevent damage from occurring to sensitive cultural areas.

Native American Traditional Uses (*)

Native Americans have used the river canyon for thousands of years. The canyon is spiritually significant to tribal members. The river canyon is also a source for plant gathering for food and crafts. Roads and access have led to off-highway vehicle damage to Native American traditional use areas. Concerns regarding access for tribal members and conflicts with off-highway vehicle activity would be addressed in this plan. This plan addresses how forest health management practices and prescribed fire could help maintain plant-gathering areas.

Historic Sites (*)

Historic sites are rapidly deteriorating and have been vandalized, which has raised concerns about how to manage these structures.

Watershed Values

The Klamath River (in the planning area) is listed as "water quality limited" in accordance with Section 303(d) of the *Clean Water Act*. It has been listed because of the impacts of nutrients and elevated stream temperatures on beneficial uses, such as habitat for threatened and endangered fish species.

Water quality also affects values, such as recreation, for which the river was designated a State of Oregon scenic waterway and a national wild and scenic river. This plan identifies possible ways of protecting and enhancing water quality within the planning corridor in support of other resource values. Management concerns about erosion caused by roads, water flows, riparian vegetation, and watershed processes would be addressed in the plan.

Wildlife and Fisheries (*)

Wildlife: There are threatened and endangered (bald eagle), and special status species (western pond turtle, Townsend big-eared bat, and white headed woodpecker, etc.) that use the river corridor. Habitat for these species would be evaluated to determine the type of management needed to protect or enhance the survival of these species. This plan addresses unique wildlife habitat, such as big game winter habitat and oak woodlands. The impacts from wildlife habitat enhancement projects to scenic values and impacts to wildlife from other resource management practices would also be addressed.

Fisheries: Fisheries is one of the outstandingly remarkable values that earned the Klamath River its designation as a wild and scenic river. Management concerns deal with the endangered Lost River and shortnose suckers and special status Klamath redband trout that use the river.

The river has been designated as a wild trout fishery. The planning area is also within the historic range of the threatened and endangered coho salmon. There are management concerns regarding the passage of both resident fish and fish that enter the river to swim upstream and spawn.

There are also recreational trout fishing concerns surrounding the lack of large fish within the river. There is evidence that the water peaking (repetitious high flows), which optimizes generation of power from J.C. Boyle Dam, impacts the aquatic habitat for fisheries on the stretches analyzed under this plan. There may be opportunities to improve fish habitat. There is speculation that the variation in water flows (for power generation), or the design of the hydropower project may affect the size of fish.

Fire and Fuels

Heavy fuel loads exist on forested lands in the river canyon. Historically, lightning occurrence has been high in this area, and, given the steep terrain, any fire occurrence could devastate the forest. Past examples are the Big Bend and J.C. Boyle fires (in the 1980s).

This plan addresses needs for effective fuel reduction treatments, and the potential loss of river canyon scenic characteristics to wildfire would be evaluated. This plan evaluates management concerns regarding fuel types and level of treatments necessary to protect or enhance the outstandingly remarkable values.

Vegetation and Biological Diversity

Vegetation manipulation would be considered in this plan when it could maintain or enhance wildlife and fish habitat, scenic quality, or Native American traditional use areas (food gathering). This plan evaluates how the vegetation would be managed, including control or eradication of exotic or noxious weed species.

Air Quality

The plan will likely propose fuel treatment to enhance wildlife habitat and reduce the potential for catastrophic wildfires. Planned prescribed fires need to be consistent with the *Clean Air Act*.

The BLM Klamath Falls Resource Area will be developing a Smoke Management/Air Quality Plan in 2003. This smoke management plan would analyze the river planning area and should identify what effect actions proposed would have on air quality. The smoke management plan would be included in the final River Plan document in 2003.

Socioeconomics

Potential management actions would have an effect on the local and perhaps regional economy. The analysis needs to consider impacts to individuals, businesses (including permitted outfitters), tribes, minority populations, and low-income populations.

PacifiCorp's Power Generating Facilities

PacifiCorp is licensed to operate a series of hydroelectric power generation facilities on the upper Klamath River. The river plan identifies the impacts these operations have on the resource values of the canyon.

Land Tenure

PacifiCorp is the major private landowner in the planning area. PacifiCorp has requested, in writing, that BLM explore the possibility of land tenure adjustments during the development of the EIS.

PacifiCorp has submitted a map to the BLM that identifies parcels of their land to be considered for possible land trade, acquisition, or a mutually beneficial land management arrangement.

In order to address potential impacts associated with recreational use, access, prehistoric and historic sites, Native American traditional uses, and fish and wildlife habitat management on the areas PacifiCorp has identified, the BLM would need to determine the resource values of these lands.

This plan addresses issues surrounding the role the State of Oregon plays in private land management within the Oregon Scenic Waterway. There are management concerns regarding how the federal government can ensure adequate recreational access to the river if it does not administer the land.

Private Land Impacts

This plan addresses the role the State of Oregon has in implementing Administrative Rules within the Oregon Scenic Waterway (See Chapter3).

There are management concerns regarding how the federal government can ensure adequate recreational access to the river if it does not administer the land. Other potential impacts on private land adjacent to BLM administered land are also addressed.

Grazing

Issues regarding livestock grazing would be evaluated for their consistency with the standards for rangeland health, and in concert with recreation, cultural, riparian, and wildlife habitat management concerns.

Cumulative Impacts

Proposed actions could not only affect resources within the canyon, but could also impact the surrounding environment, especially when combined with other management actions on public and private land.

Chapter 2 - Affected Environment

Chapter 2 – Rafting Caldera Rapid

Chapter 2 – Affected Environment

This chapter describes the affected environment of the upper Klamath River Canyon, including the general setting, land uses, and a description of the outstandingly remarkable values for which the river was designated a national wild and scenic river. This chapter will also discuss the Area of Critical Environmental Concern (ACEC) and the values for which it was designated under the "Klamath Falls Resource Management Plan and Final Environmental Impact Statement" (KFRMP/FEIS 1995).

General Setting and Background Information

Physiography

The Klamath River lies within the High Cascades Physiographic Province and borders the Basin and Range Province on the west (Franklin and Dyrness 1973). The only rivers in Oregon and California that bisect the Cascade Range are the Klamath and Columbia in Oregon and the Pit in California. The upper Klamath River drains south central Oregon, east of the Cascade Range.

The river begins at the lower end of Lake Ewauna in the city of Klamath Falls, Oregon, and flows southwesterly into California and west to the Pacific Ocean (see Map 1). The planning area portion of the upper Klamath River flows through a steep-walled, basalt canyon in Klamath County, Oregon, and Siskiyou County, California.

The topography in the planning area varies from flat to gently sloping along the river benches to almost vertical at the canyon walls. The canyon rim's basalt cliffs rise to 1,000 feet above the river. The average river gradient in Segment 1 is 75 feet per mile; Segment 2 is 27 feet per mile from river mile (RM) 219.5 to 214.3, and 77 feet per mile from RM 214.3 to 209.3; and Segment 3 is 32 feet per mile (see Map 3).

Annual precipitation, most commonly in the form of rain, ranges from 15 to 20 inches during fall, winter, and spring. Summers are hot and dry with occasional thunderstorms developing in the late afternoon. In the winter, snow falls on the rim of the canyon, but only rarely accumulates on the canyon floor. Winter temperatures in the canyon drop into the low 20s (degrees Fahrenheit) and summer temperatures climb into the high 80s or 90s.

Air quality is generally good within the canyon because it is far removed from population centers or industrialized areas.

Geology

Regional geology: The upper Klamath River is in a transition area between the High Cascade and Basin and Range Provinces. High Cascade features include Quaternary-age volcanic flows, mostly basaltic and andesitic, which cap older volcanic deposits; cinder cones from the upper Pleistocene; and Holocene pyroclastic eruptive centers. Numerous dikes and plugs of andesite, rhyolite, and basalt intrude the volcanic rocks near Copco Lake. Significant volcanic centers along the Cascade Range include Mt. McLoughlin, 30 miles north of the area, and Mt. Shasta, 40 miles south. Local Basin and Range features include a series of fault block mountains separated by basins; and normal faults that run in a north-northwest direction with the down-thrown side to the northeast, creating an echelon or stair-step pattern. Evidence of these fault patterns is found 30 miles north and 30 miles east of the planning area. The planning area has low seismotectonic (earthquake) activity; however, there is ongoing tectonic activity to the west.

Lithology: The oldest exposed rocks in the planning area are a series of rapidly weathering middle to upper Miocene-age tuff of unknown thickness, with varying degrees of welding. The rare Salt Caves anticline structure occurs in this welded tuff. The cause of the Salt Caves folded structure is unknown, but is considered unlikely to have a tectonic origin (that is, resulting from structural deformation of the Earth's crust). The Miocene tuff is overlain by upper Tertiary- to Pleistocene-age basalts and andesites that are approximately 900 to 1,000 feet thick; the basalts and andesites are overlain by Quaternary alluvium, colluvium, talus, lacustrine, and landslide deposits. Landslides are most common in the southern half of Segment 2.

Mineral Resources: No economically valuable mineral deposits are known to exist in the planning area. Potential mineral resources are too remote or of insufficient quality or quantity to be extracted economically. These potential resources include gravel deposits, diatomite (clay) beds, basalt and andesitic basalt quarry sites (used for roads and as riprap), and geothermal resources located in the planning area. There are no federal oil, gas, or geothermal leases in the planning area, and there are no mineral permits or leases. The wild and scenic river designation precludes mineral location and leasing within 0.25 miles on either side of the river Segment 2 (see Map 2).

Detailed soils information is found under the Vegetation and Soils section throughout this document.

Description of Affected Resources and Facilities

Scenic Resources

The visual quality of a landscape is based on landscape character. The stronger the influence of form, line, color, and texture, the more interesting the landscape; the more visual variety in a landscape, the more aesthetically pleasing it is. An assessment of landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications is used to classify the scenic quality of the area. During the rating process, each of these factors is ranked on a comparative basis with similar features within the planning area. A visual resource management (VRM) class rating is then made to manage the quality of the visual environment and to reduce the visual impact of development activities (BLM Handbook H-8410-1).

The upper Klamath River Canyon was evaluated by the BLM in 1977 and 1981. Segments 1, 2, and 3 received a Scenic Quality Class A evaluation - the highest scenic quality classification. Based on this classification, the area was then classified as VRM Class II. The VRM Class II management objective is to retain the existing character of the landscape. Management activities in VRM Class II areas should not attract the attention of the casual observer. The upper Klamath River from the J.C. Boyle Powerhouse to the Oregon/California state line was designated the Klamath Scenic Waterway by majority vote in 1988, in part because of the valued scenic resources.

Recreation

The major recreational activities within the planning area include whitewater boating, fishing, hunting, and camping. Additional activities include sightseeing, hiking, photography, picnicking, wildlife observation, driving for pleasure on existing roads, trapping, off-highway vehicle use, and horseback riding. Most recreational use occurs below the J.C. Boyle Powerhouse in Segments 2 and 3. The lower half of Segment 1 and all of Segment 2 and Segment 3 are managed by the BLM primarily under a semi-primitive motorized recreation opportunity spectrum class, with emphasis on float boating, fishing, camping, and other compatible uses.

Off-highway vehicle use is limited to designated roads and trails within the Klamath River ACEC; however, some unauthorized or illegal travel off of designated routes occurs, especially in Segment 2 by full-sized vehicles, all-terrain vehicles, and motorcycles.

Overall recreation visitation to the planning area is estimated by BLM to be 10,000 visitors per year. Recreation use is very light during the shoulder seasons of April-mid June and September-October, light to moderate on week days in the summer, and moderate to heavy on holiday and some mid summer weekends. Limiting factors to recreation use of the area may include the distance from population centers, the rough condition of the access roads, and the relative lack of developed camping and recreation facilities.

Existing recreation facilities include Topsy Recreation Site, Spring Island River Access area, primitive and semi-primitive fire-safe campsites, the Klamath River Campground, Stateline River Access, and five fishing accesses. One additional fishing access (Fishing Access # 1, PacifiCorp) is located immediately west of the planning area boundary. Existing trails are limited to the Klamath River Edge Trail, which extends from Frain Ranch (west side) north to the Turtle Camp area in Segment 2. This trail, presently available to motorized use, is maintained for nonmotorized uses only. Other user-created trails are found along the river at developed fishing access sites and at major rapids for fishing or scouting purposes (see Maps 3 and 13).

The recreational values of the planning area are presently recognized by a number of other agencies and organizations, including the National Park Service ("Nationwide Rivers Inventory"), Oregon Department of Energy ("Pacific Northwest Rivers Study"), ODFW (direct testimony, 1985), and the Oregon State Parks and Recreation Division ("Statewide Comprehensive Outdoor Recreation Plan).

Whitewater Boating

There are approximately 370 miles of whitewater boating rivers in Jackson, Josephine, Curry, Klamath, Douglas, and Siskiyou Counties, of which the upper Klamath River accounts for 17 miles (Table 2-1). The remaining 353 miles of whitewater boating opportunities occur on seven rivers (Rogue, Illinois, Umpqua, lower Klamath, Scott, Upper Sacramento, and Salmon Rivers). The upper Klamath River is the only river in Klamath County that sustains any significant whitewater boating activity throughout the year.

One of the unique features of the upper Klamath River is the late season whitewater boating opportunity provided as a result of year-round releases from the J.C. Boyle Dam/Powerhouse system. At least one generator must be operating to provide adequate flows for whitewater rafting.

Even if neither generator is operating, the river can still be floated by kayak or canoe from the BLM launch site to Frain Ranch (five miles). Historically (1985 from 1998) during typical summer operations, one generator operated daily for 2-8 hours between 8 a.m. and 4 p.m., increasing the river flow from approximately 350 to 1,500 cfs, the minimum flow required for rafting in Segments 2 and 3 (BLM 1989).

Since the summer of 1998, PacifiCorp has varied the release schedule to include more releases that start later in the day, starting the release as late as 2-4 p.m. This change in

Table 2-1. – Whitewater boating rivers in Oregon and northern California [1]

River	Season accessible for given class of rapids	General whitewater classification (class) [1]	Controlled flow	Trip length (days)	Floatable river length (miles)
Oregon					
Lower Rogue	Year-round	II–IV	Yes	1–5	84
Snake-Hell's Canyon	Year-round	III–IV	Yes	1–5	49
Upper Klamath	*Year-round*	*III–V*	*Yes*	*1–2*	*17*
John Day (lower)	December–June	II–III	No	1–5	69
Illinois	March–May	III–V	No	3–5	40
Owyhee (lower)	March–June	III–IV	No	3–5	55
Owyhee (upper)	March–June	III–V	No	3–5	39
Clackamas	April–June	III–V	Yes	1	20
Grand Ronde	April–June	II–III	No	1–4	44
North Umpqua	April–June	III–IV	No	2	33
Lower Deschutes	April–September	III–IV	Yes	1–3	99
California					
Lower Klamath	Year-round	III	Yes	1–5	100+
South Fork American	Year-round	II–III	Yes	1–2	30
Trinity	Year-round	II–III	Yes	1–3	83
Salmon	November–June	III–V	No	1–3	21
Scott	December–June	III–V	No	1–2	18
Upper Sacramento	March–May	III–IV	Yes	1	25
North Fork American	April–June	III–V	No	1	8
Yuba	April–June	III–V	No	1–2	28
Middle Fork American	April–July	II–IV	Yes	3	24
Middle Fork Feather	April–September	IV–V	Yes	3–5	32

[1] Class I = I - Easy: moving water with a few riffles and small waves; few or no obstructions.
Class II = Easy to medium: rapids with waves up to three feet, and wide clear channels; some maneuvering is required around obvious obstacles.
Class III = Medium to moderately difficult: rapids with high irregular waves, narrow channels, rocks, and holes; often requires complex maneuvering.
Class IV = Difficult to very difficult: long, turbulent rapids with powerful waves and holes; many obstacles requiring precise, expert maneuvering; scouting from shore is often necessary.
Class V = Extremely difficult: long, technical, and very violent rapids with highly congested routes which nearly always must be scouted from shore; dangerous drops, unstable eddies, irregular currents, and horrendous holes are often encountered; requires experience, self-confidence, and good physical condition.
Class VI = Nearly impossible and extremely impossible: difficulties of Class V carried to the extreme of navigability; mishap could be hazardous to life for teams of experts only, after close study and with all precautions taken; generally considered inaccessible for commercial purposes.

scheduling reflects changing market conditions for wholesale electric power, as well as anticipated regional electric power shortages during summer heat waves.

This shift in water release start times has impacted whitewater boating opportunities by either forcing boaters to launch their trips later in the day, or to cancel or postpone their trips due to the timing of the water release.

Historically, the J.C. Boyle Powerhouse was shut down for two weeks in July each year to perform maintenance; however, in recent years this maintenance work has been shifted to September to avoid the prime rafting season (BLM). During winter and spring both generators operate, increasing the flows to 2,500 cfs or higher. Adequate flows for boating opportunities in Segment 1, upstream from the powerhouse, are available very sporadically when excess water is spilled from the J.C. Boyle Dam, usually in late winter and early spring.

The upper Klamath River offers exceptional whitewater boating opportunities downstream from the J.C. Boyle Powerhouse. There are 74 rapids in Segments 1 and 2 (RM 220.1) more than in a comparable length on most other rivers in the western United States.

Rapids are given a difficulty rating of Class I to VI on the International Scale of River Difficulty. The rapids on the upper Klamath River can be divided into three sections based on similar river difficulty ratings, shown in Table 2-2. The river in the first section, RM 220.1 to 214.3, drops 27 feet per mile, creating less technical rapids (Class I-III) for intermediate boating opportunities (see Map 3).

In the second section, RM 214.3 to 209.3 (see Map 3), the river drops 77 feet per mile, creating several long, turbulent rapids that require precise, expert maneuvering and provide a challenging whitewater experience (Class III-V). The short distance of this section, combined with the quantity and classification of rapids, provides an experience not found in late summer and early fall on other rivers in Oregon and northern California.

The lower section, RM 209.3 to 204, drops 32 feet per mile, creating rapids similar to those in the first section (Class I-III) that provide intermediate boating opportunities (see Map 3).

The rafting season on the upper Klamath River generally starts in early to mid-May, depending on the weather (see Table 2-3 for use statistics). Early season rafting, from May through late June, consists primarily of private boaters from the local area and commercial outfitters who are running guide training camps and some early commercial trips. The middle of the season, from July through mid-September, is the peak commercial use season (Table 2-4).

Commercial trips are launched seven days a week during this period if adequate water releases are available. Use peaks on weekends in July and August, and it is not uncommon for 6-10 multi-boat commercial trips to launch on a midsummer Saturday or Sunday.

During peak commercial rafting days, the launch area, popular stops such as the scouting area at Caldera rapids, and the takeout areas at Stateline and Access 1 are congested and crowded with people and vehicles. Waiting lines develop for access to boat ramps, toilets, and beach space. There are more complaints from local residents about unsafe driving of rafting shuttle vehicles, and there are increased chances for conflicts between rafting groups and other recreationists such as anglers and campers.

Table 2-2. – Whitewater classification on the upper Klamath River

River Section	Class [1]				
	I	II	III	IV	V
RM [2] 220.1–214.3 (launch to Caldera Rapid)	14	9	1	0	0
RM 214.3–209.3 (Caldera rapid to state line)	1	9	13	3	2
RM 209.3–204 (state line to upstream of Access #1)	13	7	2	0	0

[1] Class I = I - Easy: moving water with a few riffles and small waves; few or no obstructions.
Class II = Easy to medium: rapids with waves up to three feet, and wide clear channels; some maneuvering is required around obvious obstacles.
Class III = Medium to moderately difficult: rapids with high irregular waves, narrow channels, rocks, and holes; often requires complex maneuvering.
Class IV = Difficult to very difficult: long, turbulent rapids with powerful waves and holes; many obstacles requiring precise, expert maneuvering; scouting from shore is often necessary.
Class V = Extremely difficult: long, technical, and very violent rapids with highly congested routes which nearly always must be scouted from shore; dangerous drops, unstable eddies, irregular currents, and horrendous holes are often encountered; requires experience, self-confidence, and good physical condition.
Class VI = Nearly impossible and extremely impossible: difficulties of Class V carried to the extreme of navigability; mishap could be hazardous to life for teams of experts only, after close study and with all precautions taken; generally considered inaccessible for commercial purposes.
[2] RM = River mile.

Table 2-3.—Upper Klamath River annual use statistics for whitewater rafting (1994 through 2001)

Use Statistics	1994	1995	1996	1997	1998	1999	2000	2001
Commercial Rafting Use Levels								
Number of One Day Trips	283	330	372	374	295	307	359	287
Number of Overnight Trips	69	80	70	51	30	41	33	23
Total Number of Trips	352	410	442	425	325	348	392	310
Number of Outfitters with commercial use (active)	14	14	22	24	20	19	18	16
Total number of outfitters	20	25	27	26	26	23	22	22
Number of passengers (user days)	4,471	5,763	5,963	5,509	4,081	4,614	5,100	3,575
Average number of passengers per trip	10.6	14.0	13.4	13.0	12.6	13.4	12.8	11.5
Private/Self Outfitted Boating Use Levels								
Number of trips	86	55	40	27	24	34	34	22
Number of Boaters (user days)	735	602	244	317	314	283	269	124
Average Number of Boaters per Trip	6.8	9.6	6.1	11.1	7.2	6.7	7.3	5.6

Table 2-4.—Upper Klamath River monthly commercial boating use, 1998

Month	Number of trips	Visitor use days [1]
May	7	57
June	29	268
July	109	1,390
August	140	1,948
September	39	391
October	2	35
Totals	326	4,089

[1] Passenger use days only.

Late season boating activity from mid-September through November is limited to occasional commercial trips and regional private boaters, and also seems to correlate to warm, sunny weather.

The commercial rafting outfitters tend to be based in two geographical areas. The local companies are based in Medford/Ashland, Mt. Shasta, and Klamath Falls. Most of the other outfitters are based in the river-running areas of central California such as the South Fork of the American River, and the Tuolumne River near Yosemite National Park. Their clientele tend to be a mix of local/regional residents, and destination tourists who may have come from any point in the country or world.

Since the upper Klamath River was popularized for rafting in 1980, the number of people rafting the river with outfitters showed steady increases, with some variations for drought or economic conditions, until 1996. Since then, boating use levels have been relatively steady. This trend may be due to a number of factors: weather and regional economy, the aging of the baby boomer demographic, and less interest in risk activities such as whitewater rafting (see Table 2-3).

A large part of the late summer and early fall popularity of the upper Klamath River is due to the relative scarcity of this resource. Within the region, there are very few other rivers that offer raftable flows and a high quality Class IV and V whitewater experience at this time of year. Most boaters (75 percent) indicated in a user survey that if they were unable to float the upper Klamath River due to lack of sufficient flows from the J.C. Boyle Powerhouse, they would try to reschedule an upper Klamath River trip rather than float a substitute river (Oregon State University 1990).

Private boaters are not required to obtain a use permit; therefore private boating use is not counted as accurately as commercial use. Private use appears to be fairly steady at approximately 500 visitors per year. Most of the private boating occurs on Saturday, Sunday, and Monday’s during the summer (BLM observations).

Commercial rafting is managed through the BLM Special Recreation Permit process to ensure that outfitters are professional and meet minimum standards, as well as to control the amount of commercial use.

In 1996, during a period of steady growth in commercial rafting use, a moratorium was placed on commercial rafting permits. At that time, there were 27 permits in place. Since then, the number of permits has decreased to 22, due to rafting outfitters going out of business, or deciding to stop offering tours on the upper Klamath. The moratorium capping the number of permits will be in effect until this plan is finalized.

Fishing

The upper Klamath River, managed as a wild trout river in all three segments, provides an excellent trout fishery and is among one of the better fly fishing rivers in Oregon. The Klamath Basin provides a wide variety of angling opportunities, but only the upper Klamath River provides virtually unlimited river access and an excellent catch rate for large wild rainbow trout on a major river. Only the Deschutes River rivals it in Oregon. Angling success, as defined by catch rates, varies depending on stream flows, with low flows providing the highest catch rates.

Currently, the upper Klamath, Rogue, and lower Klamath are the only major rivers in the region (Klamath, Jackson, Josephine, and Douglas Counties in Oregon and Siskiyou County in California) that are open to trout angling year-round. The Pit and Trinity Rivers, outside the region in California, also provide year-round trout angling opportunities.

Spring comes early to the upper Klamath River Canyon, providing the earliest angling opportunity for a river fishery in Klamath County. The majority of fishing use occurs during spring and fall. Most anglers in the canyon are residents of nearby communities (via BLM contacts) who usually come to fish for one day at a time. The river’s reputation for producing large wild rainbow trout in this reach draws anglers from outside the region who come to fish for more than one consecutive day. A 1984 creel survey (City of Klamath Falls 1986) indicated that 87 percent of all anglers on the upper Klamath River are from Oregon and the remaining 13 percent are from California.

Hunting

Hunting occurs primarily on open benches along the river and in draws along the canyon rim. Black-tailed deer, silver-gray squirrels, mountain and valley quail, and turkeys are hunted. Additional recreational hunting occurs in spring and early summer for ground squirrels and marmots. In Oregon, hunting is regulated by the ODFW, and in California, by the California Department of Fish and Game.

Camping

The remote Klamath River Canyon offers campers a semi-primitive experience. This experience is more primitive downstream from Frain Ranch than above. The opportunity for isolation from the sights and sounds of people is a characteristic feature of the canyon that campers enjoy. Camping occurs either at Frain Ranch, at BLM designated sites, or at upland benches along the roads, usually by commercial whitewater boaters and anglers in the summer. Rafting outfitters providing 2-day trips camp either at Frain Ranch or upstream at BLM designated sites (BLM trip card information) These sites provide the last streamside access with open benches for camping before entering the long, steep, rugged, and narrow section of river. Support vehicles can drive to these areas and establish camp, which contributes to a safer raft trip with less weight in the rafts. Some camping occurs in the spring and fall, primarily by those who are hunting and fishing.

Recreation Sites and Facilities

Public recreation sites and facilities are located throughout the planning area (see Map 3). Immediately upstream from J.C. Boyle Dam is Topsy Recreation site. Topsy provides the most developed camping and day use site in the planning area. Site amenities include paved roads and campsites, toilet, water, recreational vehicle dump station, boat ramp and dock, and accessible fishing platform. Visitation at Topsy is light to moderate during most of the May-September season, except for some mid summer weekends when it fills to capacity.

The BLM Spring Island River Access facility with toilet, picnic table, message board, and registration drop box is located at RM 220.1, approximately 0.25-mile below the J.C. Boyle Powerhouse. No overnight parking or camping is allowed. Approximately three miles below the boat launch area on river-right is the Klamath River Campground with three semi-primitive campsites with tables, vault toilets, and fire pits.

Five additional fire-safe sites are available along the river's edge, down to approximately RM 216. There are several primitive campsites at Frain Ranch. No recreational access or facilities are provided from approximately RM 214.3 to the Oregon/California state line.

The jointly managed BLM/PacifiCorp Stateline River Access area with toilets and primitive campsites is located at RM 209, just downstream of the Oregon/California state line. PacifiCorp provides fishing access on private land through five gated entrances along Topsy Road in Segment 3 with parking space, toilets, and message boards. An additional river access for raft take-out is located just upstream from Copco Reservoir at Access 1.

Roads and Access

The upper Klamath River Canyon is readily accessible from the four major population centers in the southern Oregon and northern California region. West of the canyon, Interstate 5 extends north/south through Medford, Ashland, and Yreka (Map 1).

East of the canyon, U.S. Highway 97 runs north-south through Klamath Falls and Weed. Both highways provide access from the major metropolitan areas of Portland, Oregon, and

Sacramento and San Francisco, California. State Highway 66, one mile north of the planning area, provides east/west access between Klamath Falls and Ashland. Regularly scheduled commercial air service is available at the Medford and Klamath Falls airports, and there are daily rail and bus services to Klamath Falls.

The main transportation route to the river is by State Highway 66 (Green Springs Highway), an east/west route between U.S. Highway 97 and Interstate 5. Physical and administrative access is provided to the river corridor by several improved and seasonal roads in the canyon. Public access is currently unrestricted; however, on some road segments that cross private land, public use is at the discretion of the landowner. Approximately seven miles west of Keno, Oregon, where State Highway 66 crosses the Klamath River, there are two access roads; one leading to the Topsy Road, which parallels the east side of the river in all three segments, and the other to the J.C. Boyle Powerhouse Road which parallels the west side of the river in Segments 1 and 2 (see Map 3). Picard Road from Dorris, California, provides public access to the Topsy Road from the southeast. Both Siskiyou and Klamath County maintain this road.

The road network (approximately 77 miles in the planning area) provides access to hydroelectric facilities, private land, and recreation sites (see Table 2-5 for road mileages within the planning area). Use of roads by recreationists includes general sightseeing, nature study, off-highway vehicle travel, and river access for camping, fishing, whitewater boating and waterplay.

The graveled Powerhouse Road enters the planning area above the forebay in Segment 1 (RM 223) and is routed along the western canyon wall. The road generally remains far above the river, descending to streamside only at the powerhouse area, the BLM campsite (approximately RM 217), and where it ends at the Oregon/California border. A graveled flume maintenance road runs adjacent to the concrete flume and along the western canyon wall in Segment 1. This road is much closer to the river than the Powerhouse Road and affords fishing access and fine views.

There is motorized access to the Klamath River from the Powerhouse Road in Segment 1 at the northern planning area boundary, as well as at several points along the flume road. In Segment 2, river access is at the powerhouse (RM 220.3), the BLM raft launch area (0.25-mile downstream from the powerhouse), the BLM campsite (RM 217), on both sides of the river near Frain Ranch (RM 215), and across from the Salt Caves (RM 211.8).

Table 2-5.—Road network features within the planning area [1]

	Segment							
	1		2		3		**Total**	
Ownership	Miles	Road Density[2]	Miles	Road Density[2]	Miles	Road Density[2]	**Miles**	**Road Density[2]**
BLM	5.4	3.6	26.7	3.3	2.7	1.2	**34.8**	**2.9**
PacifiCorp	3.7	12.3	10.7	6.3	14.3	1.6	**28.8**	**2.6**
State of Oregon			1.0	5.0			**1.0**	**5.0**
USFS					1.0	1.0	**1.0**	**1.0**
Private	1.5	3.0	5.0	3.3	4.4	1.0	**10.9**	**1.7**
Total	**10.6**	**4.6**	**43.4**	**3.8**	**22.4**	**1.3**	**76.5**	**2.5**

[1] The road length and density figures for Segment 3 and for the planning area as a whole underestimate actual road length for Segment 3, as a result of limited road inventory information on private lands.
[2] Calculated as miles of road per square mile of land area

From the northern planning area boundary to approximately RM 213, the Powerhouse Road is generally passable year-round. This public access road is maintained by PacifiCorp from State Highway 66 to the powerhouse. Beyond the powerhouse, the unimproved access road consists of a single-lane, rocky roadbed. Free public access on this road is provided under the terms of the current FERC license to PacifiCorp.

From RM 213 to the state line, the road is usually impassable in the winter and early spring due to snow and mud. Portions of the Powerhouse Road and other roads in the southwest portion of Segment 2 are closed seasonally (as part of the Pokegama Cooperative Seasonal Closure) to minimize intrusions into deer winter range and road damage.

Though much of the northern portion of the Topsy Road is outside of the planning area, the entire length of this road serves as an important public access route into the river canyon. Topsy Road is routed high above the river in Segments 1 and 2, descends to river level at RM 208 in California, and remains at river level through Segment 3 to Copco Reservoir. The Oregon portion of Topsy Road is classified by Klamath County as a "local access" road with no designated party responsible for road maintenance (Klamath County has jurisdiction over the road, however). The California portion of this road is accessible by the public and maintained by Siskiyou County.

Public access to the river from the Topsy Road is available during much of the year at Frain Ranch in Segment 2, as well as at a few other locations. Above RM 209 in Segment 3, the BLM raft take-out area provides easy access to the river. There are five designated fishing public access points to the river on private land with parking spaces along Topsy Road in Segment 3 provided by PacifiCorp. Two bridges along Topsy Road (Rock Creek and Shovel Creek) are affecting stream and riparian processes.

Other roads on the west side of the river include a seasonal dirt road that begins above the canyon rim and intersects the Powerhouse Road at RM 211 and 209.5, and a seldom-used jeep road that parallels the river between the Powerhouse Road and the river between RM 216.3 and 215 (Turtle Camp Road). Other roads on the east side of the river include numerous constructed and user-created roads in the vicinity of Frain Ranch, a number of roads in the vicinity of a large meadow near Rock Creek, and private roads that provide access to ranches and timber in California.

Roads within the planning area are predominantly surfaced with either native materials (such as soil) or crushed rock or gravel. Pavement or cinder surfacing is rare in the planning area (see Table 2-6 for a summary of road surface types and conditions). Of the road segments inventoried in 2001, approximately one-third were in poor condition (meaning that they were either very rocky, extremely rutted, or were washboarded). Most of the roads in poor condition were native surface roads that receive little maintenance.

Due to their location and/or condition, some road segments may be contributing to resource degradation. Damage to cultural sites has been documented both along the river and elsewhere in the canyon. Noxious weeds may be dispersed by vehicle traffic and road maintenance activities. In areas of poor drainage, on steep grades, and near stream crossings and riparian areas, road use may be causing sediment contributions, enhanced runoff, or damage to vegetation and soils. The 2001 road inventory documented no sites with obvious resource damage (in this case, meadow damage or braided roads) in Segment 1, 21 sites in Segment 2, and 12 sites in Segment 3. The documented sites in Segment 3 are associated with irrigated meadows or irrigation ditches, and do not currently present a high potential for resource damage, given that most roads in this segment are not open for public access.

Table 2-6.—Road surface types and conditions within the planning area

Surface type	Condition [1]	Segment 1	Segment 2	Segment 3	Total w/in Planning area Miles	Total w/in Planning area Percent
Native surface	Good	1.6	13.5	4.4	19.5	25
Native surface	Poor	0.8	9.0	3.9	13.7	18
Crushed rock	Good	7.6	8.8	7.0	23.4	31
Crushed rock	Poor	0.0	5.9	0.2	6.1	8
Vegetated	Good	0.2	2.8	1.3	4.3	6
Vegetated	Poor	0.0	1.9	2.0	3.9	5
Cinder	Good	0.1	0.1	0.0	0.2	<1
Cinder	Poor	0.0	0.0	0.0	0.0	0
Paved	Good	0.4	0.3	0.0	0.7	1
Paved	Poor	0.0	0.0	0.0	0.0	0
Unknown surfacing/ condition		0.0	1.0	3.8	4.8	6

[1] Roads characterized as being in poor condition include those that are rocky, rutted, or washboarded.

Cultural Resources and Traditional Uses

Cultural resources within the planning area are divided into three categories (1) prehistoric, (2) historic, and (3) current Native American traditional use. Prehistoric resources are associated with Native Americans and date before the time of contact with European settlers (A.D. 1850). Information about these resources is recovered through scientific archaeological investigations and oral histories. Historic resources date after A.D. 1850 and are more than 50-years old. In the planning area they are associated with early stagecoach and freight travel, early ranching and logging activities, and in one case, sacred use by Native Americans.

Prehistoric

Archaeological surveys, excavations, and artifact analyses have been conducted within the planning area over the last 43 years. Initial investigations by the University of Oregon in the late 1950s were prompted by the construction of the J.C. Boyle Powerhouse and Dam (Newman and Cressman 1959). Later, as part of the proposed Salt Caves Hydroelectric Project, the City of Klamath Falls (1984-1986) surveyed land and test excavated 20 sites within the planning area. In 1989, 750 acres of BLM-administered land in the planning area were surveyed (Class III - Intensive Field Inventory) by the BLM. The BLM also initiated a contract in 1989 to integrate and consolidate information obtained during the past 30 years from sites in the canyon with data from the 1950's into a single cohesive framework (Mack 1991) to help assess the suitability of the Klamath River Canyon for the wild and scenic river designation.

The Upper Klamath River Canyon Project started in 1992, to collect the canyon's ecosystem data and develop a land use history of the area. Surveys, excavations, and analyses have provided information about prehistoric activities in the canyon. Consultation with Native Americans has yielded information on the prehistory of the planning area and its relation to the lives and culture of living people, and enhanced the scope of our understanding of the prehistoric use of the canyon.

Over 100 prehistoric sites have been located in the upper Klamath River Canyon. The wide variety of known sites within the river corridor demonstrates intense prehistoric use of the canyon by Native Americans. Use of the canyon by Native Americans dates back to at least 5500 B.C.; however, archaeological data (radiocarbon dates, time-sensitive projectile points, and pottery) indicates that most of the sites within the planning area were occupied from A.D. 900 to A.D. 1850 (Late Prehistoric Period) (Mack 1995).

The wide diversity of riverine-associated plants and animals, the trade and communication corridor provided by the river, and the relatively mild winter climate within the canyon are just a few of the factors which explain the concentration of prehistoric sites in the planning area.

The diversity of site types in the canyon and archaeological evidence of the prehistoric diet indicate that the upper Klamath River Canyon was occupied year-round from at least A.D. 900 until approximately A.D. 1800 (Mack 1989). Present are fishing, gathering, and hunting camps, and pit house villages (pit houses are circular depressions reflecting a semi-subterranean prehistoric house structure.

Using ethnographic accounts (Silver 1978), the pit house villages have been interpreted as winter villages, while lithic scatters (concentrations of flaked stone debris and tools) are viewed as fishing, gathering, or hunting camps depending on location, used in the spring, summer, and fall. It is apparent that the large diversity of plant and animal resources in the canyon allowed year-round use of the canyon, rather than only seasonal use as is common for most of the riverine areas of the region.

Occupation of a river corridor on a year-round basis was an uncommon occurrence in this regionæthe distribution of plant and animal resources is usually over a wide area necessitating the seasonal movement of people from place to place. Archaeological analysis has shown that the prehistoric diet included the use of fish, acorns, large and small mammals, turtles, birds, and various plants (Silver 1978).

Due to the biological diversity of the canyon, resources were readily available within the planning area during different seasons of the year: anadromous fish in the spring and late summer; turtles in the spring, summer, and fall; acorns in the fall; and large game being taken primarily in the fall (Mack 1983).

In addition to the sites found within the canyon, sites that are easily accessible from the canyon have been found in areas where roots, seeds, and berries are available. These sites show that resource areas adjacent to the canyon were also used prehistorically to increase and supplement the Native American subsistence base.

Ethnographic accounts (Silver 1978; Spier 1930; Kroeber 1925; Gleason 2001) and artifacts recovered from sites within the planning area indicate the area was used by a variety of cultural groups and at different times. One group has been identified as the Shasta Nation of northern California.

In addition, the federally recognized Modoc and Klamath Tribes of the Klamath Basin, the Takelma of the upper Rogue River, and possibly the Pit River Indians of northeastern California are known to have used the area. Common to all of these Tribes was the use of winter pit house villages, hunting and fishing camps, and a subsistence pattern in which anadromous fish; acorns (where available), large and small mammals, and various plants were major parts of their diet.

Cultural differences between these Tribes are largely attributed to their geographic position and the influences of Tribes from outside of this region. These cultural differences resulted in the use by each Tribe of distinctive artifact forms, including projectile points, ground stone, and pottery. Pottery recovered at one site suggests that this site was occupied by the Takelma prior to its use by the Shasta. Burials and flaked stone tools show that some of the sites within the southern portion of the canyon were used by the Shasta. Projectile point types also indicate that the Modoc, Klamath, and possibly the Pit River Indians used sites within the canyon.

The wide range of artifacts from sites in the planning area shows that use of the canyon by different Tribes changed over the last 2,000 years. This is important because it shows that territorial boundaries between the different Tribes using the canyon did not remain the same through time (an assumption often made about the boundaries of prehistoric culture areas), but changed as each group expanded or decreased its Tribal area.

Archaeological investigations over the last four decades in the upper Klamath River Canyon have provided information about prehistoric use of the canyon, as well as the region. Excavations at ten of the pit house village sites have yielded information about the prehistoric diet, burial practices, architectural features, and aspects of tool manufacturing and use.

Several of these sites are very large and could provide more detailed information about prehistoric use of the canyon. Tribal boundary fluctuations, trade of raw material and finished products, and a greater understanding of the early use of the canyon are just a few of the research questions that could be pursued by additional research in the canyon.

Archaeological sites are eligible for nomination to the National Register of Historic Places if they have yielded, or may be likely to yield, information important in prehistory or history (BLM Regulations, 36 CFR 60.4[d]). The archaeological data from sites within the canyon make all sites eligible for nomination to the National Register of Historic Places and collectively as an Archaeological District. Current management direction is to evaluate the Klamath River Canyon for nomination to the national register of historic places as an archaeological district (KFRMP/FEIS).

Historic

After the 1850's, Native Americans continued to use the canyon for hunting, fishing, gathering, spiritual purposes, trade, and inter-Tribal communications. However, due to encroachment by Euro Americans, their activities were not as prevalent as in prehistoric times. Ethnographic and Euro American historic accounts (see Theodoratus et al. 1989) present only a generalized level of information concerning historic use by Native Americans.

Consultations with Native Americans yield a different perspective on historic use of the area. This perspective reflects a continuous link between prehistoric and historic cultural and spiritual uses, a linkage that has continued into the present; tying the lives of members of the Klamath Tribes and Shasta Nation with those of their ancestors who once inhabited the canyon.

Ethnographic investigations in association with archaeological research (City of Klamath Falls 1985) have identified use of one village site for religious ceremonies associated with the 1870 Ghost Dance, a Native American religious cult that first developed in the early 1870's on the Great Plains and then spread to Tribes in the west. Ceremonies were conducted so the deceased would return to the earth and help the living Native Americans regain control of their destiny. This religious doctrine was apparently transmitted from the Klamath Tribe, down the Klamath River, to the northern California Tribes (Spier 1927). This Ghost Dance site was probably part of the southward spread of the religion.

The upper Klamath River Canyon has been used extensively by Europeans since the 1850's. The terraces and flood plains along the river and several meadow areas above the river were excellent locations for agricultural and ranching activities. These areas were the focus of European settlers in the canyon.

The earliest European explorers in the vicinity of the planning area were members of Peter Skene Ogden's Hudson Bay Company expedition of 1826-27 (LaLande 1987). In their search for fur-bearing animals in southern Oregon, Ogden's party traveled along the western canyon rim (within the planning area). Unable to access the river because of the steep canyon wall, the explorers left the canyon rim near RM 222.5. Traveling southwest across the Pokegama Plateau (the area north of the river) the party again reached the river near Copco Reservoir and continued westward through the Cascade Range (LaLande 1987). Thirty years later (1856) Mart Frain, a noteworthy local figure, followed the river northward from the mining town of Yreka, California, to the Klamath Basin. Upon reaching the Klamath Basin, Frain began the first trade with local Native Americans.

Settlement and ranching started in the 1860's when one of the first settlers, A.M. Johnson, homesteaded near the Klamath Hot Springs in 1860 (Hessig 1978). Settlement increased after the construction of the Topsy Road in the 1870s (Bartoy 1995).

The Topsy Road, a stagecoach freight road, is a prominent historical landmark of the planning area. Topsy Road parallels the river for 11.4 miles (5.1 miles in Segment 2; 6.3 miles in Segment 3) on the south and east side of the river. Bisecting the Cascade Range, this road was officially opened for wagon and stage travel in 1875 between Yreka, California, and the Klamath Basin.

However, as early as 1865, freight for Fort Klamath was carried up the river canyon along a route closely approximating Topsy Road. Topsy Road underwent three construction periods: (1) initial construction from 1874 to 1875; (2) a second construction period in 1887, when the steepness of the grade was lessened; and (3) the final period of construction in 1890 when Topsy Road and Topsy Grade were cut into a vertical basalt face. From 1875 to the early 1900s, when the road to Ashland, Oregon, was improved, and the railroad reached Klamath Falls via a route east of the river canyon, Topsy Road provided the only year-round access to Klamath Falls and to towns east of the Klamath Basin.

Daily travel occurred with an overnight stop at the Beswick Hotel and Klamath Hot Springs in Segment 3 (see Map 4), and livery stops at the Way Station Ranch (0.5-mile north of the California/Oregon state line in Segment 2) and Overlong Station, which is above Topsy Grade.

The Beswick Hotel and Klamath Hot Springs complex in Segment 3 provided a popular overnight stop for stage passengers and freight drivers, as well as a vacation resort/health spa. The resort had a hotel, post office, store, saloon, swimming pool, restorative hot springs, dance pavilion, stables, plus living quarters for employees.

In its heyday as a famous spa, the hot springs were visited by such noted guests as President Herbert Hoover, author Zane Gray, and pilot Amelia Earhart. The first Beswick Hotel was constructed around 1870; a second hotel, built in 1887, was destroyed by fire in 1915.

Stones from the second hotel were used to construct a dance pavilion around 1920; this, too, was destroyed by fire. The post office, store, and saloon, all housed within the same building; swimming pool; stables; and living quarters for the resort employees are still standing today and are visible from the road and river.

Way Station, a livery stable and log cabin associated with travel on Topsy Road, is still standing. The location of Overton Station, another livery stop, is identified by several poplar trees above Topsy Grade.

Two additional historic ranch sites are found along Topsy Road; Kerwin Ranch, where the foundations and apple orchard are still visible, and the Frain Ranch, purchased by Mart Frain in 1888 and deeded to his three sons in 1893. The Frain Ranch contains the visible remains of a log cabin, root cellar, barn, and garage. The orchard, pasture lands, and the log cabin are visible from the river.

A pioneer cemetery, the Way Cemetery, is located off Topsy Road and contains the graves of Mart Frain and members of the Way, Ward, Ovelton, and Hoover families (all early ranching families). Topsy School, at the foot of Topsy Grade, was attended by children of the nearby ranches and logging camps.

All located within Segment 2, these historic sites display historical markers containing brief, descriptive accounts, courtesy of the local historical society. Two other historic ranches within Segment 2, the Hoover and Butler Ranches are on the west side of the river.

In addition to being a communication and travel corridor, the upper Klamath River played a major role in the logging operations of the area. The first cutting of timber started in the 1860s. Nearby ranchers and farmers cut posts for fences, poles and lumber for building construction, and fuelwood for home heating. The first commercial cutting was done in 1888 on the Oregon side north of the river, east of Hoover Ranch, and south of the river around Kerwin Ranch. Logs were pulled by horses along a ground-level chute made of logs braced side-by-side, to a landing at the river's edge. These logs were floated to a mill at Pokegema (later Klamathon), California, in 1891 (Helfrich 1966).

A major engineering feature of these logging activities was a wooden log chute, known as the Pokegama log chute, which was cut into the western canyon wall in Segment 3 (see Map 4) and put into operation in 1892. For ten years, logs were brought from the Pokegama Plateau by train and unloaded at the top of the chute.

The logs were pushed onto the chute, and by gravity, slid down into the river. The logs were then floated down the river to the mill at the town of Klamathon. At the height of its operation, 300 logs per day were carried down the 2,000-foot chute and over 110 men were employed along the river to facilitate movement of the logs downstream.

Today the only reminder of the log chute is a cut at the top of the canyon rim and a scar where the chute cut through the hillside, which are both visible from the river and Topsy Road.

Native American Traditional Uses

Traditional use by Native Americans of the upper Klamath River Canyon began before contact with Euro Americans and has continued into the present. Today, members of the Klamath Tribe and the Shasta Nation continue to use the canyon for spiritual purposes, hunting, fishing, gathering, and other cultural activities.

Many of the traditional use areas can be considered traditional cultural properties. A traditional cultural property is defined as a property that "is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in the community's history, and (b) are important in maintaining the continuing cultural identity of the community" (National Register Bulletin No. 38).

The Klamath and Shasta consider the river and canyon sacred because of their historical use by Tribal ancestors and present day use by Tribal members. From a spiritual perspective, the river expresses the value of life to the Klamath Tribes.

Innumerable stone cairns throughout the canyon attest to its long and continued spiritual use. These cairns are pages in the Klamath People's history, a very real conduit to the lives and spirits of those who walked the earth in the near and distant past. Further, the land and river are spiritually powerful to the Klamath People.

In the Native American world view, unlike that of Euro Americans, the land and the lives of the people who inhabit it are inextricably intertwined; to destroy the land is to unravel the fabric of life in which the people live. The upper Klamath River is one of the few parts of the region left that has been relatively untouched by development over the past 150 years. For the Klamath and their neighboring Tribes, the river and its canyon are very much a part of what makes them a people (Klamath Tribe 1989, personal communication).

A similar value of the river canyon is expressed by the Shasta Nation; to them this area represents a crucial link with the spiritual world:

> “For generations individual members, our spiritual leaders, and medicine persons have traveled to these burials to communicate with the Great Creator, to perform rituals, and to prepare for specific religious and medicinal ceremonies. The area contains places where our medicine people ascend, as they have throughout history, to their position … the first medicine power was received there, and the first practitioners of that power were brought forth and taught there . . . “ Guidance for daily life and for crises that individuals in the Tribe must face comes from those sites” (Hall 1985).

The various forms of spiritual use of an area by Native Americans do not fall within categories readily familiar to religions of western society. Religious use of a particular area encompasses a wide range of elements and observances.

Rituals can be practiced on an individual level where a person observes a particular practice as part of their daily activities. Small group observances might involve a family group with a religious specialist (shaman/doctor) who with esoteric knowledge has special access to supernatural power often used for curing or life-crisis events (for example, the death of a loved one). Other rituals and ceremonies involve the participation of all society’s members in events considered to be vital to the society as a whole (essential resources such as fish, acorns, and epos). These larger rituals renew and emphasize members’ needs for, and dependence on, the total society. The rituals must be performed properly according to well-established rites that involve time, place, and symbolic objects (Theodoratus et a1. 1989).

The concept of spiritual/supernatural power is a basic element in all Native American religions practiced in the planning area. Native Americans in the planning area had/have strong development of the religious concepts through their intimate day-to-day contact with the environment (trees, rocks, springs, weather, shapes, and animal life, etc.) many, which potentially contained power. Spirit-quests by individuals at special locations embodied with supernatural qualities were/are important (Theodoratus et al. 1989).

Native Americans also value the canyon for other important cultural activities. The river area has long been used for fishing, gathering, and hunting; as a meeting place between the area’s various Tribes and bands; as shared fishing villages; and as a site of inter-Tribal exchange and communication. There are no instream water rights for the Native Americans who use the Klamath River within the planning area. The area also contains archaeological and environmental information and material that sheds light upon the culture and history of the Klamath, their neighbors, and their ancestors (Klamath Tribe 1989, personal communication).

Vegetation and Soils

Special Status Plant Species

There are no documented sites of federally listed threatened or endangered plants in the planning area. Limited surveys have been conducted, but there have been no systematic surveys covering the entire planning area. Species of special concern that have been documented in the planning area include the mountain lady slipper orchid (*Cypripedium* *montanum*), Greene's mariposa lily (*Calochortus greenei*), Bolander's sunflower (*Helianthus bolanderi*), red-root yampah (*Perideridia erythrorhiza*), Howell's false-caraway (*Perideridia howellii*), and Lemmon's catchfly (*Silene lemmonii*) (Table 2-7). Several other special status plant species occur nearby and may potentially be found in the planning area. Several populations of Bellinger's meadow foam (*Limnanthes floccosa* ssp. *bellingeriana*), a Bureau sensitive species, have been found within the Pokegama area, which is adjacent to the west rim of the upper canyon just outside the planning area boundary. Numerous populations of a Bureau tracking species, the pygmy monkey-flower (*Mimulus pygmaeus*), have also been found at many sites within the Pokegama area. Short-podded thelypody (*Thelypodium brachycarpum*), a Bureau assessment species, is a forb that historically has been found on the Klamath River near the town of Keno (Abrams 1944), and, therefore, may occur in the planning area.

Survey and Manage Species

The diverse collection of plant communities and habitats in the Klamath River Canyon potentially support populations of survey and manage (see Glossary) organisms, including fungi, lichens, bryophytes (mosses and liverworts), and vascular plants. The only survey and manage plant documented to occur in the planning area is the mountain lady slipper orchid (*Cypripedium montanum*), a Category C vascular plant species. Category C species require pre-disturbance surveys be conducted before on-the-ground management projects are implemented. Recent surveys at a strategic survey plot within the Klamath River Canyon near the Oregon-California border found a lichen (*Peltigera collina*) which was recently removed from survey and manage list by the 2001 "Survey and Manage Record of Decision."

Noxious Weeds

Noxious weeds are plant species designated under federal, state, or local laws and ordinances to cause economic loss and/or harm the environment. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, parasitic, toxic, a carrier or host of destructive insects or plant and animal diseases, and are nonnative, new, or not common to the United States.

Populations of Russian knapweed (*Acroptilon repens*), yellow starthistle (*Centuarea solstitialis*), poison hemlock (*Conium maculatum*), Scotch broom (*Cytisus scoparius*), St. John's wort (*Hypericum perforatum*), yellow toadflax (*Linaria vulgaris*), Himalayan blackberry (*Rubus discolor*), and puncture vine (*Tribulus terrestris*) have been documented

Table 2-7.—Special status plant species known to occur within the planning area

Common name	Scientific name	Status[1]	Number of populations
Greene's mariposa lily	*Calochortus greenei*	BS	9
Mountain lady slipper orchid	*Cypripedium montanum*	BT	1
Bolander's sunflower	*Helianthus bolanderi*	TS	2
Red-root yampah	*Perideridia erythrorhiza*	BS	11
Howell's false-caraway	*Perideridia howellii*	TS	3
Lemmon's catchfly	*Silene lemmonii*	TS	3

[1] BS = Bureau sensitive species; BT = Bureau tracking species.

and mapped within the planning area through incidental surveys by BLM staff and university researchers (Table 2-8).

Limited surveys along roads have been conducted in the past, but there have been no systematic surveys covering the entire planning area, and most of these populations were found in the course of other activities. Several populations of diffuse knapweed (*Centuarea diffusa*) have been documented in the Topsy/Grenada area just east of the canyon rim adjacent to Section 1 of the planning area. Several populations of Dyer's woad (*Isatis tinctoria*) have been found within the Pokegama area, which is adjacent to the west rim of the upper canyon just outside the planning area boundary. Populations of hoary cress (*Cardaria draba*) have been reported from the California portion of the planning area, but those sites have not been documented or mapped.

The current emphasis for noxious weed management in the planning area is treating known populations of along roadsides with either spot applications of EPA approved chemicals or using biological control methods.

Vegetative Communities

The Upper Klamath River Canyon is narrow and steep, averaging one mile or less from rim to rim from J.C. Boyle Dam on the north end of the planning area to RM 215 above Frain Ranch. South of this point the canyon gradually widens, and slopes are not quite as steep. Elevation ranges from 4,400 feet along the top of south canyon rim, to about 2,580 feet at RM 204 below Spannaus Ranch at the south end of the planning area.

The vegetation of the planning area is distinctly different from adjacent areas above the rims, especially above RM 215. The plant communities are an extension of the warm, dry chaparral and woodlands of northern California, mixed with plant communities of the east slope of the Cascades and Sierra Nevada. The variety of topographic features, aspects, elevation, and soils, has created a complex mosaic of plant communities. See Appendix J for listing of plant species that occur in the planning area.

A map of current vegetation by plant community has been developed using 1999 Landsat satellite imagery. This imagery recorded vegetation on a grid of 30-meter square pixels (approximately 90 feet square, or 0.2 acre in size). Each pixel was classified by the majority vegetation type on the area. An analysis was conducted, ground checked for accuracy, and

Table 2-8.—Known noxious weed sites within the planning area

Common name	Scientific name	Number of populations	Acres infested
Russian knapweed	*Acroptilon repens*	1	0.1
Yellow starthistle	*Centuarea solstitialis*	33	278.4
Poison hemlock	*Conium maculatum*	12	6.3
Scotch broom	*Cytisus scoparius*	1	0.1
St. John's wort	*Hypericum perforatum*	14	9.7
Yellow toadflax	*Linaria vulgaris*	2	1.5
Himalayan blackberry	*Rubus discolor*	23	13.2
Puncture vine	*Tribulus terrestris*	1	0.5

then the pixels were aggregated by dominant plant community to form the current vegetation map (see Map 5). The major plant communities identified are conifer forest and woodland, dense oak woodland, open oak woodland, juniper woodland, mixed shrub, rabbitbrush-sagebrush, dry meadow, riparian, and irrigated meadow. Table 2-9 summarizes the acres by plant community for the planning area.

Conifer forest and woodland: This is the largest plant community and covers 8,366 acres or 43 percent of the 19,765-acre planning area. This community includes mixed ponderosa pine-Douglas fir stands (commonly found on lower slopes and benches), small pockets of Douglas fir below upper canyon rims, pine-oak-juniper stands on drier sites, and steep, rocky slopes with scattered pine, oak, and shrub.

An inventory of the Cascade Forest Reserve and adjacent lands in Oregon was published in 1900 (Leiberg 1900). The Klamath Canyon, referred to as Klamath Gap, was described as “a rocky and precipitous gorge, the slopes and bottom timbered with scattered trees, and the forest along the north bluff badly burned.” Before European settlement of the area (circa 1870), periodic lightning-ignited natural fires and Native American burning maintained these forests in an open condition. These recurring fires burned through forest stands generally as relatively light ground fires and limited understory vegetation to perennial grass and only occasional groups of smaller trees. Widely spaced, large-diameter Ponderosa pine and Oregon white oak gave much of the area a savanna-like appearance.

Over the last 130 years, elimination of burning by Native Americans, grazing of ground fuels, and active fire suppression, have limited fire as a disturbance agent in most of these communities. Assuming an average fire-return interval of 15 years, an average of eight light ground fires has been missed. In many stands, the Douglas fir understory component has increased in density, as has the pine understory. Extremely dense stands with ladder fuels that

Table 2-9.—Plant communities in the planning area (in acres)

Plant community[1]	BLM	USFS	PacifiCorp	Other private	State of Oregon	Total of all ownerships
Conifer forest and woodland	3,315	235	2,220	2,481	115	8,366
Dense oak woodland	612	0	287	135	0	1,034
Open oak woodland	1,803	162	1,706	715	3	4,389
Juniper woodland	0	12	53	7	0	72
Mixed shrub	1,272	161	1,466	401	0	3,300
Rabbitbrush/sagebrush	184	0	480	91	0	755
Dry meadow	340	28	267	146	0	781
Riparian	45	3	246	37	0	331
Irrigated meadow [2]	0	0	374	0	0	374
Total	7,571	601	7,099	4,013	118	19,402[3]

1. The extent of mapped vegetation communities are subject to revision based on new or updated information.
2. Small riparian, dry meadow, and other upland communities, are included within this acreage. The actual extent of irrigated meadows is approximately 290 acres.
3. Total surface areas in planning area is 19,765 (19,402 land +363 water)

can carry ground fires to the forest canopy are the result. Accumulated logs and other dead material also contribute to the risk of stand-replacement fires. The dense, stressed stands are also at high risk for insect attack, primarily by bark beetles.

Management of BLM lands in Oregon is directed by the 1995 resource management plan. Commercial forest lands total 1,689 acres. Timber sales and other forest and woodland treatments can be implemented for wildlife, fuels, and other resource benefits. Sales or treatments must conform to requirements of the 1994 “Northwest Forest Plan.” To date, timber harvest has been minimal. The last timber sale on BLM lands on the Oregon side was in 1985 at Long Point, at the extreme north end of the planning area. PacifiCorp lands include a small acreage of commercial forest. Some were partially cut in the 1970s. U.S. Timberlands owns 845 acres within the planning area on the Oregon side. Most of these lands are above the canyon; therefore management activities do not affect visual resource values as seen from the river.

Overall, the conifer forests and woodlands have overstories of Ponderosa pine, Douglas fir, or Oregon white oak, with incense cedar, sugar pine, California black oak, white fir, and western juniper less frequently found. Shrub species can include snowberry, western serviceberry, mountain mahogany, deerbrush, wedgeleaf ceanothus, Oregon grape, rabbitbrush, and gooseberry. More common forbs include wild strawberry, lupine, buckwheat, common buttercup, pussytoes, Nuttal’s gayophytum, and Puget balsamroot. Common grasses include cheatgrass, hairy brome, medusa head wild rye, needle grass, pine bluegrass, blue wild rye, and western fescue. A complete list of known plant species occurring in the planning area appears in Appendix J.

Oak woodlands: The oak woodland communities are mapped as dense oak woodland (1,034 acres or 5 percent of the planning area), and open oak woodland (4,389 acres or 22 percent of the planning area). Crown cover of overstory trees was the one factor used to divide these oak communities. Oregon white oak is the dominant tree, and these woodlands and adjacent areas form the far eastern edge of its natural range. California black oak is a minor component of some stands. Black oak in this area forms the far northeast portion of its natural range (Little 1971).

Besides Oregon white oak and California black oak, other tree species include ponderosa pine, Douglas fir, incense cedar, and western juniper. Shrub species include mountain mahogany, wedgeleaf ceanothus, manzanita, poison oak, deerbrush, snowberry, western serviceberry, and rabbitbrush. Common forbs and grasses are Puget balsamroot, mountain dandelion, yarrow, Soloman plume, large-flowered collomia, wooly sunflower, buckwheat, tarweed, cheatgrass, blue bunch wheatgrass, needle grass, hairy brome, two-flowered fescue, Idaho fescue, pine bluegrass, bottlebrush squirreltail, junegrass, and medusahead wild rye.

The oak woodlands are usually found on hot, dry sites. Under natural conditions prior to European settlement, frequent lightning-caused fires and Native American burning maintained these woodlands in an open, savanna-like condition. Most of the oak suckers sprouting from root collars of snags would be killed back by these periodic fires, as were conifer seedlings originating from adjacent stands. The oak woodlands of today are much denser than presettlement communities. Scattered older trees (300 to 350-years old), with spreading crowns (instead of forming a savanna) now share a more closed woodland with an understory of younger oak 90 to 180-years old, as well as invasive conifers.

Until recently, management of the oak woodlands has been limited to removal of minor volumes of posts and fuelwood. In 1997 (approved under “Klamath Falls Resource Area RMP”), a hand thinning of younger oaks was done near Hoover Ranch on BLM land. Objective of the treatment was to increase growth of the oaks and increase production of acorns (mast) for mule deer, acorn woodpeckers, and other wildlife. A total of 214 acres of BLM oak thinning (out of 2,415 acres of oak woodlands) has been completed to date.

Presently (January 2002), a new and possibly exotic disease has been discovered in oak woodlands in California. Sudden oak death, caused by a *Phytopthora* fungus, has killed a large number of oaks in California, especially near the Pacific coast. California black oak has proven to be highly susceptible, while Oregon white oak's susceptibility is thought to be low (Oregon Department of Agriculture 2001). The nearest incidence of this disease is in Curry County, west of the planning area.

Juniper woodland: This community covers only 72 mapped acres, or less than 1 percent of the planning area. Western juniper is not the major component of arid woodlands, as it is in the foothills to the east. Western juniper, a major component of arid foothill woodlands to the east, can be found (also in old growth form) on rocky slopes. In limited areas, the century-long absence of natural fire has permitted juniper to invade adjacent lands. In other plant communities (particularly the conifer forest and woodland, and the oak woodlands), juniper occurs as a minor component as mostly scattered individual trees. Common shrub species include deerbrush, rabbitbrush, mountain mahogany, and gooseberry. Common forbs are buckwheat, common buttercup, pussytoes, Nuttall's gayophytum, and Puget balsamroot. Cheatgrass, hairy brome, medusahead wild rye, needlegrass, and pine bluegrass are some common grasses.

Mixed shrub: The mixed shrub community is found throughout the planning area on both slopes and benches. It covers 3,300 acres or 17 percent of the planning area. Species composition and relative abundance of species varies with site location, but common shrubs include birchleaf and curlleaf mountain mahogany, wedgeleaf ceanothus (a critical mule deer browse in this community), manzanita, poison oak, deerbrush, serviceberry, snowberry, and rabbitbrush. Oregon white oak can be abundant as a small, shrubby tree. Forbs and grasses are well developed in open areas and include Puget balsamroot, mountain dandelion, yarrow, Soloman plume, large-flowered collomia, wooly sunflower, buckwheat, and tarweed. Common grasses are cheatgrass, blue bunch wheatgrass, needle grass, hairy brome, two-flowered fescue, pine bluegrass, and bottlebrush squirreltail.

Rabbitbrush/Sagebrush: This shrub community is dominated by sagebrush and rabbitbrush, and is mapped as rabbitbrush-sagebrush, with 755 acres, or 4 percent of the planning area. This community has a more open shrub cover, and the areas between the shrubs support many species of forbs and grasses. Forbs include Puget balsamroot, mountain dandelion, yarrow, Soloman plume, large-flowered collomia, wooly sunflower, buckwheat, tarweed, California poppy, least hopclover, and tidy-tips. Grasses include bluebunch wheatgrass, needle grass, hairy brome, two-flowered fescue, pine bluegrass, bottlebrush squirreltail, cheatgrass, soft cheat, bulbous bluegrass, foxtail barley, and few-flowered wild oatgrass.

Dry meadow: The dry meadow community totals 781 acres, or 4 percent of the planning area. This community is typically dominated by forbs and grasses. They often have been heavily grazed by livestock, and are dominated by exotic annual grasses such as cheatgrass and medusahead wild rye. Other common grasses include pine bluegrass, bottlebrush squirreltail, soft cheat, bulbous bluegrass, foxtail barley, and few-flowered wild oatgrass. Forb species include large-flowered collomia, wooly sunflower, buckwheat, tarweed, California poppy, least hopclover, and tidy-tips. Some of the areas mapped as the dry meadow community are seasonally wet in the spring, and support sedges and rushes in the wettest portions, which dry out in the summer.

Riparian communities: These communities occur in narrow bands along the river, on the edges of islands in the river, in drainages within the canyon, and as components of upland wet meadows that are scattered throughout the canyon. These communities total only 331 acres or 2 percent of the planning area. Due to the confined nature of the canyon in some reaches, and fluctuating water levels from the outflow of the J.C. Boyle Powerhouse, the extent of streamside vegetation is limited (Scott et al. 1993). The lack of alluvial surfaces along the

Klamath River may also contribute to the limited extent of riparian communities. Channel incision and floodplain isolation have reduced the extent of riparian and wetland communities on both the Klamath River and tributary streams.

Common riparian overstory species include Oregon white oak, birch, white alder, ponderosa pine, and Oregon ash. Black cottonwood occurs along Shovel Creek and may occur elsewhere. Blue elderberry, Lewis mockorange, willow, Douglas spirea, and western wild grape are common in the shrub layer. Common forbs include watercress, monkey-flower, speedwell, cattail, and boreal bog-orchid. Reed canary grass, sedges, and rushes are also present. Reed canary grass forms large monotypic patches along the river, since it has a competitive advantage under conditions characterized by extreme and frequent water level fluctuation and poor water quality (Conchou and Fustec 1988; Guard 1995; Antieau 2000). Although not a major component of the riparian community, stands of quaking aspen are found in some drainages. Upland springs and seeps support riparian-type vegetation, which includes many of these same species.

Irrigated meadow: The exact extent of irrigated meadows is not known at this time. Analysis of air photos suggests that approximately 374 acres of land adjacent to the river in Segment 3 are irrigated meadows.

Since there are pockets of land within that section that do not qualify as irrigated meadow, the total actual area of irrigated meadow in Segment 3 is approximately 290 acres (Miller 2002, personal communication). The remainder (80 acres) of the mapped 374 acres consists of dry meadow, riparian vegetation, and inclusions of upland vegetation types within individual meadows. PacifiCorp manages the 290 acres of irrigated meadow for hay production (100 acres) and pasture.

Soils in these areas are derived from riverine and floodplain sediments and have textures ranging from clay-rich to gravelly, often arranged in complex patterns. These soil types have varying water holding capacities, with the more clay-rich types typically holding water longer than the gravelly types. Flood irrigation is supplied to the meadows via a series of ditches that divert water from the river and the Shovel Creek drainage. Because of undulating terrain and mixed soils, delivery of sufficient irrigation water to drier or better-drained areas (coarse-textured soils) may result in delivery of excess water to moister or more poorly-drained (clay soils) areas. In most years, natural inundation or sub-irrigation from the river is limited to narrow bands along the margins of the river or low spots on the landscape that are hydrologically connected to the river by bands of coarse-textured soils (Miller 2001, personal communication).

Vegetation in the meadows is primarily a mixture of grasses that has evolved over the past 130 years of agricultural use. The most common grasses are timothy, orchard grass, and various perennial species of brome and bluegrass. Various clover and rye species occur less frequently, while western fescue, meadow fescue, alfalfa, and meadow foxtail occupy drier sites. Bullrush and willow occupy sites on the margins of pastures, and rushes occur in wetter portions of Shovel Creek meadow and the meadow to the north of Hessig Ranch. Dense sod mats form when decomposition is impaired by moist conditions. Star thistle may compete strongly if irrigation is curtailed as a result of increased nitrogen availability (from decaying grasses) and decreased competition from irrigated annual species. Fertilization with nitrogen, sulfur, and phosphorus occurs annually at the beginning of the growing season, and haying typically occurs from mid-June to August. Pastures are managed on a short-term (every few weeks for example) grazing rotation system (Miller 2001, *personal communication*).

Soils

Most renewable resources depend upon soil. Soils store and release water to streams and wetlands, and provide a medium for plant growth. The combined influences of climate, vegetation, topographic relief, parent materials, and time interact to form soils with unique sets of characteristics. These characteristics determine the productive capability of soil and its management requirements.

The Natural Resources Conservation Service (formerly the Soil Conservation Service) has delineated geographic areas that have a distinctive pattern of soils, topography, and drainage. These "map units" often consist of multiple "soil series" that intermingle to the degree that it was not feasible to map them separately. Soils series can consist of numerous variants that reflect slope and slope aspect. For the general discussion that follows, these subdivisions of soils series are not mentioned specifically.

The planning area is located in a transitional area exhibiting some characteristics of immediately adjacent major geologic provinces. These include the High Cascades and the Basin and Range provinces. Variation in landforms and, to a lesser extent, parent materials, results in the diversity of soils types in the planning area. The soils within the planning area exhibit a range of characteristics typical of soils in a topographically complex area (City of Klamath Falls 1989).

Although many of these soil types have a limited distribution (less than 100 acres), a few soils types extend over large areas within the analysis area (Table 2-10). See Map 6 for the distribution of soils in the planning area.

Oregon Soils Summary
The primary soil series in the Oregon portion of the planning area are the Bogus, Greystoke, McMullin, and Skookum series. The following descriptions are from the "Soil Survey of Jackson County Area, Oregon" (USDA-SCS 1993).

Table 2-10. Soil Survey Information

Map unit	Acres[1]	% of planning area
Oregon soils		
Bogus-Skookum (1–12%)	968	5
Greystoke stony loam	816	4
Skookum-Bogus	1,238	6
Skookum-Rock outcrop-McMullin	886	5
Skookum-Rock outcrop-Rubble land (35–70%)	4,188	22
Terrabella Clay	70	<0.5
California soils		
Bogus stony to very stony loam	2,362	12
Jenny Clay and Jenny cobbly clay	174	1
Lassen-Kuck complex, stony and Lassen-Rock outcrop-Kuck complex	5,433	28
Lithic Haploxerolls-Rock outcrop complex	1,058	5
Medford clay loam, cool	327	2
Miscellaneous Oregon and California soils	1,882	10

[1] Approximately 363 acres of the entire planning area is water.

The Bogus-Skookum complex consists of very deep, well-drained soils on old terraces. They formed in residuum and colluvium derived dominantly from andesite, tuff, and breccia. Permeability is slow, runoff is slow, and the hazard of water erosion is slight. Potential plant community includes Douglas-fir, Ponderosa pine, Oregon white oak, California black oak, Oregon grape, common snowberry, wedgeleaf ceanothus, Idaho fescue, mountain brome, bluebunch wheatgrass, and pine bluegrass.

The Greystoke stony loam consists of deep, well-drained soil on hillslopes. It formed in colluvium derived from andesite. Permeability is moderately slow, runoff is rapid, and the hazard of water erosion is high. Potential plant community includes Douglas fir, Ponderosa pine, incense cedar, Oregon grape, pachystima, and fescue. Within this soil series, 48 acres within the planning area have been classified as fragile non-suitable woodlands under the BLM Timber Productivity Capability Classification system.

This inventory classifies timber stands based on their inherent soil properties and landform characteristics. Sites are designated as fragile, nonsuitable woodlands if they are judged to be biologically and/or environmentally incapable of supporting a sustained yield of timber.

The Skookum-Bogus complex is on hillslopes and shares similar physical properties and potential plant communities to the Bogus-Skookum complex.

The Skookum-Rock outcrop-McMullin complex is on plateaus and shares common characteristics to other Skookum series with the following traits from the McMullin series. Permeability is moderate, runoff is medium to rapid, and the hazard of water erosion is moderate to high. Potential plant community includes mixed shrubs, Idaho fescue, bluebunch wheatgrass, and pine bluegrass.

Soils within the Oregon portion of the planning area generally have slow infiltration rates when wet. This is a consequence of moderately high proportions of clay, especially in subsurface horizons. Despite the potential for surface runoff, most soils in the planning area have a low susceptibility to sheet and rill erosion of surface horizons. This is due to the high proportion of coarse fragments on the soil surface.

A small portion (approximately 70 acres) of the planning area in Oregon contains Terrabella clay loam soils, which are prime farmland soils (as defined by the U.S. Department of Agriculture (see Map 6). These soils are located in the vicinity of the Hayden Creek, Chert Creek, and Way Creek wet meadows.

Two soil series comprise 50 percent of the planning area, the Skookum series, and Lassen-Kuck complex. Both these soil series/complex series are comprised of 35-50 percent clay particles. Many of the other soil series within the planning area are also high in clay content. Due to this physical property, the potential for shrink-swell of these soils exists. The importance of shrink-swell in these soils may allow some amelioration of soil compaction over time. Further study is needed to determine the time frame and extent of this compaction amelioration

California Soils Summary

The primary soil series in the California portion of the planning area are the Bogus, Jenny, Lassen-Kuck complex, Lithic Haploxerolls-Rock outcrop complex, and Medford. The following descriptions are from the "Soil Survey of Central Siskiyou County California Central Part" (USDA-SCS 1983).

The Bogus stony to very stony loam are very deep, well-drained soils on mountains. These soils are derived dominantly from tuff (volcanic ash). Runoff is rapid, and the hazard of water erosion is high. Potential plant community includes Ponderosa pine, Douglas fir, with an understory of needlegrass, fescue, lupine, and roundleaf snowberry.

Jenny clay and Jenny cobbly clay are very deep, well-drained soils on terraces. These soils formed in alluvium and are derived dominantly from extrusive igneous rock (primarily basalt). Runoff is slow to medium; hazard of water erosion is slight to moderate. Soils within this series are classified as moderate to good agricultural soils. Potential plant community includes western juniper, bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, and sulphur flower.

Lassen-Kuck complex stony and Lassen-Rock outcrop-Kuck complex are moderately deep, well-drained soils on hills. These soils formed in residuum derived dominantly from extrusive igneous rock (weathering of primarily basalt). Permeability is slow, runoff is medium to rapid, and the hazard of water erosion is moderate to high. Potential plant community includes western juniper, bluebunch wheatgrass, beardless wheatgrass, and Idaho fescue.

Lithic Haploxerolls-Rock outcrop complex is comprised of rock outcrops, and shallow, excessively drained soils on mountains. These soils formed in residual material derived from intrusive igneous or metamorphic rock.

Medford clay loam cool is very deep, moderately drained, soils on alluvial fans. These soils formed in alluvium derived from mixed rock sources. Permeability is moderately slow, runoff is slow to rapid (dependent on slope), and the hazard of water erosion is slight to high (also dependent on slope, slight on slopes less than 2 percent, high on slopes greater than 15 percent). Soils within this series are classified as moderate to good agricultural soils. Potential plant community includes western juniper, scattered oaks, Thurber needlegrass, and bottlebrush squirreltail.

Soils within the California portion of the planning area generally have slow infiltration rates when wet (for the same reasons as the soils within the Oregon portion).

Soil Erosion as a Result of Mass Movement

The planning area is relatively active in terms of erosion and mass soil movements, particularly within Segment 2. The Klamath River Canyon is thought to be a relatively youthful canyon that is actively downcutting. Evidence of this is the steep canyon slopes; the narrow, relatively straight river channel; and the abrupt change in river gradient at RM 214.3 (the Caldera area below Frain Ranch) (City of Klamath Falls 1989).

Landslides are common primarily in Segment 2 of the planning area. Landslides are present along both side slopes of the canyon. Large slides are thought to occur primarily where tuff (compact ash) is overlain with large basalt blocks, which collectively are known as basalt-caped tuff. Through natural erosion, which may cause slope steeping, the failure in tuff layers may allow the basalt to begin a down slope migration.

Benches and terraces found within the canyon may have been formed when massive landslides dammed the river and created upriver lakes. Lake sediment collected behind the landslide causing the formation of benches and terraces. Erosion breached a channel through the landslide allowing the river to resume its course (City of Klamath Falls, 1989).

Soil fungi and soil bacteria, as well as their associated predators such as various protozoa, nematodes, microarthropods, and earthworms are a necessary component of the ecosystem in order to maintain productivity of the soil community, which directly correlates to the health of the above ground plant community. Soil organisms maintain productivity by nutrient cycling of plant material, and fauna material (soil organism feces and dead soil organisms). The conversion of this “compost” into available forms of nutrients and minerals is necessary for plant growth (Ingham, E.R. 1997). Factors, which negatively affect the health of soil organisms, should be avoided or minimized during KFRA resource management projects.

Terrestrial Species and Habitat

The diversity of vegetation along the river attracts large numbers of wildlife. Because the river bisects the Cascades, this has become an important migration, movement, and dispersal corridor for wildlife and bird species.

Appendix K lists all species identified through established surveys or documented during field visits. We have also listed species with the high potential to occur within the study area based on species range, habitat availability, and expert opinions. The BLM is the primary agency that manages to maintain or improve wildlife habitat on public lands, while Oregon and California State fish and wildlife agencies manage the populations.

Recent habitat enhancement projects in or near the canyon include prescribed fire to rejuvenate brushfields for critical big game winter range, and oak thinning projects to improve health and mast crop production of oak communities. These oak communities are unique, and it is estimated that 90 percent of the historic range of the Oregon white oak communities have been lost due to urbanization, agriculture, and fire suppression.

The oak communities in the upper Klamath River Canyon make up the eastward most extension of their range. BLM manages oak habitats within the canyon for big game, turkeys, and a variety of landbird species that use these habitats. Several of these species have been identified by Partners in Flight as priority landbird species, such as the western bluebird, Lewis' woodpecker, the acorn woodpecker, and the vesper sparrow.

Special Status Species

The diverse plant communities found in the upper Klamath River Canyon provide a great variety of wildlife habitats and wildlife species. Appendix K displays the list of suspected and documented species in the upper Klamath River Canyon. This list also details special federal or state status species. Federal status of Threatened (FT) or Endangered (FE) receives full protection under the Endangered Species Act (ESA). Other federal special status categories include Bureau Assessment (BA), which could require alterations in project design to protect species or habitat and Bureau tracking (BT) which only requires documentation of the presence of the species.

Oregon special status species are listed as:

SE: State Endangered
ST: State Threatened
C: Critical
V: Vulnerable
P: Peripheral/Naturally Rare
U: Undetermined Status

Abbreviations used in CA (California State):

CSC: Species of Special Concern
SE: State Endangered
ST: State Threatened
FP: Fully Protected

Survey and Manage Species

Survey and manage organisms are considered rare or uncommon species within the range of the northern spotted owl which includes western Washington, western Oregon, and northwestern California, including the eastern flank of the Cascade Range. Survey work for these organisms includes both project surveys before habitat-disturbing activities, and strategic surveys (landscape-scale surveys) conducted at permanently established current vegetation survey plots located on a 3.4- or 1.7-mile grid across the Pacific Northwest Region.

The plots sampled each year are a randomly selected subset of these locations. The diverse habitats in the Klamath River Canyon potentially support populations of survey and manage organisms, including terrestrial and aquatic mollusks.

Terrestrial species/Habitat

Historical use of the upper Klamath River Canyon included homesteading, livestock production, and timber harvestingæthe canyon was also used as a major travel route. Despite this historical use and the current hydroelectric developments and recreation activities, the canyon remains relatively remote and undisturbed. With the surrounding sparsely-settled forests and rangelands, the canyon provides the habitat quality needed by the many species of wildlife found in and around the canyon.

The diverse terrestrial habitat within the planning area supports a large number of wildlife species. Several species of wildlife are found or expected in the surrounding environment that either reside within the planning area or use canyon habitat to some extent, including at least 197 species of birds, 67 species of mammals, and 34 species of reptiles and amphibians (herptiles) (see Appendix K).

Birds

Of the 197 known species of birds within the planning area, some reside year-round and others are seasonal or migratory. There are at least 19 known species of raptors, 44 species of water-associated birds, six upland game birds, and 109 landbirds. The other 19 species are woodpeckers or miscellaneous birds. Federal and state status is documented in Appendix K.

Because the Klamath River Canyon cuts across the Cascades, it is a natural migration corridor. The extensive rimrock, cliffs, and large trees in the canyon provide an abundance of nesting substrate for raptors. Osprey, bald eagle, prairie falcon, and American kestrel have multiple known nest sites in the planning area. Some raptors get special consideration through the current RMP, the *Endangered Species Act* and the *Migratory Bird Treaty Act*. These special considerations are seasonal restrictions to management activities and buffer zones around protected nest sites.

The fish inhabiting the Klamath River provide a good prey base for bald eagles and osprey in the canyon. At least two pair of bald eagles (federal and Oregon State listed threatened, California State listed endangered) nest within the planning area and appear to be year-round residents of the canyon. One pair has nested in the canyon every year since 1979 and, except for 3 years, has successfully fledged young (Isaacs and Anthony 2001). The pair has used four different nest sites since 1979, and all are located within the canyon in Segment 2. The other nest was officially documented in 2001 but communications with rafting companies and observation of the nest indicate that it was probably present for several years.

Two other pairs of bald eagles nest outside the planning area, but within 0.75 miles of J.C. Boyle Dam. They likely forage in J.C. Boyle Reservoir and in Segments 1 and 2. One nesting pair was discovered in 1983 and the other in 1998. Both have continued to nest in the vicinity. In 2001 all nest sites were occupied but only three young were produced. Migrating and wintering bald eagles are also found in the canyon.

Ospreys nest in the planning area and generally use the tops of large snags or live trees adjacent to the river for nest and perch sites. These birds are commonly seen foraging up and down the river. There are two known nest sites within Segment 2. At least one pair has nested in recent years, including 1999. There are also at least six nests adjacent to J.C. Boyle Reservoir whose occupants likely forage in the reservoir and Segments 1 and 2. There are several more nests in Segments 2 and 3.

Many prairie falcon nest sites have been documented in the planning area, one in Segment 1 and five in Segment 2. In Segment 2, one nest site is located on a cliff ledge 35 to 45 feet directly above the river; the others are on cliffs away from the river just below the canyon rim. Surveys done in 1984 and 1985 by the City of Klamath Falls (1986) show that a maximum of four of the sites in Segments 1 and 2 were occupied. In 2000, three of the historic nest sites in Segment 2 were monitored and two sites produced young. The recent status of nest sites in Segment 3 is unknown.

Other raptors found in the planning area include the red-tailed hawk, American kestrel, sharp-shinned hawk, Coopers hawk, great horned owl, long-eared owl, and western screech owl. The northern goshawk and northern pygmy owl, both Oregon State sensitive species, inhabit the planning area and may nest in or near the canyon. Golden eagles are commonly seen foraging in the canyon and are known to nest near the planning area.

The Klamath River Canyon is within the range of the federally listed northern spotted owl. The canyon lies within the main connectivity area between owl populations in northern California and the southern Cascades in Oregon. Below the planning area, the canyon opens up and the large expanses of open/grass communities may be a barrier to dispersal of young birds. The timber stands in the upper canyon may be an important part of the connectivity habitat between nesting/roosting/foraging habitat in southern Oregon and nesting/roosting/foraging habitat in northern California.

Through BLM's spotted owl banding program (District files), it has been documented that several spotted owls have successfully dispersed across the canyon. One particular owl was raised on the north rim of the canyon. Two years later it nested in Negro Creek just south of the planning area. The owls from the site in Negro Creek have been radioed and monitored and show use of portions of the planning area in Segment 3.

Although the peregrine falcon was removed from the federal Endangered Species List during 1999, it is still listed as endangered by state agencies in Oregon and California, and considered a sensitive species by the USFS and BLM. Peregrines historically nested in the canyon, with last known production in 1969 (Pagel 1999). No successful breeding was documented after this point.

One historic nest site is in Segment 2 and another is located a few miles south of the canyon in California, near Segment 3. Peregrines are known to migrate through and winter in the canyon and sightings have increased in the last few years. The most recent sighting occurred in June 1997, where one adult peregrine was seen (BLM observations 1997). In 1999, a habitat analysis study (Pagel 1999) for the peregrine falcon was conducted on BLM lands in Oregon including the area within Segment 2. The study by Pagel was designed to look at potential cliff complexes and summarize the habitat quality as low, medium, or high for nesting potential. Five sites were identified in Segment 2, one as low, one as medium, and three sites were identified as high.

These three "high potential" sites were monitored in 2000 and 2001 by BLM personnel and no peregrines were located. All three sites were occupied by prairie falcons in recent years. Because of the abundant prey base, use of the canyon as a migration corridor, and the abundance of suitable falcon nesting habitat, the potential exists for peregrines to reoccupy historic nest sites or establish new nest sites in the planning area as the species continues to recover.

A large area in southern Oregon and northern California, including the planning area, was designated as a management area for the recovery of the peregrine falcon (Pacific Coast American Peregrine Falcon Recovery Team 1982). In the "Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River" (1990), the BLM had designated a portion of the cliffs in Segment 1 (cliffs near Big Bend) as protected habitat for falcons. The KFRMP/FEIS protects all cliff areas and talus slopes and in a 100-foot buffer around cliffs from ground-disturbing activities.

Wet meadows adjacent to slow-moving portions of the river provide feeding, resting, and nesting habitat for several species of waterfowl. Canada geese, wood ducks, and common mergansers are known to nest in Segments 2 and 3; and mallard, cinnamon teal, and Barrow's goldeneye, potentially nest along the river. Barrow's goldeneye is listed as a sensitive species in Oregon and by the BLM and USFS. Tundra swans and green-wing teal also use river habitat. There are many fish fingerlings found in the river, which provide a food source for double-crested cormorants, king fishers, and mergansers, all of which are common throughout the canyon.

Meadows, oak woodlands, grasslands, and dense shrub are important habitats for feeding and brood-rearing of upland game birds such as California and mountain quail, wild turkey, and chukar. The latter two were introduced into the canyon in the 1950s and 60s. Redlegged partridge, a species similar in appearance and related to the chukar, were introduced into the canyon by the ODFW in the spring of 1989. No chukar or redlegged partridge are considered to persist (ODFW 1999) after the earlier releases and there are currently no plans to continue to release either chukar or partridge into the area (ODFW 1999). Wild turkeys have been released as late as 1998 within or adjacent to the canyon. ODFW is currently working on a statewide management plan for future releases and management of the species. Mountain quail populations are currently under investigation statewide as a proposed threatened and endangered species. Incidental observations over the past 5 years by BLM personnel have identified several areas within the canyon that contain reproductive populations of mountain quail. Although ruffed grouse historically inhabited the planning area, no recent sighting records exist. This grouse may be present in areas that contain moist woody vegetation near springs and seeps or areas near the few aspen stands found in the canyon. This type of habitat is very limited within the canyon and likely limits the presence of ruffed grouse. Acorns from the abundant oaks found in the planning area are an important food source for turkeys. Turkeys also prefer wooded meadows adjacent to the river. Blue grouse, mourning dove, and quail are also present in the planning area. All of the game birds found in the planning area are open to hunting during season and all are permanent residents, except the mourning dove, which is migratory. Hunting seasons for each species are set by the California or Oregon wildlife management agencies. Hunting seasons in general are from late August through January. Each species has its own season that usually lasts for a short time (7 days for elk; 45 days for waterfowl).

A large variety of landbirds (80 species) have been documented in the Klamath River Canyon through an ongoing study initiated in 1997, which includes mist-netting and censusing. The diversity of habitats and geographic location of the river allows several bird species, which occur in California and the Rogue Valley, to penetrate into southwestern Klamath County (Summers 1993). These conditions contribute to the diversity of bird species found in the canyon. A list of all bird species expected and documented in the Klamath River Canyon is included in Appendix K.

Landbirds are of concern due to long-term population declines and habitat loss. At least two dozen species that breed in Oregon are known to have experienced long-term population declines based on breeding bird survey data. Riparian zones and oak woodland have been identified by the Oregon and Washington Chapter of Partners in Flight as two of four priority habitats for conservation based on the criteria of species declines and vulnerability to habitat loss (Andelman and Stock 1994). Both of these habitat types are present in the study area.

In addition, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds" (66 FR 3853) dated January 17, 2001, directs federal agencies to take certain actions to conserve migratory birds in furtherance of the Unites States' obligations under the *Migratory Bird Treaty Act* and migratory bird conventions. In 2003, the BLM will be entering into a memorandum of understanding with the USFWS that outlines measures to ensure migratory bird conservation in conjunction with carrying out agency missions.

Although riparian habitat is limited in the canyon, it is a very important migration and breeding habitat type for landbirds. Over 60 percent of the species identified by Partners in Flight as neotropical migratory birds use riparian areas in the West during the breeding season, or as stopover sites during migration (Krueper 1993). In addition, riparian areas may harbor up to 10 times the number of migrants, as adjacent, nonriparian habitats (Stevens et al. 1977, *as cited in Rich [1999]*).

From 1997 to 2001, mist netting stations were set up at Frain Ranch (PacifiCorp land) to collect data on landbird demographics as well as baseline information on bird diversity and trends. This station is located on a bench along the river in habitat that includes riparian vegetation.

Additional data was collected through mist-netting in 1998 and 1999 at Keno Dam to determine bird use of the riparian zone. Preliminary results of the mist netting station data show that the Frain Ranch site consistently has some of the highest bird capture rates during the breeding season when compared to six other riparian sites being sampled in the Upper Klamath River Basin.

Results of the mist-netting study are that the most abundant species captured during the breeding/post breeding period were purple finches and song sparrows over the three years sampled for which data is available (1998-2000). Other abundant species included the warbling vireo, yellow warbler, lazuli bunting, lesser goldfinch, and Wilson's warbler. With the exception of the purple finch, all of these species are considered to be either riparian dependent or obligate species based on vegetation associations presented by Rich (1999). A list of the five most common species by year captured at the Frain Ranch constant effort mist netting station is presented in Table 2-11.

A total of 23 bird species, considered riparian associates, have been documented at the Frain Ranch and Keno Dam sites to date. Although sampling time was limited at Keno Dam, the most common species found during the breeding/post breeding period were the purple finch, yellow warbler, Audubon's warbler, Western tanager, song sparrow, western wood pewee, and spotted towhee.

During fall migration at the Frain Ranch site, the purple finch and song sparrow were the most consistently abundant species during the 1997 through 2000 period. Other species found to be common were the golden-crowned sparrow, pine siskin, hermit thrush, fox sparrow, and warbling vireo.

In addition to mist-netting, several survey routes for censusing songbirds were established in the Klamath River Canyon in 1998. These routes cover a variety of habitats including conifer forest and woodland, oak woodland and dry meadow over a length of approximately 15 miles. The purpose of these routes is to gather baseline data on bird species diversity, relative abundance, and habitat relationships of birds occurring in the canyon.

Oak woodlands, which are common in the lower elevation areas of the canyon, are important for approximately 100 native landbird species during their breeding season (Altman 2000). Oak/pine woodland, as defined by Altman (2000), refers to habitat including both oak-dominated woodland and mixed oak-pine habitats. Species most associated with this habitat include Lewis' woodpecker, western bluebird, and white-breasted nuthatch. Species such as the ash-throated flycatcher and acorn woodpecker are considered obligate or near-obligate to the oak woodland component (Altman 2000). All of these species, except the ash-throated flycatcher, have been documented in the canyon. The Lewis' woodpecker, an Oregon State

Table 2-11.— Abundance of landbird species*

	Yearly abundance ranking				
Bird species	1997	1998	1999	2000	Total rank
Bird abundance during the breeding/post breeding season					
Purple finch	N/A	1	1	1	1
Song sparrow	N/A	2	2	2	2
Warbling vireo	N/A	3	4	3	3
Lazuli bunting	N/A	4	5	–	4
Yellow warbler	N/A	–	3	–	5
Western tanager	N/A	5	–	–	–
Lesser goldfinch	N/A	–	4	–	–
Black-headed grosbeak	N/A	–	5	–	–
Wilson’s warbler	N/A	–	–	4	–
Willow flycatcher	N/A	–	–	5	–
Bird abundance during the fall migration season					
Purple finch	1	1	2	2	1
Song sparrow	2	1	1	1	2
Hermit thrush	3	3	–	3	3
Golden-crowned sparrow	2	5	–	–	4
Fox sparrow	3	–	–	4	5
Warbling vireo	–	1	3	5	–
Pine siskin	–	2	–	–	–
Spotted towhee	–	4	5	–	–
Ruby crowned kinglet/ White-crowned sparrow	4	–	–	–	–
Bushtit	–	–	4	–	–
Oregon junco/ Swainson’s thrush/Stellar’s jay	5	–	–	–	–

***** Relative abundance of the five most common landbird species captured at the Frain Ranch constant effort mist netting site (1997–2000) [1]

[1] Data was collected by the Klamath Bird Observatory and Redwood Sciences Laboratory, USFS, during the breeding/post breeding and fall migration periods. Several species were captured at the same rate and therefore have the same abundance rating.

critical and BLM sensitive species, occurs in the canyon in large numbers, especially during the winter period. Acorn woodpeckers also utilize the planning area and are the only population of this species that nests east of the Cascade Range.

Another species of concern documented in the canyon is the pileated woodpecker. This species is listed as BLM tracking and Oregon State vulnerable. The yellow-billed cuckoo, a riparian obligate species, is a federal candidate for listing as threatened or endangered, and is thought to be extirpated from this area.

Very little suitable habitat for this species is present in the Oregon portion of the study area. A limited amount of habitat consisting of cottonwoods and willows occur in the California section along Shovel Creek. A complete list of all bird species present in the canyon and their federal and state status is listed in Appendix K.

Mammals

The canyon provides the habitat to support a great variety and abundance of mammals. Silver-gray squirrels, an important game species in the canyon, are plentiful, as are other small mammals such as bats, rabbits, chipmunks, ground squirrels, deer mice, shrews, and other small rodents. These species provide an abundant prey base for the many mammalian and avian predators. Beaver and muskrat, two small mammals dependent on aquatic habitat, are commonly found along the river.

Wild pigs have been documented in Segments 2 and 3 of the planning area. These populations are considered feral and pests by both state game agencies, and neither organization plans to manage for these populations in the canyon. Even though some of the proposed habitat projects may encourage use by feral pigs, BLM will not manage specifically to enhance pig habitat.

The Townsend's big-eared bat is found in Segment 2 at Salt Caves. This species is listed as BLM sensitive and as critical by the State of Oregon. A maternity (birthing) colony of Townsend's big-eared bats at Salt Caves was documented by qualified bat biologists from Southern Oregon University during the summer of 1988.

Use of the caves by this species has been studied by Southern Oregon University over several years to determine the season of use, population information, and overall importance of the caves to Townsend's big-eared bats. Salt Caves serve as one of three known maternity sites in south central Oregon (Cross 1998). One of the caves also functions as a transitory roost during intermittent periods near the beginning and end of the maternity season. Due to the importance of Salt Caves to Townsend's big-eared bats, the caves have been designated as significant under the authority of the *Federal Cave Resources Protection Act*.

Hoover Ranch, which has an abandoned ranch house near the Klamath River, is also used by Townsend's big-eared bats during the reproductive season. It is believed this site may serve as a rearing site for a relatively small colony of these bats.

Studies by Southern Oregon University in the early 1990s included attempts to locate alternate roosting sites of the Townsend's big-eared bat, which used the Oregon section of the Klamath River Canyon. Most of the roost sites found were small cavities formed by piles of large boulders, all within the canyon. Most of the roost sites were within two miles of Salt Caves. No sites of large congregations were found (Cross 1992). More information on the Townsend's big-eared bat at Salt Caves is included in the "Environmental Assessment for the Salt Caves Management Plan EA#OR-014-01-07" (BLM 2002).

Several species of predators that are dependent upon riverine habitat and prey range in the canyon, including raccoon, river otter, mink, long- and short-tailed weasel, and ringtail. The ringtail, an Oregon State sensitive species, is a small, slender relative of the raccoon that is rare in southern Oregon and northern California. Klamath County is the eastern limit of their range in Oregon. Larger predatory mammals inhabiting the planning area include coyote, gray fox, bobcat, and mountain lion.

Big game mammals that occur within the planning area include black-tailed deer (mule deer in California), Roosevelt elk, black bear, and cougar (ODFW). Although appearing uncommon in the planning area, black bear and cougar either reside or pass through the canyon. Carnivore studies along the canyon rim in Oregon have shown a frequent use by cougar and bobcat. Black bears forage in the blackberry patches along the river and the irrigation ditches during the late summer. This activity is especially prevalent in Segment 3, and at times the bears are a nuisance.

A migratory herd of 3,100 black-tailed deer (estimated 1988-89 population), known as the Pokegama Herd, inhabits the area on the north side of the canyon (Keno Unit). The summer range of this herd extends from Siskiyou County in California to Crater Lake. The majority of this herd winters in and around the planning area. In California the herd that utilizes the south side of the river is managed as mule deer (see Map 7).

The majority of the planning area lies within a larger area designated by the BLM and ODFW as critical deer winter range. This area mainly consists of low elevations, which gives rise to light to snow-free conditions during severe winters essential for deer survival. The planning area is important to deer by providing accessible forage, easier movement, good thermal cover, and early spring green up that furnishes critically needed forage for deer coming off of a hard winter. Segment 3 is considered winter range for the deer herd in California, especially the lower elevations. A small portion of these deer herds reside year-round in the planning area. Springs and wet areas with riparian cover are important fawning habitat for these resident deer (see Map 7).

The forested areas in the canyon, along with the meadows around the Frain Ranch area, provide suitable habitat for elk, which are occasionally seen in these areas in the spring and early summer. Elk use the area during winter, but usually only during the most severe winters. Recent surveys (2000-2001) estimate up to 700 elk in the Keno Management Unit and this number is predicted to continue to increase. The Keno Management Unit covers all of the planning area in Oregon. In California, elk are beginning to range south of the river. In 2000, a radio-collared elk from northern California moved into Segment 3 and then continued through the planning area. USFS biologists from the Klamath National Forest and local residences have commented on increased elk numbers south of the river in Segment 3.

Herptiles

A herptile (reptiles and amphibians) study (conducted from 2000 through 2001) documented 18 species of reptiles and amphibians in and around the planning area, which is potential habitat for about 34 species (see Appendix K). Talus slopes and rocky hillsides provide good habitat for lizards and den sites for snakes. Historic den sites include the old housing site near the powerhouse. Amphibians inhabit moist sites around seeps and springs and along the river. Snakes found within the canyon include the western rattlesnake, common and western terrestrial garter snake, gopher snake, striped whipsnake, rubber boa, ringneck snake, and yellow-bellied racer. Common lizards include the western fence lizard, southern alligator lizard, sagebrush lizard, and western skink; amphibians of note include western toad and Pacific chorus frog.

Five Oregon State sensitive species found in the planning area are the California mountain king snake, sharptail snake, northern sagebrush lizard, western toad, and western pond turtle. Species that potentially occur but have not been documented in the planning area include the Pacific giant salamander, roughskin newt, ensatina, black salamander (listed as a species of concern in 1989 Oregon Natural Heritage Database), Great Basin spadefoot toad, western aquatic garter snake, northwestern garter snake, and night snake; and three Oregon State sensitive species, tailed frog, Oregon spotted frog, foothill yellow legged frog, and short-horned lizard (St. John 1987).

Watershed Values

Water resources are a key component in shaping the animal and plant communities found within the planning area, and in providing recreation opportunities. Factors discussed in this section include beneficial uses and resource values, energy generation, water rights, stream flows, water quality (including that of Upper Klamath Lake and upstream segments of the Klamath River), and aquatic habitat.

Although the river within the planning area is the primary focus of examination, upstream conditions substantially affect this portion of the river. Additionally, tributary streams contribute streamflow to the river and provide habitat. Where relevant, characteristics of these streams will be discussed in the appropriate sections of this chapter.

Beneficial Uses

The appropriation of surface waters within the Klamath Basin is governed by Oregon and California law, and the "Klamath River Basin Compact" (Oregon Revised Statutes 542.620). The Compact became effective in 1957 upon ratification by Oregon and California and acceptance by the U.S. Congress. Article III of the Compact addresses beneficial uses in the Klamath River Basin.

The Oregon Department of Environmental Quality (ODEQ) has expanded upon these beneficial uses for the purpose of developing water quality management programs for the upper Klamath River (Oregon Administrative Rules 350-41-962). Established beneficial uses include public and private domestic water supply; industrial water supply; irrigation; livestock watering; salmonid rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing, boating, and water contact recreation; and aesthetic quality.

The North Coast Regional Water Quality Control Board has established beneficial uses for the California portion of the Klamath River. These are broadly categorized as water supply, recreation, fish and wildlife habitat, power generation, and scientific study. Specific existing and potential beneficial uses for the Klamath River between the state line and Iron Gate Dam have also been outlined. Existing beneficial uses include municipal and domestic supply, agricultural supply, groundwater recharge, freshwater replenishment, commercial and sport fishing, hydropower generation, navigation, water contact and noncontact recreation, warm freshwater habitat, cold freshwater habitat, fish migration, fish spawning, and wildlife habitat (North Coast Regional Water Quality Control Board 1994).

Water Rights

Water use upstream from and within the planning area affects streamflows in the Klamath River. The Oregon Water Resources Department (OWRD) is currently conducting an Oregon general stream adjudication for the Oregon portion of the Klamath River Basin. An adjudication is the Oregon statutory process for quantification and determination of all rights to surface water, the use of which was initiated before February 24, 1909 (the date the surface water code in Oregon was established) and federal reserved water rights. The reserved water rights claims submitted by federal agencies and the Klamath Tribes will be determined through this process.

The OWRD process for acquiring water rights under state law has three steps. Prior to receiving a water rights certificate, a water user must first apply for, and then receive, a water rights permit. In order to "prove up" on the permit, a water user must begin putting the water to beneficial use. Following this period, the OWRD determines whether to issue a "perfected" water rights certificate (OWRD, 2001).

Klamath River

Within the Oregon portion of the study area (Segments 1 and 2), PacifiCorp is licensed to divert up to 2,500 cubic feet per second (cfs) of Klamath River water for the operation of the J.C. Boyle hydroelectric project (Hydroelectric Commission of Oregon 1965). The discrepancy between the hydraulic capacity of the powerhouse (3,000 cfs) and the licensed diversion volume (2.500 cfs) will be addressed during the FERC re-licensing process.

In addition, PacifiCorp has other pre-1909 water rights claims that were acquired with the purchase of land adjacent to the river. Two permits allow diversion from the Klamath River for irrigation, stock, and domestic use. The volume of water that could be withdrawn by these permits is an insignificant portion of the total river discharge (less than approximately 10 cfs).

The BLM has filed a claim for instream flows in Segment 2 of the planning area based on the *Wild and Scenic Rivers Act* of 1968. In the Act, Congress expressly reserved water for flow-dependent outstandingly remarkable values. Flows were claimed (Federal Reserve Claim 376, 1999) for two outstandingly remarkable values: fisheries (625 cfs from April 1 through June 15, and 525 cfs for the rest of the year), and recreation (whitewater rafting, 1,500 cfs between Memorial Day and September 30) (see Table 2-12). The BLM water right claim on the Klamath River is pendingin the Klamath Basin Adjudication.

The Oregon Department of Parks and Recreation and the Oregon Department of Fish and Wildlife (ODFW) applied to the Water Resources Department in 1989 for an instream water right on the Klamath Scenic Waterway (Segment 2). Based on the release regime from the J.C. Boyle Powerhouse, the application requests 1,500 cfs for recreation and 550 cfs (not additive) for fish populations and habitat. This application is still pending.

The Bureau of Indian Affairs, on behalf of the Klamath Tribes, has claimed (Federal Reserve Claim 671, 1999) for future use 700 cfs year-round to provide adequate migratory passage of anadromous salmonid fishes into and out of the Upper Klamath River Basin (should the former range of the anadromous fish habitat be restored).

Within the California portion of the planning area (Segment 3), the California State Water Resources Control Board currently does not have any water use applications or claim of rights on file. Private land owners within Segment 3 exercise pre-1914 water rights to divert water from the main stem and from Shovel and Negro Creeks to irrigate pastureland and hay fields.

Table 2-12.—Summary of BLM instream flow claims

Claim		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recreation	1,500 cfs												
Fisheries	625 cfs												
	525 cfs												

Shading shown under a month indicates the times BLM applied for a water right claim.

The "Klamath River Basin Compact," provides guidance along with other applicable laws for water rights administration in the Klamath Basin. The major purposes of the Compact, as stated in Article I, are:

A. To facilitate and promote the orderly, integrated and comprehensive development, use, conservation and control thereof for various purposes, including, among others: the use of water for domestic purposes; the development of lands by irrigation and other means; the protection and enhancement of fish, wildlife, and recreational resources; the use of water for industrial purposes and hydroelectric power production; and the use and control of water for navigation and flood prevention.

B. To further intergovernmental cooperation and comity with respect to these resources and programs for their use and development and to remove causes of present and future controversies by providing (1) for equitable distribution and use of water among the two states and the federal government, (2) for preferential rights to the use of water after the effective date of this compact for the anticipated ultimate requirements for domestic and irrigation purposes in the upper Klamath River Basin in Oregon and California, and (3) for prescribed relationships between beneficial uses of water as a practicable means of accomplishing such distribution and use.

Tributary Streams

The Oregon State Department of Forestry has a permit to use up to 10,000 gallons of water per day for dust abatement from an unnamed tributary of the Klamath River near the Topsy Road in Segment 2. An irrigation diversion is located on Hayden Creek, but is not currently used.

In Segment 3, water is diverted from the mainstem of Shovel Creek in two locations and from near the mouth of Negro Creek (a tributary of Shovel Creek) in one location. From April 15 to October 15, these diversions supply up to 15 cfs to irrigated meadows along the lower portion of Shovel Creek (Ichisaka 2001, personal communication). This constitutes a relatively large percentage of total stream discharge during the summer baseflow period. Water rights for these diversions are based on California's doctrine of riparian water rights.

Streamflows

Klamath River

General

The Klamath River begins at the outlet of Upper Klamath Lake and flows to the Pacific Ocean. At the upstream end of Segment 2, the river drains approximately 4,080 square miles (not including the Lost River sub-basin, which occasionally overflows into the Klamath River drainage).

Late winter and spring peak flows are derived primarily from snowmelt in the drainage area of Upper Klamath Lake and subsequent releases from Link River Dam. Summer flows in the river are derived from releases at Link River dam, groundwater discharge from volcanic aquifers, and some return flow. Elevated flows in fall and early winter are a result of return flow from irrigated areas south and west of Klamath Falls (BHI 1996).

The Klamath Reclamation Project operated by the Bureau of Reclamation (USBR), supplies water to about 240,000 acres of irrigated land and a smaller area of national wildlife refuge lands. Diversion of water for use by the USBR Project began in 1905. In 1961, the completed USBR Project facilities were fully operational (USBR 2000).

Compared to pre-USBR Project conditions, flow regulation at Upper Klamath Lake results in higher and earlier peak flows in the Klamath River, decreased summer minimum flows, and greater annual flow variability (BHI 1996). In the planning area, these effects commingle with the effects of diversions and releases related to hydropower generation.

Flow Modifications Due to Operation of the J.C. Boyle Facility

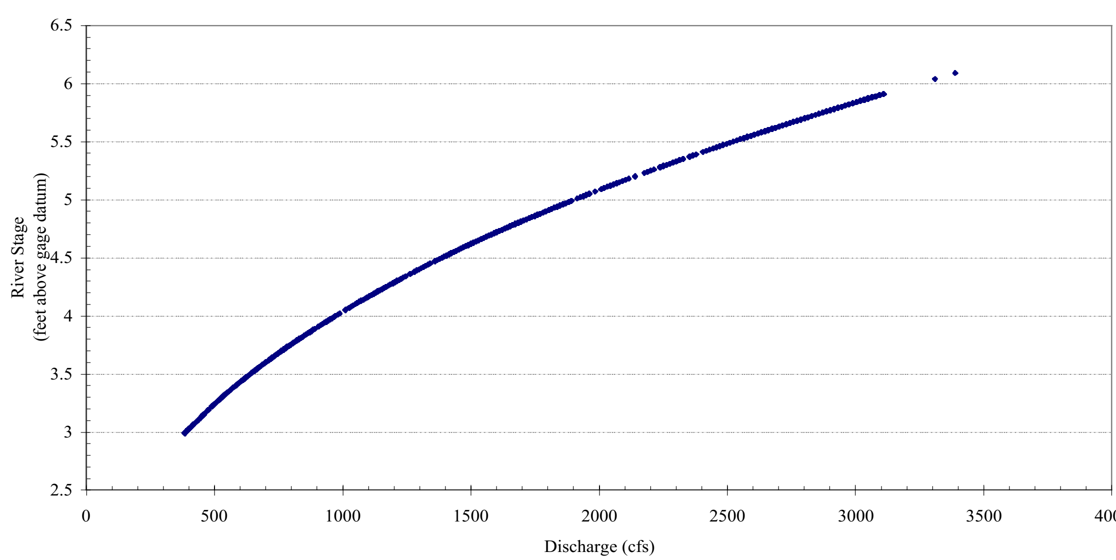
The operation of the J.C. Boyle facility varies according to water availability, instream flow requirements for ESA-listed salmon downstream from Iron Gate Dam (RM 190), and PacifiCorp's FERC license.

A minimum flow of 100 cfs is released at J.C. Boyle Dam to provide instream flow for fish movement through Segment 1. In addition to this continuous outflow at the dam, a series of springs in the riverbed between the dam and the powerhouse (located near RM 223) add another estimated 225 cfs of flow (on average), which maintains a relatively constant flow of approximately 325 cfs during summer (see Map 3). Flows in Segment 1 between the dam and the powerhouse are not subject to the daily fluctuations that occur in Segments 2 and 3 that result from powerhouse operations.

One, both, or neither of the turbines at the J.C. Boyle Powerhouse may be generating electricity at any given moment, depending on energy demand and water availability. When daily average river flows are less than about 3,300 cfs, the J.C. Boyle facility is operated to produce power during periods of peak energy demand (PacifiCorp 2000). This type of operation is referred to as "peaking" or "load following."

When neither turbine is in use, water flowing into J.C. Boyle Reservoir is stored for later use. As a result of peaking operations, streamflow and water surface elevations ("stage") in the river below the powerhouse can fluctuate throughout the day. Stage fluctuations below the dam and powerhouse are limited to a 9 inch per hour ramp rate, as per the 1956 FERC license (PacifiCorp 2000). Depending on flow levels, this equates to changes in discharge that range from 400 cfs per hour, to approximately 950 cfs per hour (see Figure 2-1).

Figure 2-1. Water Level-Discharge Relationship.
Correlation between streamflow and the elevation of the water surface level at the USGS gage downstream from the J.C. Boyle Powerhouse, derived from measurements made between January and September of 2000. Data courtesy of USGS.



Daily Average Streamflows

Streamflows have been measured since January 1959 by the USGS at a gaging station located 0.7 mile below the J.C. Boyle Powerhouse (USGS gage 11510700). The streamflow record at this gage is representative of flows in Segments 2 and 3, although flows through Segment 3 are slightly higher and slightly less variable than flows in Segment 2, due to tributary inflows from Shovel Creek (10 to 100 cfs), Hayden Creek, and minor intermittent tributaries.

For this planning effort the data set has been converted to water years, which are defined by the USGS as beginning on October 1 and ending the following September 30, and are designated by the calendar year in which the water year ends. Data is not available for water years 1972-74, 1980-82, and 1988.

Average daily discharge data from water years 1961 through 2000 show an average annual flow of 1,839 cfs. Mean monthly flow data show that average monthly flows are highest December through April and lowest June through September (Table 2-13). Average daily discharges in the 300 to 400 cfs range can occur any month of the year, as can average daily discharges greater than 1,600 cfs.

Daily Fluctuations in Streamflow and Stage

Peaking operations cause significant daily stage and discharge fluctuations in the river. The effects of daily powerhouse operations on streamflow were analyzed using discharge data collected every 30 minutes at the USGS J.C. Boyle gage. This analysis was limited to January and July 2000, which are representative of average winter and summer flows.

During low flow periods (summer/fall), there is typically only one turbine generating for a portion of any given day. On a daily basis during the low flow season, discharge below the

Table 2-13.— Average Daily Discharge*

	Maximum average daily quantity [2]	10% exceedance [3]	Mean average daily quantity	90% exceedance [3]	Minimum average daily quantity
January	9,860	3,940	2,483	862	318
February	10,200	5,432	2,584	647	316
March	9,630	6,174	2,932	700	313
April	7,810	5,091	2,540	756	306
May	6,790	3,890	1,888	602	317
June	6,740	1,891	1,043	493	321
July	1,890	951	678	385	309
August	1,650	1,180	899	509	302
September	2,290	1,620	1,208	745	309
October	4,170	2,540	1,556	861	320
November	5,100	2,943	1,954	894	361
December	8,260	3,732	2,344	979	342

- Summary statistics for average daily discharge downstream from J.C. Boyle Powerhouse (USGS gage 11510700) for water years 1960–2000 [1]
-

[1] Data is not available for water years 1972–74, 1980–82, and 1988.
[2] All values are in cfs.
[3] The 10% and 90% exceedance flows refer to average daily discharges that are exceeded 10 and 90% of the time, respectively.

powerhouse generally ranges from 300 to 400 cfs (baseflow, composed of outflow from the dam and contributions from springs) to approximately 1,500 cfs (baseflow plus turbine throughflow). When there is sufficient water and consumer demand both turbines may be used, and flows can ramp from baseflow to 3,000 cfs within a few hours (see Figure 2-2). Alternatively, there may be days when no water is released in excess of the minimum bypass flow.

Discharge in Segments 2 and 3 is more variable during the high flow season (late winter/early spring) than during the low flow season (see Figure 2-2). As a consequence of tributary inflows, baseflow increases to approximately 700 cfs. Higher average daily flows allow frequent two-turbine peaking during this period. Depending on how the J.C. Boyle complex is operated, discharge fluctuations within a 24-hour period can range from 50 to more than 2,500 cfs.

Flow ramping causes river levels downstream from the powerhouse to vary widely on a daily basis. These effects persist for the length of Segments 2 and 3. Measurements at the USGS gaging station indicate that daily fluctuations (at this site) during the low flow season may exceed 2.5 feet, though fluctuations on the order of 1.75 feet are more common. Portions of the streambed are dewatered and exposed during intervals when no power is generated. As with discharge, stage fluctuations during the high flow season are more variable. On days when the J.C. Boyle complex is operated for peaking power, stage can be raised or lowered by approximately 2.2 feet over a 6-hour period. Conversely, when the complex generates power at a steady rate there is no appreciable stage variation. Because stage fluctuations vary according to channel geometry, the magnitude of stage fluctuations in Segments 2 and 3 is not constant between different locations; in confined reaches of the river, fluctuations may be higher, while in reaches with low benches, fluctuations may be lower.

Peak Flows

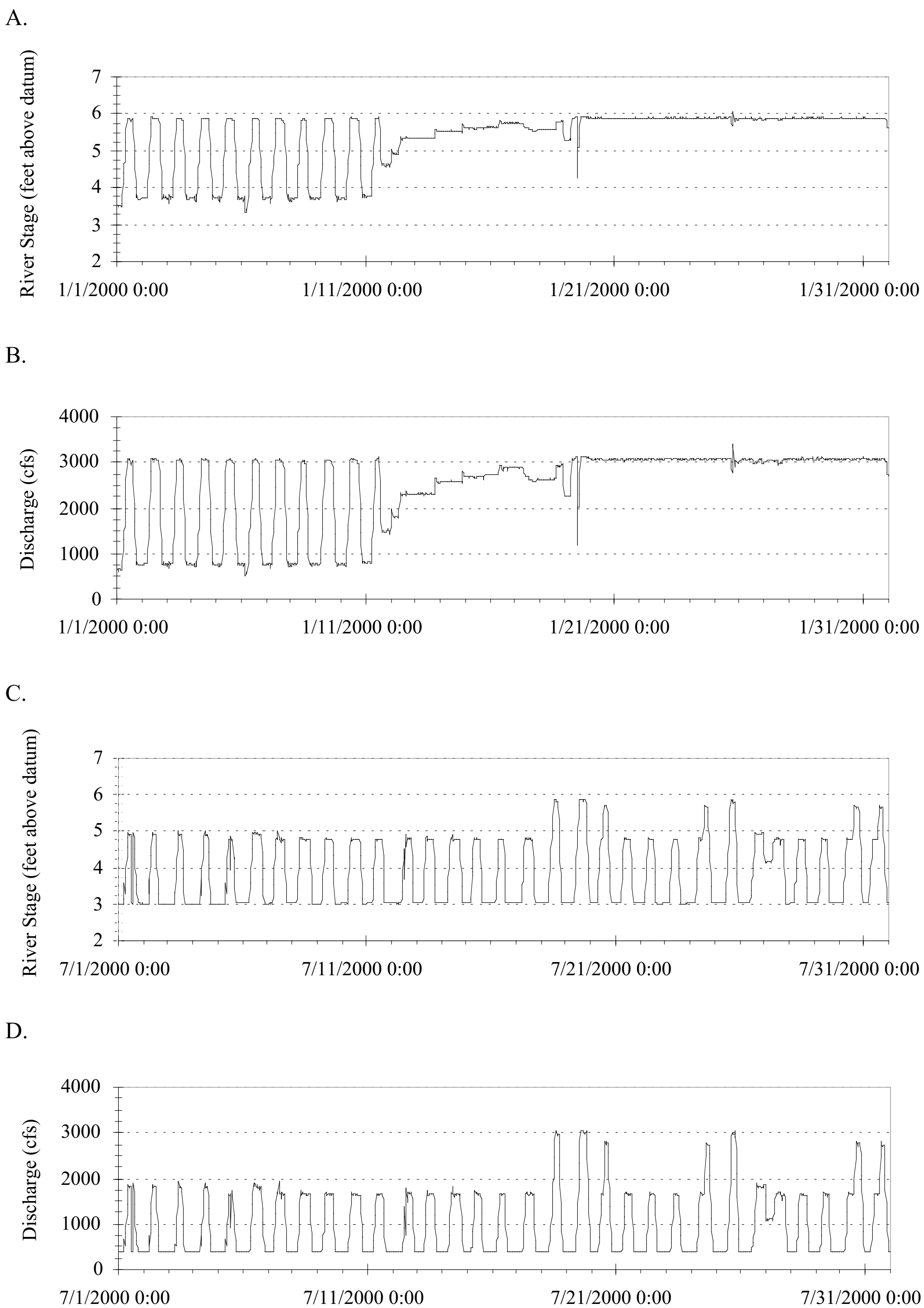
Floods with recurrence intervals of about 1.5 years are generally considered to be the most geomorphically effective (Dunne and Leopold 1978). Analysis of peak flow data from the USGS J.C. Boyle gage suggests that flows of between 3,100 and 4,700 cfs occur about every 1.5 years in Segments 2 and 3. Spills from J.C. Boyle Dam into Segment 1 occur in about two out of every three years. Due to flow regulation and diversions, peak flows in Segment 1 are currently of lower magnitude and shorter duration than would occur were the river unregulated. The largest peak flow recorded at the J.C. Boyle gage occurred in February 1996. Discharge during this flood exceeded 11,500 cfs.

Tributary Streams within the Planning Area

One large seep complex and two relatively large perennial streams enter the river in the planning area, as well as numerous smaller streams and springs. Depending on the season, total accretions between J.C. Boyle Dam and the slackwater of Copco Reservoir range approximately from 230 to 700 cfs. The greatest portion of this inflow occurs in Segment 1, where an extensive zone of seepage into the riverbed contributes, on average, about 225 cfs to the river (Hanel and Gerlach 1964; PacifiCorp 2000). Except for this seepage zone, the magnitude of tributary inflows are relatively minor and of much more importance locally (as coldwater refugia, for example) than on the scale of the Klamath River as a whole.

Shovel Creek enters the Klamath River near RM 206. Although Shovel Creek drains a large watershed (51 square miles), most summer flow is derived from springs in the Negro Creek and Bear Canyon drainages. As discussed above, a substantial portion of summer baseflow is diverted for irrigation use near the mouth of Shovel Creek. Winter peak flows are on the order of 100 cfs (PacifiCorp 2000). The summer base flows are about 20 cfs when irrigation diversions are not in use (Beyer 1984).

Figure 2-2. Daily Hydrographs Below J.C. Boyle Powerhouse
Daily stage and discharge data for the Klamath River below J.C. Boyle Powerhouse (USGS gage 11510700), collected at 30 minute intervals, including stage (A) and discharge (B) for January 2000, and stage (C) and discharge (D) for July 2000. Data courtesy of USGS.



Hayden Creek drains approximately 28 square miles and has fewer large springs than the Shovel Creek drainage. Measured summer discharges about two miles upstream from its mouth are on the order of 0.5 cfs. There are no active diversions from Hayden Creek within the planning area, although the stream intersects an irrigation ditch (diverted from the river) at its mouth.

Peak flows from Hayden Creek and Edge Creek have been estimated using a variety of methods - refer to the "Topsy Pokegama Landscape Analysis" (BLM 1996) for this information.

The hydrologic cycle in tributary watersheds within the planning area has likely been affected by the extensive road network. Roads can change infiltration rates, intercept and divert subsurface flow, change the drainage area of small streams, and decrease the time it takes for runoff to reach streams. This can cause peak flows to increase (Furniss et al. 1991). Incision of streams into their floodplains has also affected baseflows, due to the loss of the "sponge effect" of the floodplains.

Water Quality

Klamath River

Water Quality Standards

Water quality standards have been set by the ODEQ for Klamath Basin waters and specifically for the Klamath River from Upper Klamath Lake to the state line (Oregon Administrative Rules 340-41-965). In California, the North Coast Regional Water Quality Control Board (1994) has established water quality objectives for the upper Klamath River from the state line to Iron Gate Dam (see Table 2-14).

303(d)-Listed Segments of the Klamath River

The mainstem Klamath River upstream from, within, and downstream from the planning area is included on lists of water quality limited water bodies (referred to as 303[d] lists) prepared in 1998 by the ODEQ and California North Coast Regional Water Quality Control Board. In each listed segment, state standards are regularly exceeded for numerous water quality parameters (Table 2-15). For some water quality parameters, data is not available to assess compliance with state standards.

Water quality of the Klamath River within the planning area is affected by upstream point and nonpoint sources of pollutants:

- The source of the Klamath River, Upper Klamath Lake, is a hyper-eutrophic lake that supports an abundant algal population. Lake water quality varies according to season and the annual amount of runoff entering the lake. Recent studies have pointed out that the nutrient-enriched condition of the lake, though natural, has likely been accentuated as a result of agricultural activities, livestock production, logging, urban development, and reclamation of wetlands for agriculture (Eilers et al. 2001, Snyder and Morace 1997). Massive blooms of blue-green algae typically occur in the lake in the summer. Daily cycles of respiration and decomposition result in extremely high pH levels and wide fluctuations in levels of dissolved oxygen and carbonic acid.

- The Link River, which is that portion of the Klamath River flowing between the outlet of Upper Klamath Lake and the upstream end of Lake Ewauna, is included on the 1998 Oregon 303(d) list for temperature, pH, and chlorophyll-a.

Table 2-14.—Oregon and California water quality standards for key parameters within the planning area

Parameter	Oregon standard or criteria	California standard or criteria
Temperature	No measurable increase when ambient temperature exceeds 64 degrees Fahrenheit. During the period from salmonid spawning to fry emergence, no measurable increase when ambient temperature exceeds 55 degrees Fahrenheit.	Shall not be altered unless demonstrated that such alteration does not adversely affect beneficial uses. At no time shall temperature be increased by more than 5 degrees Fahrenheit above natural receiving water temperature.
Dissolved oxygen	Absolute minimum of 8.0 mg/L or 90 percent saturation. At ODEQ discretion, 30 day mean minimum of 8.0 mg/L, seven day mean minimum of 6.5 mg/L, and absolute minimum of 6.0 mg/L. During the period from salmonid spawning to fry emergence, 95 percent saturation.	Minimum 7.0 mg/L. In the Klamath River, 50 percent of monthly means greater than 10.0 mg/L; in other streams 50 percent of monthly means greater than 9.0 mg/L
pH	Values shall not fall outside the range of 6.5–9.0.	Values shall not fall outside the range of 7.0–8.5.
Turbidity	No more than a 10 percent increase above natural background levels (except for certain limited duration activities).	No more than a 20 percent increase above natural background levels (except as otherwise allowed by permit).

- Drainage water from portions of the USBR Klamath Project is conveyed back into the Klamath River via the Klamath Straits Drain, which enters the river upstream from Keno, Oregon. Water quality standards for dissolved oxygen, fecal coliform, temperature, pH, chlorophyll-a, and ammonia are not being met for this water body (ODEQ 1998). Effects to water quality in the river depend on the proportions of return flow to river water and vary by constituent (Mayer 2000).

- The Klamath River upstream from Keno Dam to the upper end of Lake Ewauna is included on the 1998 303(d) list due to high temperatures, low dissolved oxygen levels, high pH levels, and high chlorophyll-a abundance. Additionally, measured concentrations of un-ionized ammonia in this reach are above criteria set by the ODEQ and the Environmental Protection Agency (ODEQ 1998).

The Klamath River between Keno Dam and the California border (which includes Segments 1 and 2) is included on the 1998 303(d) list for exceedance of Oregon temperature standards. Though generally within the range of standards, other water quality parameters, such as dissolved oxygen and pH, may detrimentally affect beneficial uses and outstandingly remarkable values (including fisheries, recreation, and wildlife) in Segment 2 during certain flow conditions.

The Klamath River between the state line and Iron Gate Dam is listed for high nutrient levels, organic enrichment, low dissolved oxygen, and high temperatures (California State Water Resources Conservation Board 1999).

Table 2-15.—Segments of the Klamath River included on state 303(d) lists of water quality limited streams

Parameter for Listing	Klamath River			Link River (Lake Ewauna to Klamath Lake)	Upper Klamath Lake
	(Iron Gate Dam to Oregon border)	(California border to Keno Dam)	(Keno Dam to Link River)		
Temperature	1998 303(d) List	1998 303(d) List	1998 303(d) List	1998 303(d) List	Need Data
Dissolved oxygen	1998 303(d) List		1998 303(d) List		1998 303(d) List
pH			1998 303(d) List	1998 303(d) List	1998 303(d) List
Chlorophyll a			1998 303(d) List	1998 303(d) List	1998 303(d) List
Toxics (ammonia)			1998 303(d) List		
Nutrients	1998 303(d) List	Need data[1]	Need data[1]	Need data[1]	Need data[1]
Sedimentation		Need data[1]	Need data[1]	Need data[1]	Need data[1]
Habitat modification		Need data[1]	Need data[1]		
Flow modification			Need data[1]	Need data[1]	
Toxics			Need data[1]		

[1] More data collection and analysis is required for these parameters before a conclusive determination of compliance with water quality standards can be made.

Water Quality Trends

Water quality within the planning area is monitored monthly by the ODEQ at several locations above Keno Dam and at the USGS J.C. Boyle gage. The City of Klamath Falls (1986) monitored water quality at several locations between Keno Dam and Copco Reservoir during 1984 and 1985, in relation to the proposed Salt Caves project (Table 2-16).

Additionally, PacifiCorp monitored temperature, dissolved oxygen, pH, total dissolved gas, and specific conductivity at several sites between the Link River Dam and the Iron Gate Powerhouse between 1994 and 1995 (PacifiCorp Environmental Services 1996).

Within the planning area, dissolved oxygen (DO) levels increase between the upstream and downstream end of Segment 1, are reduced when flows are released at the powerhouse, and then increase between the powerhouse and the downstream end of Segment 3 (PacifiCorp 1996; PacifiCorp 1998).

This longitudinal pattern reflects two primary influences on DO levels: (1) the balance between relatively high quality spring inflows and water from J.C. Boyle Reservoir, and (2) the effect of turbulent aeration caused by rapids. On a daily basis, it is likely that DO levels change as water temperatures respond to solar heat inputs and fluctuating flow levels downstream from the powerhouse.

As discussed above, upstream water quality limitations may be responsible for a substantial portion of water quality problems within the planning area. Water quality downstream from

Table 2-16.—Measured water quality parameters for the Klamath River within the planning area

Parameter	Keno Bridge (RM 235.0)		Below J.C. Boyle Powerhouse (RM220.4)		River mile 205.5 [1]	
	Average	Range of values	Average	Range of values	Average	Range of values
Temperature (degrees Fahrenheit) [2]	57.0	32.0–78.8	55.2	34.7–74.3	54.5	35.1–67.5
Dissolved oxygen (mg/L) [2]	6.7	0.7–15.5	9.4	3.9–12.8	9.2	7.5–11.2
Dissolved oxygen (% saturation) [2]	75.5	14–308	98	49–125	---	---
pH (units) [2]	8.1	6.8–10.0	8.0	7.3–9.0	7.7	7.7–8.7
Laboratory turbidity (NTU) [3]	8	2–47	7	1–35	---	---
Dissolved nitrate/nitrite (mg/L as N) [4]	0.14	<0.02–0.50	0.40	0.07–1.1	---	---
Un-ionized ammonia (mg/L) [5]	0.042	0.0–0.978	0.009	0.0–0.061	---	---
Total phosphorous (mg/L) [3]	0.24	0.09–0.72	0.19	0.08–0.5	0.20	0.12–0.35
5-day undiluted biological oxygen demand (mg/L) [2]	3.6	0.8–10.1	2.6	0.2–10.0	---	---

[1] Station KR-5, City of Klamath Falls, 1984–1985.
[2] 1959–2000, ODEQ.
[3] 1977–2000, ODEQ.
[4] For Keno Bridge, 1980–2000; for below J.C. Boyle Powerhouse, 1986–2000; ODEQ.
[5] 1959–1997, ODEQ.

pollution sources often improves due to dilution and/or mixing. Dissolved oxygen concentrations increase between Keno Bridge and the J. C. Boyle Powerhouse as result of aeration and dilution of organically enriched waters; pH levels decrease between those two sites, likely for similar reasons. Were it not for high quality groundwater entering the river in Segment 1, the effect of dilution within the planning area would be minimal, especially during the low flow season, when water quality problems are most critical.

Water Temperature Measurements

Water temperatures in the planning area vary with season and by segment. Within both the river and tributary streams, temperatures are controlled by interactions between streamflow, channel geomorphology, and riparian vegetation. In the river, altered flows and, to a lesser degree, altered channel geomorphology and riparian vegetation have likely adversely affected water temperature and warming rates.

Highest water temperatures occur June through August, in conjunction with high local air temperatures and low flows. Daily summer temperature fluctuations are lowest in Segment 1 and greatest in Segments 2 and 3. Because of the stable flows and springs, temperatures in Segment 1 remain relatively constant from day to day, and are typically around 70 degrees Fahrenheit in August and 48 to 53 degrees Fahrenheit in early spring. Where the flows from Segment 1 meet the releases from the Powerhouse, an abrupt mixing zone occurs.

Mid-day peaking operations at the J.C. Boyle Powerhouse cause significant daily temperature fluctuations in Segments 2 and 3. Summer temperatures typically range from approximately 70 degrees Fahrenheit in early evening, coincident with the passage of large volumes of reservoir water, to approximately 58 degrees Fahrenheit in early morning hours, a result of nighttime cooling (City of Klamath Falls 1986). An additional cause of temperature fluctuations is the alternating source of water in this reach (i.e., spring-dominated vs. reservoir-dominated flows). Because the springs are much cooler than the reservoir water, higher water temperatures in Segments 2 and 3 correspond to higher releases from the powerhouse (Figure 2-3). At flows near 600 cfs, average water temperatures at the upstream end of Segment 2 are near 61 degrees Fahrenheit, while at flows near 1,800 cfs (one turbine) average water temperatures are near 68 degrees Fahrenheit.

When flows from the powerhouse are stable, water temperatures in Segments 2 and 3 are also relatively stable. During periods when peaking occurs, the daily minimum temperature is reduced and the daily range of temperatures is increased. The rate of temperature change associated with peaking operations is generally faster than the rate at which temperature changes due to changes in ambient air temperature (Figure 2-4).

Figure 2-3. Discharge-Temperature Relationship
Correlation between streamflow and water temperature, measured from 7/18/01 to 9/20/01 at the USGS gaging station downstream from the J.C. Boyle Powerhouse (derived from PacifiCorp water temperature data set). Note that no data is available for flows greater than 1,850 cfs, and that the temperature logger was often exposed during flows less than 600 cfs (rendering the data for those flows unusable). Data courtesy of PacifiCorp and USGS.

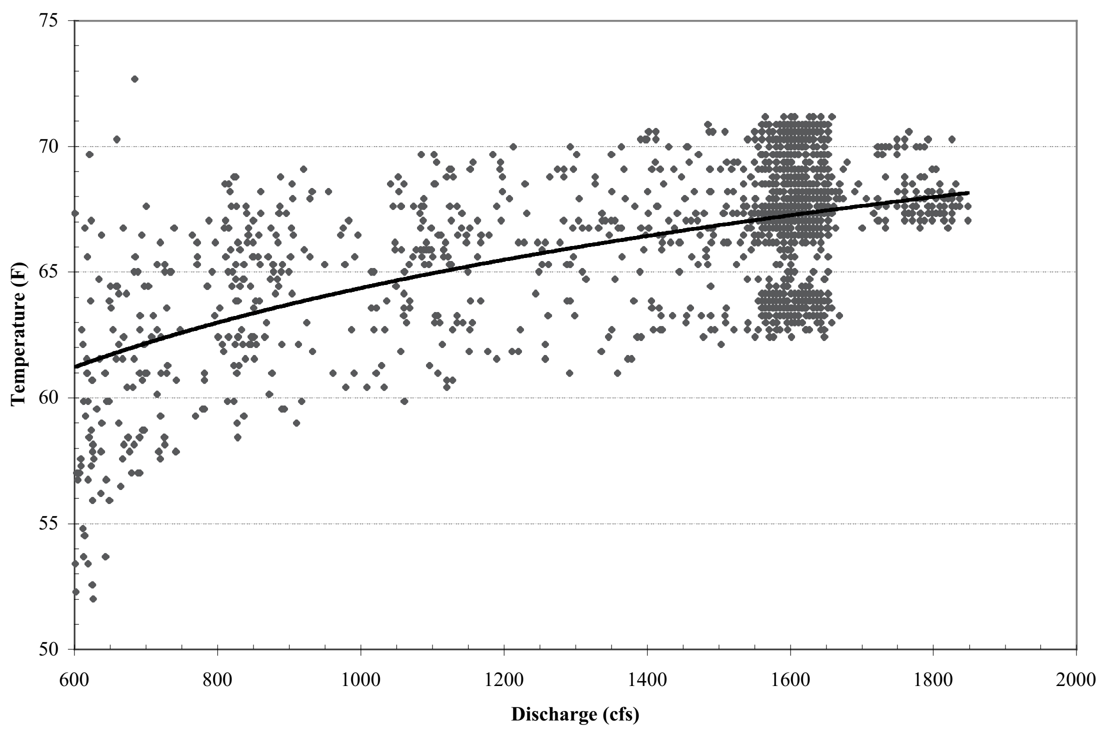
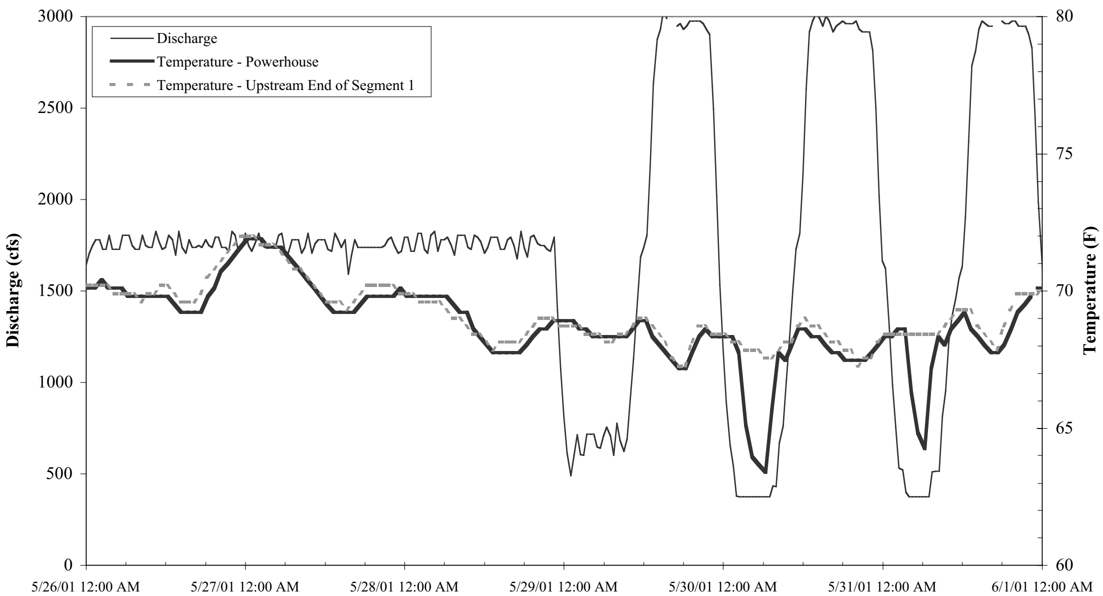


Figure 2-4. Daily Water Temperature Patterns
Daily cycles of discharge and water temperature during two distinct periods of powerhouse operation in spring 2001. From 5/26 to 5/29, flow was stable at about 1,700 cfs; from 5/29 to 6/1, flows fluctuated from about 400 to 3,000 cfs. Note that although the temperature data from the upstream end of Segment 1 is included in order to allow a comparison of quasi-natural rates of temperature change, the flows occurring in that portion of Segment 1 were stable at about 100 cfs during this period, and do not correspond with the discharge measured at the USGS gage. Data courtesy of PacifiCorp and USGS.



Effects of Reservoirs on Water Quality

Instream reservoirs such as J.C. Boyle and Keno can improve or degrade water quality, depending on factors such as reservoir size and shape, reservoir operations, climatic conditions, time of year, and upstream water quality. According to one source (City of Klamath Falls 1986), the presence of instream reservoirs can reduce pH, bacterial counts, nutrients, sediments and turbidity, biological oxygen demand, and settling of algal loads. A more recent analysis of nutrient dynamics in the Klamath River suggests that the series of reservoirs do not function as nutrient sinks, perhaps as a result of nutrient cycling within the reservoirs (Campbell 1999).

Effects of Land Management on Water Quality

Water quality within the planning area is affected primarily by hydroelectric facilities and operations and the character of water flowing into the planning area. Because the Klamath River drains such a large area, it is unlikely that land management activities such as timber harvest or grazing within the planning area have a substantial effect on overall water quality within the river. However, land management actions can affect habitat quality (and beneficial uses) at varying scales within the river, and can profoundly affect water quality within tributary streams. As the land within the river canyon is somewhat inaccessible and generally receives special management attention, the most significant land management effects on water quality and habitat quality in the river are related to the location and condition of the road network.

In all segments, there are roads within the riparian reserves along the river (equivalent to the width of two site potential trees, or 280 feet) and along tributary streams. Segment 1 has a relatively modest length of road within the riparian reserve of the river, although sidecast material from the flume maintenance road severely affects riparian and aquatic habitat features. Segment 2 has the greatest length of roads within the river's riparian reserve (see Table 2-17 for a summary of riparian road features). These roads reduce the recruitment of coarse woody debris, reduce stream shading, and reduce overall riparian habitat quality. The roads along the river in Segment 3, though extensive, are located primarily in areas that would not be expected to have forest cover, so their effect on habitat quality is more limited.

Effects of Water Quality on Beneficial Uses and ORVs

High water temperatures can affect beneficial uses indirectly, principally through the relationships between water temperatures, dissolved oxygen, and fish health. Low dissolved oxygen levels impair fish health. Dissolved oxygen levels decrease as temperature increases. Increased temperature can also enhance algal productivity.

Algae can impart a bad odor to water and a bad taste to game fish. As massive quantities of blue-green algae decay, the biological oxygen demand increases, and dissolved oxygen concentrations decrease to levels that are harmful to fish. This effect can be partially offset by aeration occurring in high gradient reaches of the river. Conditions that favor algal growth include shallow turbulent water, hard water, well-illuminated and warm water, and high phosphorous concentrations (FERC 1990). Such conditions are present in some reaches of the river within the planning area, especially in Segment 1.

Dissolved organic matter within the water contributes to the distinctive coffee color and foam that is often noted about the Klamath River.

Water Quality Management Programs

The federal EPA has delegated primary responsibility for implementation of the *Clean Water Act* to state agencies. In addition, Oregon and California have adopted various pieces of legislation that address water quality (discussed in more detail in Chapter 4).

The ODEQ and the California North Coast Regional Water Quality Control Board are currently developing water quality improvement strategies for those water bodies that are

Table 2-17.—Summary of riparian road lengths (miles) and number of stream crossings

	Segment 1	Segment 2	Segment 3	Total
Fish-bearing streams	2.9	10.3	5.6	18.8
Non-fish-bearing streams	0.2	5.8	3.2	9.2
Wetlands > 1 acre	–	0.8	1.9	2.7
Wetlands < 1 acre	–	–	<0.1	<0.1
Reservoirs	0.2	–	–	0.2
Number of stream crossings[1]	4.0	14.0	14.0	32.0

[1] Does not include bridges across the Klamath River.

either not meeting, or suspected of not meeting water quality standards, and thus, not supporting beneficial uses. The ODEQ (1998) is in the process of establishing total maximum daily loads (TMDLs) for point and nonpoint sources of water quality limitations. A temperature TMDL for the Klamath River and tributary streams between Keno Dam and the state line is scheduled to be complete in December 2004. For the river and tributary streams between the state line and Iron Gate Dam, TMDLs for nutrients and temperatures are scheduled to be complete in April 2004, while a TMDL for organic enrichment and dissolved oxygen is scheduled for completion in December 2004 (California SWRCB 1999).

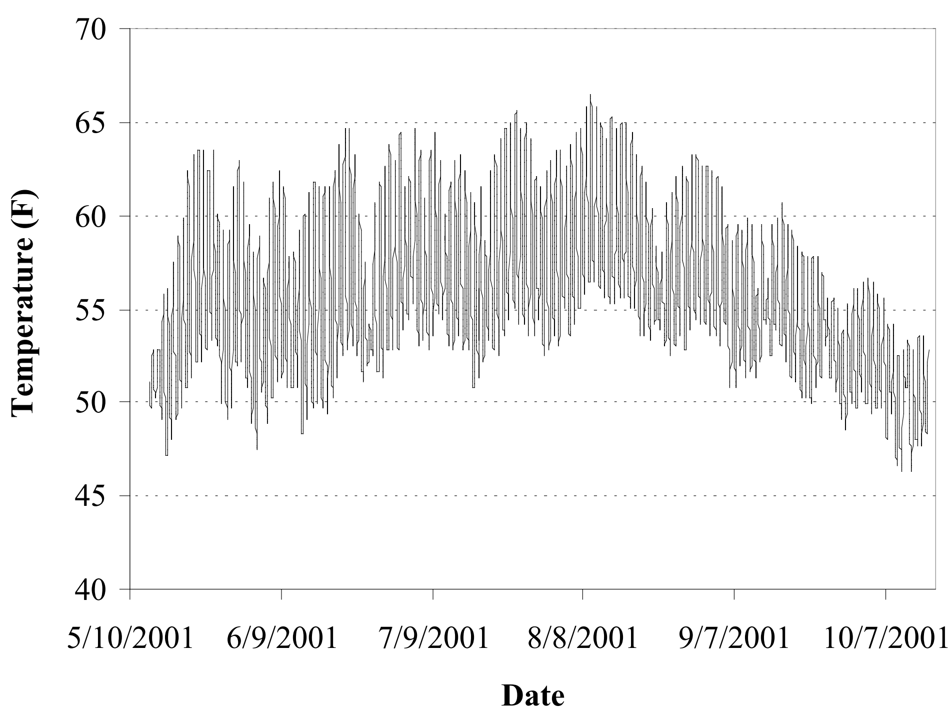
Tributary Streams

Water quality data is generally lacking for tributary streams within the planning area. Water temperature data includes a continuous temperature data set measured at the mouth of Shovel Creek during 2000 and 2001 and a series of "spot" measurements in various streams during the summer of 2001.

Temperature and other water quality parameters, such as dissolved oxygen and pH, may detrimentally affect beneficial uses and outstandingly remarkable values (including fisheries, recreation, and wildlife) during certain flow conditions.

The temperature data set for Shovel Creek is reflective of the springs that comprise summer baseflow in this stream (Figure 2-5). A field survey of instantaneous temperatures conducted in August 2001 suggests that some warming occurs between the mouth of Bear Canyon and the mouth of Shovel Creek (over a distance of about 2.1 miles), but is limited by the contribution of Negro Creek flows, the northern aspect, and the closed canopy riparian forest. The effect of the Shovel and Negro Creek diversions on water temperatures in those streams is uncertain, though other aspects of aquatic habitat may be adversely affected (Beyer 1984).

Figure 2-5. Shovel Creek Water Temperature
Hourly water temperature near the mouth of Shovel Creek. Data courtesy of PacifiCorp



In May 2001, water temperature at three springs adjacent to the river downstream from the J.C. Boyle Powerhouse ranged from 50 to 60 degrees Fahrenheit. Temperatures at the mouths of Chert Creek (near RM 210) and Hayden Creek were 60 and 57 degrees Fahrenheit., respectively. Although both of these streams are spring-fed, warming occurs as they flow across broad meadows and south aspect slopes (BLM field notes).

Riparian roads adjacent to tributary streams may impair water quality, habitat quality, and fluvial processes. In the most severe cases, where roads are located extremely close to streams (such as along Chert Creek), streamflow may be captured by road surfaces. In other situations, riparian roads and stream crossings limit coarse woody debris (CWD) recruitment, stream shading, and fish/herptile passage, and may contribute runoff and fine sediment to stream channels.

The length of roads within riparian reserves of tributary streams (equivalent to the width of one site potential tree, or 140 feet), as well as their effect, varies between segments. Riparian roads adjacent to tributary streams in Segment 1 are short and do not appear to be causing resource damage. Riparian road length is greatest in Segment 2 (see Table 2-17). Of greatest concern in this segment are the roads that parallel portions of Chert and Way Creeks; the remainder cross, rather than parallel, streams. In Segment 3, relatively long road segments parallel Shovel and Hessig Creeks. While the Hessig Creek road likely affects runoff and channel processes in that ephemeral stream, the portions of the Shovel Creek Road (and associated spurs) that pass through forested areas probably have a detrimental effect on stream shading, wood recruitment, and sediment delivery to that stream.

Stream Channel Geomorphology

This section will discuss the characteristics of stream channels within the planning area, as well as the processes that shape them. Before addressing individual streams, general principles of channel geomorphology will be discussed briefly.

Overview

Important attributes of channel morphology include width, depth, substrate, sinuosity, channel gradient, and pool spacing. Stream channel morphology in areas of high topographic relief - such as the planning area - is determined primarily by structural constraints within the channel. Examples of such constraints are bedrock outcrops or stable coarse woody debris (CWD), as well as interactions between sediment and streamflow (Swanston 1991). Limited adjustment of channel features occurs when flow is great enough to entrain and transport sediments and CWD on the streambed and along channel margins.

The movement of bedload sediment (sediment that moves by sliding, rolling, or bouncing along the streambed) is controlled by interactions between streamflow, particle size, and channel hydraulics (Swanston 1991). In general, coarse sediment moves through stream systems discontinuously, being alternately stored and mobilized. Steep streams are typically supply-limited (capable of transporting more sediment than is supplied, with the result that alluvial features are rare). That said, low gradient reaches or local features (such as tributary mouths, side channels, large boulders, or stable CWD jams) may create conditions favorable for sediment deposition. Though spatially and temporally variable, channel storage of coarse material in such settings is common, particularly in the form of riffles and bars (Sullivan et al. 1987).

CWD can be delivered to stream systems from upstream sources or by recruitment of material from adjacent riparian areas and hillslopes. In small streams with low mass wasting potential, such as are common within the planning area, most CWD is derived from adjacent riparian areas (McDade et al. 1990, Lienkamper and Swanson 1987). In the river, wood is contributed from streamside forests as well as from upstream, although the presence of upstream dams limits the delivery of wood from upstream sources. The channel-forming role of CWD is more strongly expressed in tributary streams and secondary channels than in the main stem of the river. In both settings, however, CWD affects sediment storage, pool formation, secondary channel development, bank stability, and riparian vegetation patterns. The role of instream CWD is a function of piece location, size, and stability; in large rivers, jams of CWD pieces are often much more stable and morphologically active than individual pieces.

When the amount of water or sediment delivered to a given stream changes, aspects of channel morphology adjust in response (Furniss et al. 1991). The nature of the adjustment depends on the extent of changes in water or sediment supply, the morphology and condition of the channel, and the extent of constraints limiting the ability of the channel to reshape itself. Hydroelectric developments and land management activities can alter channel morphology by changing the magnitude and timing of water, sediment, and CWD delivery to streams and thereby affecting the capability of the channel to transport and store these materials (Williams and Wolman 1984; TPLA 1996). Potential channel adjustments to altered discharge and sediment load include changes in width, depth, velocity, slope, roughness, and sediment size. Increased discharge, decreased sediment supply, or a combination of both can cause channel widening, incision, and bed armoring (Williams and Wolman 1984; Montgomery and Buffington 1993).

The bank materials of natural streams influence channel patterns and processes, and also provide a boundary between aquatic and terrestrial habitats (BLM 1996). The resistance of streambanks to erosion influences channel width, sinuosity, and sediment supply. The root systems of riparian vegetation contribute substantial cohesion to streambanks. As such, changes in streamside vegetation can have dramatic impacts on channel morphology and processes (BLM 1996).

Secondary channels (comprised of floodplain high flow channels and chute-cutoffs) occur throughout the planning area. High flow channels function as important refugial areas and could potentially function as spawning habitat (City of Klamath Falls 1986). Chute-cutoffs typically result from lateral scour at the upstream end of meander bends, and cause reduced sinuosity, increased local channel gradient, and increased flow velocities. (Knighton 1984). While both types of secondary channels are found on unregulated rivers, the current distribution and function of these channels may be impacted by the hydroelectric project. Decreased bank stability due to impaired riparian vegetation may cause increased secondary channel formation. A lack of gravel may reduce the rate at which they recover, or fill back in. Perhaps most importantly, flow fluctuations create conditions in these channels that lead to fish stranding (Hunter 1992; Marcus et al 1990).

Klamath River

Stream channel types in the planning area can be generally classified as Rosgen (1994) B and C type systems (Table 2-18). Currently the Klamath River is a very stable system, with well developed (though rarely inundated) floodplains in the Rosgen C type segments (BLM 1996). The cobble and boulder substrate is resistant to scouring, and provides the majority of channel roughness (except during periods when floodplains are inundated).

As a whole, channel complexity in the river has likely been reduced, due to activities associated with historic log drives, construction, and operation of the J.C. Boyle development. Altered flow regimes and changes in sediment supply have resulted in excessive fine sediment deposition in some reaches and reduced gravel availability in others. Currently, coarse sediment is supplied to the river only from tributary streams and eroding banks. Historically, upper watershed sources (i.e., upstream from J.C. Boyle Dam) were likely important sources of coarse sediment. Due to frequent flow fluctuations, the channel may never achieve equilibrium with the increased duration of high flows (due to peaking operations at the powerhouse) and the reduced supply of coarse sediment.

Table 2-18—Summary of habitat information for Segments 1-3 of the Klamath River planning area

	Segment 1	Segment 2	Segment 3
Habitat features [1]			
Reach length (meters)	7,155	18,122	9,359
Gradient (%)	1.3	0.9	0.4
Average active channel width (meters)	36.9	61	41.2
Width:depth ratio	15.3	27.4	No Data
Entrenchment ratio [2]	1.2	1.3	No Data
Rosgen (1994) channel types	B and C	B and C	B and C
Secondary Channels			
% of Area in secondary channels	1.7	6.8	No Data
Number of secondary channels	6	16	11
Secondary channels/kilometer	0.8	0.9	1.2
Pools			
Number of pools	33	53	No Data
Pool area (% of channel area)	45	43	No Data
Residual pool depth	1.38	1.68	No Data
Pool spacing (channel widths/pool)	6.1	7	No Data
Pools >/= 1 meter deep (pools/kilometer)	4.3	2.2	No Data
Coarse Woody Debris [3]			
Number of pieces/100 meters	0.9	1.3	No Data
Volume (m^3)/100 meters	1.3	1.2	No Data
Substrate			
Fines in riffles (%)	2	4	No Data
Gravel in riffles (%)	5	7	No Data
Riparian Vegetation [4]			
Number of hardwoods/100 meters	150	391	No Data
Number of conifers/100 meters	45	74	No Data
50 cm conifers DBH/100 meters	15	13	No Data
90 cm conifers DBH/100 meters	10	4	No Data

[1] Data for Segments 1 and 2 were derived from ODFW Physical Habitat Surveys (1998), data for Segment 3 was based on BLM geographic information system spatial databases.
[2] Entrenchment ratio is defined as the ratio of floodprone width to active channel width, and is an index of the degree to which stream channels are confined by valley walls.
[3] In these surveys, all rootwads and pieces with diameter > 15 cm and length > 3 m were considered as coarse woody debris.
[4] In these surveys, vegetation within one channel width of streambanks was considered to be riparian.

Segment 1 (J.C. Boyle Dam to J.C. Boyle Powerhouse)

Segment 1 aquatic habitat is comprised primarily of pools and riffles (ODFW 1998). No stream banks were found to be actively eroding or undercut. Boulders and cobbles dominate stream substrate, and CWD volume is low. The average residual pool depth is 4.5 feet. Gravel is in short supply and is restricted primarily to small pockets behind large boulders (City of Klamath Falls 1986). Recruitment of gravel to this area (as is the case in the majority of the planning area) is limited due to the presence of J.C. Boyle Dam and the small number of tributary streams.

The river channel in Segment 1 is narrow, averaging 100 feet in width, and is steep, with an average gradient of 75 feet per mile (City of Klamath Falls 1986). Highly regulated flows in this segment provide consistent aquatic habitat through most of the year. Historic flow regimes (i.e., increased summer flows, seasonally varying hydrographs with a gradual recession to baseflow) likely provided additional habitats within this reach that are no longer available due to flow regulation and hydropower diversions.

Instream cover for aquatic species in the diversion reach is provided by an ample supply of large boulders (City of Klamath Falls 1986). Bank cover is sparse due to the steep, rocky walls of the canyon and the presence along the north bank of extensive rock spoils areas created during the construction of the power project’s flume and road. In addition, bank development has likely been impaired due to the sparse sediment supply. Banks are predominately a mixture of cobble/boulder and reed canary grass.

Based on field reconnaissance and air photo interpretation, it has been determined that at least six secondary channels (either high flow channels or chute-cutoffs) occur within Segment 1. Currently, side channels in this segment are only inundated when spill from the dam occurs during periodic high flows that cause water to be spilled from J.C. Boyle Dam. There have likely been substantial changes in the timing, frequency, duration, and magnitude of high flow channel inundations as compared to probable historic conditions, as a consequence of both altered flow regimes and altered river morphology.

Upper Portion of Segment 2 (J.C. Boyle Powerhouse to Caldera)

Between the powerhouse and RM 214.3 the river continues through a deep, steep-walled canyon (City of Klamath Falls 1986). The width of the canyon floor increases to about º mile towards the downstream end of this section. Physical characteristics of this section vary somewhat over its length due to the widening of the canyon floor and a gradual reduction in gradient to 27 feet per mile (City of Klamath Falls 1986). The river channel in the upper half of this section is confined by steep canyon walls and averages about 150 feet in width. The lower half is somewhat wider, averaging about 200 feet in width, with some areas over 300 feet in width. Aquatic habitat in Segment 2 is comprised primarily of pools and riffles (ODFW 1998). The bed is generally heavily armored with boulders and cobble, and instream CWD volumes are low. A few small gravel pockets are present in the main channel behind boulders, although most gravels are embedded in fine sediments. The average residual pool depth is 5.5 feet. No stream banks were found to be actively eroding or undercut.

Instream cover in Segment 2 is largely made up of large boulders (City of Klamath Falls 1986). Deep pools in many parts of this section may also provide instream cover. Bank cover is relatively sparse and dominated by reed canary grass. Large expanses of the bed are exposed and inundated on a daily basis throughout varying lengths of the year (particularly during the summer) due to the water level fluctuations associated with hydropower generation.

The exposure of river substrate on a daily basis potentially contributes to reductions in productivity of aquatic vegetation and macro-invertebrates. Additionally, daily flow fluctuations limit the development of near-stream riparian vegetation, thereby limiting the availability of vegetated edge habitat, especially during low flow periods.

Two bridge sites crossing the Klamath River are present in this reach. One site was a single span, which was blown out during the mid-1960s. Abutments at this site have restricted channel width and increase water depths locally. The second bridge site was a multiple-arch span that was demolished at an unknown date. Channel widening is evident at this siteæan apparent result of multiple buttress footings located within the stream channel. Historic irrigation diversions present in this reach have caused the channel to widen in some locales.

Based on field reconnaissance and air photo interpretation, it has been determined that at least nine secondary channels are present within the upper section of Segment 2. As noted above, side channels likely function as important refugial areas during high flows, but their habitat value has potentially been impaired due to hydropower operations. Summer load-following operations at the powerhouse result in most side channels being inundated and dewatered on a daily basis. This contributes to an increased potential for stranding of fish species as well as limiting the habitat available to macroinvertebrate species. Chute-cutoff formation has had similar impacts as those described for Segment 1, as well as providing additional potential stranding habitats due to daily peaking operations.

Lower Portion of Segment 2 (Caldera Rapids to State line)

The river flows through a constricted canyon in this section, and the channel averages about 90 feet in width (City of Klamath Falls 1986). The gradient is 77 feet per mile. Substrate throughout this reach of the river is predominately boulders and large cobble, though a few gravel pockets occur, and instream CWD volume is low. The high velocities that occur in the reach have resulted in a heavily armored streambed. No appreciable gravel recruitment is apparent downstream from Rock Creek, a tributary that enters the river near RM 214. No stream banks were found to be actively eroding or undercut. At least seven secondary channels are present within the lower portion of Segment 2.

Cover in this section is described as good in terms of both instream object cover and bank vegetation (City of Klamath Falls 1986). Cover is similar to that present in the upper portion of Segment 2, with much of the cover habitat being boulder-dominated. Channel edges are vegetated primarily by reed canary grass. Instream diversions for upland meadow irrigation are present in the lower part of this segment. These diversions have resulted in channel widening along several hundred feet of river channel above and below the diversion points. One historic bridge site is present at the lower end of the segment, the abutments of which are currently affecting floodplain function and channel width-to-depth ratios.

Segment 3 (State line to Copco 1 Reservoir)

In this segment, the valley floor begins to widen and the river gradient decreases (City of Klamath Falls 1986). The average gradient through this segment of the study area is approximately 23 feet per mile. Width of the river is uniform, averaging 135 feet. Expansive alluvial deposits of gravel, sand, silt, and clay form floodplains along large portions of the river in this segment.

Cover in this segment is described as good, with both instream and bank cover being plentiful (City of Klamath Falls 1986). Boulders, undercut banks, and rooted aquatic vegetation provide most of the instream cover. Field review of river morphology indicates some lateral erosion of banks is occurring; however, active erosion is limited to the outside of a few meanders. Instream diversions for irrigation have resulted in channel widening along several hundred feet of river channel above and below the diversion. Two bridges are currently present in this segment. Both sites are likely impairing floodplain access during high flows and reducing width to depth ratios over short lengths of the river.

Based on field reconnaissance and air photo interpretation, it has been determined that at least 11 secondary channels exist within Segment 3. As noted above, side channels likely function as important refugial areas during high flows, but their habitat value has likely been impaired by frequent flow fluctuations. Chute-cutoff formation has had similar impacts as those described for other segments, though these features appear to be more common in Segment 3.

Major Tributaries of the Klamath River Planning Area

Tributaries within the canyon function as conduits for sediment and organic debris (BLM 1996). These materials originate on hillslopes and move through stream channels. These watershed products (sediment, course woody debris, and organics) are especially important for gravel bar and floodplain development, pool formation, and aquatic resource productivity in the Klamath River system. The mouths of tributary streams may also serve as important aquatic habitat refugial areas during flood events. Where tributary waters mix with the Klamath River, areas of relatively good water quality may persist through the year.

Four important tributaries enter the river within the planning area: Rock, Hayden, Shovel, and Edge Creeks.

Rock Creek is a small tributary that meets the river at approximately RM 214. Rock Creek provides supplemental flows during spring and winter; its natural flow is supplemented by water pumped from Meiss Lake during wetter years. Increased suspended sediments have been noted in the river during periods of pumping (City of Klamath Falls 1986). The entrance to the creek from the river is steep and limits fish passage upstream of the mouth.

Portions of Rock Creek have been affected by road construction and maintenance. The channel has apparently been bulldozed and straightened to protect the bridge where Topsy Road crosses the stream. The stream in this area is no longer connected to its floodplain, channel form has been simplified, and as a result the extent of riparian communities has been reduced.

Hayden Creek enters the river approximately one river mile above the state line. Hayden Creek flows perennially, though during summer the flow near its mouth is restricted to subsurface pathways and perennial pools. As it enters the planning area, Hayden Creek flows in a step-pool channel (alternating between boulder cascades and plunge pools) through a narrow canyon that widens somewhat in two locations. As it nears the river, Hayden Creek enters a wide valley into which the stream has entrenched and formed a new floodplain. The channel assumes a pool-riffle morphology in this reach, with some side channel development. Riparian vegetation is moderately abundant and consists of Oregon ash, willow species, ponderosa pine, and sedge species. The relic floodplain is now a dry meadow, the low parts of which may be seasonally inundated. Some gully development is apparent in portions of the relic floodplain.

Downstream from Hoover Ranch, the stream briefly flows through a steep canyon before opening up again at its mouth. An irrigation canal (from the Klamath River) diverts flow at the mouth of Hayden Creek and prevents full connectivity of the stream to the river. A small irrigation diversion had been developed on Hayden Creek approximately 0.25-mile upstream from the mouth, likely to irrigate the lower field of Hoover Ranch. The irrigation diversion point has subsequently blown out. Two wet meadows are adjacent to the mouth of Hayden Creek, one to the east and one to the northwest

Shovel Creek is the most significant tributary within the planning area. It enters the river upstream from RM 206. A major tributary to this stream is Negro Creek, which joins Shovel Creek less than a mile from the river. Both of these are small streams, averaging not more than 15 feet wide. As they enter the planning area, these streams flow through moderately steep and confined valleys. Shovel Creek enters a wider valley approximately 1.6 miles upstream from the river, while Negro Creek remains moderately confined for all but the lower 0.3 miles of its length.

The unconfined portions of both streams are responsive to changes in watershed and riparian conditions, and thus show some evidence of past and recent land management. Stream channels have incised by perhaps one to three feet, partly as a result of increased runoff and partly as a result of reduced instream CWD. The active channels have widened and contain few deep pools. Loss of gravel storage areas and increased fine sediment contributions could also be impairing habitat quality (Beyer 1984). Currently, the streams are cobble-dominated systems that have fairly low sinuosity and sparse functional CWD. A few pockets of gravel were noted during stream surveys in the river below the mouth of Shovel Creek. Shovel Creek is a primary a source of gravel for the mainstem river in the lower portion of Segment 3.

In the vicinity of the bridge near its mouth, Shovel Creek has been channelized in the past to prevent bridge failure during peak flows. Coarse sediment and CWD accumulate upstream from the bridge during these events and restrict the conveyance of floods. The bridge and associated structures have been threatened during such events at least three times in the past 40 years (Miller 2002, personal communication). These occurrences suggest that the volume of sediment moving through the stream is not in balance with the ability of the stream to transport it, the size of the bridge is not adequate, or both.

Riparian communities change along the length of Shovel Creek, with the amount of stream cover increasing with distance from the mouth (Beyer 1984). Towards the mouth, grass is the dominant vegetation, with a narrow fringe of hardwoods and blackberry along the stream. Upstream, a closed canopy forest is present along the stream, the composition of which shifts from hardwood dominated to conifer dominated as the stream gains elevation. Portions of the riparian area have been logged in the past, though there are no extensive anthropogenic openings in the forest. Similar patterns exist in Negro Creek, though portions of its drainage have been harvested recently.

The diversion of Shovel and Negro Creek waters for irrigation (and the maintenance of instream irrigation diversions) has had adverse affects on fish habitat (Beyer 1984). The irrigation diversions lower stream flow from late spring through early autumn.

Edge Creek enters the river less than a mile downstream from Shovel Creek. Only a very short length of Edge Creek is within the planning area. This consists primarily of a steep drainage flowing down from the canyon rim, though the stream gradient decreases substantially near its mouth. Edge Creek flows under an irrigation ditch near its mouth. During high flow periods, runoff from Edge Creek is captured by the irrigation ditch (Miller, personal communication, 2002).

Other minor tributaries within the planning area include Chert, Way, and Frain Creeks. These streams enter the river at steep inclinations. Each of these streams is spring-fed and provides habitat for aquatic invertebrates and herptiles. Instream and riparian conditions within and along these streams vary, although an array of potential problems have been identified. These include poorly functioning stream crossings, riparian roads, grazing impacts, and conversion of riparian vegetation to upland types.

Aquatic Conservation Strategy

The Aquatic Conservation Strategy (ACS) was developed (as part of the Northwest Forest Plan) to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The ACS is designed to meet the following objectives:

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

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

3) Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

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

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

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

7) Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

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

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

The components of the ACS are Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration.

Riparian Reserves

The riparian reserve system on federal land was created as a land use allocation under the Northwest Forest Plan. Riparian reserves are designated on federal lands adjacent to streams and potentially unstable areas where special standards and guidelines direct land use. These reserves include those portions of the watershed that are required to maintain the hydrologic, geomorphic, and ecologic processes that directly affect fish habitat and standing and flowing water.

Riparian reserves are used to maintain and restore riparian structures and functions, confer benefits to riparian-dependent and associated species, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed.

Riparian reserve widths for various types of waterbodies are based on the height of a site potential tree (see Table 2-19). Within the planning area, about 1,600 acres of riparian reserves occur on BLM land and 40 acres on Forest Service land. (Table 2-20). The majority of the riparian reserves on BLM land are adjacent to the Klamath River.

The riparian reserve land use allocation applies only to federally managed land. The areas adjacent to streams, springs, and wetlands on private land provide similar resource values as

Table 2-19.—Riparian reserve and riparian corridor widths for various types of water bodies

Riparian feature	Reserve width
Fish-bearing streams, including the Klamath River	280 feet (the height of two site potential trees)
Perennial non-fish-bearing streams	140 feet (the height of one site potential tree)
Seasonal non-fish-bearing streams ***and*** wetlands less than 1 acre ***and*** unstable or potentially unstable areas	*At a minimum, the corridor will include:* • The stream channel and the area extending to the top of the inner gorge; • The wetland and the area extending to the outer edges of riparian vegetation; • The area extending from the stream channel to a distance equal to the height of one site potential tree, or 100 feet slope distance, whichever is greatest; and, • The extent of stable or potentially unstable areas.
Constructed ponds and reservoirs ***and*** wetlands greater than one acre	*At a minimum, the corridor will include:* • The body of water or wetland and the area to the edges of riparian • vegetation; • The extent of seasonally saturated soil; • The extent of unstable or potentially unstable areas; • To a distance equal to the height of one site potential tree; and, • To 140 feet slope distance from the edge of the wetland or the maximum pool elevation of constructed reservoirs.
Lakes and natural ponds	*At a minimum, the corridor will include:* • The body of water or wetland and the area to the edges of riparian vegetation; • The extent of seasonally saturated soil; • The extent of unstable or potentially unstable areas; • To a distance equal to the height of two site potential trees; and, • To 280 feet slope distance from the edge of the body of water.
Springs	*Corridor* widths vary according to the size of the associated wetland (see above).

federal riparian reserves. "Riparian corridors" on private land were mapped in order to assess watershed functions and quantify the relative extent of actions proposed within federally managed riparian reserves. About 1,700 acres are within riparian corridors on PacifiCorp land, and an additional 460 acres occur on private land (Table 2-20). No state lands are near waterbodies.

Key Watersheds

Key watersheds serve as the cornerstones of aquatic species recovery, and special guidelines apply to federal lands within key watersheds.

No key watersheds exist within the planning area. Spencer Creek, which is tributary to the Klamath River at J.C. Boyle reservoir, is a Tier 1 key watershed outside of the planning area, which plays an important role in the protection of at-risk fish populations within the Klamath River. Jenny Creek, which is tributary to the Klamath River at Iron Gate reservoir, is also a Tier 1 key watershed. Connectivity between the planning area and the Jenny Creek watershed is currently disrupted by the Copco 1 hydroelectric facility, which prevents emigrant species from Jenny Creek from accessing the planning area.

Watershed Analysis

Watershed analysis is required in key watersheds and non-key watersheds containing inventoried roadless areas, prior to determining how proposed land management activities meet ACS objectives. Additionally, watershed analysis is required prior to implementing proposed actions within riparian reserves.

The Topsy-Pokegama Landscape Analysis (TPLA; BLM 1996) includes all but the most southern portion of the planning area, and does not include any key watersheds or inventoried roadless areas. The Affected Environment chapter of this River Management Plan serves as an update and extension of the TPLA.

Watershed Restoration

As part of the ACS, watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. In general, the most important components of watershed restoration are control and prevention of road-related runoff and sediment

Table 2-20.—Estimated extent of riparian reserves (on federal land) and riparian corridors (on private land) within the planning area, in acres.

Feature	Segment 1			Segment 2			Segment 3			Total
	BLM	PC	Other	BLM	PC	Other	BLM	PC	Other	
Fish-bearing	253	47	10	753	150	4	16	519	33	1,785
Non-fish-bearing	23	8	17	478	87	127	59	568	258	1,625
Wetlands > 1 acre				19	20	20	1	270	29	359
Wetlands < 1 acre				1	1	1		1	1	5
Reservoirs	4	9								13
Total	280	64	27	1,251	258	152	76	1,358	321	3,787

production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity. Monitoring is an important component of restoration projects.

Aquatic Species/Habitat

The dams on the Klamath River have affected fish species distribution throughout the Klamath Basin. Historically, the Klamath River was a passageway for anadromous fish, salmon, steelhead, and Pacific lamprey as they migrated to various tributaries of the Klamath River and Upper Klamath Lake (ODFW 1997). These fish runs were halted as early as 1910 by the construction of Copco I Dam, completed in 1917, which permanently blocked fish passage (City of Klamath Falls 1986). Five more dams were built on the upper Klamath River-Copco II and lrongate are located in California, and Link River, Keno, and J.C. Boyle Dams are located in Oregon (PacifiCorp 2000). J.C. Boyle, Keno, and Link River Dams have fish ladders intended for trout migration. Only J.C. Boyle Dam has a screening facility to prevent entrainment of fish into the power diversion canal.

Connectivity of the planning area segments to the upper and lower portions of the Klamath River has been impaired by alterations in water quality and development of the river for commercial purposes including dams, diversions, and dikes.

The major human impact to aquatic habitat over the last 150 years has been the fragmentation and loss of components of the marsh, lake, and stream system in Klamath Basin (ODFW 1995). The basin floor was developed for agriculture, which included extensive diking, channeling, draining, and loss of marshlands. Diversions were constructed on many streams and rivers in the Klamath system, causing dewatering and physical blockages for both upstream and downstream migrating trout. Cattle grazing also contributed to channel degradation in some locations.

Alteration in lake alkalinity and water quality limited outflow may have increased contributions as a result of the loss of adjacent marshlands in the upper basin. Lake, marsh, and riparian rearing habitat and functioning migration corridors have been lost as a result. Much of the impacts have occurred on private lands and are affecting the aquatic condition of the planning area.

The wild and scenic river segment of the upper Klamath River is inhabited by a diverse assemblage of fish species; at least 10 known native species occur (Table 2-21). Three species of note occur in the wild and scenic river segment (redband trout, Lost River sucker, and shortnose sucker) and shall be addressed independently. The other native species found in the river include Klamath smallscale sucker, blue and tui chub, Klamath speckled dace, sculpin species, and lamprey species (City of Klamath Falls 1986). The Klamath largescale sucker, a federal species of concern, has been found in J.C. Boyle Reservoir and potentially occurs in the planning area (USDI-BLM 1990).

Lost River (*Deltistes luxatus*) and shortnose (*Chasmistes brevirostris*) sucker are large, long-lived and omnivorous lake-dwelling species that generally spawn in rivers, streams, or springs (Beuttner and Scoppettone 1990). These two species likely occur in the wild and scenic river segment of the upper Klamath River. Although utilization has not been documented, both species have been documented in upstream and downstream reservoirs (City of Klamath Falls 1987; Beuttner and Scoppettone 1991). Both species were federally listed as endangered in 1988, and state listed as endangered 1991 (ODFW 1995). The U.S. Fish and Wildlife Service (USFWS) completed a federal recovery plan in 1993. The planning area was listed as proposed critical habitat (unit 3) for both Lost River and shortnose suckers in 1994 (*Federal Register* Vol. 59, No. 230).

Klamath redband trout are currently the primary game fish inhabiting the river. The upper Klamath River from Keno Dam to slackwater of Copco I Reservoir has been identified as

Table 2-21. Common and scientific names of fish known or suspected to occur with the planning area

Common name [1]	Scientific name
Native species	
Klamath smallscale sucker	*Catostomus rimiculus*
Klamath largescale sucker	*Catostomus snyderi*
Shortnose sucker	*Chasmistes brevirostris*
Sculpin sp.	*Cottus* sp.
Lost River sucker	*Deltistes luxatus*
Tui chub	*Gila bicolor*
Blue chub	Gila coerulea
Lamprey sp.	*Lampetra* sp.
Redband trout	*Onchorynchus mykiss* sp.
Klamath speckled dace	*Rhinichthys osculus*
Introduced species	
Bullhead sp.	*Amerius* sp.
Sacramento perch	*Archoplites interruptas*
Green sunfish	*Lepomus cyanellus*
Pumpkinseed	*Lepomus gibbosus*
Bluegill	*Lepomus macrochirus*
Largemouth bass	*Micropterus salmoides*
Golden shiner	*Notemigonus chysoleucas*
Yellow perch	*Perca flavescens*
Fathead minnow	*Pimephales promelas*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Brown trout	*Salmo trutta*

[1] Where species level identification has not occurred or where multiple species may be present the fish names were listed to genus only.

wild trout managed fisheries (ODFW 1997; CDFG 2000). The Klamath River from the Keno Dam downstream to the state line was one of the first three rivers designated in 1978 by the ODFW as a wild trout stream. From the state line to Copco Reservoir, the Klamath River has been managed by the California Department of Fish and Game as a wild trout area since 1974 (CDFG 2000).

No nonnative hatchery trout have been stocked in the Oregon reach of the Klamath River since 1978, or in the California reach since 1974. The California Department of Fish and Game and a private organization cooperated to raise and plant native stocks of trout into Shovel Creek between 1985-1990.

The concern for and importance of this wild rainbow trout fishery has been acknowledged not only by state designation, but by public and private concerns and also by state and federal government agencies as evidenced by the following:

- The National Park Service, in its 1982 nationwide rivers inventory, recognized the “excellent trout fishery” of the Klamath River.

- The Northwest Power Planning Council designated the upper Klamath River as a protected area in 1988, to protect the resident rainbow trout population.

- The 1986 Pacific Northwest rivers study for Oregon gave their highest resource value rating to the Klamath River based on the wild trout population.

- The ODFW chose the wild rainbow populations of the Klamath Basin, specifically those of the Klamath River, as the first of many in the state to be studied, to better understand how stocks of wild trout have adapted to their particular environments.

The Klamath system produces an immense quantity of aquatic invertebrates such as caddisflies, mayflies, midges, and stoneflies, which provide a primary food source for trout (USDI-BLM 1990). Crayfish are considered abundant and would be an important part of the trout's diet.

Redband of the Klamath River

The Oregon Basin redband trout occupies remnant streams in seven Pleistocene lakebeds in Oregon (ODFW 1995). Populations in each of these basins are completely isolated by natural geological features, except for those in the Klamath Basin. After Lake Modoc cut an outlet to the Pacific Ocean via the Klamath River, the lake became smaller as the outlet trenched down (Behnke 1992). After the connection to the ocean was made with the Klamath River, steelhead were known to migrate from the ocean to the Klamath Lake area. The novel traits in the Upper Klamath Basin group may have resulted from the interbreeding of the newly invading *O. mykiss* with the original resident fish of the basin (ODFW 1995; Behnke 1992).

Thousands of years of adapting to a drying environment have enabled populations of Klamath Basin redband trout to feed at higher temperatures than most other western trout, which typically are affected by increases in temperature (Behnke 1992). Native stocks of redband in the Klamath Watershed have also evolved resistance to an endemic bacterial disease, (*Ceratomyxa shasta*), which is highly lethal to nonnative trout (ODFW 1997).

Klamath River redband confront many environmental constraints, including low summer base flows and concurrent decreasing water quality, lack of spawning gravel, cyclic water fluctuations from power generation, and potential competition from nonnative warm water fish (City of Klamath Falls 1986). Despite these problems, Klamath River redband in the planning area have been able to sustain a sport fishery (ODFW 1997).

The loss of access between lakes, marshes, and streams has interfered with the migratory life histories of Klamath Basin redband trout (ODFW 1995). Population productivity has been compromised because of the loss of the important rearing areas. Gene flow among the Klamath Basin populations has ceased or is reduced and many of its populations are seriously fragmented. Some populations have likely been completely lost.

The trout population that persists in the wild and scenic river segment of the upper Klamath River could be described as locally productive; however, due to passage limitation above and below the wild and scenic river segment, this population is very restricted in distribution. Potentially, the life history options that carried this population through natural drought cycles, or provided for recolonization in the event of die off, are no longer available.

Close genetic similarity of rainbow trout exists between multiple stream populations in areas above Upper Klamath Lake including Spring Creek and Trout Creek, and areas below including Spencer Creek and Bogus Creek (Buchanan et. al. 1994). This genetic similarity suggests that the upper Klamath River trout, including fish within the wild and scenic river segment, are closely related. In addition, ODFW noted genetic uniqueness of the populations of trout in the basin as evidence of a history of isolation from other evolutionary lines of trout (Buchanan et al. 1994).

Based on the genetic analysis of upper Klamath native trout indicating uniqueness and isolation from other trout populations, support exists for the classification as a separate subspecies (Klamath redband trout) scientific name *Onchorhynchus mykiss newberri* of the trout of the upper basin including the affected wild and scenic river segment of the upper Klamath River. This classification nomenclature was originally derived from early collection of specimens from the 1850s (Behnke 1992). While this classification has not been formally accepted, protection of genetically distinct stocks is an important management goal (USDI-BLM 1995; ODFW 1997). The redband, including those within the wild and scenic river segment, are included in ODFW Klamath Lake gene conservation group of the Oregon Basin redband trout complex that is listed as a State sensitive species (ODFW 1997).

The "Upper Klamath River Wild Trout Management Plan 2000-2004" (CDFG 2000) makes no distinction between these Klamath River trout stocks and other rainbow trout. The purity of the wild and scenic river segment of the upper Klamath River strain comes under question as a result of Iron Gate hatchery supplementation from 1970-1981 into Copco Reservoir.

Iron Gate Hatchery steelhead stocks were founded on native fish, but some eggs were imported from Trinity River hatchery and Cowlitz River Hatchery in Washington (Klamath River Basin Fisheries Task Force 1991). The introduced nonnative strains of rainbow trout into the Klamath Basin probably have not been able to reproduce due to their susceptibility to the endemic disease, *C. Shasta* .It is hoped that the genetics of the native trout in the affected reach would endure only minimal negative effects. (ODFW 1997).

Informally, California Department of Fish and Game biologists support ODFW classification of the Klamath redband trout as a separate subspecies of rainbow trout (Rode 2002, personal communication).

In high-gradient systems trout production can be greatly affected by limited habitat features rather than food supply (Behnke 1992). Trout require four kinds of habitat during the various stages of their life history: spawning habitat, nursery or rearing habitat, adult habitat, and overwintering habitat. Deficiencies in any one of the four will limit the potential production.

Spawning Habitats/Occurrence: All western trout spawn during the spring, stimulated by the rising water temperatures (Behnke 1992). However, specific spawning time varies greatly depending on temperature and flow regimes. Klamath River redband trout spawn from late February through May (City of Klamath Falls 1986).

Although some spawning habitat is found in the bypass reach, the wild and scenic river segment of the upper Klamath River and the California reach have little or no spawning habitat for trout (ODFW 1997; City of Klamath Falls 1986). Recruitment of spawning gravel to the wild and scenic river segment, as well as the Bypass and California reaches, is very limited, due to the presence of the J.C. Boyle Dam and the small number of tributary streams (City of Klamath Falls 1986).

Of the spawning habitat that is present in the wild and scenic river segment of the upper Klamath River, much would be exposed during low flows, as a result of peaking operations, making these areas unsuitable for incubation of trout embryos during most years. The abnormal flow fluctuations, associated with peaking operation below the powerhouse, may also interfere with normal spawning behavior (Marcus et al. 1990).

Adult trout from the analysis area are assumed to migrate to either Spencer Creek or Shovel Creek to spawn due to the general lack of spawning habitat in the Klamath River. Spencer Creek, the primary spawning tributary in the Keno reach of the river, empties into J.C. Boyle Reservoir. The spawning population in Spencer Creek has been monitored in Spencer Creek and robust spawning recruitment is evident (ODFW 1995).

However, most of the spawners in Spencer Creek appear to come from the Keno reach above J.C. Boyle Dam.

The number of fish below J.C. Boyle Dam attempting to migrate to Spencer Creek apparently has decreased by about 99 percent since the construction of the J.C. Boyle facility (Hemmingsen et al. 1992). Monitoring migration over J.C. Boyle Dam in 1959 indicated 5,529 adult redband passing the facility, while counts in 1991 (a drought year) were only 70. River flow in the mainstem reach used by this population is highly regulated (ODFW 1995) and may be affecting fishery ecology (Marcus et al. 1990). Inadequate upstream fish passage facilities at J.C. Boyle Dam are also a possible cause of this decline.

Shovel Creek, located three miles downstream from the state line, is the primary tributary to the Klamath River reach below the wild and scenic river segment of the upper Klamath River. The lower 2.77 miles of this tributary are an important spawning area for the Klamath River wild redband trout (CDFG 2000). However, insufficient spawning gravel was found to be a limiting factor in Shovel Creek. Loss of gravel storage areas, increased fine sediment contributions, and diversions for irrigation delivery may also be impairing spawning habitat quality. Adults were documented to be moving upstream into Shovel Creek to spawn from March-June (Beyer 1984). Most downstream movement of spawned out adults (kelts) occurred from mid-May until June.

Rearing Habitats/Occurrence: Important rearing habitat for trout would include habitat with protective cover and low velocity water (Behnke 1992). Such habitats occur along the margins of streams and in spring seeps, side channels, and small tributaries. The bypass reach of the river is potentially an important rearing area for young trout during their first year of life (City of Klamath Falls 1986). After the high winter/spring flows drop off, the flow is relatively stable in bypass reach from summer through winter and the water temperatures of the lower part of the reach is improved by spring inflow (USDI-BLM 1990).

Little information exists on the condition of rearing habitat in upper wild and scenic river segment of the upper Klamath River, however the milder gradient of the upper reach should provide more rearing habitat than the lower segment. In the lower wild and scenic river segment of the upper Klamath River very few pools or backwater habitats suitable for rearing of juvenile fishes were found under summer low flow conditionsæeven less would be available at higher flows due to increased water velocities in the narrow, constricted river valley (City of Klamath Falls 1986).

Some rearing habitat for trout fry and juveniles is available in the California section of the Klamath River. Shovel creek is considered an important rearing tributary to the Klamath River in California (CDFG 2000). Shovel Creek rearing capacity could be limited as a result of water withdrawal (Beyer 1984). However, the effect of diversions on age-0 fish rearing habitat is uncertain.

In the wild and scenic river segment of the upper Klamath River and California reach, large expanses of riverbed are exposed and inundated on a daily basis throughout varying lengths of the year (particularly during the summer) due to the water level fluctuations associated with hydropower generation. The dewatering of river habitat on a daily basis contributes to reductions in the availability of rearing habitat (Marcus et. al. 1990). In addition, stranding of rearing fish may also occur in the wild and scenic river segment of the upper Klamath River as a result swift exposure of riverbed. Stranding has been documented in the California reach, below wild and scenic river segment (City of Klamath Falls 1987). The target species for this stranding study was larval suckers, however the exact species classification of stranded animals was not noted as all fish were classified as larvae.

Fry and juvenile redband trout inhabit the wild and scenic river segment of the upper Klamath River. Monitoring by PacifiCorp, snorkeling of the J.C. Boyle reach in 1996, indicated the presence of young of the year (less than three inches) redband trout (ODFW 1997). Juvenile trout appear to rear as a relatively larger percentage of the population in the Bypass reach versus the portions of the wild and scenic river segment of the upper Klamath River and California reach (City of Klamath Falls 1986). Trout fry and juveniles were observed in the Klamath River below Shovel Creek during electro-fishing surveys in September 1984. In Shovel Creek fry emergence occurred in June. Fish averaged 29 mm long and grew about 15.7 mm every month until November (Beyer 1984). Most trout emigrated from Shovel Creek to the Klamath River as young of the year (CDFG 2000).

Fry and juvenile trout appear to exhibit a late summer to early fall downstream movement at the J.C. Boyle Dam (City of Klamath Falls 1986). Observed downstream movement of fry to the J.C. Boyle Reservoir of the Klamath River from Spencer Creek occurred during October and November (Hemmingsen et al. 1992).

Some fry movement occurred as early as May and June. Research monitoring downstream fish movement below J.C. Boyle Dam to measure possible recruitment from Spencer Creek concluded that the low numbers of juvenile redband collected suggests inadequate recruitment was occurring to maintain the population in the river between the J.C. Boyle Dam and the California state line (Hemmingsen et al. 1992).

Other sources of recruitment for trout may contribute to the present fishery, including the upper basin sources, mainstem sources, and tributaries sources such as Shovel Creek. In Shovel Creek, movement of fry (0+) occurred in late summer with the peak in late August, and juveniles (1+) migrated out of Shovel Creek to the river from April to June (Beyer 1984).

Adult Habitats/Occurrence: At adulthood, stream species generally live at a depth of 0.3 meters or greater, in areas where slow waters for resting are juxtaposed with fast waters that carry food, and where protective cover is provided by boulders, logs, overhanging vegetation, or undercut banks (Behnke 1992).

Cover for adult habitat in the Klamath River is primarily derived from instream sources such as boulders and water depths (City of Klamath Falls 1986). The riparian vegetation contribution to cover varies in along the length of the river. Large expanses of riverbed in the wild and scenic river segment of the upper Klamath River are exposed and inundated on a daily basis throughout varying lengths of the year (particularly during the summer) due to the water level fluctuations associated with hydropower generation.

ODFW's monitoring of downstream fish movement below J.C. Boyle Dam indicated that Spencer Creek did not have adequate recruitment of juvenile redband to maintain the adult population in the river between the J.C. Boyle Dam and the California state line (Hemmingsen et al. 1992). Regardless, the existing trout population appears to support a sustainable fishery (ODFW 1997). Estimates of adult trout (197 mm or larger) populations between J.C. Boyle Powerhouse and the Frain Ranch (upper reach), and Frain Ranch to Salt Caves (lower reach) were conducted in August 1984 (City of Klamath Falls 1986). Population estimates ranged from 890 fish/mile in the upper reach (95 percent confidence interval of 763-1,069), to 1,911 fish/mile in the lower reach (95 percent confidence interval of 475-7,936). The highest number of adult trout would probably have occurred late in January or early February.

Shovel Creek appears to support a healthy population of spawning rainbow trout (CDFG 2000). The age of the Shovel Creek fish at maturity was similar to rainbow trout in other studies (Beyer 1984). Most trout mature in their second or third year. Minimum size at maturity 140 mm (males) to 163 mm (females) was smaller when compared to other studies but within the range of normal variation. The back calculated mean fork-length for each age of fish taken in Shovel Creek was; 102 mm age 1, 191 mm age 2, 293 mm age 3, and 357 mm at age 4.

Redband management: The planning area portion of the Klamath River in Oregon is managed as a catch-and-release fishery from June to September, and is open to a limited catch the remainder of the year (ODFW 2002). The palatability of the trout meat decreases during the summer/fall seasons, potentially as a result of the poor water quality conditions (ODFW 1997). ODFW noted that in the lower river reach downstream of the J.C. Boyle Powerhouse the hydroelectric peaking operation seriously hampered angler use and catch rates. Low angler use was noted during power peaking periods due to added difficulty and poor success during those conditions.

In the California reach of the planning area, Shovel Creek is closed to fishing year-round to protect important wild trout spawning areas, and a portion of the Klamath River, 250 feet upstream and downstream from the mouth of Shovel Creek, is closed from November through June (CDFG 2000). Otherwise the California segment is open to a limited catch from April to November. When compared to other wild trout rivers monitored by California Department of Fish and Game, the Upper Klamath River Wild Trout Area had the highest overall catch rate (CDFG 2000).

Lost River and Shortnose Suckers

The Lost River sucker, or “mullet,” once an important food staple for local Native Americans, was at one time abundant in Klamath Basin lakes and streams, migrating by the thousands to spawn in tributaries of Upper Klamath Lake. Lost River and shortnose suckers typically inhabit lakes and migrate into tributaries to spawn. Adult suckers are long-lived with late sexual maturity (ages 5-7). There is extremely poor recruitment to adult size and age classes in the Klamath Basin. Recruitment failure is attributed to poor survival of larval and juvenile life history stages due to water quality changes, habitat availability, and exotic predation (ODFW 1995; Desjardins and Markle 2000).

Spawning Habitat/Occurrence: For stream spawning populations, suckers begin their spawning migration in late February, March, or early April, depending on peak flows, with spawning activity continuing well into May (USDI-USFWS 1993). Suckers spawn in a range of water temperatures (9-17 degrees Celsius), water depths (1-170 centimeters), and water velocities (42-132 centimeters/second) (Beuttner and Scoppettone 1990). Spawning occurs near the bottom, and when gravel is available eggs are dispersed within the top several centimeters. Spawning over cobbles and armored substrate, eggs fall between the crevices or are swept downstream. Spawning preference appears to be more related to flow than to substrate type. However, reproductive success may not be tightly linked to spawning habitat preference.

Spawning runs of listed sucker species has been documented in the California reach above Copco Reservoir (Beuttner and Scoppettone 1991

Tagged suckers have been documented appearing to prepare for spawning near the slackwater of Copco Reservoir (City of Klamath Falls 1987). Suckers have not been observed spawning in Shovel Creek. Age class analysis has indicated that successful recruitment is not occurring among the two sucker species in these segments of the river (Beuttner and Scoppettone 1991). The scouring and dewatering associate with the hydroelectric operations were thought to reduce survival of eggs and larvae, and predation may also be impairing recruitment.

Rearing Fry/Juvenile Habitat/Occurrence: Larval suckers usually spend relatively little time in tributary streams but migrate back to the reservoir shortly after swim-up (the emergence of larvae from spawn substrate, which typically occurs soon after hatching in suckers) (USDI-USFWS 1993). Larval suckers appear to exhibit a diel migratory behavior and typically migrate during the evening hours. Most larvae would likely migrate to the reservoir between May and June. Larvae prefer slow water areas surrounded by rooted aquatic vegetation, and the larvae appear to avoid areas devoid of vegetation. Gently sloping, unvegetated shorelines are common today lining the lakes and larger streams of the Klamath.

This type of habitat was probably nonexistent historically and created as a result of dams. This type of habitat does not provide nursery habitats of the same quality as a marsh/mature riparian edge habitat.

Little is known of juvenile sucker habitat in the wild and scenic river segment of the upper Klamath River, the adjacent river reaches, and the slackwater of Copco Reservoir. However, juvenile habitat could be affected by water level fluctuation from power peaking operations, which can disturb littoral zone cover and substrate, and can also affect nutrient concentrations, light, temperature, phytoplankton and zooplankton abundance, and macroinvertebrates (Desjardins and Markle 1999).

Loss or alteration of any of these components could be harmful to sucker population stability. Introduction of exotic fish species and hybridization have also been suggested as mechanisms for decline. Recent genetic work suggests hybridization does not occur frequently. Surveys for larval suckers in the California reach indicated that the majority (98 percent) of larvae occurred near the lower most portion of the reach (City of Klamath Falls 1987). Larval presence declined substantially progressing upstream.

Adult Habitat/Occurrence Copco Reservoir:
Lost River and shortnose sucker extended their range into the upper Klamath River system following the creation of lacustrine habitat by construction of Copco reservoir (City of Klamath Falls 1987). Adult suckers spend relatively little time in the riverine spawning reaches, migrating back to the reservoirs after spawning (USDI-USFWS 1993).

The Klamath River reservoirs may be acting as catch basins for expatriated suckers from Upper Klamath Lake (Desjardins and Markle 2000). Juveniles and subadult survive in J.C. Boyle Reservoir, while older individuals move downstream through the Bypass reach, the wild and scenic river segment of the upper Klamath River, and the California reach to Copco and Iron Gate Reservoirs.

Introduced Species

At least fourteen exotic species occur in the river and reservoirs (Table 2-21). Yellow perch, fathead minnows, Sacramento perch, and golden shiner typically favor slower water habitats including slackwater shoals close to Copco Reservoir, and generally are not found in swift flowing portions of the river (USDI-BLM 1990). Although not documented by fisheries specialists, there have been at least two reports of white sturgeon in the planning area. White sturgeon was planted in Upper Klamath Lake in 1956 (ODFW 1997). Brown trout, planted in Copco Reservoir, inhabit and migrate through the California reach to spawn in Shovel Creek (CDFG 2000). Steelhead, planted into Copco Reservoir 1971-1981 (excepting 1975, 1977, and 1978) has been reported from the California portion of the Klamath in the past.

Limitation to Aquatic Species in the Wild and Scenic River

Habitat: Abnormal fluctuation in daily and seasonal flow patterns created below the hydroelectric power operations can lead to low flow dewatering of spawning beds, and both low flow and high flow induced spawning interference, incubation mortality, and rearing mortality of resident fish (Marcus et al. 1990).

Downstream dewatering and desiccation of spawning habitat is a documented occurrence in the wild and scenic river segment of the upper Klamath River (City of Klamath Falls 1986). Downstream dewatering and desiccation are undoubtedly the worst of the possible adverse impacts on the stream (Marcus et al. 1990). In addition, in regulated streams where natural peak flushing flows are greatly reduced, fine sediment can accumulate in the deeper layers, clogging the free flow of water (Marcus et al 1990).

The quality of the spawning habitat present in the wild and scenic river segment of the upper Klamath River was impaired, as result of being heavily embedded and interspersed with large cobble (City of Klamath Falls 1986). Embedded sediments can adversely affect the intragravel habitat important to the survival of benthic insects, incubating eggs, and rearing larvae (Marcus et al. 1990).

The wild and scenic river segment of the upper Klamath River is probably poor rearing habitat. This can be attributed to high gradient and a wide range of flow velocities as a result of peaking operations by the J.C. Boyle Powerhouse. Downstream dewatering of habitat resulting from hydroelectric impoundments would eliminate access to cover habitat and potentially degrade the quality of the existing habitat (Marcus et al. 1990).

Alteration of instream flows from power operation and changes in sediment regimes due to reservoirs can result in decreased bank stability and loss of riparian vegetation (Marcus et al. 1990), which would decrease the cover habitat important to rearing fish (Behnke 1992). Rearing habitat in the California reaches would be affected similarly by peaking operations.

The extent and cumulative impacts of stranding has not been studied in the wild and scenic river segment of the upper Klamath River (CDFG 2000), but the occurrence of larval stranding has been documented (City of Klamath Falls 1987). In the wild and scenic river segment of the upper Klamath River and California reach, large expanses of riverbed are exposed and inundated on a daily basis throughout varying lengths of the year (particularly during the summer) due to the water level fluctuations associated with hydropower generation (City of Klamath Falls 1986).

The predominate habitat types, from the lower segment of the upper reach within the wild and scenic river segment of the upper Klamath River, are shallow rapids, riffles, and runs. Channels with an abundance of shallow habitat are more likely to have larger areas exposed during down-ramping where fish could become separated from the main river flow due to declines in stage (Stillwater 1999). The large flow fluctuations associated with the J.C. Boyle Powerhouse can cause high mortality to young fish through stranding (City of Klamath Falls 1990).

Daily temperature fluctuations of up to 12 degrees Celsius occur in this full flow reach of the river during the middle of the summer (City of Klamath Falls 1986). The effects of these large diurnal temperature fluctuations on the existing cold water fish populations has not been studied specifically for the wild and scenic river segment of the upper Klamath River.

It can be assumed that water temperature fluctuation impacts to fisheries may include elevation of temperatures beyond the range preferred for rearing, inhibition of upstream migration of adults, increased susceptibility to disease, reduced metabolic efficiency, and shifts in competitive advantage (Hicks et al. 1991).

Impacts to other aquatic resources may also be occurring as a result of hydroelectric power operations, including water level fluctuation associated with J.C. Boyle Powerhouse, and poor passage. The distribution of benthic organisms appears to be limited by power peaking operations (City of Klamath Falls 1986). The production of benthic invertebrates' appears to be limited to locations in the riverbed that remained wet during the low flow period of the daily flow cycle.

The impact of J.C. Boyle Dam impairing downstream movement of fish to the wild and scenic river segment of the upper Klamath River has not been studied. Studies of trout food habits in the Bypass reach and wild and scenic river segment of the upper Klamath River did not note the occurrence of prey fish species in stomach contents analysis (City of Klamath Falls 1990). Downstream passage concerns have been noted, including poor passage hydraulics and predation exposure in the forebay of J.C. Boyle Reservoir (FishPro 2000), which may limit the downstream movement of prey species.

Redband Trout: ODFW fisheries biologists have noted that redband in the wild and scenic river segment of the upper Klamath River and Bypass reach appear to be smaller in size on average than fish observed in the Keno reach of the river above J.C. Boyle Reservoir (Smith 2000, personal communication). The physical structures of Keno Dam are more conducive to fish passage than J.C. Boyle (FishPro 2000). Lake elevation and flow rates are regulated at Keno Dam to maintain near constant conditions in Lake Ewauna (FishPro 2000) and instream flows for the reach generally are governed by Bureau of Reclamation directives in meeting their instream flow requirements downstream from Iron Gate Dam (PacifiCorp 2000). This results in fairly unimpaired flows in the Keno reach.

Adult habitat limits the population biomass of resident trout in most streams (Behnke 1992). Spawning and rearing habitat are adequate, and the food supply would support a greater biomass of trout if more adult habitat were present. Excessive recruitment into the population, where young and adult fish are competing for a common food supply, results in short-lived slow-growing individuals and a population whose biomass is tied up in small, young fish.

Based on the population estimates and length frequency distribution (City of Klamath Falls 1986) and the existing conditions of poor upstream passage at J. C. Boyle Dam (Hemmingsen et al. 1992) and power operations which provides suitable habitat to only individuals which can escape the daily dewatering, the trout population could be exceeding carrying capacity and the additive recruitment of trout to these segments could then affect the trout size/age structure.

Genetics may be playing a part in the differences in size and age between the Keno stretch and the wild and scenic river segment of the upper Klamath River reach. The populations of Upper Klamath Basin trout exhibit older ages at maturity and large maximum size (Behnke 1992). Fish passage facilities at J.C. Boyle Dam have been described as inadequate (FishPro 2000; Hemmingsen et al. 1992). Recruitment to the wild and scenic river segment of the upper Klamath River may be limited from these upper populations. Movement between Keno and the upper basin may not be similarly affected. Selection of smaller, earlier maturing fish may be occurring in the wild and scenic river segment of the upper Klamath River.

Food supply may also be impairing size and age structures. Trout restricted to small food items form populations characterized by small maximum individual sizes and young maximum ages (Behnke 1992). Only when trout have adequate access to larger prey, such as crayfish and fish, can they avoid feeding competition with smaller trout and sustain growth.

Truncated population structures, particularly in the Bypass reach where older age classes were missing, has been documented (City of Klamath Falls 1990). Downstream passage concerns have been noted, including poor passage hydraulics and predation exposure in the forebay of J.C. Boyle Reservoir (FishPro 2000), which may limit the downstream movement of larger prey species. Lack of this larger fish prey base could be limiting the size classes present in the wild and scenic river segment of the upper Klamath River, which would not occur in Keno Reservoir (which has better passage).

Historic Anadromous Species

The steelhead life history morphology was historically present in this group, but is now considered extinct (ODFW 1995). This life history probably was introduced into the Upper Klamath Basin after the Pleistocene Lake Modoc opened to the Pacific Ocean (Behnke 1992). The novel traits in the Upper Klamath Basin group may have resulted from the interbreeding of the new invading *O. mykiss* with the original resident fish of the basin (ODFW 1995; Behnke 1992). Steelhead were documented as far up as the Link River (ODFW 1997).

Fall chinook and spring chinook salmon potentially spawned within the Sprague River (Klamath River Basin Fisheries Task Force 1992). Runs were seen as far up the Sprague

River as Beatty, Oregon, and spawning was reported in the North and South Forks of the Sprague. Historically, entry timing for spring chinook appeared to occur in March to upper Klamath River area. Fall chinook entry to the Sprague River was noted in September and October.

The Coho adapted to the Upper Klamath Basin had been lost sometime prior to the earliest documented fisheries assessment and collections, and prior to fish collections between 1914-1918 at Klamathon Racks (Klamath River Basin Fisheries Task Force 1992).

Currently the Southern Oregon Northern California Coastal Coho salmon ESU, in which the Klamath River populations downstream of Iron Gate Dam are included, was listed as threatened under the *Endangered Species Act* in 1997 (62 FR 24588). An ESU or Evolutionarily Sensitive Unit, is a designation that defines a distinctive group of Pacific salmon, steelhead, or sea-run cut-throat trout (NOAA and National Marine Fisheries Service 2000).

Designated critical habitat for Southern Oregon Northern California Coastal Coho salmon occurs downstream of Iron Gate Dam (May 5, 1999; 64 FR 24049).

Reintroduction of anadromous fisheries to the Upper Klamath Basin has been addressed more than once (Fortune et al. 1966; Klamath River Basin Fisheries Task Force 1992). Conditions of the Upper Basin and anticipated relative costs versus relative benefits negated implementation of reintroduction of anadromous fisheries at the time based on these reviews.

The hydroelectric project on the upper Klamath River (FERC Project No. 2082), including five of the six mainstem dams currently blocking or impairing fish passage, will be assessed for reintroduction of anadromous species through the hydroelectric facilities as part of the relicensing process.

Management of the Fishery Resources

The BLM has committed to fisheries management goals from the 1994 “Northwest Forest Plan” and included Aquatic Conservation Strategy objectives, “Bring Back The Natives,” and “Fish and Wildlife 2000.” These plans/initiatives are guidance to the BLM for fisheries habitat management.

“Bring Back The Natives” is a national effort by the BLM, the USFS, and National Oceanic and Atmospheric Administration-Native Marine Fisheries Service to restore the health of entire riverine systems and their native species (NFWF et al. 1992).

Public land management initiatives, such as “Fish and Wildlife 2000,” target key habitats and animal and plant species as well as water quality. “Fish and Wildlife 2000” is a plan to improve management of fish, wildlife, and their habitats on BLM-administered lands.

It is the objective of the BLM to manage and maintain habitat in the planning area and, where feasible, restore those habitats that are now in degraded condition. The 1994 “Northwest Forest Plan” provides for protection of areas that could contribute to the recovery of fish and improve aquatic habitat and water quality through out the basin. The 1994 “Northwest Forest Plan” also provides general guidance on implementation and effectiveness monitoring.

Federal aquatic habitat within western Oregon, Washington, and northern California falls under the 1994 “Northwest Forest Plan” guidance and aquatic conservation strategy objectives, which include:

- Establish watershed and riparian goals and objectives to maintain and restore fish habitat;

- Delineate riparian management areas and a system of key watersheds to protect fish habitat;
- Provide standards and guides for management in riparian areas; and
- Calls for watershed analysis and sub basin reviews to set priorities and provide guidance on priorities for watershed restoration.

Range Resources

Livestock Grazing

Homesteaders have grazed cattle, sheep, and horses within the Klamath River Canyon since the late 1800s. Cattle, and a few domestic horses inside fenced pastures, are currently the only domestic stock that graze within the canyon. Although no figures are available on historic livestock use in the canyon, grazing use has been intense as evidenced by a change from native perennial grasses to invading nonnative annual grasses currently dominating the rangeland. Cattle, wildlife, and a small herd of wild horses (see the following Wild Horses section), currently compete for forage. U.S. Timberlands, PacifiCorp, and BLM-administered lands are used for grazing in and around the planning area. Hay production is also common on privately-owned meadows in the planning area in California.

Riparian vegetation has also been impacted by grazing. Typically, areas that have retained their natural vegetative composition are primarily in steep topography that are inaccessible to livestock. Native grasses that were typical of the once dominant perennial range but are now limited, include Idaho fescue, blue bunch wheatgrass, pine bluegrass, few-flowered wild oatgrass, melic (onion) grass, and needle grass. Cheatgrass, medusa head wildrye, two-flowered fescue, bulbous bluegrass, foxtail barley, thistle, and dandelion are presently found, indicating an annual rangeland and poor range condition. All of these annuals are generally unpalatable and provide little or no nutrient value to both livestock and wildlife (Stoddardt, Laurence A., et. al. *Range Management, Third Edition*, McGraw-Hill Book Company, 1975). Factors causing this change include early spring grazing, historical burning, natural erosion, trampling and soil compaction by livestock, and repeated livestock use. These conditions favor the weedy annual species that easily take over the native perennial plants and grasses (see the Noxious Weeds section for more information).

Two studies have been done in the Klamath River Canyon in relation to vegetation and range condition, one by the Medford District BLM in 1981 and the other for the proposed Salt Caves Hydroelectric Project by the City Of Klamath Falls in 1984 and 1986. Both studies determined the rangelands to be in poor condition. The BLM range study included 5,580 acres in the proposed Salt Caves Hydroelectric Project area, most of this within the river study boundary. It rated ecological range condition based on the seral stage present and determined 64 percent of these acres to be rated poor (early seral stage), 28 percent fair, 8 percent good, and 0 percent excellent condition (late seral stage).

The "Edge Creek Rangeland Health Standards Assessment" came to the following conclusion relative to "Standard 1 – Watershed Function – Uplands," the standard which most addresses upland ecological conditions: "Though this standard is currently not being totally met, BLM management (grazing and nongrazing) is making significant progress toward meeting it on the public portions of the Edge Creek Allotment. Current BLM leased/licensed livestock is not considered a factor…" this points to the fact that though ecological conditions are not optimum, current livestock use was not determined to be a significant factor in the suppressed conditions or was slowing down the gradual improvements.

BLM-Administered Lands

The first known grazing lease on Oregon BLM lands in the canyon was issued in 1960, although it is believed that grazing was occurring long before that. Current grazing use on BLM-administered lands in the planning area is licensed under two different leases covering portions of two different grazing allotments (see Map 8). The recognized base properties for both BLM leases are owned by PacifiCorp. Since the mid-1990s, these base properties (and thus, the attached BLM grazing privileges) have been leased to Bob Miller, a long-term grazing user in the area. Specific grazing allotment and lease information is as follows:

Edge Creek Allotment (0102): The majority of this allotment is outside the Klamath River Canyon, and thus, outside the planning area. The portions in the canyon are licensed as part of the Ward Pasture of the Edge Creek Allotment. It has never been clear exactly how the canyon was adjudicated for grazing use; the common assumption has been and still is, that the canyon is a portion of the Ward Pasture.

The current BLM lease allows for 43 cattle from May 1 to July 15 (107 animal unit months), which includes use in the Ward Pasture on top of the rim (and out of the planning area) as well as the canyon area from the Hoover Ranch (mouth of Hayden Creek) up to the Frain Ranch area (near RM 216). An animal unit month (AUM) is a unit of measurement indicating how much forage is eaten by a cow/calf pair in one month.

Since 1997, the Frain Ranch area has been effectively fenced off from the grazing areas downstream by the Rock Creek fence. The majority of the current grazing use within this allotment (inside the planning area) is in the vicinity of the Hoover Ranch. This grazing use is confined by the power line fence, which is located about 2 miles north and east of the Hoover Ranch and appears to effectively limit the upstream movement of cattle. Cattle ingress/egress is also limited by the Klamath River rim itself and intermittent gap fencing located along low spots in the canyon rim, from just east of the Hayden Creek canyon to near the California/Oregon border.

It should be noted that both the Frain Ranch and Hoover Ranch areas have large quantities of private lands intermingled with BLM-administered lands. Thus, grazing use is not totally within BLM control.

More information on the Edge Creek Allotment can be found in the "Topsy/Pokegama Landscape Analysis" (1996); and Edge Creek Allotment's rangeland health standards assessment (1999).

Laubacher Lease Allotment (0155): This small allotment is located fully within the planning area. It is also entirely within the jurisdiction of California's Redding Field Office and is administered only for grazing use by the Klamath Falls Resource Area. All other management is out of the Redding Field Office.

The grazing lease allows for 32 cattle from April 15 to June 14 yearly (64 animal unit months). The grazing use in this small allotment is limited somewhat by fencing that keeps livestock out of BLM portions of the canyon near the rafting take-out. Cattle use on much of the BLM uplands is limited by steep slopes; thus, most of the grazing use occurs on the gentler-sloping, leased private lands owned by PacifiCorp and others.

In 1998, over one-third of the allotment was sold into private ownership and most of the remaining acreage (everything outside of the 0.25-mile river corridor buffer) is identified for disposal by sale or exchange in the "Redding Resource Management Plan and Record of Decision" (1993).

Private Lands

The majority of the grazing use within the planning area takes place on privately-owned lands—primarily PacifiCorp lands leased to Bob Miller. The most important and highest capacity lands for vegetation production are the irrigated meadows between Copco Reservoir and the Oregon/California state line.

Within the planning area, about 95 percent of the grazing use takes place on private lands, though some of the private landsæmost notably in the Frain Ranch areaæare not grazed for various reasons. The private lands have a long and rich history (and prehistory), with grazing generally beginning around the time of the Civil War, though some cattle trailing was done through the western portions of the region (west of Iron Gate Reservoir) as early as 1837.

From 1993 to 1995, PacifiCorp contracted with rangeland management consultant Ed Korpela for the preparation of a grazing management plan. This was consummated in the August 1995 "Livestock Grazing on PacifiCorp's Klamath River Rangelands: Inventory, GIS Model Development, and Grazing Management Plan–Working Draft."

This plan provided a comprehensive overview of estimated forage quantities and related grazing capacities for both normal and drought years; suggested various rotational grazing systems and seasons of use by pastures; comprehensively listed current and proposed rangeland improvements; stated rangeland objectives and monitoring; and provided other information pertinent to livestock operations on the PacifiCorp properties.

The plan included the BLM-administered lands that are attached to PacifiCorp's private base properties (see previous section). Approximately 50 percent of the normal year grazing capacities outlined in the PacifiCorp management plan are located within the planning area analyzed in this document.

This grazing management plan forms the basis for the current basic management system on the private lands (and to a much more limited degree, the public lands). The plan allows for up to 400 head of cattle to be run year-round throughout the plan in defined operational areas. The cattle are variously rotated through a myriad of separate irrigated and upland pastures and units throughout the year. However, the actual yearly use is largely dependent on the needs and desires of the lessee.

Wild Horses

A very small portion (<5 percent) of the Pokegama Wild Horse Herd Management Area is located within the planning area north of the Klamath River. The total herd management area is bounded by Copco Lake and the Klamath River on the south and east, Jenny Creek on the west, and State Highway 66 on the north. With the exception of State Highway 66, these natural boundaries appear to be physical barriers to movement of wild horses and therefore to habitat expansion. These horses are not in a designated herd management area but drift occasionally from the adjacent Gavin Peak Herd Management Area, which lies to the south and east of the planning area. The Gavin Herd Management Area is administered by the USFS Goosenest Ranger District, which has been trying to remove the horses due to the small amount of federal land in the herd management area. As the herd management area only touches the river planning area in a few locations, it will be minimally considered in this document (see Map 8).

Wild horses have been reported in the Klamath River Canyon area since the early 1900s in numbers that have widely varied depending on many factors. In 1972, 25 horses were counted during BLM's first inventory. Since then, the Pokegama herd has been inventoried frequently with the counts ranging from 25 to a high of 55 in 2000. Actual horse numbers were probably 25–50 percent higher due to the difficulty of accurately counting animals on a forested landscape.

The primary objective for wild horses is the "…management of wild horses and burros as an integral part of the natural system of the public lands under the principle of multiple use…" (43 Code of Federal Regulations [CFR] 4700.0-2). A primary aspect of this management is ensuring that wild horse grazing use is in harmony with the resource capacities of the public lands and other legal uses. In part, this entails ascertaining the conditions of the rangelands relative to the total numbers of grazing animals using those lands.

An analysis of range conditions was prepared in 1983 by the Medford District ("Medford Grazing Management Program EIS"), allocated 250 animal unit months of forage from BLM lands for the Pokegama Wild Horse Herd within the herd management area (the Dixie and Edge Creek Allotments). The bulk of the forage was (and is) expected to be provided by the dominant private lands, which make up over 80 percent of the herd management area. Part of the herd management area is within critical deer winter range, which was considered in allocating animal unit months. Studies conducted for the original 1978 wild horse herd management plan showed that the horses feed primarily on grass, and therefore do not appear to compete with deer for browse on critical winter range; however, there may be direct competition for grass during green up periods when deer feed heavily on grasses and forbs. Horses will compete directly with elk and cattle since these species have almost complete dietary overlap.

The above AUM figure and the appropriate management level of 30–50 head was affirmed in the 1995 "Klamath Falls Resource Area Final RMP/EIS Record of Decision." This appropriate management level was also documented in the 1995 "Lakeview District Wild Horse Gather Environmental Assessment," 1996 "Topsy/Pokegama Landscape Analysis," and the Dixie (2001) and Edge Creek (1999) Allotments rangeland health standards assessments.

In 1996, the actual wild horse numbers were found to exceed 50 head and resulted in the first ever government removal of horses from this herd management area. During the late spring, summer, and early fall of 1996, 20 horses were removed from the herd management area via a bait trapping method. In 2000, the horses were found to again be above the appropriate management level maximum of 50 head. Because of this, 18 more horses were removed (using the same trapping method) during May and June of 2000. All of the horses captured in 2000 were captured north of State Highway 66—out of the designated herd management area. Captured horses have been taken to the Burns, Oregon, wild horse facility where they were made available for public adoption as required under the regulations (43 CFR part 4700). There are currently (2002) estimated to be 35–45 horses residing in the herd management area.

Wildland Fire and Fuels Management

The Klamath River Canyon vegetation is a very diverse assemblage of plant communities. The major plant communities identified are conifer forest and woodland, dense oak woodland, open oak woodland, juniper woodland, mixed shrubs, rabbitbrush-sagebrush, dry meadow, riparian, and irrigated meadow.

Lightning occurrence was 20 lightning ignitions from 1990 through 1999 (Oregon Department of Forestry). The fire return interval for the conifer forest/woodland type is every 10 to 20 years. The estimated fire return interval for oak woodlands in this type of canyon terrain is 5 to 15 years.

Since European settlement, several factors have allowed changes in the vegetation to occur. Native American subsistence burning has been eliminated, heavy grazing has occurred in certain areas, and active fire suppression has occurred in the planning area.

Beginning early in the 20th century, fire prevention and suppression efforts greatly intensified in order to protect public resources and private property from perceived risk of wildfire (Oliver et al. 1994). These efforts became increasingly successful, and by the 1930s nearly all fires were successfully suppressed (Oliver et al. 1994; Agee 1994, 1990, 1993).

Throughout much of the 20th Century, the success of these efforts effectively eliminated fire from these landscapes, leading to conditions favorable for the establishment of numerous small (often shade tolerant) trees, shrubs, and other vegetation (Hessburg et al. 1999; Lehmkuhl et al. 1994).

The resulting additional biomass has caused an increase in crown and ladder fuels, which contribute directly to the lethal effects of recent fires on these landscapes (Huff et al. 1995).

The three main vegetation types considered for fuels treatment are conifer forest and woodlands (41 percent), oak woodlands (21 percent), and mixed shrub (16 percent) within the total planning area. Both mechanical thinning and prescribed burning are options being considered to achieve reduction of fuel loadings.

The conifer forest overstory consists mainly of Douglas fir, sugar pine, ponderosa pine, and incense cedar. The developing ladder fuels in this type targeted to receive fuels reduction treatments are Douglas fir, incense cedar, and white fir.

The oak woodland overstory consists mainly of the dominant Oregon white oak and lesser amounts of California black oak. The developing ladder fuels in this type targeted to receive fuels treatment are scattered junipers, pines, wedgeleaf ceanothus, manzanita, and other brush species (depending upon site conditions).

The mixed shrub type is quite variable and species composition and density is tied to local site conditions. Common shrubs include birchleaf and curlleaf mountain mahogany, wedgeleaf ceanothus, manzanita, poison oak, and serviceberry. Oregon white oak can also be found in its shrubby form class. Fuels treatment in this type will be in the form of fuel loading reduction and lowering the height structure of the shrubs.

A prescribed burning program began in 1996 on BLM land on the Oregon side of the planning area. Burn units were created based on fuel type, fuel loads, topography, and access. Units were selected for burning on a random basis to more closely mimic natural burn patterns at a landscape level. The objective of these burns is to reduce fuel loads to lower, more natural levels, reducing the risk of stand-replacing wildfires (for more details, see “Environmental Assessment No. OR- 014-94-09, Klamath Falls Resource Area – Fire Management, June 1994). To date, 300 acres have been burned, and 200 acres have been contracted for burning when conditions fall within prescription. These prescribed burn projects are limited to areas not seen from the Klamath River. The Final River Plan will determine the locations of treatment areas where prescribe burning can be used.

Air Quality

Air quality is a sensitive issue in the Upper Klamath Basin primarily because of the existing relatively clean air. Potential air quality consequences of the range of alternatives are important for the preservation of high quality visual values for the region. Clean (clear) air is also an important quality with respect to this plan, because of the role it plays in maintaining the Scenic values attributed to the Klamath River Canyon.

Air pollutants are emitted from a variety of sources in the Basin including industrial plants, highways, and urban areas. Agriculture operations contribute greatly to air pollutants (dust) especially in the spring when fields are tilled and planted before irrigation begins. With the emphasis on reducing risk of wildfire on federal, state, and private lands, fuels reduction projects using prescribed fire are also becoming a more common source of pollutants that can contribute to reduced air quality.

The incised nature of the river canyon results in restrictive topography that can trap air until winds can move it out. Because of the lower elevation, smoke and dust generated outside the planning area can contribute to poorer air quality within the canyon and be evidenced as a haze. This typically could occur in the mornings after cooler downdrafts carry the smoke or dust particles down into the canyon over night. Pollutants introduced locally within the inversion layer may follow the drainage flow, but will likely stay within the stable inversion layer. During the daylight hours, when the sun warms the local topography, air adjacent to the surface warms and rises and can break down the surface inversion and ultimately results in an upslope flow. Predominant winds are westerly to northwesterly, however, wind direction fluctuates greatly from the north, south and more rarely from the east as weather “fronts” move through the area.

Air Quality Standards

National Ambient Air Quality Standards (NAAQS) were established by the 1963 *Clean Air Act* and subsequent Amendments to protect the public health (primary standards) and public welfare (secondary standards) from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air.

On May 15, 1998, the EPA issued the *Interim Air Quality Policy on Wildland and Prescribed Fires (Air Quality Policy)* (EPA, 1998) to integrate the public policy goals of, 1) using fire to restore healthy ecosystems, and 2) mitigating the impacts of air pollutant emissions on air quality and visibility. The Air Quality Policy was written to help air quality managers to ensure that plans by Federal Land Managers to conduct more prescribed burns would not result in exceedances of NAAQS.

Enforcement of the *Clean Air Act* in Oregon has been delegated, by the U.S. Environmental Protection Agency (EPA), to the Oregon Department of Environmental Quality (ODEQ) - Air Quality Division. The state, in turn, is required to develop and administer air pollution prevention and control programs approved by EPA. State ambient air standards must either be the same as or more stringent than the federal NAAQS. The State of Oregon has established its own ambient air quality standards (Division 31, Oregon Administrative Rules).

California’s Smoke Management Program addresses potentially harmful smoke impacts from agricultural, forest and rangeland management burning operations. The legal basis of the program is found in the *Smoke Management Guidelines for Agricultural and Prescribed Burning* (California, 2001) adopted by the California Air Resources Board at its meeting on March 23, 2000. These Guidelines were filed with the Secretary of State and became effective on March 14, 2001. The California Air Resources Board and the State’s 35 air districts are responsible for administration of the program.

The biggest health risk arising from prescribed fires is from smoke, which contains multiple chemical compounds and particulate matter, one of the six pollutants for which EPA has set NAAQS. If the particulate matter for NAAQS is exceeded, the EPA is required to designate the area as a “nonattainment” area. This designation then imposes on the state certain legal requirements to bring the area back into attainment.

Visibility is an important air quality value in the western United States, particularly for scenic and recreational areas. *Clean Air Act* Section 169A requires EPA to develop regulations for the "prevention of any future and remedying of any existing impairment of visibility in mandatory Class I federal areas which impairment results from man-made air pollution." EPA has prepared a list of 156 mandatory Class I areas in which visibility is an important value.

Generally, Class I is the designation for clean pristine airsheds. Class I areas include national parks larger than 6,000 acres, most national wilderness areas greater than 5,000 acres, and international parks and national memorial parks that exceed 5,000 acres. The nearest Class I airshed is Mountain Lakes Wilderness located 12 miles directly north of the northern end of the planning area.

The River Plan will propose fuel treatments to enhance wildlife habitat, maintain scenic resources, and reduce the potential for catastrophic wildfires. Planned prescribed fires need to be consistent with the *Clean Air Act*. Klamath Falls Resource Area will be developing a Smoke Management/Air Quality Plan in 2003. This smoke management plan would analyze the river planning area and should identify what affect actions proposed would have on air quality. The final river plan will meet the requirements of the Smoke Management Plan currently under development.

Land Tenure

Land ownership within the planning area boundary is as follows (see Map 3):

- Segment 1: 70 percent BLM and 30 percent private
- Segment 2: 75 percent BLM, 2 percent state, and 23 percent private
- Segment 3: 11 percent BLM, 2 percent U.S. Forest Service (USFS), and 87 percent private ownership

Table 2-22 shows land ownership by segment in both acres and percent.

Existing Rights

Rights-of-way for three power lines and four roads totaling 27.3 miles in the planning area affect 259 acres of federal land. Table 2-23 summarizes the rights-of way by segment. There are no existing mining claims. PacifiCorp has three water right claims for power generation and irrigation and the Oregon Department of Forestry has one water permit for fire suppression. Native American rights, which include access to religious sites and the freedom to worship through ceremonies and traditional rites, are protected and preserved within the planning area by the *American Indian Religious Freedom Act* of 1978.

Hydroelectric Facilities

The planning area includes the portion of the Klamath River between two hydroelectric facilities: J.C. Boyle Dam in Oregon and Copco 1 Reservoir in California. The J.C. Boyle 80-megawatt power generation plant is 4.3 river miles below J.C. Boyle Dam. This facility has two turbine generators that provide power during high use (peak) periods. Up to 3,000 cfs of flow can be diverted at J.C. Boyle Dam.

This water passes through a 14-foot-diameter pipe into an above ground concrete flume for two miles, flows into a concrete forebay, and then enters a tunnel, which passes a short distance through the canyon wall before entering the penstocks and turbines (PacifiCorp 2000). At the entrance of the tunnel an emergency overflow spillway can discharge water from the canal to the river. Additional facilities associated with the J.C. Boyle Powerhouse in Segment 2 include a surge tank, substation, and storage building at the powerhouse site, and a

Table 2-22.—Upper Klamath River planning area land ownership

Landowner	Acres	Percent
Public		
Bureau of Land Management	947	67
Private		
PacifiCorp	169	12
U.S. Timberlands	276	20
JELD-WEN, Inc.	18	1
Segment 1 Total	1,410	100
Segment 2		
Public		
Bureau of Land Management	5,152	71
State		
Oregon	118	2
Private		
PacifiCorp	1,100	15
U.S. Timberlands	545	7
Other Private	391	5
Segment 2 Total	7,306	100
Segment 3		
Public		
Bureau of Land Management	1,472	14
Klamath National Forest	601	6
Private		
PacifiCorp	5,830	55
Boise Cascade	754	7
Other Private	2,029	18
Segment 3 Total	10,686	100
Total Acres for all Segments	19,402	

U.S. Geological Survey (USGS) gaging station downstream from the powerhouse. Roads and power lines associated with energy transmission are found in all three segments.

The Klamath Hydroelectric Project is comprised of the J.C. Boyle and Copco 1 facilities, four other dams (Keno, Copco 2, Iron Gate, and Fall Creek), and the powerhouses associated with the Link River Dam (PacifiCorp 2000). The hydroelectric project, which is operated by PacifiCorp, was licensed by FERC in 1956. That license expires in 2006.

In 2000, PacifiCorp formally initiated the relicensing process. The BLM is working with numerous federal, state, and tribal agencies to ensure that resource management concerns are addressed in the new licensing process. A new license would probably have a life of 30 to 50 years.

Table 2-23.— Upper Klamath River planning area rights-of-way

Right-of-way	Width (feet)	Length (miles)	
		Private	Bureau of Land Management
Segment 1			
Power lines			
OR 24416	100	0.5	1.5
OR 17364	50	0.4	0.0
ORE 013482	N/A	0.0	<0.1
Roads			
OR 200608	60	0.0	1.8
Power Project #2082	100	2.0	4.3
Segment 2			
Power lines			
OR 17364	50	1.1	5.7
OR 24416	100	0.0	0.5
Roads			
Power Project #2082	100	1.0	6.2
Access Road [1]	60	4.4	4.9
Segment 3			
Power line	50	4.8	0.5
Topsy Road	100	4.9	1.8

[1] Includes portions of the Topsy Road and the J.C. Boyle Powerhouse Access Road.

Socioeconomics

Three counties, Jackson and Klamath Counties in Oregon and Siskiyou County in California, would most likely be affected by changes in management or reallocation of resources associated with the upper Klamath River. The population of this area during the 2000 Census totaled 289,345. Populations in the individual counties were: Jackson, 181,269 (up 23.8 percent since the 1990 census); Klamath, 63,775 (up10.5 percent since the 1990 census); and Siskiyou, 44,301 (up 1.8 percent since the 1990 census). Major population centers are Ashland, 20,085; Klamath Falls, 19,365; Medford, 62,030; and Yreka, 7,500.

The Oregon Employment Department in its 1999 annual employment report, estimated civilian labor force in Jackson County to be 89,160 and 28,760 in Klamath County. The California Employment Development Department estimated civilian labor force in Siskiyou County to be 17,760. In Jackson County the three largest sectors were trade (20,800), services (19,840), and government (11,280). In Klamath County the three largest sectors were services (5,580), trade (5,510), and government (5,400). In Siskiyou County the three largest sectors were government (3,820), services (3,370), and trade (3,280). Unemployment rates in the individual counties were: Jackson, 6.6 percent; Klamath, 8.7 percent; and Siskiyou, 9.5 percent.

Personal income in 1998, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis, was $6.17 billion for the tri-county region. County totals were as follows: Jackson, $4,021,718,000; Klamath, $1,250,550,000; and Siskiyou, $901,367,000. Jackson County had the highest per capita income ($23,214) followed by Siskiyou ($20,474) and Klamath ($19,800).

Agricultural products/crops in the area include cattle, forage and hays, nursery products, and in Siskiyou County only potatoes and potato seed. Total agricultural sales for each county in 2000 were Jackson, $58,847,000; and Klamath, $132,815,000. Total agricultural sales for Siskiyou County in 1999 were $116,598,000. Farm income is a very small portion of total personal income in the area. During 1998, farm income represented just 0.23 percent of the total personal income in Jackson County. Farm income represented 0.73 and 2.16 percent to total personal income in Klamath and Siskiyou Counties, respectively.

The lumber and wood products industry also contributes to the local economy. In Jackson County, 3,870 people were employed in the lumber and wood products industry, representing 5.4 percent of all wage and salary employment in the county. In Klamath County, 2,470 people were employed in the lumber and wood products industry, representing 10.6 percent of all wage and salary employment. In Siskiyou County, 770 people were employed in the lumber and wood products industry, representing 5.3 percent of all wage and salary employment. The industry also contributed to personal income in the region. In Jackson County, earnings in the lumber and wood products sector totaled $196,287,000, or 4.9 percent of total personal income. In Klamath County, earnings in the lumber and wood products sector totaled $109,677,000 or 8.8 percent of total personal income. In Siskiyou County, earnings in the lumber and wood products sector totaled $31,795,000, or 3.5 percent of total personal income.

Employment and income statistical references do not specifically track recreation and tourism as a sector. Instead recreation and tourism contributes to several sectorsætransportation, services, retail trade, and even government. The Oregon Tourism Commission publishes an annual report with estimates to total travel-related spending in each county. Estimates for 1999 were $224.1 million in total travel spending in Jackson County and 99.7 million in Klamath County. The same researcher made estimates for Siskiyou County for 1998 of 171.0 million.

Description of Potential Area of Critical Environmental Concern Values

An ACEC designation highlights an area where BLM special management attention is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes; or to protect human life and safety from natural hazards (BLM Regulations, 43 CFR 1610).

The ACEC designation indicates to the public that the BLM not only recognizes the area possesses significant values, but has also established special management measures to protect those values. Designation serves as a reminder that the significant values or resources must be accommodated during the BLM's consideration of subsequent management actions and land use proposals within an ACEC.

To be considered as a potential ACEC, and further analyzed in resource management plan alternatives, inventory data for the area must be analyzed to determine whether there are areas containing significant resources, values, systems or processes, or hazards. To be a potential ACEC, an area must meet both relevance and importance criteria, as established and defined in BLM Regulations, 43 CFR 1610.7-2:

Relevance. There shall be present significant historic, cultural, or scenic values; a fish or wildlife resource or other natural system or process; or natural hazard.

Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property."

Upper Klamath River Area of Critical Environmental Concern Designation

The "Klamath Falls Resource Area Record of Decision and Resource Area Management Plan" (1995) designated an ACEC in the Klamath River Canyon from rim to rim extending from J.C. Boyle Powerhouse to the Oregon/California state line (see Map 2**).** The presence of cultural (both prehistoric and Native American traditional use) values, scenic values, fish and wildlife (both populations and habitat) resources, and a natural process or system (both priority plant species and vegetation) were found to be both relevant and important. Management guidance outlined in the 1995 resource management plan specified that this area is not available for planned timber harvest, limited off-highway vehicle use to designated roads, allowed no developments to enhance the potential for grazing, limited mineral leasing to no surface occupancy, and allowed no hydroelectric development. The area was to be managed for semi-primitive motorized recreation opportunities. A site-specific management plan for this ACEC will be developed as part of the final river plan.

Potential Areas of Critical Environmental Concern

This plan will also evaluate extending the existing ACEC to Segment 1 (below J.C. Boyle Dam to the powerhouse) of the planning area. To be considered as a potential ACEC, an analysis and evaluation report must consider the relevance and importance of resource values identified within the area which has be nominated as an ACEC. This report is found in Appendix I.

Chapter 3 - Klamath River State Scenic Waterway Management Plan

Chapter 3 – Klamath River above Frain Ranch

Chapter 3 - Oregon Scenic Waterways Klamath River Scenic Waterway Management Plan

Background

The Oregon Scenic Waterways System was created by ballot initiative in 1970. Scenic waterways are defined as including the designated river and related adjacent lands within º mile of the bank on either side of the river. The original Act designated 496 free-flowing miles in six different rivers.

Rivers can be added to the system through ballot initiative, or designation by the legislature or the governor. In 1988, Oregon voters passed a second ballot initiative, the Oregon Rivers Initiative (Ballot Measure #7) that added 573 river miles to the Oregon Scenic Waterways System, including 11 miles of the upper Klamath River. This segment begins at the J.C. Boyle Powerhouse and goes southwest downstream to the Oregon-California state line (see Map 2).

There are now segments of 19 rivers (1,148 river miles) and one lake (Waldo Lake) in the Oregon Scenic Waterways System.

Administration

The Oregon Parks and Recreation Commission administers scenic waterways in accordance with Oregon Revised Statutes 390.805 to 390.925. Oregon Administrative Rules have been adopted to govern the program.

General rules prescribe generic standards that apply to all scenic waterways. Specific rules are also developed for each river during the management planning process. These regulations are designed to manage development within the scenic waterway corridor and maintain the natural beauty of the river.

The *Scenic Waterways Act* and related rules require evaluation of proposed land development, and improvement or alteration relative to the scenic and aesthetic beauty of the waterway, as viewed from the river. This review and evaluation apply to all related adjacent lands within 1/4 mile of the banks of the scenic waterway. Landowners wanting to build houses or roads, cut timber, mine, or pursue other similar projects must make written notification to the Oregon Parks and Recreation Commission. Department staff members review the proposal, in coordination with other jurisdictions, and determine if the proposal will substantially impair the natural beauty of the scenic waterway.

When a project is inconsistent with scenic waterway goals, the Oregon Parks and Recreation Department Commission and staff work with the landowner to resolve conflicts. The commission has one year from the date of initial notification in which to reach accommodation with the landowner.

This may include revising the project, or compensating the landowner by purchasing the land or resource, or negotiating a scenic easement. If satisfactory resolution is not reached within one year, the landowner may proceed with the initial development proposal.

Local and state agencies must comply with the scenic waterway law and rules. Federal land managing agencies are encouraged to coordinate with the Oregon Parks and Recreation Department, to insure that their own land management actions are compatible with scenic waterway prescriptions.

Management Plans

The *Oregon Scenic Waterway Act* describes conditions under which activity can occur within the corridor of a state scenic waterway. The Act specifies that a management plan, in coordination with other state and local agencies, will be developed. The Act specifically describes the management plan as being the administrative rules that are adopted. Within the management plan, scenic waterways are classified into one or more of six possible classifications, according to the character of the landscape, the amount and type of development, and local zoning. River classifications are also based upon access to, and existing development in, the scenic waterway corridor.

In the development of the management plan (administrative rules) for the Klamath River, an eleven step process was followed:

1) Scoping meetings with federal, state and local governments and the public
2) Data collection
3) Corridor description
4) Resource and management analysis
5) Public and agency review of findings
6) Draft management plan
7) Public and agency review of the Draft Management Plan
8) Revisions to the draft management plan
9) Final management plan adopted by the Oregon Parks and Recreation Commission
10) Water Resources Commission concurrence with plan adoption
11) Plan implementation and monitoring

The goal of the Scenic Waterway management planning process is to produce a comprehensive and workable management plan, implementation of which will protect or enhance the special attributes of the designated river corridor.

The intent is to maintain the scenic status quo without turning back the clock on existing land uses. Scenic waterway management plans (administrative rules) are developed to protect or enhance the aesthetic and scenic values of scenic waterways, while allowing compatible agriculture, forestry and other land uses.

The plans are composed of management principles, standards and prescriptions applicable to scenic waterway shorelines and related adjacent lands. The rules establish varying intensities of protection or development based on the special attributes of each river segment. This is done through the use of river classifications.

The administrative rules (management plan) for the Klamath River Scenic Waterway were adopted by the OPRD Commission on September 25, 2002 and became effective on October 3, 2002.

Existing Condition

The Klamath River from the J.C. Boyle Powerhouse to the Oregon-California state line was designated a scenic waterway in 1988. Ownership within this corridor is 75 percent BLM, 23 percent private, and 2 percent State of Oregon (see Map 3). Vehicle access is limited to Topsy Road along the east side of the river and the J.C. Boyle Powerhouse Road on the west side of the river. Both roads are gravel or native surface and provide vehicle access to numerous locations on each side.

Since both roads follow a bench elevated well above the river, the roads are only visible from the river at their river-level access points. Klamath County has zoned the private lands within the scenic waterway corridor as “forestry”.

Within this forestry zone landowners may conduct forest operations, develop temporary structures for the purposes of a forestry operation, alter the land for mineral exploration, mining, gravel extraction and processing, and a host of other uses.

To date, uses in the canyon have been primarily recreation, range, and timber management. Few structures exist within view of the river, and timber harvest activities have been limited to selective cutting. Range activities are primarily above the canyon rim with no evidence of activity in view of the river.

Classification for the Klamath River Scenic Waterway

Based on the existing condition, and through public review and comment resulting from the 11-step planning process, the Oregon Parks and Recreation Department has classified the entire 11-mile segment of the Klamath River Scenic Waterway as a Scenic River Area. Scenic River Areas are accessible by roads in places, but which contain related adjacent lands and shorelines still largely primitive and undeveloped except for agriculture and grazing. The management goal of this classification is to preserve the undeveloped character, and to maintain or enhance the high scenic quality, recreation, fish and wildlife values while allowing continued agricultural use.

The rules established for the Klamath River Scenic Waterway generally do not affect development existing at the time of scenic waterway designation. This classification is not designed as an absolute prohibition against new development, though some types of improvements require notification, review, and approval.

Mining, road building, new structures, mobile and manufactured home placement, land clearing and timber harvest typically must go through the notification process. The administrative rules for the Klamath River Scenic Waterway determine what proposals may be approved and how they must be conditioned to protect the natural and scenic beauty of the waterway.

Notification and approval is generally not needed for fences, farm building maintenance, irrigation lines, crop rotation, danger tree removal, residential maintenance and remodeling, home site landscaping, minor road maintenance, and firewood cutting.

However, landowners are advised to contact Oregon Parks and Recreation Department before making any changes to their land within a scenic waterway corridor, especially if it is visible from the river.

Land Management Rules for the Klamath River Scenic Waterway

Following are the Administrative Rules (management plan) specific to the Klamath River Scenic Waterway:

OAR 736-040-0053
Klamath River Scenic Waterway
(1)Scenic River Area:

(a) That segment of scenic waterway beginning at the J.C. Boyle Dam Powerhouse to the California border (11 miles) is classified as a Scenic River Area.

(b) This Scenic River Area shall be administered consistent with the standards set by Oregon Administrative Rules 736-040-0035 and Oregon Administrative Rules 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e., forest-related dwellings) shall comply with Klamath County land use regulations.

(c) New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, except as provided under Oregon Administrative Rules 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection.

If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years).

The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the improvement.

(d) Commercial public service facilities, including resorts, motels, lodges, and trailer parks that are visible from the river shall not be permitted.

(e) New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in Oregon Revised Statutes 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation.

The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the new mining operation.

If inadequate topographic or vegetative screening exists to totally screen the proposed mining site, the mining operation may be permitted if native vegetation can be established to provide total screening of the proposed mining site within a reasonable time (4-5 years).

(f) New roads may be permitted only when totally screened from view from the river by topography and/or vegetation. The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the new road.

If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created, or road design techniques used, to totally (100 percent) screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

(g) Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall be totally screened from view from the river.

The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the subject improvement. Necessary minor road improvements shall be substantially screened from view from the river.

The condition of "substantial screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75 percent) the minor road improvement.

If inadequate topography or vegetation exists to substantially screen the road improvement, it may be permitted if acceptable topography can be created, or road design techniques used, to substantially screen the road at the time of construction; or native vegetation can be established to provide substantial screening of the road improvement within a reasonable time (4-5 years).

When an existing road is re-graded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river and placed in a manner that the excess material will not reach the waters of the scenic waterway due to wind, water or other means of erosion or transport.

(h) Visible tree harvest or other vegetation management may be permitted provided that:

(A) The operation complies with relevant Forest Practices Act rules;

(B) Harvest and management methods with low visual impact are used; and,

(C) Harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). Within this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

(i) Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

(j) Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

(k) Whenever standards of Oregon Administrative Rules 736-040-0035 and 736-040-0053 section (1), subsections (b) through (j) are more restrictive than Klamath County's land use and development ordinances, scenic waterway regulations shall apply.

Chapter 4 - Resource Goals, Issues and Alternatives

Chapter 4 – Rafting the Klamath River

Chapter 4 - Resource Goals, Issues and Alternatives

Introduction

In order to develop the alternatives described in this DEIS, the interdisciplinary team used their past experience and considered existing management direction and resource conditions to develop an image of what the resource should look like in the future. This desired future condition was used to define resource goals, which are listed below for each resource. In addition, public comments were summarized into issue statements and combined with management concerns to help in the development of alternatives.

Issues related to resource management are also listed below for each resource. Appendix G (Public Issue Statement Tracking), displays how individual public comments are addressed in this document. A list of possible management actions was then developed that could help to guide realization of those future conditions.

Various management actions were added into alternatives based on the theme of each particular alternative. There is substantial overlap of management actions between alternatives. Implementation of any alternative would help achieve the listed goals, but to varying levels and over varying timelines.

Alternatives and Actions Considered but Eliminated from Detailed Analysis

No Management Alternative

During development of this DEIS, Klamath Falls and Redding Field Office personnel met with residents and landowners in the Copco area, California, to discuss the planning effort and describe alternatives proposed by the interdisciplinary team. It was suggested that BLM should consider a "no management" alternative that did not include <u>any</u> activities by the BLM within the canyon. However, an alternative that did not include any management actions whatsoever could be in violation of law and policy for protecting resources within the river canyon. Some of the same people who suggested this "no management" alternative, mentioned after the meeting that some actions in the proposed alternatives might be beneficial, but they just were not comfortable with *all* the actions proposed. The public comment period on the DEIS allows the public to study each alternative closely, and make specific suggestions for changes. Therefore, the planning team will be able to address comments from the public about changes to any alternatives, including removal of some actions proposed for any alternative, during preparation of the Final EIS.

Expanded Planning Boundary Alternative and Actions

At least one public comment suggested that the planning area boundary extend north of Highway 66 to include the Klamath River up to Keno dam. There are no BLM lands along this section of river so the northern boundary was set at Topsy Reservoir.

Some specific actions such as preventing development, or eliminating existing uses on lands far beyond the rim of the river canyon were suggested in public scoping comments. The planning team determined that the scope of the plan should include the river canyon and access to the canyon, but not go beyond that.

Other Actions not Analyzed

Although the issues inherent to the following actions were addressed, the specific actions listed were not analyzed.

- OHV use should be strictly banned within the canyon area due to its destructive nature and abuse to house pits and ceremonial areas.
- No OHV recreation should be allowed in the canyon, or maybe allow OHV recreation if a permit process to restrict use was established.
- At a minimum the Topsy road should be gated and closed in winter and during wet weather.
- Plant poison oak around the Rain Rock to help prevent vandalism.

Connected Actions

The Council on Environmental Quality Regulations for implementing NEPA stipulate that “Connected Actions” need to be analyzed. Connected Actions are those that:

- would automatically trigger other actions
- cannot or will not proceed unless other actions are taken perviously or simultaneously
- are interdependent parts of a larger aciton and depend on the larger action for their justification.

An example of this is if a new campground is proposed, a connected action might be that a new permanent access road is also needed. In this EIS the interdisciplinary team listed the actions, including all know connected actions, in the detailed description of alternatives. Therefore, each alternative does not have a separate *“connected actions”* section.

Overview of the Proposed Alternatives

Alternative 1-No Action (Existing Management)

This alternative is considered the “no action” alternative, because it would not change any direction that is currently in the Klamath Falls or the Redding Resource Management Plans.

Management would continue to follow direction in existing plans. Values “shall be preserved in free-flowing condition, and … they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations” (Section 1[b], *Wild and Scenic River Act*).

The goal of this alternative would be to maintain the existing wild and scenic river (scenic classification) outstandingly remarkable values and ACEC values. See Map 9 for the project area boundary for Alternative 1.

Alternative 2- Improvement of Resources and Opportunities

This alternative was developed in response to direction in the *Wild and Scenic Rivers Act* to maintain and enhance scenic river outstandingly remarkable values. The Act states, "Each component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included, without … limiting other uses that do not substantially interfere with public use and enjoyment of these values."

The goal of this alternative therefore, would be not just to maintain, but to enhance where possible, the outstandingly remarkable values, while resolving resource management conflicts that could occur. See Map 10 for the project area boundary for Alternative 2.

Alternative 3 - Natural Resource Enhancement/ Restoration (Preferred Alternative)

This alternative emphasizes enhancement of resource values for which the river was designated a Scenic river and an ACEC. The goal of this alternative is to maintain all outstandingly remarkable values, while placing emphasis on restoration and enhancement of the values related to natural resources. Proposed actions are designed to achieve this goal and not create any significant resource management conflicts with other outstandingly remarkable values. See Map 11 for the project area boundary for Alternative 3. For this DEIS, Alternative 3 has been adentified as the "Preferred" Alternative.

Alternative 4 - Expand Human Use Opportunities

This alternative has a greater recreation emphasis. The goal of this alternative is to maintain and enhance all outstandingly remarkable values, while implementing management actions that contribute to enhanced human use of the river corridor. This alternative should emphasize utilizing resources for recreation, including interpreting wildlife and cultural resources, but should not create significant conflicts with managing other values. See Map 12 for the project area boundary for Alternative 4.

Detailed Description of Alternatives

The following description of alternatives is organized by resource topics, to allow easy comparison of how each resource will be managed without having to flip between numerous sections.

During scoping, there were some issues that appeared to be of greater interest to the majority of people than other issues. The listing of issues is organized in this relative order of interest format.

The following section is also formatted in relative order of the interest expressed during scoping. To facilitate understanding of the proposed actions for each alternative, summary tables are provided for each major resource topic. Reviewers should also refer to Appendix H, Proposed Management Actions, for specific management actions and projects listed by resource topic.

Scenic Quality

Resource Goals

- The natural landscape diversity is maintained.
- Mature, old growth, multi-layered canopy structure is maintained in forested areas.
- Plant communities are maintained in a healthy condition.
- More arid areas are maintained with reduced or eliminated noxious weed areas, especially in more arid areas
- long-term scenic quality objectives are met with the use prescribed fire and other vegetation treatments to reduce the likelihood of catastrophic fire.
- Scenic quality is enhanced in areas that contain existing hydropower facilities, through the FERC relicensing process

Summary of Issues

Scenic quality is one of the outstandingly remarkable values identified for the planning area. The consideration of new recreational facilities, fuel loading, prescribed fire, utility development, and roads, could impact visual resources. A computerized viewshed analysis was completed (BLM 2002) to help determine if proposed resource management projects could impact scenery. These impacts are discussed thoroughly in Chapter 5 (Environmental Consequences) of this DEIS. Maintaining, enhancing, or restoring scenic qualities is a management concern.

Actions Common to All Alternatives

- Scenic quality and scenic views would be improved through priority targeted vegetative treatments and plantings around recreation sites and creation of scenic overlooks
- The BLM would cooperate with Oregon States Parks and Recreation Department on management of scenic resources within the State Scenic Waterway
- The BLM would cooperate with PacifiCorp and other private landowners to minimize the visual effects of their management activities and structures, and modify existing structures and projects to lessen negative visual effects
- Vegetation treatment projects would be designed to reduce opportunities for catastrophic wildfire (long- term) while allowing acceptable short-term (5-10 year) visual resource impacts
- Facilities, roads, trails, and activities would be managed to maintain VRM Class II objectives
- River flows that improve the scenic quality would be pursued

Actions Specific to Each Alternative

(Refer to Maps 13, 14, 15, 16, and Table 4-1 and Appendix H)

Alternative 1

Management of scenic quality and visual resources would be done primarily on a project-by-project basis through project planning and the NEPA process (see Table 4-1).

Fuel treatments to protect scenic values would be focused around recreation sites.

Alternative 2

Management activities would be undertaken only if/when scenic quality/visual resources can be maintained or enhanced (see Table 4-1).

Vegetation treatments would be undertaken specifically to mitigate past damage to scenic quality and to maintain and protect existing values.

Fuel treatments to protect scenic values would be increased to reduce the potential for destructive wildfire.

Alternative 3

Scenic quality/visual resources would be managed through projects that restore and improve damage caused to this resource by past human activity (see Table 4-1).

Vegetation treatments would be aggressively pursued to restore and improve scenic quality/visual resources on public and private lands in the planning area.

Fuel treatments would be implemented to protect scenic values using prescribed fire as the primary method**.**

Alternative 4

Visual and scenic resources would be maintained and enhanced through careful planning of all developments, using landscape architecture and design to blend projects with the existing visual/scenic resource (see Table 4-1).

Projects to improve visual/scenic resources would be undertaken from key observation areas that draw the greatest human use.

Fuel treatments would be concentrated around recreation facilities, trails, and roads.

Recreation

Resource Goals

- A wide variety of recreational opportunities, such as hunting, fishing, camping, whitewater boating, mountain biking, OHV driving for sightseeing, hiking, and picnicking are provided in the upper Klamath River canyon.

- Water quality in the river to allows a safer, higher quality experience for water contact recreation, primarily swimming and whitewater boating. River flows provide as much boating opportunity as possible, while still maintaining or enhancing other resource values.

- The KFRMP/FEIS semi-primitive motorized recreation objective is accomplished by maintaining recreation facilities, roads, and trails for most recreational uses.

- A spectrum of camping opportunities is available for the public from full-service, developed campgrounds near the planning area to primitive dispersed camping.
- Facilities are universally accessible to the greatest extent possible.
- Visual/scenic resources are maintained or enhanced without degrading other resource values.
- Fishing opportunities for trout are maintained or enhanced.
- Roads and motorized use are managed to provide safe, reliable access by either two-wheel drive high-clearance or four-wheel drive vehicles to the most commonly used locations.
- Commercial rafting and rafting use levels are managed to provide a safe, high quality experience while not significantly impacting other recreational users or resource values.
- Coordination with PacifiCorp and interested user groups, such as commercial outfitters, provides for effective recreation management.

Summary of Issues

A primary recreational use is whitewater rafting below the John C. Boyle Powerhouse. Whitewater rafting opportunities are dependent upon the timing and amount of river flow released by PacifiCorp. If the timing or amount of river flow is changed significantly, traditional whitewater rafting could be jeopardized. Recreation use has been identified as an outstandingly remarkable value.

A diversity of recreational activities should be provided (both on/off river) and include routes managed for driving for pleasure. Increased recreation use could also increase the number of access points to the river, causing damage to riparian and upland habitat and significant cultural sites.

If there are no controls on visitor use levels, the quality of the recreation experience could be negatively impacted. Because commercial rafting is a dominant use and occurs in a very pronounced peak use pattern, this activity should be carefully managed. Visitor use levels for other recreation should also be monitored and managed, when necessary, to maintain the quality of recreation experiences, to protect other resource values, to minimize conflicts between various recreational user groups, and to maintain public health and safety. This plan will evaluate the need for limits to visitor use, and apply them where necessary, in order to maintain or enhance the Outstandingly Remarkable Values of the Wild & Scenic river designation.

Vandalism of recreational structures is increasing, and visitor use is damaging vegetation. Concerns have been raised about indiscriminant shooting and target practice that may endanger other recreationists.

Actions Common to All Alternatives

- Manage all segments of the river for nonmotorized boating/watercraft, except for Alternative 4, where consideration would be given for motorized boating in Segment 3 near Copco Reservoir.
- Partner with landowners and stakeholders to maintain the Topsy, Frain Ranch, and Stateline Roads to reduce vehicle damage to natural resources

- Manage OHV use and rehabilitate areas damaged by OHVs. OHVs would be limited to designated roads. No OHV play areas would be provided within the planning area. Other nearby areas may be developed to meet existing OHV trail demand..

- Monitor dispersed camping and picnicking areas to determine if additional facility development or management actions are needed to reduce resource impacts.

- Provide "assurance signing" along major travel routes and major intersections.

- Construct river-scouting trails (for safety) at Caldera Rapid and Hells Corner Rapid.

- BLM will use the minimum necessary tool to manage recreational activity. Regulations, visitor use limits, signage, areas closed to visitation, and other measures, will be undertaken only as necessary. This management approach most closely matches the management goals for the semi- primitive motorized Recreation Opportunity Spectrum classification of the planning area.

- The use limits proposed for commercial rafting under the various alternatives are based on the professional judgment of the BLM recreation staff and observations of historical use patterns. The proposed limits attempt to balance the needs to provide the public with outfitting services and recreational opportunities, protect resource values, and minimize congestion and the potential for user conflicts. The limits also intend to maintain attributes of the recreation experience such as the opportunity to experience solitude and observe wildlife.

Actions Specific to Each Alternative

(Refer to Maps 13, 14, 15, 16, and Tables 4-2, 4-3 and Appendix H)

The roads and access section more thoroughly discusses roads by each alternative. For the convenience of the reviewer, there is discussion of roads in this section to emphasize concerns with recreation management.

Alternative 1

Under this alternative, the project area would be managed primarily for dispersed recreation in a semi-primitive motorized setting. BLM would continue existing agreements with landowners and other agencies. Recreation use levels continue to be light most of the year, with moderate use during the summer months, and more concentrated use occurring on some summer weekends at select recreation sites (see Map 13).

Off-highway vehicle use would be allowed on designated roads and trails. Topsy Road would be nominated for designation to the National Back Country Byway system. Topsy road would also be designated and signed as a motorized vehicle tour route (Table 4-2).

Recreation use levels are limited partially by the basic sites and facilities, by the difficult, slow vehicle travel conditions on roads in the planning area, and by some limits on commercial use established under BLM Special Recreation Permits for rafting and fishing. The overall daily limit on commercial rafting, established in the 1983 Recreation Area Management Plan (RAMP), of 200 passengers and/or 10 commercial trips, has historically been met or exceeded on 0-5 days per season. These peak days generally fall on weekend days in the July-August period. This use limit was established to minimize social conflicts such as congestion at access points, vehicle traffic near residences and villages, and crowding on the river leading to unsafe conditions. Impacts to natural resources from whitewater boating were not considered to be a determining factor in setting the 1983 use limits (BLM 1983). The physical recreation carrying capacity under current management did not account for other recreational uses.

Table 4-2. —Motorized and nonmotorized recreation trails by alternative (miles)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Nonmotorized trails construction (hiking, mountain biking, and horseback riding) and administrative road closures.				
Segment 1	0.00	5.0	2.0	8.0
Segment 2	18.0	15.0	8.0	15.0
Segment 3	0.2	9.5	6.4	8.2
Total	**18.2**	**29.5**	**16.4**	**31.2**
Off-highway vehicle motorized routes[1] (designated all-terrain vehicle, trail bike, four-wheel drive routes)	22	44	22	50 [2]

[1] Includes 9 miles of Topsy Road outside planning area, all alternatives.
[2] Includes 1 new off-highway vehicle route bridge.

Recreation use and law enforcement patrols would continue to be sporadic and limited during the off-season. “No Shooting” visitor safety zones would be posted around the Klamath River and Topsy Campgrounds.

Recreation sites, trails, and other facilities are few in number, have no user fees (outside of Topsy Campground), and are intended to support the public seeking recreational opportunities in the canyon, rather than serve as attractions or destinations. The Stateline Recreation Site would be developed to better accommodate rafting take-out and protect cultural resources (see Table 4-3 and Map 13).

An 18 mile trail has been planned under this alternative, but designs and surveys have not been developed.

The BLM would work with partners to do minimal road maintenance.

The BLM water right claim for river flows sufficient to maintain both whitewater rafting and fishing recreational use would be pursued, similar to the flows occurring at the time of designation.

Alternative 2

Under this alternative, the project area would be managed primarily for dispersed recreation in a semi-primitive motorized setting. Recreational resources would be managed to improve the quality of visitor experience, while also protecting other resource values. Management would include an increase in the number and standard of developed sites and trails while still allowing dispersed recreation (see Map 14).

Recreation use levels would be managed by limiting the total number of developed sites and by restricting OHV use to designated routes to balance between opportunity, resource protection, and maintenance of a high quality recreation experience (Table 4-2).

The physical recreation carrying capacity of the planning area would increase slightly under this alternative due to the development of new recreation sites. The limits to commercial rafting proposed under this alternative would allow for moderate increases from current use levels. Based on recreation use patterns, the amount of recreation facilities and developments proposed, and limits imposed on commercial rafting use, the carrying capacity is set at 500 visitors per day maximum. The alternative would encourage expanded agreements with landowners and other agencies to allow a moderate increase in use levels.

Recreational facilities would be maintained, improved, or relocated, and otherwise managed as needed to enhance the recreational experience and minimize resource conflicts.

A river hiking trail would be constructed that traverses the planning area. Additional potential trail segments (outside the planning area) would link the community of Copco, California, with Keno, Oregon (including the Keno reach). These new trail segments would be designated to join with a potential trail that would connect to Klamath Falls and the Link River (see Table 4-3 and Map 14). Non-motorized bridge would be constructed below the Klamath River campground.

Roads and trails would be maintained, closed, constructed, etc., to improve recreational opportunities and maintain or enhance other resource values. Motorized vehicle tour routes would be designated and signed. Topsy Road would be nominated for designation to the National Back Country Byway system and National Historic Trail system. OHV travel would be limited to designated roads, both on BLM land and private land, to reduce damage to cultural sites and other resources.

To reduce vandalism, law enforcement patrols would be increased through budget allocations or cooperative agreements. Target shooting and varmint hunting would be restricted from mid-May to mid-September, from the Frain Ranch area to J.C. Boyle Dam. “No Shooting” visitor safety zones would be posted around all recreation sites and use areas in all segments.

Water flows that provide for mid-morning launches would be pursued to enhance whitewater rafting, and at flows that are less damaging to streamside vegetation and habitat to enhance fishing opportunities.

Alternative 3

Recreation facilities, access roads, and commercial outfitting are actively managed to protect other resource values and to provide the opportunity for more solitude and a less developed setting. Some recreation developments will be closed or relocated if necessary to protect other resource values, although this may result in the recreation opportunity being diminished (see Map 15).

A reduction in motorized use would be promoted by reducing the number of designated access/travel routes in the planning area, to protect other resource values. The BLM would work with OHV groups to develop education and outreach programs that address unauthorized OHV use in sensitive areas, such as wetlands and riparian areas (Table 4-2).

The BLM would pursue an agreement for public winter seasonal (mid November to mid April) closure of the access road to Frain Ranch, to protect cultural sites and reduce/eliminate indiscriminate OHV travel. Topsy Road would be nominated for designation to the National Back Country Byway system. Topsy road would also be designated and signed as a motorized vehicle tour route.

Overall recreation visitation levels are expected to remain at or near current levels. The limits to commercial rafting that are proposed under this alternative are established to manage use levels to remain near current levels while still allowing the opportunity for some increase in commercial rafting use. The overall limits on the number of passengers per day (see Appendix H) provide a ceiling to safeguard against the potential for overuse or sudden increases in commercial rafting, and the associated potential impacts, issues, and problems.

Based on recreation use patterns, the amount of recreation facilities and developments proposed, and limits imposed on commercial rafting use, the carrying capacity limit is set at 400 visitors per day maximum.

Sixteen miles of nonmotorized trails would be developed to provide for more semi-primitive backcountry experiences (see Table 4-3 and Map 15).

Law enforcement patrols would remain about the same as current levels with the intent to make management control less obvious. Target shooting and varmint hunting would be restricted from mid-May to mid-September, from the Frain Ranch area to J.C. Boyle Dam. "No Shooting" visitor safety zones would be posted around all recreation sites and use areas in all segments.

Pursuit of river flows for recreation use would be de-emphasized to favor flows that are most conducive to fish habitat improvement and restoration of the river channel.

Alternative 4

Under this alternative, most recreation use would be concentrated on roads and trails on the river, and at developed sites, to minimize impacts to other resources. Facilities, trails, and interpretive materials would be the primary attraction for many visitors. Management objectives would include a change to a more developed setting (roaded natural recreation opportunity spectrum class), which would allow for visitor use levels significantly higher than have existed historically. Based on recreation use patterns, the amount of recreation facilities and developments proposed, and limits imposed on commercial rafting use, the carrying capacity limit is set at 1000 visitors per day maximum.

Agreements with landowners/agencies would be expanded to manage these higher use levels.

Roads and trails would be maintained or improved to allow easy access by all types of vehicles and to attract more casual visits by passing motorists. The BLM would work with OHV groups to develop education and outreach programs that address unauthorized OHV use and OHV use in sensitive areas such as wetlands and riparian area (Table 4-3).

Motorized vehicle tour routes would be designated and signed. Topsy Road would be nominated for designation to the National Back Country Byway system and National Historic Trail system. OHV travel would be limited to designated roads both on BLM land and private land to reduce damage to cultural sites and other resources (see Table 4-3 and Map 16). Motorized bridges are proposed in River Segments 1 and 2.

Recreation patrols and law enforcement activities would be increased, to better manage the expected increase in visitors. The BLM would request increased funding and pursue cooperative agreements to expand these patrols, and station a law enforcement officer in the canyon (for example in the Frain Ranch area) during the high-use summer season.

Target shooting and varmint hunting would be restricted from mid-May to mid-September, from the Frain Ranch area to J.C. Boyle Dam. "No Shooting" visitor safety zones would be posted around all recreation sites and concentrated use areas in all segments.

Additional recreation facilities would be built and managed to support heavy use by a wide variety of users. Land acquisitions are considered to maximize recreation use opportunities (see Map 16).

A river hiking trail would be constructed from the Link River along the Keno Reach, with an intertie to the Pacific Crest Trail in the Cascade-Siskiyou National Monument. Dispersed recreation opportunities would be reduced or displaced because of an increase in emphasis on developed sites.

Efforts would be made to secure sufficient water flows needed to optimize whitewater rafting opportunities.

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Table 4-3 – (continued)

		One trip/day/permittee. 30 passengers/trip 10 companies/day weekends, historical average (4-5) on weekdays. 10 trips or 200 passengers per day total maximum.	One trip/day/permittee plus 2nd trip allocated based on historical use. 10 trips or 200 passengers per day total maximum on weekend days. 8 trips or 160 passengers per day total maximum on weekdays.	

Roads and Access

Resource Goals

- The outstandingly remarkable values of recreation, scenery, fish and wildlife, and cultural resources (prehistoric, historic, and Native American traditional use) are not diminished as a result of road management actions. An appropriate transportation system is maintained to protect and enhance outstandingly remarkable values and to move towards attaining "Aquatic Conservation Strategy" objectives and state water quality standards. The transportation network is adequate for river access, OHV use, resource management, PacifiCorp operations and maintenance, and access to private lands (KFRMP/FEIS, Page 71)

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- Road segments are managed so as to not contribute to water quality problems, cultural site damage, noxious weed dispersal, or riparian/wetland degradation are identified. In cooperation with affected landowners and user groups, such roads are resurfaced, closed, decommissioned, or converted to trails.

Summary of Issues

There are numerous roads within the river canyon that are user-developed and not maintained. BLM has closed a number of these roads, via barriers, to protect cultural resources and reduce erosion, but many closures are no longer effective. There is concern that road location and OHV activity has led to decreased riparian and aquatic habitat quality. User-created roads and access have led to damage to significant prehistoric and historic sites and Native American traditional use areas. There is public interest in driving for pleasure (see Recreation section) and accessing recreation facilities.

Actions Common to All Alternatives

- The following descriptions define the scope of the proposed treatments. These descriptions correspond with those in the Western Oregon Transportation Management Plan (BLM 1996), although some terms have been grouped for clarity (see Table 4-4).

Table 4-4.–Comparrison of terminology used in this document and the Western Oregon Transportation Management Plan.

<table>
<tr><th>River Plan Terminology</th><th>Western Oregon Transportation Management Plan (BLM 1996) Terminology</th></tr>
<tr><td>Decommission</td><td>Decommission</td></tr>
<tr><td rowspan="2">Obliterate</td><td>Full Decommission</td></tr>
<tr><td>Obliterate</td></tr>
<tr><td>Seasonal Closure</td><td rowspan="2">Temporary/Seasonal Closure</td></tr>
<tr><td>Administrative Use</td></tr>
<tr><td>Spot Improvement</td><td>Level 3 Maintenance</td></tr>
<tr><td>Contiguous Improvement</td><td>Level 4 Maintenance</td></tr>
</table>

"Decommission" means that the road would be closed to motor vehicles on a long-term basis, but may be used again in the future. The road would be prepared to avoid future maintenance needs and would be left in an "erosion-resistant" condition by establishing cross drains, and removing road fill from stream channels and potentially unstable areas. Ditch-relief culverts would generally not be removed. The road would be barricaded. Slash would be placed on the road surface or small diameter (< 6" Diameter Breast Height (DBH) trees would be felled onto the road. Although the roadbed would not be ripped and conifers would not be planted, some seeding of herbaceous species could occur.

"Obliteration" means that the road would not be open to motor vehicles in the future. The road would be barricaded. Slash would be placed on the road surface or small diameter (< 6" DBH) trees would be felled onto the road. The road surface would be ripped in places and recontouring would occur where needed. Ditch-relief culverts would be removed and trees, shrubs, or grass could be planted on the road surface. This term includes both "Full Decommissioning" and "Obliteration" as defined in the Western Oregon Transportation Management Plan.

"Seasonal Closure" means that the road would be open for public use during part of each year. The length of the closure period would be based on resource concerns regarding wildlife habitat, and the susceptibility of road surfaces to rutting or erosion.

"Administrative Use" means that the road would be gated and would be open only for administrative access or by permit. Roads open for permitted use are described in the Recreation section.

"Contiguous Improvement" may include raising the road surface to prevent water ponding, providing roadside and leadout drainage ditches, and surfacing with materials to harden the road surface and minimize the potential for rutting from use during wet conditions. Treatment of vehicle tracks that have been created around wet areas will include providing drainage, scarification, and revegetation and blocking to prevent future travel if necessary.

"Spot Improvements" would be similar to contiguous improvements but on a more local scale. Spot improvements would address areas where vehicle passage is impaired by rough conditions or where resource damage is associated with a particular road segment.

Actions common to all alternatives include:

- Maintain primary access roads to ensure visitor safety (by continuing to remove rockslides and hazardous trees).
- Maintain access to private land within the planning area
- Continue the Pokegama Cooperative Seasonal Wildlife Closure.
- Manage the road network to meet best management practices and move towards attainment of "Aquatic Conservation Strategy" objectives.
- There would be no net gain of road mileage in riparian reserves. New road construction in riparian reserves would be contingent upon a net reduction (through obliteration) in riparian road mileage.

- Work with PacifiCorp, other private landowners, and other agencies (county, state, federal) to address resource concerns related to roads that cross their ownership/ administration.

- Use road inventory data and input from user groups to manage OHV use in the canyon.

Actions Specific to Each Alternative

(Refer to Maps 17a, 17b, 18a, 18b, 19a, 19b, 20a, 20b, and Tables 4-5, 4-6, 4-7, 4-8 and *Appendix H)*

Alternative 1

Under this alternative, road treatment opportunities would include limited resurfacing, relocating (obliterating roads in sensitive areas, coupled with constructing "replacement" roads), decommissioning, or obliterating roads that are causing ongoing resource damage.

Limited construction of new roads would occur where needed to access recreation developments.

Stream crossings would be improved to reduce diversion of hydrologic flow paths and ensure habitat connectivity.

Extensive spot improvements and some resurfacing along the Topsy Road would improve access and reduce resource damage. These roads would be passable by high clearance four-wheel drive vehicles, and access during winter would be limited (see Maps 17a and 17b).

Alternative 2

Under this alternative, resource enhancement opportunities would include resurfacing, decommissioning, or obliterating roads that are causing ongoing resource damage. Road treatments would be more extensive and restoration-oriented than those in Alternative 1.

Roads located in riparian areas would be managed to ensure that detrimental impacts to aquatic resources are reduced.

Some roads may be relocated to meet management objectives.

Stream crossings that divert streamflow, impair fish/herptile passage, or impair aquatic or wetland habitat quality would be enlarged, improved, or removed.

Extensive spot improvements and some resurfacing along the Topsy Road and the upper portion of the Powerhouse Road (north of the Klamath River Campground) would improve access and reduce resource damage. These roads would be passable by high clearance 4-wheel drive vehicles, and access during winter would be limited (see Maps 18a and 18b).

Alternative 3

Under Alternative 3, road mileage in the planning area would be reduced over time.

Roads that contribute to resource degradation would be decommissioned, obliterated, or resurfaced. Road treatments would be more restoration-oriented than those in Alternative 2.

Table 4-5.–Proposed public and recommended PacifiCorp road management actions

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Segment 1				
Construction	0	0.1	0	0.1
Decommissioning	0	0	0	0
Obliteration	0	0	0	0
Spot improvements	0.6	4.4	4.4	0
Contiguous improvements	0	0	0	4.4
No action[1]	10.0	6.2	6.2	6.2
Segment 2				
Construction	0.9	0.2	0.3	1.0
Decommissioning	0	1.9	1.0	0.3
Obliteration	4.9	9.2	12.6	5.6
Spot improvements	4.3	10.1	3.3	3.1
Contiguous improvements	0	1.6	0.7	9.8
No action[1]	34.4	20.8	26.0	24.8
Segment 3				
Construction	0	0.8	0.3	0.5
Decommissioning	0	0	2.1	0
Obliteration	0	0.5	0.7	0.1
Spot improvements	0	2.3	1.7	2.3
Contiguous improvements	0	0.1	0.1	0.1
No action[1]	12.9	13.0	18.0	15.6
Total miles of road by Alternative Boundary	**67.1**	**70.1**	**76.8**	**72.7**

[1] No Action includes roads on USFS, State of Oregon and other private lands.

Riparian road mileage would be reduced over time. Roads located in riparian areas would be retrofitted, relocated, or otherwise managed to ensure that detrimental impacts to aquatic resources are minimized.

Stream crossings that divert streamflow, impair fish/herptile passage, or impair aquatic or wetland habitat quality would be enlarged, improved, or removed.

Extensive spot improvements and some resurfacing along the Topsy Road and the upper portion of the Powerhouse Road would reduce resource damage. These roads would be passable by high clearance four-wheel drive vehicles, and access during winter would be limited (see Maps 19a and 19b).

Alternative 4

Under this alternative, road mileage in the planning area and in riparian areas could increase, to provide access for recreation opportunities, although roads would not be built where unacceptable resource damage could occur.

Limited seasonal road closures, decommissioning, obliterating, resurfacing, or relocation would occur to reduce resource damage or mitigate for increased human use. This alternative would favor resurfacing and relocation rather than decommissioning and obliteration.

New recreation developments and river access roads would be designed to as not to prevent attainment of "Aquatic Conservation Strategy" objectives.

Stream crossings would be improved to reduce diversion of hydrologic flow paths, ensure habitat connectivity, and mitigate for road-related resource damage.

Extensive contiguous improvements and resurfacing would improve access along the Topsy Road and the upper portion of the Powerhouse Road (north of the Klamath River Campground). These roads would be passable year round in standard low clearance passenger vehicles (see Maps 20a and 20b).

Table 4-6.— Proposed/recommended road management actions by ownership (miles) [1, 2]

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
BLM				
Construction	0.4	0.2	0.2	0.5
Decommissioning	–	1.6	1.6	<0.1
Obliteration	3.5	4.8	7.7	3.5
Spot improvements	3.6	12.3	6.3	1.8
Contiguous improvements		0.9	0.4	11.9
No action proposed	26.7	14.2	18.8	17.6
PacifiCorp				
Construction	0.5	0.9	0.4	1.0
Decommissioning	–	0.4	1.5	0.3
Obliteration	1.4	4.6	5.3	2.2
Spot improvements	1.0	4.4	3.1	3.5
Contiguous improvements		0.8	0.4	2.3
No action recommended	21.9	17.9	18.5	20.5
State of Oregon				
Obliteration	–	0.3	0.3	–
Spot improvements	0.3	–	–	–
No action recommended	0.7	0.7	0.7	1.0
USFS				
No action recommended	0.5	0.5	1.0	0.5
Private				
No action recommended	6.9	6.9	10.9	6.9
All roads within the planning area	**67.1**	**70.1**	**76.8**	**72.7**

[1] Miles are rounded to the nearest 0.1 mile.
[2] Does not include Topsy Road outside of the planning area

Table 4-7.—Summary of proposed/recommended road status designations (miles) [1, 3]

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Segment 1				
Open	10.6	8.2	5.6	10.1
Administrative Use	–	2.4	5.0	0.5
Segment 2				
Open	26.7	20.4	9.1	28.2
Seasonal closure	8.3	7.4	15.1	9.2
Administrative Use	4.6	4.8	5.9	1.2
Segment 3 [2]				
Open	7.3	7.4	7.8	8.0
Seasonal closure	–	–	–	0.5
Administrative Use	5.6	8.8	12.3	10.1

[1] Miles are rounded to the nearest 0.1 mile.
[2] Roads on non-PacifiCorp land in Segment 3 were assumed to be closed to use by the general public, although that is at the discretion of individual landowners.
[3] No access to non-PacificCorp private lands is affected by closures.

Table 4-8.—Summary of proposed/recommended stream crossing improvements (number of sites)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Replace or improve existing stream crossings	7	13 [1]	14 [1]	10
Decommission road and remove crossing	2	8	10	4
Bridge Improvements [2]	2	2	2	2

[1] Stream crossings on tributaries to Shovel Creek may be removed in the future if the associated roads are relocated or decommissioned.
[2] Not including Klamath River Bridges.

Cultural Resources/Native American Traditional Use

Resource Goals

- Cultural resources are managed for public, scientific, and cultural heritage purposes. Management would continue to conserve and protect cultural resources for future generations by conducting survey and literature inventories on both public and private land. This information would then be maintained in a common database (KFRMP/FEIS page 43).

- Measures are used to minimize site and structure deterioration and vandalism. Mitigation to resolve conflicts between the prehistoric and historic resources and other outstandingly remarkable values described under the 1994 scenic designation would be pursued.

- Government to government relationships with Native American Tribes is enhanced (KFRMP/FEIS page 43). Native American traditional use areas are maintained or enhanced to allow appropriate Tribal use. Interpretive and educational opportunities are provided and developed in cooperation with Native American Tribes.

Summary of Issues

An abundance of prehistoric and historic resources lie within the Klamath River Canyon. Some of these sites are located in areas of intensive recreation use, resulting in both intentional and unintentional damage to the cultural resources. Management concerns about how to reduce impacts to cultural sites from recreation use would be addressed in this plan.

Road development and use has lead to OHV damage to cultural resources. Concerns regarding access for Tribal members and conflicts with OHV activity should be addressed in this plan. This plan should also consider how vegetation management practices and prescribed fire could help maintain food and material gathering areas.

On both private and BLM-administered lands, historic sites are rapidly deteriorating and some have been vandalized. Management concerns exist on how to manage these structures.

Native Americans have used the river canyon for thousands of years and continue to use the area. The canyon is spiritually significant, and a source for food and craft material gathering. The origin, use, importance, and preferred management of these sites vary between different neighboring Native American groups and federally recognized Tribes. This has led to a difficult and complex situation for the BLM.

Actions Common to All Alternatives

- Nomination of the Klamath River Canyon to the National Register of Historic Places would be finished and submitted.

- The BLM would continue to conduct cultural resource surveys/inventories prior to implementation of ground-disturbing activities and practice avoidance of all sites during such activities (Section 106 of the National Historic Preservation Act, 1966, amended 1992; and 36 CFR Part 800).

- The BLM would further protect sites through the development of a site-monitoring program designed to systematically evaluate sites to assess baseline site conditions.

- Native American traditional use areas would be identified and managed through Tribal consultation .

Actions Specific to Each Alternative

(Refer to Map 4 and Table 4-9 and Appendix H)

Alternative 1

This alternative would focus on documenting historical sites using Historic American Buildings Survey/Historic American Engineering Record standards (HABS/HAER), in addition to conducting BLM Class I inventories on each site, and does not propose to rehabilitate, reconstruct, restore historic structures, nor would the alternative pursue public outreach and excavation as educational/mitigation tools (see Table 4-9 and Map 4).

The Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) standards consist of measured drawings, large-format photography, and written history. When complete, this documentation would be archived at the Library of Congress and be available to the public. BLM Class I inventories are defined as a review of published and unpublished documents, records, files, registers, and other sources, resulting in analysis and synthesis of all reasonably available data.

Limiting motorized access to existing roads would minimize erosion and sedimentation effects on cultural sites. Access to Native American traditional use areas would be maintained.

Inventory would be expanded to include unsurveyed BLM lands. Information gathered from the expanded cultural resource surveys/inventories and monitoring, such as the locations of all the sites and Native American traditional use areas in the project area, combined with evaluations (of present condition, and assessment of the damages that are occurring and could

Table 4-9.— Cultural Resources management actions by alternative

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Prehistoric				
Sites capped	1	1	0	2
Sites fenced	0	2	0	1
Access controlled sites	0	1	3	0
Establish caretaker	0	0	0	1
Research	1	1	1	1
Historic				
Sites documented [1]	10	10	10	10
Sites stabilized	0	3	2	3
Sites rehabilitated	0	2	4	4
Research	1	1	1	1
Native American Traditional Use				
Research	1	1	1	1
Class III inventory [2] (100% survey)	Unsurveyed BLM lands only	Unsurveyed BLM lands and resurvey BLM lands not meeting Class III standards	Unsurveyed BLM lands; resurvey BLM lands not meeting Class III standards; and survey unsurveyed high probability areas on private lands	Unsurveyed BLM lands; resurvey BLM lands not meeting Class III standards; unsurveyed private lands not tied to projects; and resurvey private lands not meeting Class III standards

[1] Historical sites would be documented according to HABS/HAER standards, which consists of measured drawings, large-format photographs, and written history, along with a Class I overview/archival study. A Class I inventory is defined as a documentation review of published and unpublished documents, record, files, registers, and other sources, resulting in analysis and synthesis of all reasonably available data.

[2] Class III inventory is a continuous, intensive survey of an entire target area, aimed at locating and recording all archaeological properties that have surface indication, by walking close intervals (<30 meters) until the area has been thoroughly examined.

occur), would help the BLM make more informed decisions on protection and enhancement measures. In response to Tribal input, gathering new information via excavation would be minimized on public lands and discouraged on private lands.

Alternative 2

Cultural resources would be protected from erosion, recreational, and project-related impacts. Protection measures would be expanded by developing outreach/education programs, establishing working partnerships with Tribes and interested groups, expanding cultural resource inventories to cover all BLM lands and resurvey BLM lands that do not meet Class III standards, implementing both natural and unnatural stabilization techniques. The aim of the programs and partnerships would be toward cultural resource protection through education, via interpretational signs and presentations, such as a ”sensitivity toward cultural areas” message in interpretive and safety talks during rafting trips. Partnerships may be used to help carry out stabilization projects and interpretation projects (see Table 4-9 and Map 4).

Information gathered from the expanded cultural resource surveys/inventories and monitoring, such as the locations of all the sites and Native American traditional use areas in the project area, combined with evaluations (of present condition, and assessment of the damages that are occurring and could occur), would help make more informed decisions on protection and enhancement measures. In response to Tribal input, gathering new information via excavation would be minimized on public lands and discouraged on private lands.

Alternative 3

Management emphasis would be on protecting cultural resources from erosion, recreational, and project-related impacts. Protection would include rehabilitating historical structures (see Table 4-9 and Map 4), increasing restrictions on motorized recreation, enhancing Native American traditional use areas by supporting forest health practices, discouraging public outreach and excavation as educational and mitigation tools, and inventorying all unsurveyed BLM lands as well as high probability areas on private lands (through cooperative agreements).

Alternative 4

Management of cultural resources would continue to protect sites according to regulation. Use of excavation, as a mitigation and research tool would be actively promoted. Restoration of historic structures would be pursued (see Table 4-9 and Map 4).

Interpretation signs, pamphlets, and presentations would be developed to foster respect for cultural resources and discourage vandalism. In addition, management would increase law enforcement patrols, and seasonally encourage the use of volunteer “caretakers” through the development of RV host sites at select locations in the canyon. Cooperative agreements with Tribes would be pursued and outfitters would be asked to incorporate a “sensitivity toward cultural areas” message in interpretive and safety talks during raft trips.

Vegetation Treatments

Resource Goals

- Conifer forests and woodlands are managed as healthy stands of site-appropriate species. Stands are relatively open, with density within site potential. Fuels are at a relatively low level, and low-intensity fires can be accommodated without excessive tree mortality. Insect and disease occurrence is at endemic levels. Oak woodlands are open savanna, and trees are vigorously growing. Mast (acorn) production is at a high level. Mixed shrubfields with wedgeleaf ceanothus are 30 years old or less, with palatable browse in deer winter range. Western juniper dominance is limited to rocky outcrops, ridges, and other historic sites where natural fire frequency is limited by lower site productivity and sparse fuels.

- Wild and scenic river values are maintained or enhanced by restoration treatments that improve condition and health of vegetation.

- Irrigated meadows in Segment 3 are managed to support a mixture of native grasses, forbs, and shrubs and nonnative pasture grasses. The extent of noxious weed populations would be reduced from current levels. The withdrawal of water to supply these meadows would not substantially affect water quality and aquatic habitat.

- Processes that shape the distribution and extent of riparian areas are restored. The composition and character of riparian vegetation communities would resemble the potential natural community associated with the hydrologic, geomorphic, and ecologic character of a given site.

- New infestations of noxious weeds are kept to a minimum, and existing population centers are treated.

- Populations and habitat of rare plant species and their communities are in a stable or improving condition.

Summary of Issues

Vegetation manipulation should be considered in this plan to maintain or enhance wildlife and fish habitat, scenic quality, water quality, ecosystem health, and Native American traditional use areas (food/materials gathering), and reduce the hazard of damaging wildfires (see Fire section). This plan should evaluate how the vegetation would be managed in the short term and long term, including management and control of noxious weed species.

Actions Common to All Alternatives

BLM actions would be designed to meet the guidance given in the KFRMP/FEIS, for the “Aquatic Conservation Strategy,” based on the “Northwest Forest Plan,” and the total maximum daily load/water quality management plan scheduled to be completed in 2004.

Inventories for special status species, including Survey and Manage (S&M) species, are performed and sites protected and/or managed, according to the appropriate guidelines, prior to ground-disturbing activities.

Management is proposed for the narrow bands of riverine riparian communities that occur along the river. These areas would be affected by altered flow regimes and channel restoration projects (which would create areas favorable for development of riparian vegetation). Specific areas are identified within the aquatic resources section.

The prescriptions for treatment of each plant community would generally be the same for all alternatives; however, methods and timing would differ. The main differences by alternative are the locations and total area of treatment (as determined by each alternative’s resource emphasis), and mitigations for other affected resources. General treatment prescriptions by plant community are discussed as follows.

Integrated management of noxious weeds would include systematic inventories of the planning area, education, prevention, and control, using manual, mechanical, chemical, and biological methods.

Conifer forest and woodland: Reduce overstocking by thinning. Each potential treatment area would first be examined to determine stand conditions (species, size classes, density) in relation to site capability (see Map 5). Based on this information, prescriptions for thinning and follow-up fuel treatment would be made (in denser stands, up to half the basal area of trees may be removed). Cutting of excess trees would be mainly done by machine on gentler slopes (<35 percent), and manually with chainsaws on steeper slopes. A thin layer of borax would be spread on larger stumps to prevent infection by annosus root rot. In stands where road access is available, merchantable size logs may be skidded to roadside landings and removed from the area by truck.

In sensitive areas and on slopes over 35 percent, helicopter or cable yarding of logs to landings within or above the canyon rim could be done. The value of these logs would be used to reduce the expected high cost of the thinning treatment. No sustained supply of logs is planned from these stands, and no allowable sale quantity would be identified for timber products.

Cutting of excess trees results in a large volume of dead wood, which is fuel for potential wildfires. Further treatment of this material is necessary to reduce the fire hazard. Some of this material could be made available for campground use or public firewood collection. Removal for biomass and energy production could conceivably be done, but access and removal costs would be prohibitive in most parts of the planning area.

On slopes under 35 percent, shredding by machine (either during the cutting operation or as a follow-up after cutting), reduces wood size and arrangement, and reduces fire hazard. Piling slash concentrations in open areas for later burning also reduces slash. In areas of lighter fuels, as well as in mechanically treated areas, under-burning would further reduce the fuels and fire hazard. On slopes over 35 percent, hand piling and burning of the slash would be done.

Should wildfires, insect mortality, or other stand-replacing events occur, salvage of the trees for timber products would be considered, especially to reduce the high fuel loads of the dead trees and promote long-term enhancement of scenic resources. Follow-up treatments to re-establish conifer forest and woodland stands would be tree planting, control of competing vegetation, animal damage control, and, later, density control thinning of the resulting young stand.

Where larger, old-growth trees have a dense understory of small trees and other vegetation growing below them, these large trees are commonly under moisture stress. Understory trees would be heavily thinned out to relieve stress on large trees (this treatment would also apply to all other plant communities where feasible).

After initial fuel reduction treatments, a maintenance underburn program would be established to periodically run light underburn through the stands to reduce fuel loading and understory densities (see Fire and Fuels section).

Individual large tree management would occur where the potential exists for eagle or osprey nests. Upland vegetation communities within riparian reserves are preferred, because of access to foraging areas. This type of management would entail selecting desired leave trees, reducing fuel buildup and ladder fuels around the trees by thinning shrubs and small trees beneath the drip line. Removing competing vegetation within up to two crown widths would reduce moisture stress.

Management of nesting, roosting, and foraging habitat for spotted owls would involve density management of some stands to maintain stand health. Treatment would maintain a multi-storied stand with a high canopy closure. Thinning may involve removal of some of the larger trees to promote a multi-storied stand or species diversity.

Open grown pine trees appear to be important for selection as granary (storage) trees for acorn woodpeckers. Scattered individual pines in other vegetative communities would receive treatment to reduce fuel reduction and ladder fuels.

Forest management within riparian reserves would involve thinning of stands to a sustainable level. During this thinning, the objective will be to retain the multi-storied and multi-species canopies. In some areas, conifers adjacent to streams may be thinned heavier to favor riparian vegetation.

Oak woodlands: Oaks would be managed to improve mast acorn crops, forage, and cover for oak-dependent species (see Map 5). This will be accomplished with manual or mechanical thinning that spaces the trees to 30' - 40' between oak trees. Trees selected to leave would be healthy, full-crowned trees that can develop a full canopy. On slopes under 35 percent, cutting would be done either by machine (shear, dozer, slashbuster, etc.) or manually by crews with chainsaws, while steeper slopes would be manually cut only. Further treatment of the cut trees, by mechanical shredding/chipping, and/or burning, would be done as described in the "conifer forest and woodland" section above. After initial fuel reduction treatments, a maintenance underburning program would be established to periodically reduce fuel loads and sprouts, and maintain an open oak savanna community.

Individual oak trees in mixed conifer and pine stands would receive treatment also. Thinning of competing vegetation would be done around the large oaks. Conifers may be removed to maintain the oak.

Juniper woodlands: Young, invasive juniper would be cut, followed by a fuel reduction treatment (see Map 5). Old growth juniper would be left uncut (old growth juniper are those over 130 years old, which were established before natural fire was, in effect, eliminated from the canyon).

Mixed shrub: Management would vary somewhat depending on species present (see Map 5). Dense stands of mixed shrub may have manual slashing or mechanical treatment prior to a prescribed burn. Pretreatment will create ignition sources or cut fuels down to ground level, so they can be treated with fire. Fire would be used to create a mosaic pattern and rejuvenate fire-generated species.

Slashing alone would be enough to stimulate some species of shrub, such as wild lilac (*Ceonothus intergerrimus)*, serviceberry (*Amelanchier florida*), bitter cherry (*Prunus emarginata*), etc. In some areas, these shrub species will be severed below the browse line to stimulate regrowth as a food source for big game. Residual slash would be treated on a case-by-case basis.

Stands of wedgeleaf ceonothus (*Ceonothus cuneatus)* would be treated with fire to rejuvenate stands. This species is regenerated by heat, and needs fire or bare soil over summer periods to stimulate seed establishment. This species is extremely important to wintering deer and periodic treatment is crucial to keep stands producing. The stands would need to be rejuvenated approximately every 40 years. Only 25 percent of these stands would be treated in a decade.

Dry meadow: In many areas, dry meadows need rejuvenation and or removal of invasive species (see Map 5). Shrubs, juniper, or other trees would be slashed where they are encroaching on meadow areas. Some areas may involve tilling and replanting with native species. Non-native species may be used as a cover crop to establish native species. Fire would be used extensively to maintain dry meadow areas.

Irrigated meadow: Management of these meadows would involve a combination of active measures (such as irrigation, mowing, seeding, grazing, and burning) and passive measures (such as natural inundation, construction of exclosures, natural succession).

Other vegetation types, such as riparian or dry meadow, within the mapped irrigated meadows (refer to chapter 2) would be managed similar to other riparian or dry meadow communities (see Map 5).

Riparian: A variety of treatments could occur within streamside riparian areas and upland wet meadows, depending on site characteristics and management emphasis (see Map 5). Treatments could include constructing exclosures, decommissioning roads and improving or removing stream crossings, thinning, burning, mowing, seeding, soil ripping (in compacted areas), restoring hydrologic patterns by removing berms or ditches, noxious weed control, or aquatic restoration.

Actions Specific to Each Alternative

*(Refer to Maps 5, 21, 22, 23, 24 and Tables 4-10, 4-11, and Appendix H)***.**

Alternative 1

Conifer forest and woodland treatments would be limited to fuel reduction, especially in areas with other resource emphasis. Prescribed fire would be used only when a unit is randomly selected (refer to “Fire Management Environmental Assessment #OR-014-94-09”). Oak woodland thinning and fuel reduction treatment would be done in priority areas as wildlife projects to increase production of mast (acorns) to benefit wild turkeys, acorn woodpeckers, and mule deer.

All selected units would be in areas unseen from the river.

Some riparian forest management would be proposed, to improve habitat conditions for pond turtles.

The only shrubfields proposed for treatment with fire would be areas where manual treatments have already been conducted. These shrubfields would be further treated with prescribed fire.

No meadow treatments would be proposed under this alternative.

No changes in current management would be recommended for irrigated meadows.

Forest and woodlands treatments would be limited to oak stand enhancements and fuel treatment.

See Map 21 (Tables 4-10, 4-11) for the proposed vegetation treatment locations with in the project area for Alternative 1.

Alternative 2

Conifer forest and woodland treatments would involve thinning stands mainly on lower slopes, with follow-up fuel treatment. Prescribed fire random selections would also be done. Oak woodland thinning and burning would increase over levels prescribed in Alternative 1.

Shrubfields would be treated for the benefit of big game. Some dry meadows would be treated to improve forage quality for big game and birds.

Irrigated meadows would be managed for native wet meadow and floodplain habitats. Principles of adaptive management would be applied to achieve long-term vegetation management and wildlife habitat objectives. Long-term management options include:

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- Use of existing irrigation diversions along the river and Shovel Creek (use of the Negro Creek diversion would be phased out)

- Altering or improving the configuration of irrigation infrastructure

- Noxious weed control

- Mowing and/or grazing

- Planting of native and nonnative species, consistent with long-term management objective

- In stream restoration in the river and restoration of floodplain pools and sloughs.

Riparian features would be enhanced through a program of targeted restoration actions in riparian areas, and would be focused in areas listed in Appendix H. Riparian areas would be managed for resource goals of vegetation composition and distribution. Moderate levels of exclosure construction, road decommissioning, and stream crossing improvement/removal would address factors that impair riparian communities and water quality.

Options for maintenance of wet meadow communities that are at risk of conversion to dry sites due to altered hydrologic regimes (reduced floodplain inundation) could include short-term use of existing abandoned irrigation works. Understory thins would occur in riparian mixed hardwood/conifer forests along portions of Hayden, Shovel, and Negro Creeks. Prescribed fire use, followed by seeding with native plants, would occur in wet meadows currently dominated by nonnative or invasive plant communities.

See Map 22 (Tables 4-10, 4-11) for the proposed vegetation treatment locations with in the project area for Alternative 2.

Forests and woodlands would be treated to promote the enhancement of scenic river and ACEC values, primarily scenic and wildlife.

Systematic inventory of the planning area for special status species would be conducted.

Interpretive signs would be placed in high use recreation areas for noxious weed awareness/prevention.

Alternative 3

Conifer forest and woodland treatment would include all stands over the life of the plan, with the approximate acreage shown in Table 4-11, for the first decade. In general, ponderosa pine would be favored, but a mix of species and size classes would also be maintained. All oak woodlands would be thinned, with a follow-up fuel treatment (usually burning) during the life of the plan. Approximate acreage for the first decade is shown in Table 4-11.

Shrubfields and meadow areas would receive increased management emphasis. Segment 3 would have an increase in management across all vegetative communities.

Irrigated meadows would be managed for native wet meadow and floodplain habitats. Principles of adaptive management would be applied to achieve long-term vegetation management and wildlife habitat objectives. Long-term management options include:

- Gradually phasing out the use of the Shovel and Negro Creek diversions, as well as some or all of the diversions from the river. Altering or improving the configuration of irrigation infrastructure.

- Noxious weed control.
- Mowing and/or grazing.
- Planting of native and nonnative species, consistent with long-term management objectives.
- Instream restoration in the river and restoration of floodplain pools and sloughs.

Riparian restoration activities would be expanded to encompass a more holistic ecosystem restoration approach, and would be focused in areas listed in Appendix H. Riparian reserves would be managed for desired vegetation composition and distribution. Extensive exclosure construction, road decommissioning, and stream crossing improvement/removal would address factors that impair riparian communities and water quality. Understory thinning would occur in riparian mixed hardwood/conifer forests along portions of Hayden, Shovel, and Negro Creeks.

Prescribed fire use, followed by seeding with native plants, would occur in wet meadows currently dominated by nonnative or invasive plant communities.

See Map 23 (Tables 4-10, 4-11) for the proposed vegetation treatment locations with in the project area for Alternative 3.

Systematic inventory of the planning area would be conducted for special status plant species, including S&M species.

Funding would be sought for proactive restoration of sites treated to control noxious weeds, to enhance native plant species.

Post-project inventory would be conducted for noxious weeds in areas disturbed by vegetation management actions. Forests and woodlands treatments would improve health and be aimed at returning the stands to a more historically natural condition.

Alternative 4

In conifer forests and woodlands, all areas identified in Alternative 2 would be treated, with priority given to areas adjacent to recreation sites, river corridor, trails, and roads. Oak woodland treatments would be applied as Alternative 2, with priority to areas adjacent to recreation sites, river corridor, trails, and roads. Slightly more acres are to be treated in this alternative because there are more recreation sites proposed.

Shrubfield management would be similar to Alternative 2 except in Segment 3. In this segment, more treatment areas are proposed within a larger boundary.

Irrigated meadows may be fenced to discourage OHV use. Limited restoration may occur as mitigation for the proposed Berwick Campground.

Practices designed to protect springs and wetlands from damage by roads and road use would be focused in areas listed in Appendix H. Moderate levels of exclosure construction, road decommissioning, and stream crossing improvement/removal would address factors that impair riparian communities in highly visible locations. Riparian vegetation communities would be managed to reduce and mitigate recreation impacts.

Forests and woodlands treatments would improve health and condition of stands especially around high recreation use areas and in important wildlife habitat.

See Map 24 (Tables 4-10, 4-11) for the proposed vegetation treatment locations within the project area for Alternative 4.

Interpretive signs would be placed in high use recreation areas for noxious week awareness/ prevention.

Interpretive brochures on noxious weeds would be made available in high use recreation areas.

Terrestrial Species/Habitat

Resource Goals

- Habitat is managed for a rich diversity of wildlife species. Wildlife management is focused on special status species with the objective to maintain healthy populations. Management promotes the recovery of listed species.

- Diverse terrestrial habitats are developed with a mixture of habitat types and seral stages. The quality and connectivity of unique habitats such as oak woodlands, grasslands, and riparian areas are maintained or improved.

- Unique habitat features, such as caves, rimrocks, large pine trees, etc., are protected.

- Manage critical big game winter range to provide adequate wintering habitat for big game populations, as suggested by ODFW- and California Department of Fish and Game-approved management objectives.

- Coordination with ODFW and California Department of Fish and Game on the management of all species (state listed special status and game animals, etc.) is ongoing.

Summary of Issues

Wildlife was identified as an outstandingly remarkable value for the wild and scenic river segment, and determined to be important and relevant in the ACEC. There are threatened and endangered (bald eagle and peregrine falcon for example) and special status species (western pond turtle, Townsend big-eared bat, and white-headed woodpecker, etc.) that use the river corridor. Habitat for these species should be protected or enhanced to promote their survival. Unique wildlife habitat such as big game winter habitat and oak woodlands should be improved. Impacts from wildlife habitat enhancement projects to scenic values and impacts to wildlife from other resource management practices should be addressed.

Actions Common to All Alternatives

- All major projects that “may affect” threatened, endangered, or candidate species will be discussed with USFWS, and proper consultation documents will be prepared if necessary.

- Established nest season restrictions and habitat buffers (KFRMP/FEIS) will be followed.

- State game management agencies will monitor and manage game populations within the planning area.

Actions Specific to Each Alternative

(Also refer to Map 7 and Table 4-12 and Appendix H for specific species and habitat management actions)

Alternative 1

Current wildlife management activities such as habitat improvement in oak stands and periodic prescribed fires would continue. Yearly monitoring for eagles, osprey, peregrines, and landbirds would continue. Periodic monitoring of bats, owls, carnivores and other special status species would occur as time and funding allow.

Table 4-12.—Summary of Terrestrial Habitat management actions by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Vegetation treatments[1] (acres/decade)	1,171	2,778	3,676	2,884
Structures	Modify signs and bridges for wildlife	Same as Alternative 1, except include existing buildings and new structures modified to accommodate wildlife	Same as Alternative 1	Increase wildlife viewing opportunities at recreational facilities
Inventory/monitoring	Threatened and endangered species only	Same as Alternative 1, except add some priority special status species	Same as Alternative 2, except add all special status species	Same as Alternative

[1] Vegetation treatments specific to wildlife habitat are included with other vegetation treatments displayed by plant community on Table 4-11

Habitat restoration such as big game winter range or oak woodlands is proposed. Existing wildlife habitat structures and projects would be maintained.

Existing road closures for wildlife purposes would be continued.

Alternative 2

Management emphasis would be primarily for game species, threatened and endangered species, and high-profile special status species such as raptors, acorn woodpeckers, and western bluebirds.

Surveys for some species such as woodpeckers and bluebirds would be established, and frequency of surveys would be determined.

Habitat improvements would occur on all vegetative types, including oak woodlands, old growth pine, mixed conifer stands, and shrubfields, for the benefit of a variety of species from land birds to big game.

Nesting structures would be installed for eagles and osprey in riparian zones. Additional nest structures for landbirds would be installed, to increase watchable wildlife opportunities near recreational developments.

Existing road closures for wildlife purposes would be continued.

Alternative 3

Management emphasis would be to restore a diverse mixture of habitat types and seral stages as quickly as possible. Inventory and monitoring of all special status species would be maximized.

Animal populations would be managed for natural processes, with human use de-emphasized. This would be coordinated with ODFW and California Department of Fish and Game.

Habitat restoration would use all proven methods such as mechanical, manual, and fire, to return to natural ecosystems as soon as possible.

Road closures for wildlife protection would increase.

Alternative 4

Wildlife populations and habitats would be managed for visibility to public users, and a Watchable Wildlife program specific to the Klamath River Canyon would be developed. Management emphasis would be primarily for game species and bird species that are desirable around recreational facilities. Nest structures and Watchable Wildlife programs would be proposed to enhance the viewing pleasure.

Areas around large mature pines would be managed to reduce competition and potential stress or injury from insects or disease. Space would be created around important large trees by thinning smaller commercial trees, treating shrub, and reducing fuels to improve chances of saving the large trees during wildfire. Other habitat improvements would enhance wildlife viewing (such as deer winter range and improved riparian habitat, etc.)

Surveys and monitoring would only be conducted for those species where monitoring is required (eagles and owls, etc.) or those affected by recreational developments.

Watershed Values

Resource Goals

- Water quality, which is a major contributor to the outstandingly remarkable values of scenery, fishery, wildlife, and recreation is maintained or improved. Upstream water quality improves and road-related sediment contributions in the canyon and tributary watersheds are reduced. Baseline data on water quality within the planning area is acquired through a long-term water quality monitoring program developed and implemented in cooperation with ODEQ, California State Water Resources Control Board, and PacifiCorp.

- The timing and magnitude of flows are managed so they are sufficient to directly and indirectly support the outstandingly remarkable values associated with Segments 2 and 3. As necessary to maintain and enhance ORVs and to meet “Aquatic Conservation Strategy” objectives, flow regimes maintain and enhance riparian resources, channel processes, water quality, functional aquatic habitat, and fish passage. Additionally, stabilized instream flows provide a wide array of fish habitats that are not exposed and/or “flooded out” on a daily basis. (Note: actual flows will likely be developed during FERC relicensing or as a result of other studies rather than as part of this River Plan.)

- Channel margins are restored so they support diverse and well-distributed riparian vegetation communities that meet the habitat needs of wildlife and birds. Recovery of deciduous and emergent riparian vegetation provides partial shading of the river and filtering of nutrients and sediment, thereby improving water quality.

- Ecosystem forms and processes referred to in the “Aquatic Conservation Strategy” objectives (refer to Chapter 2) are maintained in functioning condition, and restored when conditions are below system potential.

- Riparian reserves are managed so their ecologic, hydrologic, and geomorphic function support attainment of “Aquatic Conservation Strategy” objectives. Riparian reserves maintain and restore riparian structure and function, confer benefits to riparian-dependent species, enhance habitat for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors, and provide for greater connectivity (both lateral and longitudinal) within the watershed. Well developed riparian communities provide a continual supply of coarse woody debris to stream channels, riparian areas, and adjacent uplands.

- The ecological potential and connectivity of key watersheds adjacent to the planning area are maintained so they are not adversely affected by actions within the planning area. If impacts are unavoidable, actions will be taken to minimize adverse effects.

- Watershed restoration projects are implemented as needed to improve aquatic habitat, riparian habitat, and water quality.

Summary of Issues

Streamflows in the river are affected on a seasonal basis by water allocation in the upper Klamath Basin and on a daily basis by operation of the J.C. Boyle hydroelectric facility. Although the current flow regime supports a number of beneficial uses and ORVs, reduced minimum flows, reduced peak flows (in Segment 1), and fluctuating river levels cause detrimental impacts to the same beneficial uses and ORVs. The BLM currently has instream flow claims (to support the recreation, scenic, and fisheries ORVs) pending in the Klamath Basin Adjudication. This plan will provide flow recommendations designed to maintain and enhance flow-dependent ORVs and water quality.

The Klamath River (in the planning area) is listed as “water quality limited” in accordance with section 303(d) of the Federal *Clean Water Act*. It has been listed due to impacts of nutrients and elevated stream temperatures on beneficial uses, such as habitat for threatened and endangered fish species. Water quality also affects resource values, such as recreation, for which the river was designated a state scenic waterway and national scenic river. This plan needs to identify possible ways to protect and enhance water quality within the planning corridor in support of other resource values. Water quality alterations associated with hydroelectric operations, streamflow, riparian vegetation, altered stream channel form, roads, and recreation use need to be addressed in the plan.

Numerous “Aquatic Conservation Strategy” objectives have been adversely affected by the hydroelectric project and, to a lesser degree, roads, recreation facilities, fire suppression, and past land use. This plan needs to identify a spectrum of restoration opportunities that would address these concerns and are compatible with the outstandingly remarkable values and ACEC values.

Actions Common to All Alternatives

- The BLM would secure adjudicated instream flows to maintain the fisheries, recreation, and scenic outstandingly remarkable values in Segments 2 and 3.

- During the FERC relicensing process, the BLM would provide conditions and/or recommendations regarding instream flows to maintain habitat conditions, and maintain or restore riparian resources and stream channel integrity (KFRMP/FEIS page F-10).

- In developing conditions and recommendations associated with a new FERC license for the hydroelectric project, the BLM would utilize studies conducted during the relicensing, as well other analyses that may be conducted.

- The BLM would continue to address 303(d) listed waters by implementing the "Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Action Section 303(d) Listed Waters" (May 1999). Among other actions, this would include validation of listed water bodies, assessment of water quality impairment, and development of sufficiently stringent management measures to ensure attainment of beneficial uses. The Water Quality Restoration Plan (WQRP) would be the vehicle for implementing, monitoring, and evaluating the effectiveness of management actions. Plans would be developed concurrently or in advance of TMDLs that would be developed by the states. The BLM would cooperate with state water quality management agencies and with the Federal EPA throughout the TMDL development process.

- BLM actions and recommendations would be designed to meet the guidance given in the following documents:

  - The "Aquatic Conservation Strategy;" outlined in The KFRMP/FEIS (1995)

  - The total maximum daily load/water quality restoration plans scheduled to be complete in 2004

  - The "Forest Service and BLM Protocol for Addressing Clean Water Act Section 303(d) Listed Waters" (USFS 1999)

  - The 2002 "Memorandum of Agreement Between the USDA Forest Service and the ODEQ" (this Memorandum is substantively similar to the BLM/DEQ Memorandum that is currently being revised)

  - The laws and regulations of Oregon and California, including "Division 41, Statewide Water Quality Management Plan: Beneficial Uses, Policies, Standards, and Treatment Criteria for Oregon" (OAR 340-041) and "Division 7, Porter-Cologne Water Quality Act" (California Water Code)

  - The antidegradation policies of the State of Oregon (OAR 340-041-0026) and the State of California (Resolution No. 68-16).

- Implement best management practices to reduce adverse impacts to streamflow and water quality.

- PacifiCorp would retrofit the J.C. Boyle emergency spillway (located along the diversion canal in Segment 1) to address excessive erosion at the outfall, and associated fisheries, water quality, and scenic quality concerns.

- Conduct riparian monitoring, water quality monitoring, and proper functioning conditionsurveys

- Develop a system for determining site potential (including vegetation, channel form, and streamflow) using data collected during the FERC relicensing process and during other BLM/ODEQ efforts. Site potential objectives would be used to develop water quality restoration projects and best management practices (the extent of restoration activities varies by alternative).

- Delineate riparian reserves on federal land prior to ground-disturbing activities. Management actions could occur within riparian reserves, so long as they are consistent with "Aquatic Conservation Strategy objectives.

- Manage riparian reserves to achieve ACS objectives.

- Roads within riparian reserves would be managed to meet ACS objectives. There would be no net gain in road mileage in riparian reserves.

Actions Specific to Each Alternative

(Refer to Maps 17a, 18a, 19a, 20a and Tables 4-5, 4-6, 4-7, 4-8, 4-11, and Appendix H for projects that are designed to benefit watershed conditions)

Alternative 1

Watershed management would focus on maintaining or enhancing watershed and riparian function, and water quality.

No changes in flow regimes in Segment 1 would be recommended by the BLM.

No conditions or recommendations regarding the timing or duration of use of the PacifiCorp irrigation diversions on the river or in the Shovel Creek drainage would be made by the BLM.

No new roads would be constructed in riparian reserves, except in circumstances where alternate locations would cause unacceptable resource damage. Practices would be implemented to protect springs and wetlands from damage by roads and road use. Limited wet meadow restoration would occur where roads are causing highly visible resource damage.

Some roads near the river or other streams that parallel other nearby roads would be decommissioned or obliterated . Road removal adjacent to the river would accommodate restoration of wetland hydrologic processes and plant communities (see Map 17a).

Alternative 2

Watershed management would focus on maintaining and enhancing watershed and riparian function, and would also include a range of restoration projects designed to address watershed processes in high priority areas.

Flows for the river in this alternative would be based on the objectives of:

- Providing a variety of high quality, river-related recreation opportunities throughout the planning area, including the same general type and level of use as was occurring at the time of designation
- Ensuring that the scenic quality of the planning area, as it pertains to river flows, is not degraded
- Creating flow conditions that would allow native fish to access the full extent of available habitat (including the Bypass reach and reaches upstream from J.C. Boyle Dam)
- Maintaining high quality aquatic habitat for a variety of species and life stages.

During the FERC relicensing process, the Department of the Interior would utilize relicensing studies and other analyses to develop flow regimes that meet the resource management objectives listed above. Absent substantive analysis showing that resource management objectives would be met by other means, the following would be required or recommended as appropriate:

- Increased baseflows in Segment 1 to support fish migration.
- The implementation of a “modified run-of-the-river” flow regime in Segments 2 and 3, in which J.C. Boyle operations are allowed to alter instantaneous flows within a defined range around the daily average flow. Schedule powerhouse

Table 4-13. Summary of recommended flow regime concepts

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Segment 1				
Minimum flows	Give emphasis to securing instream flows for favorable channel conditions and fish passage	Increase baseflows to enhance fish migration	Increase baseflows, with seasonal variation, to enhance fish migration and ecological processes	Increase baseflows to enhance fishing and fish migration
Ramp rate	No Action	Reduce ramp rate during the recession of flood peaks	Reduce ramp rate during the onset and recession of flood peaks	Reduce ramp rate during the recession of flood peaks
Peak flows, pulse flows and recreation releases	No Action	No Action	Release occasional “geomorphic flows” and “pulse flows”	Schedule releases to enhance whitewater recreation
Segment 2				
Minimum flows	Give emphasis to securing instream flows for favorable channel conditions and fish passage	Provide sufficient flows for adult and juvenile stages for trout	Increase fisheries baseflows to provide for all 3 life stages for trout	Set flows to optimize whitewater recreation opportunities while providing flows sufficient for adult and juvenile stages of trout
Ramp rates	No Action	Reduce ramp rate	Reduce ramp rate, if peaking occurs	Reduced ramp rate
Daily flow fluctuations	No action, except as regarding minimum flows	Modify run-of-the-river flow regime	Run-of-the-river flow regime	No action, except as regarding minimum flows and ramp rates
Recreation releases	No Action	Schedule powerhouse releases to resemble timing, volume and duration that occurred at the time of Wild and Scenic designation.	No special releases to support recreation	Schedule powerhouse releases to enhance whitewater opportunities
Adaptive management	No flow changes anticipated unless as a result of the FERC relicensing process	Revise, as necessary, instream flow needs through the FERC relicensing process and other studies	Revise, as necessary, instream flow needs through the FERC relicensing process and other studies	Revise, as necessary, instream flow needs through the FERC relicensing process and other studies
Water rights	Secure adjudicated water rights for recreation and fisheries instream flows	Secure adjudicated water rights for recreation and fisheries instream flows	Secure adjudicated water rights for recreation and fisheries instream flows	Secure adjudicated water rights for recreation and fisheries instream flows
Segment 3	Flows in this segment are essentially the same as in Segment 2.			

*Note: Flows will be based on relicensing studies and other analyses releases to resemble timing, volume and duration that occurred at the time of Wild and Scenic designation. Some peaking (within defined ramp rates) could occur if necessary to attain recreation flow objectives.

- A reduced ramp rate at the Powerhouse, relative to current levels.

PacifiCorp irrigation diversions from the river and Shovel Creek would be adaptively managed to restore wet meadow communities along the river in Segment 3, and that the diversion from Negro Creek be removed to eliminate adverse impacts to the downstream fishery.

Watershed and riparian features would be enhanced through a program of targeted restoration actions in uplands and riparian areas. Riparian reserves would be managed for site potential conditions of vegetation composition and distribution. Special management would occur at limited locations within the Shovel Creek riparian reserve and in the meadows adjacent to the river in Segment 3.

Some roads in riparian reserves would be decommissioned or obliterated to meet "Aquatic Conservation Strategy" objectives. Road removal adjacent to the river would accommodate restoration of wetland hydrologic processes and plant communities. Upland wet meadows would be protected from OHV damage using signs and fences (see Map 18a).

Alternative 3

Watershed management would focus on restoring watershed and riparian function throughout the planning area.

Flows for the river in this alternative would be based on the objectives of:

- Maintaining and restoring high quality aquatic habitat for a variety of species and life stages

- Creating flow conditions that would allow native fish to access the full extent of available habitat (including the Bypass reach and reaches upstream from J.C. Boyle Dam)

- Providing a variety of recreation opportunities throughout the planning area, though the balance between suitable flows for fisheries and recreation would favor the fisheries resource

- Ensuring that the scenic quality of the planning area, as it pertains to river flows, is not degraded

During the FERC relicensing process, the Department of the Interior would utilize relicensing studies and other analyses to develop flow regimes that meet the resource management objectives listed above. Absent substantive analysis showing that resource management objectives would be met by other means, the following would be required or recommended as appropriate:

- Increased baseflows in Segment 1 (to support various fisheries life stages).

- The implementation of a "run-of-the-river" flow regime in Segments 2 and 3. Full run of the river means only that the water that comes into J.C. Boyle Dam (from all up-stream sources) is released downstream from either the dam or power house at the same rate it enters, and does not imply that additional flow release would be required from Upper Klamath Lake. This alternative recommends minimizing flow fluctuations associated with peaking operations and upstream ramping.

- A reduced ramp rate at the powerhouse, relative to current levels.

PacifiCorp irrigation diversions from the river would be adaptively managed to restore wet meadow communities along the river in Segment 3, and that the diversions from Shovel Creek and Negro Creek be removed to eliminate adverse impacts to the downstream fishery.

Watershed and riparian restoration activities would be expanded to encompass more of the planning area. Riparian reserves would be managed for site potential conditions of vegetation composition and distribution. Some facilities (such as roads and recreational developments) within riparian reserves along the river would be removed and the sites revegetated.

Some roads in riparian reserves would be decommissioned or obliterated to meet "Aquatic Conservation Strategy" objectives. Road removal adjacent to the river would accommodate restoration of wetland hydrologic processes and plant communities (see Map 19a).

Alternative 4

Watershed management would focus on maintaining or enhancing watershed and riparian function, and on providing the flows and riparian features needed to maintain and enhance ORVs.

Flows for the river in this alternative would be based on the objectives of:

- Providing a variety of river-related recreation opportunities throughout the planning area
- Ensuring that the scenic quality of the planning area, as it pertains to river flows, is not degraded
- Maintaining and restoring high quality aquatic habitat in the designated/suitable segments of the river for a variety of species and life stages, though the balance between suitable flows for fisheries and recreation would favor the recreation resource more than other alternatives.

During the FERC relicensing process, the Department of the Interior would utilize relicensing studies and other analyses to develop flow regimes that meet the resource management objectives listed above. Absent substantive analysis showing that resource management objectives would be met by other means, the following would be required or recommended as appropriate:

- Increased baseflows in Segment 1 (to support whitewater kayaking and fish migration).
- That timing, volume and duration of releases from the powerhouse (for Segment 2 and 3) are established to enhance whitewater opportunities.
- A reduced ramp rate at the powerhouse, relative to current levels.

No conditions on the timing or duration of use of the irrigation diversions on the river would be made in this alternative. PacifiCorp irrigation diversions from Shovel Creek and Negro Creek would be adaptively managed to restore wet meadow communities along the river in Segment 3 and to reduce adverse impacts to the fishery.

Watershed management actions would be guided by the need to mitigate the impacts of expanded recreation opportunities. Practices such as road closures and fence construction would be implemented to protect springs and wetlands from damage by roads and road use. Limited wet meadow restoration would occur where roads are causing highly visible resource damage. Impacts to riparian reserves from new or upgraded recreation developments and opportunities would be avoided and/or mitigated.

New roads would not be located where unacceptable resource damage may occur to riparian reserves. Some roads that are parallel to the river or other streams would be decommissioned or obliterated. Road removal adjacent to the river would accommodate restoration of wetland hydrologic processes and plant communities (see Map 20a).

Aquatic Species/Habitat

Resource Goals

Fisheries and Aquatic Habitat

- Existing at-risk fish stocks and their associated habitats are managed for adequate protection (KFRMP/FEIS). Impacts associated with habitat manipulation, fish stocking, harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands are identified and eliminated (KFRMP/FEIS). Implement rehabilitation measures including, but not limited to, hydraulic and water quality improvements to protect and enhance fish passage, instream structures using boulders and log placement to create spawning and rearing habitat, placement of fine and coarse materials for over-wintering habitat, and establishment of riparian/wetland trees and vegetation for cover habitat and water quality protection and enhancement.

- Fisheries and recreational fishing outstandingly remarkable values in the project area are maintained or enhanced. Wild trout remain highly productive; both in terms of catch rate and recruitment (USDI-BLM 1990).

- The genetic diversity, adaptiveness, and abundance of redband trout in the project area for which the river segments were designated wild trout management areas are maintained or enhanced (ODFW 1997; California Department of Fish and Game 2000). Trout present in the project area are naturally spawned stock, and to retain unique resistance to high pH values, endemic disease *Ceratomyxa shasta*, and high summer water temperatures.

Licenses

- Existing leases, permits, rights-of-way, and easements are managed so that they do not retard or prevent the attainment of “Aquatic Conservation Strategy” objectives.

- Existing hydroelectric support facilities inside the riparian reserves that are essential to proper management of the hydroelectric project are managed so they meet “Aquatic Conservation Strategy” objectives (KFRMP/FEIS). Where these objectives cannot be met, support facilities would be either relocated outside the riparian reserves or operated and maintained in such a way as to eliminate adverse effects that would retard or prevent attainment of “Aquatic Conservation Strategy” objectives.

Land Tenure

- Appropriate actions are taken to assure that land acquisitions, exchanges, and conservation easements meet “Aquatic Conservation Strategy” objectives and facilitate restoration of fish stocks and other species at risk of extinction.

- Aquatic resources are managed so they promote long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and attain “Aquatic Conservation Strategy” objectives.

- The Klamath River and tributary streams and other waters are maintained or enhanced so that the fisheries potential is consistent with the BLM’s “Fish and Wildlife 2000 Plan,” the “Bring Back the Natives” initiative, and other nationwide initiatives.

Summary of Issues

Fisheries is one of the outstandingly remarkable values for which the Klamath River was designated a national scenic river. Management concerns deal with the endangered Lost River and shortnose suckers, which are known to be occasional inhabitants of the Klamath WSR. The planning area is within the historic range of steelhead, Chinook salmon, and federally listed threatened southern Oregon/northern California Coho salmon. There are management concerns dealing with resident and anadromous fish passage in the river. The river has been designated as a wild rainbow trout fishery by Oregon and California. There is also a concern by fishermen about the lack of large fish within the river. There is evidence that the water peaking (repetitious high flows), which optimizes generation of power from J.C. Boyle Dam, impacts the aquatic habitat for fisheries on the stretches analyzed under this plan (and likewise, may affect the size of the fish). There may be opportunities to improve fish habitat.

Actions Common to All Alternatives

- BLM actions would be designed to meet the guidance given in the 1995 KFRMP/FEIS for fisheries resources.

- Proposed actions would be designed and managed at a minimum to not retard attainment of “Aquatic Conservation Strategy” objectives identified under “Standards and Guidelines For Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl” (1994), and the 1995 KFRMP/FEIS.

- All projects would be consulted on as necessary, both individually and cumulatively with appropriate management agencies (USFWS, National Marine Fisheries Service) for compliance with “Endangered Species Act” protections.

- It would be recommended that structural changes to the fish ladder at J.C. Boyle Dam be implemented to achieve better fish passage.

Actions Specific to Each Alternative

(Refer to Maps 25, 26, 27, 28 amd Table 4-14 and Appendix H)

Alternative 1

Federal land management of aquatic resources in the scenic river and ACEC is minimal and mostly in response to requirements of the *Endangered Species Act*. The distribution and abundance of fish species would not be expected to change as a result of this alternative.

The recreational fishing opportunity would remain largely undeveloped.

Monitoring would occur in order to determine status and conditions of fisheries populations and aquatic habitatsæthere would be no expected changes in the fisheries habitat or accessibility to fishing sites associated with this alternative.

Flows would be expected to remain under their current regimes and controls.

Long-term management agreements or land acquisition would not be proposed to benefit fish habitat or access for fishing. Pursuit of alterations in current facilities such as dams, fish ladders, and screening of canals to protect fish movement are not proposed in this alternative but may be pursued as part of other watershed restoration strategies (see Map 25).

Table 4-14.—Project summary for Aquatic Resources by alternative [1]

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bypass canal/road sidecast	No action	Sidecast material removed and bankfull benches installed along 1.25 miles, passage concern removed	All sidecast on historic floodplains removed	Sidecast material removed to improve fish passage concern on approximately 500 feet of channel
Channel width enhancement (miles)	BLM 0 PC 0 Total 0	1.8 1.2 3.0	4.0 3.0 7.0	0.4 0.6 1.0
Sediment enhancement	No action	Establish a continuous sediment enhancement program	Restore sediment regimes	Spot enhancement based on other instream projects
Large woody debris	No action	Actions in all channels, balance with rafting needs in mainstem river channel	Maximize wood in all channels	Focus wood placemer in tributaries
Chute cutoffs/side channels enhancement	No action	Enhance/eliminate all secondary channels affecting river function	Enhance/eliminate all secondary channels affecting river function	Limited enhancement of secondary channels for rafting experience and secondarily for fish habitat
Historic bridge sites fish habitat enhancement	No action	Two bridge site abutments enhanced, two bridge site abutments removed	Remove all bridge site abutments (up to six sites)	Two bridge site abutments enhanced, two bridge site abutments removed
Bypass canal/road side cast	No action	Bankfull benches installed, passage issue removed	All side cast on historic flood plain removed	Passage issue remove
Irrigation diversion	No action	Redesign all diversions to enhance fish habitat	Remove as many diversions as possible	Redesign all diversions to enhance fish habitat

[1] Summary descriptions are for comparative purposes only and do not necessarily describe the actual scope of proposed projects (see Chapter 4, Table 4-1, and alternative maps for a more detailed action description). Attraction flows to enhance fisheries were not summarized in this table, as these actions would be facility operations based rather than on the ground land management actions.

Alternative 2

Activities to improve aquatic habitat would be addressed in this alternative, including channel roughness features and multiple life stage habitat needs of fish species.

Existing access to the river would be improved to provide a greater diversity of recreational fishing opportunities. Conflicts that may occur as a result of differing uses of the river would be resolved to the extent practicable to optimize multiple uses of the river.

Flow regimes more conducive to fish species productivity and life histories than current flows would be pursued.

Alterations in facilities and diversions within riparian reserves would be pursued to improve/protect the movement and life histories of resident fish species. Long-term management agreements or land acquisition would target, to an extent, improving mainstem and refugial aquatic habitat and recreational fishing accessibility issues. Functional barriers to fish migration (such as poorly regulated flows, inadequate or nonexistent facilities, and water quality limiting features) would be modified to minimize their effect (see Map 26).

Alternative 3

Fisheries production restoration would be emphasized, thus trail construction and road access for recreational users would be de-emphasized.

Restoration of fisheries habitat and natural flow patterns would occur to protect and restore distribution and abundance of all species and life-stages of resident and anadromous species if fish passage was restored down river. Elements of fish habitat: sediment (gravel) levels, stream bank, vegetative conditions, and large woody debris (CWD), would be restored to be within the range of natural variability. Additionally, water quality parameters that benefit fisheries resources would be improved through management within the planning area and through larger landscape level restoration efforts, such as TMDLs (see Map 27).

Instream flows that reflect the natural variability of the system to which the fish species adapted would be pursued. Long-term management agreements or land acquisitions would target protecting and restoring distribution and abundance of native wildlife species, including aquatic species.

Movement or modification of existing facilities and diversions located either instream or in the adjacent riparian reserves, including fish ladders and diversions, would be pursued so as to have no or minimal impact on the connectivity and condition of aquatic habitats through the planning area.

Alternative 4

Fisheries management goals would be to increase the recreational fishing opportunities in the planning area.

Additional access points for providing recreational fishing opportunities would be provided. Recreational fishing would be managed to provide a diverse range of opportunities in a more developed setting. Opportunities to increase fishing productivity, stream enhancement, and facility modifications that would not conflict with other recreational uses would be pursued (see Map 28).

Instream flows that optimize fishing opportunities and other recreational uses would be pursued in order to provide the greatest amount of recreational opportunities. Long-term management agreements or land acquisition would increase recreational fishing access, thus providing more opportunities.

Livestock Grazing

Resource Goals

- Livestock grazing is managed within the context of appropriate resource protection and/or preservation and sustained-yield principles, dependent on the specific alternative selected. Grazing management will be considered with the rangeland health standards and guidelines outlined in BLM Regulations, 43 CFR 4180.

Summary of Issues

Issues regarding livestock grazing are related to recreation, cultural resource, riparian area, and wildlife habitat management concerns. Past grazing use within the planning area has led to various levels of environmental disturbance and degradation, though current grazing use on public lands is at historically low levels. The vast majority of the livestock use currently takes place on private land.

Actions Common to All Alternatives

- All grazing management on public-administered lands would be in accordance with pertinent and appropriate BLM laws, regulations, and policies.

- Up to two miles of additional fencing may be constructed along gap portions of the Klamath River Rim northwest of the river as needed for livestock control.

Actions Specific to Each Alternative

(Refer to Map 8 and Table 4-15 and Appendix H)

Alternative 1

Edge Creek Allotment (0102): Current grazing management activities would continue up to the maximums in the current grazing leases (see Map 8). Existing rangeland improvement projects would be maintained, and new ones constructed, to improve livestock distribution. Rangeland monitoring data would be collected and evaluated periodically to ensure appropriate grazing use and that progress is being made toward the attainment of Range Health Standards.

Current fencing would be maintained to limit cattle use to either the Hoover Ranch area or the Ward Pasture (on top of the rim and out of the planning area).

Laubacher Lease Allotment (0155): Under this alternative, grazing use in this small allotment would remain the same as outlined in the Redding Field Office RMP/ROD, including the closure to grazing of the BLM lands within 0.25 mile of the river (see Map 8).

PacifiCorp lands: Grazing use on private lands would generally be as outlined in the PacifiCorp document: "Livestock Grazing on PacifiCorp's Klamath River Rangelands: Inventory, GIS Model Development, and Grazing Management Plan: Working Draft" (see Chapter 2, Livestock Grazing section in this document, for more information).

Alternative 2

Grazing management activities could continue up to the maximums allowed under the KFRMP/FEIS, though to a level consistent with maintaining/improving fish and wildlife habitat and providing optimum protection for other resource values.

Existing rangeland improvement projects would be maintained, and new ones constructed, if necessary for resource enhancement/improvement.

Rangeland monitoring data would be collected and evaluated periodically to ensure grazing use is appropriate and that progress is being made toward the attainment of Range Health Standards.

PacifiCorp: Under this alternative, the grazing use to be recommended for PacifiCorp lands could be variably reduced, deferred, and/or eliminated as necessary to facilitate or protect restoration or recreation related activities. These activities and projects are outlined in other (nongrazing) sections of this plan. The actual grazing management changes would be site-specific and determined in the future during the implementation of the specific management actions.

Alternative 3

Livestock grazing use would be generally excluded from the planning area and would be considered only if useful as a management tool to accomplish other resource restoration goals.

Additional fencing may be pursued, if necessary to inhibit livestock access to the canyon.

Periodic field checks would be made to ensure that unauthorized livestock do not graze the area.

Edge Creek Allotment (0102): Grazing use would be excluded from the canyon portions of the Ward Pasture (the portions below the canyon rim). Additional gap fencing along the rim might be necessary to effectively preclude cattle drift into the canyon from the grazing areas on top of the rim (see Map 8).

Laubacher Lease Allotment (0155): Grazing use on this small allotment would be eliminated under this alternative since all of it is located within the planning area (see Map 8).

Table 4-15. Summary of Livestock Grazing management actions by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Grazing management (animal unit months)				
BLM	171	125–171 [1]	0	125–171 [1]
PacifiCorp	2,500–3,000	0–2,000 [2]	0	1,500–2,500 [3]
Fencing projects (miles)	2	2	2	2

[1] Animal unit month refers to a range of reasonable amount that will still be available outside of excluded areas.

[2] Covers the range of possibility of diminished/no grazing use on PacifiCorp lands in the short term and the potential restoration of up to 2,000 AUMs in the long term. Actual number could vary widely based on type and speed of restoration project work and ultimate disposition and management of the PacifiCorp properties.

[3] AUM range covers a reasonable expectation of grazing use allowable outside special management areas (such as recreation sites, riparian reserves, and cultural sites).

PacifiCorp lands: No grazing use of PacifiCorp lands would occur, except where livestock would be useful in the accomplishment of other resource goals.

Alternative 4

Grazing management would be allowed to the extent that it does not significantly conflict with the recreation management and opportunities in the canyon.

Existing rangeland improvement projects would be maintained and new ones constructed, as necessary, for enhancing recreation and other human use opportunities. Livestock/recreation compatibility usually entails the exclusionary fencing of developed recreation sites.

Rangeland monitoring data would be collected and evaluated periodically to ensure grazing use is appropriate, and that progress is being made toward the attainment of Range Health Standards.

Wild Horses

Resource Goals

- Wild horses are managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat. Management activities affecting wild horses are undertaken with the goal of maintaining free-roaming behavior (BLM Regulations, CFR 4700.0-6).

Actions Common to All Alternatives

Wild horse management in the Pokegama Herd Management Area (see Map 8) would be basically the same under all the alternatives.

A very small portion of the herd management area, established under the 1971 *Wild and Free-Roaming Horse and Burro Act*, lies within the planning area. Stewardship of the herd management area, regardless of the alternative selected, must be done in accordance with BLM Regulations, 43 CFR 4700 (wild horse regulations), current policy and direction, and other documents. Wild horse management for the Gavin Peak Herd Management Area, which lies just outside the planning area, would continue to be the responsibility of the USFS Klamath National Forest Goosenest Ranger District and is not covered by this plan.

In general, the Pokegama Herd Management Area management would include:

- Monitoring of the wild horse herd management area including annual animal census, vegetative and habitat monitoring, and as necessary, water monitoring during drought.

- Periodic evaluation of the appropriate management level versus the habitat conditions and competing forage demands to ensure that herd numbers are within the sustained yield capacity of their range.

- Periodic animal removals, to stay within the appropriate management level range of 30-50 head.

- Revision and periodic update of the Pokegama herd management plan.

- All other management needs to be consistent with the herd management plan, wild horse regulations (BLM Regulations, 43 CFR 4700), and current BLM policy and direction.

No specific on-the-ground projects are proposed at this time within the planning area for wild horse management. An upcoming revision of the Pokegama herd management plan will likely propose additional or altered management, but such proposals are not appropriate as part of this planning effort.

Fire and Fuels

Resource Goals

- Fire is reintroduced into areas in which fire has a profound biological influence on ecosystem composition.
- Sustainable function and structure to plant communities is restored, with resulting improvement in forest and rangeland health for fire-adapted ecosystems. This includes restoring forest (and other plant community) composition from fire-intolerant species to fire-adapted species. Reduce the populations of encroaching white fir and western juniper.
- Major losses of sustainable ecosystem resources from catastrophic wildfire are reduced.
- Overall reducing large acreage multi-burn period fires minimize management costs. Fewer numbers and types of suppression resources are needed in extended attack and project fire situations.

Summary of Issues

Heavy fuel loads exist on forests, woodlands, and shrubfields in the river canyon. Historically, lightning has been high in this area, and, given the steep terrain, any fire occurrence could become a forest stand-replacing event. Past examples are the Big Bend and J.C. Boyle fires (in the 1980s). This plan would address needs for effective fuel reduction treatments. The potential loss of river canyon scenic quality to wildfire is high. Existing heavy fuel loads and the level of treatments necessary to protect scenic and wildlife values is a management concern. Planned prescribed fires need to be consistent with the federal *Clean Air Act*.

Actions Common to All Alternatives

- BLM actions would be designed to meet KFRMP/FEIS guidance.
- Appropriate management response to wildfire situations would be initiated, and prevention and education programs pursued.
- The practice of prescribed fire by random selection, as defined in EA-OR-014-94-09, would be continued .
- Fuel treatments would occur in the entire planning area, from the river to the first serviceable road above the canyon rim (the first likely fire break).
- Several types of fuel treatments would be used including: manual treatments (severing vegetation and hand piling followed by pile burning) along roads and campground areas; treatments using a tracked low pressure swing excavator used to break down vegetation followed by piling and burning (in areas where effects would be unseen from the river). Prescribed fire would be used to reduce fuels and to alter vegetation in conifer and deciduous forests and shrub fields. When prescribed fire is used, it would follow the restoration process described in EA-OR-014-94-09.

- A Klamath Falls Resource Area Smoke Management/Air Quality Plan will be completed in 2003. This plan would encompass the planning area.

- Fire prevention would include increased signing and joint patrol by Oregon Department of Forestry and the BLM. The Oregon Department of Forestry would continue to apply fire prevention adjective class and seasonal high-risk public fire closures as necessary. Commercial operations would continue to be managed by Oregon Department of Forestry and BLM to prevent and plan for the suppression of wildfire.

- Cooperative assistance agreements would be initiated with private landowners (using funding as authorized by the "Wyden Amendment") to meet fuels management objectives across ownership boundaries.

Actions Specific to Each Alternative

(Refer to Maps 21, 22, 23 24 and Tables 4-10, 4-11 and Appendix H)

Alternative 1

The fuels management program would be implemented with random burn selections, and would include minimal fuel treatment around recreation sites.

Alternative 2

The fuels management program would emphasize hand treatments with piling and burning of materials; and some random prescribed burn selections would be performed. Prescribed fire may be used to enhance species in Native American traditional use areas. All fuel management treatments would be strategically located in areas that are not seen from the river and other key observation points.

Alternative 3

In addition to the current random selection program, the fuels management program would place greater emphasis on the use of prescribed fire (to mimic the natural fire regime). Location of treatment sites would be less restrictive and could occur throughout the canyon.

Alternative 4

The fuels management program would place greater emphasis on the use of mechanical treatment because more motorized access would exist in this alternative. The emphasis would be to treat areas along roads and near recreation sites, although treatment sites could occur throughout the canyon. The BLM would partner with the Oregon Department of Forestry, Klamath County Sheriff Department, or Tribes to provide a joint-use guard station.

Land Tenure

Management Goal

- Adjustments are completed so that land ownership patterns or implemented management agreements are such that management throughout the planning area maintains and enhances resource values.

Summary of Issues

PacifiCorp is the major private landowner in the planning area. PacifiCorp has requested, in writing, that BLM explore the possibility of land tenure adjustments or long-term cooperative management strategies during the development of this plan. PacifiCorp has submitted a map to the BLM that identifies parcels of their land to be considered for possible land trade, acquisition, or a mutually beneficial land management arrangement. PacifiCorp has stated that they are interested in acquiring public lands within the operational area of the Klamath Hydroelectric Project.

Public lands within the operational area of the Klamath Hydroelectric Project are identified for retention and management as part of the public lands, and are not available for disposal by sale, exchange, or any other method. PacifiCorp did not identify any other lands that they were interested in acquiring; therefore, we cannot evaluate the impacts that could result from their disposal in this document.

In order to address issues/resource concerns identified in this plan, the BLM would need to determine the resource values of the PacifiCorp lands pertaining to recreational use, access, prehistoric and historic sites, Native American traditional uses, and fish and wildlife on the lands they have identified.

This plan would also address issues surrounding the management role of the State of Oregon in private lands within the Oregon Scenic Waterway. There are management concerns surrounding how the federal government (in Oregon) can ensure adequate recreational access to the river if it does not administer the land. Oregon State Scenic Waterway administrative rules for the Klamath River would be developed and made part of the river plan.

Actions Common to All Alternatives

- The BLM would maintain existing rights-of-way and road use agreements.

- Management agreements would be developed with private landowners to maintain scenic river/ACEC values.

- Land tenure direction within the proposed project alternative boundaries will be to increase public land holdings by retaining public lands and acquiring nonfederal lands. The alternative boundaries change only in California.

- All land acquisitions would be through exchange, purchase, or donation. If possible, surface and mineral estates would be acquired. Acquisitions will be from willing sellers of available unimproved property. Lands that are acquired will be managed with the management direction of the Final River Plan. Acquisition of private lands would be actively pursued within the proposed alternative project area boundaries (project area boundaries vary only in California). It is possible that additional lands could be acquired outside the alternative project boundary, if so then the management objectives identified in the Final River Plan would apply to those lands. Acquired lands would be subject to mineral leasing with no surface occupancy. Acquired lands would be managed to maintain or enhance the designated and proposed ACEC in Oregon, the designated Upper Klamath River Wild and Scenic River in Oregon, and the portion of the Klamath River found to eligible and suitable for inclusion into the national wild and scenic river system in California (per the *Wild and Scenic Rivers Act)*. If lands with unique or fragile resource values were acquired, the BLM would protect those values until the next plan revision.

- Conservation easements may be acquired if they provide rights sufficient for the Bureau to protect and enhance the upper Klamath River's outstandingly remarkable values found on the private lands.

- In Oregon, the proposed ACEC boundary for river Segment 1 remains the same for Alternatives 2, 3, and 4. There are no differences between the alternatives for the designated ACEC in river segment 2 (Oregon), nor are there differences in acreage of private lands.

- The boundary remains the same in all alternatives for the designated ACEC in river Segment 2 (Oregon).

Actions Specific to Each Alternative

(Refer to Map 3 and Table 4-16 and Appendix H)

Table 4-16. Land ownership by project area and alternative (acres)*

	BLM	USFS	PacifiCorp	Other private	State of Oregon
			Alternative 1		
Oregon	6,099	—	1,269	1,230	118
California	214	291	2,025	273	—
Total	6,313	291	3,294	1,503	118
Grand Total			**11,517**		
			Alternative 2		
	BLM	**USFS**	**PacifiCorp**	**Other private**	**State of Oregon**
Oregon	6,099	—	1,269	1,230	118
California	214	291	3,575	840	—
Total	6,313	291	4,844	2,070	118
Grand Total			**13,636**		
			Alternative 3		
	BLM	**USFS**	**PacifiCorp**	**Other private**	**State of Oregon**
Oregon	6,099	—	1,269	1,230	118
California	1,472	601	5,830	2,783	—
Total	7,571	601	7,099	4,013	118
Grand Total			**19,402**		
			Alternative 4		
	BLM	**USFS**	**PacifiCorp**	**Other private**	**State of Oregon**
Oregon	6,099	—	1,269	1,230	118
California	1,297	291	5,830	845	—
Total	7,396	291	7,099	2,075	118
Grand Total			**16,979**		

*Does not include 362 acres of surface water in planning area.

Alternative 1

Continue existing agreements with PacifiCorp for managing recreation uses in the canyon.

Alternative 2

Where opportunities exist, use land tenure adjustments to facilitate the management and protection of resource values. Any change in ownership would be to acquire lands with high values or facilitate management of values on existing public lands.

Alternative 3

Where opportunities exist, land tenure adjustments would be used to facilitate the management and protection of resource values. All land tenure adjustments (into public ownership/management) would facilitate managing the canyon area in a more historically natural condition. This alternative would maximize acquisition of lands with high values or that facilitate management of values on existing public lands.

Alternative 4

Where opportunities exist, land tenure adjustments would be used to facilitate the management and protection of resource values. Land tenure adjustments (into public ownership/management) would primarily be to enhance recreation opportunities, cultural resource management, and scenic values.

Land Use Allocations

Management Goal

- Implement changes in land allocations and management designations to facilitate more consistent management of resources.

Actions Common to All Alternatives

No actions are common to all alternatives.

Actions Specific to Each Alternative

(Refer to Maps 2, 14, 15, 16 and Appendix H)

Alternative 1

No land allocations or designations are proposed with this alternative.

Alternative 2

Expansion of the existing ACEC boundary to include planning area lands in Segment 1 is proposed. The boundary of this area is the same for Alternatives 2, 3 and 4, and can be seen on Map 2.

Expansion of the existing Upper Klamath River Management Area in river Segment 3 (Redding RMP p.23, 27, 35) to retain land and resources important to maintaining the existing resource values in the Suitable and Eligible section of the Upper Klamath River. The boundary of this area varies by alternative – the Alternative 2 boundary can be seen on Map 14.

Alternative 3

Expansion of the existing ACEC boundary to include planning area lands in Segment 1 is proposed. The boundary of this area is the same for Alternatives 2, 3 and 4, and can be seen on Map 2.

Expansion of the existing Upper Klamath River Management Area in river Segment 3 (Redding RMP p.23, 27, 35) to retain land and resources important to maintaining the existing resource values in the Suitable and Eligible section of the Upper Klamath River. The boundary of this area varies by alternative – the Alternative 3 boundary can be seen on Map 15.

Alternative 4

Expansion of the existing ACEC boundary to include planning area lands in Segment 1 is proposed. The boundary of this area is the same for Alternatives 2, 3 and 4, and can be seen on Map 2.

Expansion of the existing Upper Klamath River Management Area in river Segment 3 (Redding RMP p.23, 27, 35) to retain land and resources important to maintaining the existing resource values in the Suitable and Eligible section of the Upper Klamath River. The boundary of this area varies by alternative – the Alternative 4 boundary can be seen on Map 16.

Chapter 5 - Environmental Consequences

Chapter 5 – Klamath River - California Segment

Chapter 5 - Environmental Consequences

This chapter is organized by resource or topic and the narrative presents the potential impacts to that resource or topic from all the different proposed actions of the alternatives. Only those actions that would have potential impacts are discussed for the various resources or topics. Each resource or topic has the potential cumulative impacts summarized for each alternative.

Scenic Quality

Assumptions

All BLM managed lands within the planning area are classified and managed as BLM Visual Resource Management (VRM) Class II. VRM Class II lands are to be managed for low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer. Any modifications should repeat the basic elements of form, line, texture, color, and scale found in the predominant natural features of the characteristic landscape. All BLM management activities that have the potential to affect the scenic quality in the planning area would be evaluated using the VRM process, prior to implementation, and necessary design modification and/or mitigation would be used to maintain or enhance the scenic quality.

The Oregon State Scenic Waterways Program will enforce administrative rules for the Oregon State Scenic Waterway portion of the planning area. State Scenic Waterways and county zoning regulations will continue subject to compliance with federal designation as stipulated under Goal 5 of state land use law. These regulations would govern the use and development of private lands for activities such as timber harvesting and house building.

Future developments occurring on private lands outside the scope of this plan (private lands other than PacifiCorp) within the view shed of the planning area could potentially have significant negative impacts on scenic quality. Projects on private lands, such as timber clearcuts, construction of communications towers, water towers, buildings, pipelines, powerlines and roads, could cause severe negative impacts to the scenic Outstandingly Remarkable Value of the WSR designation.

Proposed vegetation treatments were analyzed, by alternative, using GIS modeling to determine areas of high visibility along the Klamath River (20 miles) and 17 key observation points. The observation points were selected using areas such as common viewing areas and popular recreation sites (Spring Island boat launch, Klamath River Campground).

Impacts Common to All Alternatives

Management activities related to cultural resources protection are expected to have little if any impact to scenic quality under all alternatives. Road closures and signing to protect cultural resources would be designed to have a neutral or beneficial effect to scenic quality. Activities such as environmental education, interpretive displays, historic building stabilization or reconstruction would also have little potential to negatively impact scenic quality.

Management activities related to watershed values are expected to have essentially the same impacts to scenic quality under all alternatives. More consistent flow rates in all segments would lessen the visual impact of the daily "inundation/exposure" of the stream channel caused by the peaking operation of the J.C. Boyle hydroelectric plant. This "inundation/ exposure" effect causes large areas of wet, slimy rocks in the streambed, and an unnatural appearing dry channel. The impact of improved water quality has the slight potential to improve scenic quality of the flowing river by lessening the amount of foam seen in eddies, and by causing the water to appear clearer and brighter, particularly in whitewater rapids.

Livestock Grazing/Range Management activities would have no or very minor impacts to scenic quality under all alternatives. Grazing would be most visible in Segment 3 on PacifiCorp lands. Because there are currently many rustic appearing cultural modifications in this segment related to ranching such as buildings, hay fields, and rock walls, continued grazing at low to moderate levels is not expected to cause significant negative impacts to scenic quality.

Scenic quality would be positively impacted by terrestrial species habitat management actions under the assumption that improved diversity of species and population numbers of wildlife would improve wildlife viewing opportunities, a positive aesthetic feature of scenic quality. The impacts of vegetation treatments designed to improve wildlife habitat are discussed in the Vegetation and Biological Diversity section.

Impacts to scenic quality from prescribed fires would be common to all alternatives. There would be short-term negative impacts to scenic quality caused by smoke, dust, and ground disturbance from heavy equipment and firebreak construction during project implementation. Areas would appear blackened from the prescribed fire activities. Prescribed fires and small scale, low intensity wildfires would have short-term negative affects but help achieve the long-term benefits for scenery management by improving forest health and reducing the risk of catastrophic wildfires. A large-scale catastrophic wildfire would have severe impacts to the scenic quality by burning down vegetative communities that would require 50-150 years to return.

Structures and facilities of the J.C. Boyle hydroelectric project, such as the canals, spillways, forebay, power lines, and the powerhouse, create strong visual contrast and negative impacts on the scenic resources found in the planning area. This plan does not propose any changes to PacifiCorp hydroelectric facilities. While these impacts to scenic resources are outside the scope of this plan, it should be noted that the impacts of hydroelectric facilities on scenic resources would be addressed during the FERC relicensing process.

Impacts of Specific Alternatives

(Refer to Maps 5, 13-16, 17a-20a, 21-24, 25-28 and Appendix H)

Alternative 1

Scenery Management - See “Impacts Common to All Alternatives”.

Recreation - Management of existing recreation facilities and trails and the development of new facilities is guided by the VRM class II guidelines to protect scenic quality. Scenic quality continues to be impacted by the uncontrolled use of OHVs creating new roads and trails, and traveling cross-country in open areas. Vehicles are encountered at the river in many areas near the Frain Ranch (see Map 13).

Road Management - The extensive network of roads throughout the Frain Ranch area (PacifiCorp lands) would continue to impact scenic quality by soil disturbance, removal of vegetation, and unnatural appearing road alignment (see Map 17a).

Vegetation Management - Alternative 1 proposes limited vegetative treatments, compared to the other alternatives (see Map 21). Prescribed fire and thinning treatment designed to increase vegetative and biological diversity would, in some cases, have short-term negative effects on recreation users. While mitigation measures and treatments would be designed to minimize negative effects, some short-term negative affects would at times be visible. Such effects would include small piles of brush and small trees, small tree and brush stumps cut close to ground, and some ground disturbance from mechanized equipment. Other effects would include some localized noise from saws and machinery, dust and smoke from controlled fire and other common affects from forest industrial operations during project implementation.

In many cases, vegetation treatments would enhance scenic quality by increasing scenic and wildlife diversity. Some of these treatments would enhance existing scenery, by targeting areas near recreation sites or along roads that lack vegetative diversity. Treatments would be designed to enhance areas where existing vegetation such as large old growth trees or geologic features are hidden due to overstocked stands, heavy fuel loads, or decadent, old brush.

Aquatic Species/Habitat Management - Management activities would be minimal and mainly in response to requirements of the Endangered Species Act. Few negative impacts or long-term benefits to scenic quality would be anticipated under this alternative (see Map 25).

Cumulative Impacts - Management actions from construction, forest thinning, and prescribed burning would likely have short-term negative impacts to scenic quality. However, over the long-term, vegetative regrowth, replacement of noxious weeds with native species, and controls on human uses, would contribute to improved scenic quality.

Alternative 2

Scenery Management - See “Impacts Common to All Alternatives”

Recreation - The construction of developed day use sites, campgrounds, and trailheads could cause some impact to scenic quality by creating unnatural, disharmonious appearing openings, colors, lines, or shapes, in the landscape. The Shovel Creek campground proposed in Segment 3 at the Beswick site would be sited in an existing hay field. The construction phase would create numerous short-term impacts from exposed earth, piles of building materials, new access roads, holes dug to place toilets, and other construction elements. By placing the campground in a meadow, it would require more landscaping and more time for the landscaping to mature, to lessen the visual impact (see Map 14).

The construction of non-motorized trails could cause minor short-term negative impacts to scenic quality by creating a strong line with contrasting color, from the ground disturbance where the trails traverse large openings that are readily viewed from common viewing areas. This visual contrast would be apparent until vegetation is re-established. The construction of a bridge for non-motorized travel, located at the upper end of Frain Ranch, would impact scenic quality by introducing cultural modification to an otherwise natural appearing landscape. The bridge would also have the effect of drawing more attention to nearby roads that currently are mostly hidden in the background of the river view.

The management of campfires and related fire risk behavior by regulated use seasons and camping areas would help to lessen the risk of catastrophic wildfire, and the attendant extreme impacts to scenic quality.

The construction of interpretive displays, brochures, environmental education efforts, could have an indirect beneficial impact on scenic quality by fostering a greater appreciation and stewardship ethic amongst visitors to the planning area. This type of visitor would be more likely to take an active role in helping to maintain and improve scenic quality by volunteering to help with vegetation treatments or clean up projects, and by noting and reporting illegal activities that might jeopardize scenic quality.

Creating designated OHV travel routes and restricting motorized travel to designated roads would have the beneficial impact of lessening the amount of visual damage to meadows caused by unrestricted, cross country OHV use.

Road Management - The closure and obliteration of 9.0 miles of roads, would enhance scenic quality by lessening the spider webbed appearance of the large flat areas around the Frain Ranch (PacifiCorp lands). The construction of new access roads to reach dispersed camp areas could impact scenic quality by increasing contrast in line and color (see Map 18a).

Vegetation Management - The types of vegetation treatments proposed include fenced exclosures of meadows, thinnings of various forest types with chain saws, shearers, and other mechanized equipment, and clearing brush fields with mowers. Impacts to scenic quality common to all of these treatments would include changing the pattern, lines, and colors of the vegetation, visible stumps and piles of slash left behind, and ground disturbance created by mechanized equipment. Short-term impacts to scenic quality would be created by smoke and dust and the presence of heavy equipment during operations (see Map 22).

A very small percentage (estimated less than 10 %) of the surface area of the proposed vegetation treatment units would be highly visible from key observation points such as scenic overlook areas and popular recreation sites. These highly visible areas are found near the top of steep slopes adjacent to the observation points.

In many cases, vegetation treatments would enhance scenic quality. Some of these treatments would enhance existing scenery, by targeting areas near recreation sites or along roads that lack vegetative diversity. Treatments would be designed to enhance areas where existing vegetation such as large old growth trees or geologic features are hidden due to overstocked stands or decadent, old brush. For example, additional scenic vistas may be able to be created through careful vegetation manipulation along Topsy Road and elsewhere. Targeted vegetative plantings would be used to improve scenic quality where vegetation is lacking, or to screen culturally modified areas from view.

Aquatic Species/Habitat Management - Management activities such as channel improvement/restoration, placement of large woody debris, and reconstruction of irrigation diversions, all have the potential to create short-term negative impacts to scenic quality. The presence of heavy equipment in the river, piles of materials stockpiled in central areas, and heavy helicopter traffic, could cause enough temporary degradation to scenic quality to prompt negative perceptions of management actions and generate complaints to BLM, PacifiCorp, and other managing entities (see Map 26).

Cumulative Impacts - The project implementation work associated with all the proposed actions would have short-term impact to scenic quality. However, once projects are completed, impacts to scenic quality are expected to be either neutral or beneficial. Construction of a new, non-motorized access bridge and other new recreation developments would introduce new cultural modifications into a landscape that is relatively undeveloped.

Alternative 3

Scenery Management - See “Impacts Common to All Alternatives”.

Recreation Facilities and Management - Alternative 3 proposes the least amount of facility development and an extensive amount of road closure, recreation site closure, and riparian site restoration work. The impacts of this alternative to scenic quality would be to create a more natural appearing landscape, with the least amount of development and cultural modification. All of this would result in a long-term improvement to scenic quality (see Map 15).

The construction of non-motorized trails would cause minor short-term negative impacts to scenic quality by creating a strong line with contrasting color, from the ground disturbance where the trails traverse large openings that are readily viewed from common viewing areas.

Creating designated OHV travel routes and restricting motorized travel to designated roads would have the beneficial impact of lessening the amount of visual damage to meadows caused by unrestricted, cross country OHV use.

The management of campfires and related fire risk behavior by regulated use seasons and camping areas would help to lessen the risk of catastrophic wildfire, and the attendant extreme impacts to scenic quality.

Road Management - Alternative 3 would receive the most extensive road closures and road restoration efforts of all alternatives (see Map 19a). The closure and obliteration of duplicate roads, would enhance scenic quality by lessening the spider web appearance of the large flat areas around the Frain ranch (PacifiCorp lands) and giving other areas a more natural appearance. Road treatments designed to keep OHV vehicles on the roads and from creating braided roads and roads in meadows, would have the long-term benefit of maintaining the meadows and openings in a more natural appearance.

Vegetation Management - This alternative, with the greatest amount of vegetation treatments would have the greatest opportunity for short-term negative impacts to scenic quality. While mitigation measures and treatments would be designed to avoid long-term negative impacts to scenic quality, some short-term negative impacts would occur. Such visual impacts would include small piles of brush and trees, tree and brush stumps cut close to ground, dust and smoke, scars from ground disturbance, and mechanized equipment working in an otherwise primitive, natural appearing landscape (see Map 23).

A very small percentage (estimated less than 10 %) of the surface area of the proposed vegetation treatment units would be highly visible from key observation points such as scenic overlook areas and popular recreation sites. These highly visible areas are found near the top of steep slopes adjacent to the observation points.

In many cases, vegetation treatments would enhance scenic quality. Some of these treatments would enhance existing scenery, by targeting areas near recreation sites or along roads that lack vegetative diversity. Treatments would be designed to enhance areas where existing vegetation such as large old growth trees or geologic features are hidden due to overstocked stands, heavy fuel loads, or decadent, old brush. For example, additional scenic vistas may be created through careful vegetation manipulation along Topsy Road and elsewhere. Many treatments are proposed to improve wildlife habitat. This would have the indirect benefit of increasing wildlife species diversity and population numbers. Targeted vegetative plantings would be used to improve scenic quality where vegetation is lacking, or to screen culturally modified areas from view.

Aquatic Species/Habitat Management - Management activities such as channel improvement/restoration, placement of large woody debris, and reconstruction of irrigation diversions, all have the potential to create short-term negative impacts to scenic quality. The presence of heavy equipment in the river, piles of materials stockpiled in central areas, and heavy helicopter traffic, could cause enough degradation to scenic quality to prompt negative perceptions of management actions and generate complaints to BLM, PacifiCorp, and other managing entities (see Map 27).

Enhancing fish habitat and passage through riparian/vegetation treatments, structural changes and channelization efforts would have the long-term effect of no impact or a slight improvement to scenic quality. Providing for fish passage and modifying fish ladders would enhance the opportunity to view anadromous and resident fish, which would benefit scenic quality.

Cumulative Impacts - The project implementation work associated with all proposed actions would have short-term impacts to scenic quality. In many cases this impact would only occur during the project implementation. In some cases visual contrast may persist for 1-5 years until vegetation is reestablished. However, once projects are completed, impacts to scenic quality are expected to be either neutral or beneficial. Management of recreation facilities and use would result in fewer cultural modifications and less visual contrast, which would result in little to no negative impact to scenic quality.

Alternative 4

Scenery Management - PacifiCorp structures and facilities of the J.C. Boyle hydroelectric project, such as water canals, emergency spillway, forebay, penstocks, transmission lines, substation, and power station, would have negative impacts to scenic quality. This impact will also be addressed during the FERC relicensing process of the Klamath hydroelectric project.

Recreation Facilities and Management - Alternative 4 provides the greatest amount of developed camping, day use, interpretive facilities and hiking trails of all the proposed alternatives. This alternative also provides the greatest amount of Off-highway vehicle opportunities and maintained roads. OHV tour routes would be designated, signed and improved, with informational brochures to provide scenic tour opportunities for users. New bridges would greatly expand motorized loop trail opportunities (see Map 16). New tour routes would be provided, primarily in California (PacifiCorp lands).

The construction of developed day use sites, campgrounds, and trailheads would cause some impact to scenic quality by creating unnatural, disharmonious appearing openings, colors, lines, or shapes, in the landscape. The campground proposed in segment 3 at the Beswick site, would be sited in an existing hay field. The construction phase would create numerous short-term impacts from exposed earth, piles of building materials, new access roads, holes dug to place toilets, and other construction elements. By placing the campground in a meadow, it would require more landscaping and more time for the landscaping to mature, to lessen the visual impact.

The construction of non-motorized trails would cause minor short-term negative impacts to scenic quality by creating a strong line with contrasting color, from the ground disturbance where the trails traverse large openings that are readily viewed from common viewing areas. The negative impacts caused by non-motorized trail would have its greatest negative impacts to scenic quality in this alternative when compared to the other alternatives.

Having fewer restrictions on use levels of commercial whitewater rafting could have the impact of causing more crowding and congestion of rafting groups at common bottleneck areas. The visual effect of seeing crowds of rafters and rafts in an area would be a negative short-term impact to scenic quality. By managing the planning area to allow and encourage more recreational use, the risk of human ignited wildfire increases, the potential to see more people and vehicles increases, and the potential to view more developed, larger recreation facilities increases. The negative impacts caused by allowing more commercial and private white water boating would have its greatest negative impacts to scenic quality in this alternative when compared to the other alternatives.

The construction of interpretive displays, brochures, environmental education efforts, could have an indirect beneficial impact on scenic quality by fostering a greater appreciation and stewardship ethic amongst visitors to the planning area. This type of visitor would be more likely to take an active role in helping to maintain and improve scenic quality by volunteering to help with vegetation treatments or clean up projects, noting and reporting illegal activities that might jeopardize scenic quality, and advocating for scenic quality resources in the political arena.

Creating designated OHV travel routes and restricting motorized travel to designated roads would have the beneficial impact of lessening the amount of visual damage to meadows caused by unrestricted, cross country OHV use.

Designating the Klamath River trail from Frain Ranch to the Turtle camp area for motorized use, would have the impact of introducing more vehicles to the riverside, an unnatural scenic element that would detract from scenic quality.

Additional recreation facilities in Segment 1 for boating and fishing would have little to no negative impact to scenic quality in that area.

Road Management - The proposed road treatments to widen and resurface the major access roads to the planning area, Topsy road and Boyle access road, could cause indirect, significant, negative impacts to scenic quality. This action could introduce a wider variety of visitors, and a large increase in the number of visitors to the area. This would have the effect of detracting from the natural appearance of the area. The proposed management of four bridges, open to all types of travel, would also contribute to a greater number and variety of people and vehicles in the area. The bridges would also have the effect of drawing more attention to nearby roads that currently are mostly hidden in the background of the view from the river. The construction of two new bridges, located at the upper end of Frain ranch and Stateline, would impact scenic quality by introducing major cultural modifications to otherwise natural appearing landscapes (see Map 20a).

Vegetation Management - These treatments, designed to increase vegetative and biological diversity would, in some cases, have short-term negative affects. While mitigation measures and treatments would be designed to minimize negative affects, some short-term negative affects would at times be visible. Such affects would include small piles of brush and small trees, small tree and brush stumps cut close to ground, and some ground disturbance from mechanized equipment. Other very short-term affects would include dust and smoke.

In many cases, vegetation treatments would enhance scenic quality. Some of these treatments would enhance existing scenery, by targeting areas near recreation sites or along roads that lack vegetative diversity. Treatments would be designed to enhance areas where existing vegetation such as large old growth trees or geologic features are hidden due to overstocked stands or decadent, old brush. For example, additional scenic vistas may be created through careful vegetation manipulation along Topsy Road and elsewhere. Targeted vegetative plantings would be used to improve scenic quality where vegetation is lacking, or to screen culturally modified areas from view (see Map 24).

Aquatic Species/Habitat Management - Management activities such as channel improvement/restoration, placement of large woody debris, and reconstruction of irrigation diversions, all have the potential to create short-term impacts to scenic quality. The presence of heavy equipment in the river, piles of materials stockpiled in central areas, and heavy helicopter traffic, could cause enough degradation to scenic quality to prompt negative perceptions of management actions and generate complaints to BLM, PacifiCorp, and other managing entities.

Proposed treatments that would restore large, woody debris to the river and stream banks would be located in areas that are highly visible and accessible to visitors. This action could negatively impact scenic quality during project construction (see Map 28).

Cumulative Impacts - Opportunities for maintaining primitive, natural appearing landscapes would be less likely under this alternative when compared to the other alternatives. Most roads, including primary access routes and facilities would be greatly improved. This would allow access to low clearance vehicles, likely increasing the amount and type of visitation into the area.

The greatest change to the scenic quality would be expected under this alternative. Greater crowding of facilities, developed facilities where there is presently limited or no development, improved motorized access and greater visitor contact would likely change the character of the scenic quality and visual resources in the planning area. It would be more difficult to maintain the standards for BLM VRM class II management of the planning area. This change in scenic quality may be great enough that the "scenic" ORV would not be maintained.

Irretrievable, Irreversible, and Unavoidable Impacts

Opportunities for viewing a very primitive, natural appearing landscape would be decreased or lost. The continued use of the Klamath River Edge trail from Frain Ranch to the Turtle camp area for motorized access would be an unavoidable impact to scenic quality near the river. The proposed developments such as recreation facilities, roads, bridges, and trails would irretrievably impact scenic quality. Alternative 4 would have the greatest unavoidable negative impacts to scenery when compared to the other alternatives. The landscape would appear more modified and developed with more intrusions and a less natural appearance.

Vegetation treatments proposed in all alternatives would help maintain or enhance scenery management. The treatments would have short-term negative impacts to scenery but the long-term benefits for maintaining or enhancing scenery. Fuel loading would be reduced, further protecting scenery from wildfire. A large-scale catastrophic wildfire would have irretrievable impacts to the scenic quality by burning down vegetative communities that would require 50-150 years to return. The most positive benefits would be in Alternative 3.

PacifiCorp structures and facilities of the J.C. Boyle hydroelectric project, such as water canals, emergency spillway, forebay, penstocks, transmission lines, substation, and power station, would have unavoidable negative impacts to scenic quality. The impact of some of these facilities may be addressed during the FERC relicensing process of the Klamath hydroelectric project.

Recreation

Assumptions

People visit the upper Klamath River canyon to gain a variety of outdoor recreation experiences. The types of experiences gained depend upon a combination of three factors: environmental (developed versus undeveloped landscape), managerial (less versus more restrictions or management controls) and social (fewer versus greater contacts with visitors). In the planning area, the primary variation by alternative is the relative change in the proposed level of development of recreation sites, trails and use areas to meet or exceed anticipated demand. Another primary variation is the amount of emphasis on motorized versus non-motorized recreation, and the level of improvements to the roads and transportation network.

Under all alternatives it is anticipated that dispersed recreation use would increase over the present. Each alternative that follows discusses anticipated recreation demand and how the plan addresses recreation use and developments, through monitoring and management actions.

It is anticipated that the selected alternative's recreation sites, trails and use areas, including any proposed projects would be maintained over time, in order to continue to meet public demand and visitor health and safety concerns. These actions would include the evaluation and removal of hazard trees and limbs as necessary to protect visitor safety. All proposed recreation project developments are contingent upon adequate funding for implementation.

Some proposed projects would require management agreements between BLM, PacifiCorp and other entities, BLM acquisition or PacifiCorp development.

Implementation of any recreation action proposed on private land or land managed by an agency other than the BLM will be contingent upon approval from the affected land owner or agency. This includes restrictions on target and varmint shooting, which would be implemented (to varying degrees) under all alternatives (contingent upon cooperation with Oregon Department of Fish and Wildlife, Oregon State Police and Klamath County Sheriffs Department). These restrictions would be placed in order to address a legitimate public concern and protect public welfare and property from unregulated shooting. Recreation actions that are linked to other proposed actions would, when practicable, be sequenced so as not to cause undue reductions in recreation access that would complicate implementation of the related project.

Impacts Common to All Alternatives

Scenery Management - Management actions designed to maintain, enhance or improve the river's scenic quality would benefit those recreationists seeking more primitive recreation experiences. Modifications to existing facilities, and existing roads would lessen existing negative visual impacts. Enhancing landscaping and visual screening at camping/day use areas would benefit the recreationist's experience. Vegetation treatment projects designed to reduce risk for catastrophic wildfire (long-term) would receive visual resource design review to have acceptable short-term visual resource impacts.

Recreation Facilities and Management - Facility development and maintenance would positively affect those visitors preferring primitive experiences may see facility development as a negative affect on their experience. However, abundant opportunities for more primitive recreation experiences away from developed facilities will be available.

Road Management - Motorized travel would be limited to designated "open" roads. Road closures and obliterations, using physical barriers and other means (fencing, etc.) would be used to discourage motorized vehicle use off of existing roads. This would help to decrease impacts to other resources from unregulated OHV use. Additional developed day use and camping on Topsy Reservoir (outside planning area) may need to be developed to meet future demands.

The following is common to Alternatives 1, 2 and 3 only: Road treatments designed to reduce erosion and vehicle rutting (through surface treatments) would keep motorized travel on existing roads (and out of meadows), while maintaining the semi-primitive motorized recreation experience. To maintain this semi-primitive motorized recreation experience, road treatments would be designed for the passage of high clearance and 4-wheel drive vehicles only. Some roads presently available for a semi-primitive motorized experience would be permanently closed and rehabilitated, seasonally closed, available for administrative access only or converted to non-motorized trails and this would reduce opportunities for recreational driving.

Cultural Resource Management - For protection of historic and prehistoric resources, user-developed, duplicate or unimproved roads and primitive camp sites may be closed and rehabilitated to prevent further resource degradation. In addition, some cultural sites may be capped with soil and re-vegetated to protect them from further OHV damage. These management actions would cause a long-term displacement of some existing motorized recreation use of these roads and sites, primarily on PacifiCorp lands in Oregon and California. Enhancing interpretation of cultural resources through displays, brochures and direct contact with recreationists would improve the visitor experience and increase awareness to protecting these valuable resources.

Vegetation Management - Prescribed fire and thinnings designed to increase vegetative and biological diversity would, in some cases, have short-term negative affects on recreation users. While mitigation measures and treatments would be designed to minimize these affects, some short-term negative affects would at times be visible to recreationists near recreation sites and use areas. Such effects would include small piles of brush and trees, small tree and brush stumps cut close to ground, and some ground disturbance from mechanized equipment. Other very short-term affects would include some localized exhaust smoke, noise dust from saws and machinery and smoke from controlled burns.

Vegetative treatments designed to reduce fuel loadings and ladder fuels would have positive long-term benefits to recreationists by reducing the likelihood of catastrophic stand replacing wildfires. Recreation sites use areas and existing opportunities would receive long-term protection from destructive wildfires. While all catastrophic wildfires might not be able to be prevented, vegetative treatments would reduce the risk, which would benefit recreation use. In many cases, vegetation treatments would enhance the recreation experience by increasing scenic and wildlife diversity. Some of these treatments would enhance existing scenery, by targeting areas near recreation sites or along roads that lack vegetative diversity. Treatments would be designed to enhance areas where existing vegetation such as large old growth trees or geologic features are hidden due to overstocked stands or decadent, old brush. For example, additional scenic vistas may be able to be created through careful vegetation manipulation along Topsy Road and elsewhere. Targeted vegetative plantings would be used to improve scenic quality where vegetation is lacking, or to screen culturally modified areas from view.

Terrestrial Species/Habitat Management - Improving habitat and structures for game birds (especially turkeys) and waterfowl would enhance game bird/waterfowl hunting opportunities. Road closures, vegetative treatments and wildlife structures should increase wildlife availability for hunting and viewing. In general, vegetation treatments or structures designed to enhance vegetation diversity and attract wildlife would have a positive long-term affect on recreation through increased opportunities for wildlife viewing and hunting.

Watershed Management Actions - Improved water quality and riparian vegetation conditions would have a positive benefit on recreationist's experiences and scenic quality.

Range Management - If cattle grazing were to resume, it would primarily be on PacifiCorp lands within the river corridor. Cattle grazing in the Frain Ranch area would have a negative impact to recreationists who find cattle objectionable. Cattle grazing in the Frain Ranch area and along the riverbanks in Segment 3 have caused trampled riparian vegetation, and denuded riverbanks.

Wild Horse Management - Wild horse management would have little or no impact on recreation. When wild horses are present in the canyon, they are typically considered to be beneficial to the recreation experience, much like viewing other wildlife.

Fire and Fuels Management - By reducing fuel loadings through prescribed fire and vegetative treatments, the long-term goal of reducing the chance of a catastrophic wildfire is more likely achieved. By reducing the chance of a catastrophic wildfire, both short and long-term objectives of maintaining scenic quality, recreation sites and use areas, and existing recreation opportunities would more likely be achieved. There would be short-term negative impacts to recreation visitors from noise, exhaust smoke and dust from mechanized fuel treatments, and from smoke, blackened tree boles and dead brush from prescribed fire activities.

Impacts of Specific Alternatives

(Refer to Maps 3, 13-16, 17a-20a, 21-28 and Table 5-1 and Appendix H)

Alternative 1

Scenery Management - See "Impacts Common to All Alternatives".

Recreation Facilities and Management - See "Impacts Common to All Alternatives". In addition, this alternative allows for the greatest unrestricted Off-Highway Vehicle (OHV) use, camping and other dispersed activities. This alternative benefits those recreationists seeking unstructured recreation with little controls on motorized access and a limited law enforcement presence. Existing road closures are minimal and cause little inconvenience to motorized access. Additional road closures and rehabilitation could occur, but other, nearby routes would be provided. Topsy Road would be nominated for designation to the National Back Country Byway System, which would highlight this historical stagecoach route. A slight increase in OHV traffic along Topsy Road would be expected from this designation (see Map 13).

Unrestricted target and varmint hunting (except where presently posted "No Shooting") would continue to occur, negatively affecting whitewater boaters and others intimidated by this recreational activity. There is a risk of an accidental shooting, mishap or even death from continued, unrestricted firearm use along the river's banks.

Most California PacifiCorp lands would continue to remain unavailable to the general public for hunting or other recreation activities.

Fishing access along Segment 1 would remain very primitive, and accessible only to those willing to challenge steep, rocky terrain. Barrier free access to fishing would be primarily limited to Topsy Recreation site and Spring Island River Access. Opportunities for kayaking and boating in Segment 1 would continue to be limited to times of high flow during spring and early summer. In Segment 2, river rapid scouting trails would likely be improved; however, dedicated non-motorized hiking trails would be limited.

River flows suitable for whitewater boating in Segments 2 and 3 would be expected to be maintained, however the timing of water releases would probably continue to be shifted to later in the afternoon. From 1980 to 1999 hydropower water releases allowed mid-morning float launches. Since 1999, water releases have shifted from mid-morning to later in the day, for hydropower production purposes. This shift in the timing of flows, from what has been traditional or historical, is negatively affecting commercial whitewater boating companies operation, and resulting revenues.

The commercial whitewater boating industry on the upper Klamath River became established in the early 1980s. Most companies were able to take advantage of a reliable and consistent flow pattern of mid-morning water releases, and marketed their trips with this consistency in mind. Based on discussions and several meetings with PacifiCorp, BLM and commercial whitewater boating companies, PacifiCorp worked with the commercial whitewater industry when possible to accommodate the timing of flows to benefit both hydropower production and rafting.

With a shift in the timing of water releases to later in the day, the number of commercial whitewater boating companies would be expected to stay the same or decline, especially if the availability of new commercial permits continues to be frozen and commercial operations become more difficult. The numbers of commercial trips and passengers would decrease, as it becomes more difficult to sell or market float trips later in the day. Pursuing consistent river flows, to provide for mid-morning launches, would improve commercial boating marketability/viability while maintaining the Scenic River recreational ORV.

Road Management - See "Impacts Common to All Alternatives". In addition, motorized access to primitive campsites and fishing presently available along the river near the old bridge site north of Frain Ranch (river left), and along the river northwest of Frain Ranch (river right) would be permanently closed. This would be a long-term permanent loss of motorized recreation access to primitive camping and fishing sites along this stretch of the river, however, non-motorized recreation and solitude opportunities would be improved. Most California PacifiCorp lands would continue to remain unavailable for motorized travel. Abundant opportunities for motorized travel throughout the planning area would still be available (see Map 17a).

Road management, especially construction of new roads or closure/decommissioning of existing roads not only affects the miles of road open to vehicle travel, but also tends to concentrate recreation use. The majority of visitors traveling by vehicle tend to recreate a very short distance (often 1/4 mile or less) from where they park. To give an indication of the effect that road system management has on the amount of access, the area within 1/4 mile of each open road was calculated. For Alternative 1, about 523 acres would be accessible from motorized vehicles in Segment 1, about 3,145 acres in Segment 2, and about 1,265 acres in Segment 3 (refer to Table 5-1).

Cultural Resource Management - See "Impacts Common to All Alternatives".

Vegetation Management - Alternative 1 proposes limited vegetative treatments, compared to the other alternatives. Limited vegetative treatments would not sufficiently reduce fuel loadings and reduce the risk of catastrophic wildfires. A catastrophic wildfire would cause a long-term impact to recreationists through a drastic reduction in vegetative diversity and scenic quality, and through the loss of recreation sites, use areas and opportunities (see Map 21).

Terrestrial Species/Habitat Management- See "Impacts Common to All Alternatives".

Watershed Management Actions - Improved water quality and riparian vegetation conditions would have a positive benefit on recreationists' experiences and scenic quality along the river.

Continuing to pursue the pending water rights claim for 1500 cfs during the primary whitewater use period would maintain the Scenic River recreation outstandingly remarkable value (Segment 2).

The closure of some roads parallel to the river or streams, to protect riparian values, should have minimal impact on most motorized recreation access (see Map 17a). Many of these road closures are proposed where road access is duplicated or available nearby (see above Road Management section for a discussion of long-term impact to primitive camping and fishing access due to road closures). The installation of barriers to prevent access across wet meadows would have a minor long-term negative affect on those OHV enthusiasts that enjoy driving across meadows. These users would likely seek out other nearby unregulated areas with similar qualities.

Aquatic Species/Habitat Management - Since Alternative 1 proposes little new enhancement of fish habitat or passage, the recreational fishing opportunities should remain fairly stable. Providing interpretive panels on fish habitat, history and recreational fishing opportunities would improve education efforts (see Map 25).

Range Management - See "Impacts Common to All Alternatives".

Fire and Fuels Management - Alternative 1 provides for the least prescribed fire treatment acres of all the alternatives. Therefore, the long-term goal of reducing the chance of catastrophic wildfire may not be achieved in time to prevent unavoidable impacts to recreation. Recreation sites use areas and the desired recreation experiences are presently threatened by the likelihood of wildfire. Therefore, Alternative 1 may have long-term negative impacts to recreation and scenic quality.

Cumulative Impacts - In this alternative, one developed campground (Topsy), and several designated dispersed campsites and developed day use sites would be available for public use. New trails would be constructed to provide additional non-motorized recreation opportunities, and meet an existing demand. Motorized tour routes would be identified. The overall recreation facility development scenario would provide a spectrum of recreation opportunities, from developed campgrounds to primitive campsites, and from semi-primitive motorized access to primitive non-motorized trails. Management controls, regulations and patrols would remain present but at a level which is subtle to most visitors. Public access to the planning area would be improved, with some access within certain areas reduced, although similar access will remain with other existing roads.

Recreation use such as fishing and camping will be expected to remain near the present level and increase slightly over time due to limited road improvements and developed facilities. Whitewater boating use may be expected to remain near current levels, with slight decreases over time if the timing of water releases continues to be later in the day. Some displacement of OHV visitors would be expected as roads and areas presently used are closed or rehabilitated.

Limited vegetation management (compared to the other alternatives) would not sufficiently reduce fuel loadings and reduce the risk of catastrophic (forest stand replacing) wildfires. Increased water quality and quantity would benefit the recreational experience.

Alternative 2

Scenery Management - See “Impacts Common to All Alternatives”.

Recreation Facilities and Management - Alternative 2 provides additional developed camping, day use sites, interpretive facilities, non-motorized trails and designated OHV routes that would benefit those recreationists seeking a more structured recreation experience while maintaining abundant opportunities for dispersed, more primitive recreation and solitude (see Map 14).

Off-highway vehicle (OHV) tour routes would be designated on existing roads, signed and have informational brochures to provide scenic tour opportunities for users. This would improve management of existing OHV use, through information/education efforts while improving long-term protection of resource values associated with these routes. Opportunities for organized tours (regulated with permits) would be recommended on some Segment 3 semi-primitive roaded PacifiCorp lands (not currently open), assuming management agreements or BLM acquisition were pursued. While motorized use on designated tour routes is expected to increase over the present, long-term resource damage to roads and other resources is expected to decrease, due to better road management, education and partnership efforts.

Proposed additional law enforcement patrols, along with educational efforts, would also reduce vandalism and increase compliance with regulations. However, it would be necessary to secure funding from grants, PacifiCorp and others to provide the additional law enforcement patrols.

Unregulated target shooting and varmint hunting would be restricted from about one-half of the planning area during the summer season. While this management action would displace this activity to areas outside of camping and visitor use areas during a portion of the year, visitor safety would be significantly improved. Additional areas for non-motorized target shooting and hunting would be available on some Segment 3 (California) PacifiCorp lands, assuming management agreements or BLM acquisition were pursued. This would be a long-term benefit for hunters, as these areas are presently closed to public access.

Access to some places will be improved, therefore, some primitive, difficult to use (non-developed), fishing access opportunities would be eliminated under this alternative. Some opportunities for solitude would be permanently lost.

Fishing opportunities, especially in Segment 1, would be significantly improved under this alternative, with several new fishing access trails and parking areas being developed. In Segment 2, additional trail access would also provided, to areas presently inaccessible. With this improved fishing access, accessibility for those with disabilities would be provided at several sites in Segments 1, 2 and 3 (presently available at only one site each in Segment 1 and 2).

A wide variety of camping opportunities would be available/provided. Fully developed campgrounds, with on-site caretakers would continue to be available at Topsy Reservoir, including a new campground in Segment 3 (Shovel Creek site). New and additional designated campsites and relocation of some existing facilities in Segments 2 and 3, would reduce resource damage and provide for human waste containment. Non-motorized, dispersed camping would continue to be available. Additional areas for dispersed camping would be available on some Segment 3 (California) PacifiCorp lands, assuming management agreements or BLM acquisition was completed. This would be a long-term benefit for those seeking primitive camping, as these areas are presently closed to public access.

Several new trails would greatly improve nonmotorized recreation opportunities and access to remote areas. New footbridge in the Frain Ranch area would greatly expand loop trail opportunities. Existing rapid scouting trails would be upgraded, improving boater safety. New areas would be available for non-motorized recreation on Segment 3 (California) PacifiCorp lands, assuming management agreements or BLM acquisition were completed. This would greatly expand hiking, mountain biking and horseback riding opportunities in an area that is presently closed to public access. At times, non-motorized recreationists would share area access with permitted, organized OHV tour groups.

Boating and kayaking river access would be provided on PacifiCorp lands (assuming management agreements or BLM acquisition were completed) in segment 1 (assuming enhanced river flows), and improved in segment 2 (Frain ranch), and in segment 3 (Stateline and at Fishing Access 6), and at Fishing Access 1 immediately outside the planning area. Pursuing consistent river flows, to provide for mid-morning launches, would improve commercial whitewater boating marketability and viability while maintaining the scenic river recreational ORV.

Motorized boating would be unavailable permanently in all segments under this alternative, except by special use authorization, such as for conducting scientific research or movie production. Motorized boating use is currently non-existent or at a miniscule level due to naturally occurring restrictions such as shallow, rough and rocky river sections, and extremely difficult and numerous rapids.

Interpretive/environmental education efforts and day use opportunities would be improved and expanded. These efforts would be designed to improve visitor information services, while increasing visitor compliance with rules and regulations and reducing vandalism and resource damage. Additional developed day use and scenic overlook sites would enhance the recreational experience by highlighting educational opportunities and scenic vistas.

Many of these development proposals are located on PacifiCorp lands, in Oregon and California. To achieve these developments, management agreements, BLM acquisitions or PacifiCorp development would be necessary. In addition, it would be necessary to acquire funding or grants from PacifiCorp for increased law enforcement and for enhancing or developing recreation facilities.

Road Management - Under this alternative, several roads presently available for a semi-primitive motorized experience would be permanently closed (due to road decommissioning), seasonally closed, available for administrative access only, or converted to non-motorized trails (see Maps 18a and 18b). Compared with Alternative 1, opportunities for relatively unrestricted OHV use would be permanently lost. In general, road decommissioning and closures would slightly reduce motorized access to the planning area for recreation opportunities. Abundant opportunities for motorized travel would still be available, however.

Motorized access to primitive campsites and fishing presently available along the river near the old bridge site area north of Frain Ranch (river left), and along the river northwest of Frain Ranch (river right) would be permanently closed. However, short spur roads would be constructed to provide access to several newly designated campsites in these areas. Several other duplicate roads would be recommended to be closed in the Frain Ranch area. These road closures would be a permanent loss of motorized recreation access to primitive camping and fishing sites along this stretch of the river, however non-motorized recreation and opportunities for solitude would be improved. PacifiCorp lands in California would continue to remain unavailable for motorized travel, except for areas where organized tours (regulated with permits) are being proposed.

Road management, especially construction of new roads or closure and decommissioning of existing roads not only affects the miles of road open to vehicle travel, but also tends to concentrate on recreational use (see Map 18a). The majority of visitors traveling by vehicle tend to recreate a very short distance (often 1/4 mile or less) from where they park. To give an indication of the effect that road system management has on the amount of access, the area within 1/4 mile of each open road was calculated. For Alternative 2, about 356 acres would be accessible from motorized vehicles in Segment 1, about 2,975 acres in Segment 2, and about 1,514 acres in Segment 3 (refer to Table 5-1). Relative to Alternative 1, this alternative would entail a 32 percent reduction in motorized access in Segment 1, a five percent reduction in Segment 2, and a 16 percent increase in Segment 3.

Cultural Resource Management - See "Impacts Common to All Alternatives".

Vegetation Management - Alternative 2 would increase vegetative treatments compared to Alternative 1. This would provide additional areas with reduced fuel loadings and thereby reduce the risk for catastrophic wildfires to occur. Disturbance to the recreating public from use of equipment (noise and dust) and smoke from prescribed fire would have short-term impacts (see Map 22). Terrestrial Species/Habitat Management - Alternative 2 would provide enhanced wildlife viewing and hunting opportunities through greater types of habitat improvements and structures, compared to Alternative 1.

Watershed Management Actions - Pursuing increased water flows for the Bypass Reach (Segment 1) on weekends during spring through fall, and increased instream flows for fish habitat and passage at other times, would greatly enhance kayaking and boating opportunities. This would lead to increased whitewater boating use in the Bypass Reach (where there is presently a miniscule amount). This whitewater use would be managed to maintain the semi-primitive recreation experience (see Appendix H, Recreation, Private Boating and Commercial Boating for management recommendations). Continuing to pursue the pending water rights claim for 1500 cfs during the primary whitewater use period would maintain the scenic river recreational outstandingly remarkable value (Segment 2).

The closure of roads parallel to the river or streams should have minimal impact on most motorized recreation access. (See above Road Management section for discussion of long-term impacts to primitive camping and fishing access from road closures). Many of these road closures are proposed where road access is duplicated or available nearby (see Map 18a). The installation of barriers to prevent access across wet meadows would have a minor long-term negative affect on those OHV enthusiasts that enjoy driving across meadows. These users would likely seek out other nearby unregulated areas with similar qualities.

Aquatic Species/Habitat Management - Enhancing fish habitat and passage through riparian/vegetation treatments, structural changes and channelization efforts should positively affect recreational fishing opportunities by increasing numbers and sizes of resident fish. Providing for enhanced fish passage at J. C. Boyle dam should improve fishing opportunities by enhancing the ability of native fish to migrate above and below the dam. Enhancements at the J. C. Boyle fish ladder should increase opportunities for viewing fish and interpretation of fish migration patterns. Removal of sidecast material and installation of bankfull benches along the Bypass reach affected by the canal would enhance the recreation experience with the subsequent creation of a hiking trail and fishing access along this reach. Channel width treatments would have long-term benefits of enhancing opportunities for whitewater boating (by creating additional, deeper rapids), and recreational fishing (through the creation of additional deep pools).

Range Management - See "Impacts Common to All Alternatives".

Fire and Fuels Management - See "Impacts Common to All Alternatives". In addition, Alternative 2 increases the use of prescribed fire and vegetative treatments as a management tool to reduce fuel loadings (compared to Alternative1). This would more likely achieve both short and long-term goals of reducing the risk of catastrophic wildfires. By reducing the risk of wildfires, scenic quality, desired recreation experiences, and recreation sites would be maintained. However, under Alternative 2, there would be greater short-term negative impacts to recreation visitors. This is because there would be increased noise and dust from more fuel treatment areas, and more smoke, blackened tree boles and dead brush from increased prescribed fire activities.

Cumulative Impacts - In Alternative 2, two developed campgrounds (Topsy and Shovel Creek) would be provided, and additional designated dispersed campsites and developed day use sites would be available for public use (compared to Alternative 1). Barrier free access to facilities and existing trails would be improved. New trails would be constructed to provide additional non-motorized recreation opportunities, including providing fishing access to Segment 1 (Bypass reach). Some primitive, difficult to use fishing access and solitude opportunities would be unavailable. New footbridge access would be provided near Frain Ranch and Shovel Creek. Additional motorized tour routes would be identified, in conjunction with increased OHV and other educational efforts. The overall recreation facility development scenario would provide a spectrum of recreation opportunities, from developed campgrounds to primitive campsites, and from semi-primitive motorized access to primitive non-motorized trails. Management controls, regulations and patrols (i.e., management setting) would remain present but at a level which is subtle to most visitors. However, this managerial setting would be at a higher level than Alternative 1, and may cause some recreationists to seek out more primitive or less structured areas. Public access to the planning area would be improved for safer travel, along with a reduction in road access, although access will remain with other nearby roads. Some opportunities for primitive (non-designated) camping would be lost due to road or campsite closures or improvements to existing campsites.

Recreation use such as fishing and camping will be expected to remain near the present level and increase slightly over time due to limited road improvements and developed facilities. Whitewater boating use may be expected to remain near current levels, with slight increases over time, if the timing of water releases provide for mid-morning launches. Kayaking and boating opportunities would be expected to improve with more consistent flows, especially for Segment 1. Motorized boating would be permanently unavailable in all segments, except under special use authorization. Some displacement of OHV visitors and loss of OHV opportunities would be expected as roads and areas presently open are closed or rehabilitated. Additional firearm use restrictions in about one-half of the planning area would be implemented to protect visitors and property. Some opportunities for primitive (non-designated) camping would be lost due to road or campsite closures or improvements to existing campsites.

Increased vegetation management (compared with Alternative 1) would help to reduce fuel loadings and the risk of catastrophic (forest stand replacing) wildfires. Increased water quality and quantity would benefit the recreational experience.

Alternative 3

Scenery Management - See "Impacts Common to All Alternatives".

Recreation Facilities and Management - Alternative 3 provides limited developed camping, day use, interpretive facilities and non-motorized trails that would benefit those recreationists seeking a less structured recreation experience (see Map 15). The greatest opportunities for dispersed, more primitive recreation and solitude would be available under this alternative.

Off-highway vehicle (OHV) users would face the greatest restrictions in Alternative 3. The greatest reduction in designated roads open to OHV travel would be made in Alternative 3, compared to other alternatives. More restricted travel would also be recommended for PacifiCorp lands in Segment 2. More restricted travel would be recommended for PacifiCorp lands in Oregon. No OHV tour routes would be designated and signed under this alternative. Segment 3 semi-primitive roaded PacifiCorp lands would remain closed to motorized use, continuing the existing level of resource protection. Better management of OHV use would also occur through information/education.

While motorized use of existing roads is expected to stay the same or slightly increase over the present, long-term damage to roads and other resources is expected to decrease, due to better road management, educational and partnership efforts. Existing law enforcement patrols, along with other visitor contact efforts, would likely be reduced, increasing the potential for vandalism and decreasing compliance with regulations.

Fishing access in segment 1 would remain similar to the existing situation (Alternative 1). Under this alternative, no new river access trails or parking areas would be provided in segment 1. The bypass canal access road would be available for non-motorized use only, as would the bridge immediately below J.C. Boyle Dam. In segment 2, additional trail access would also provided, to areas presently inaccessible. Accessibility to those with disabilities would remain similar to the existing situation, with access provided at Topsy Recreation Site and Spring Island launch site.

Opportunities for unregulated target shooting and varmint hunting would be restricted during the summer season in all segments under this alternative. While this management action would displace this activity to areas outside of camping and visitor use areas during a portion of the year, visitor safety would be significantly improved.

Fewer developed camping opportunities would be available compared to the other alternatives. A fully developed campground, with on-site caretakers, would continue to be available, but only at Topsy campground. The closure of the access road and relocating of campsites in the Klamath River Campground, to above the riparian reserve, would impact those campers desiring an improved camping area next to the river. No additional developed camping facilities would be provided in Segment 1, 2 or 3, to reduce resource damage and provide a more "rustic" camping experience.

The closure of the lower bench area at Stateline Recreation Site to motorized recreation would negatively impact those boaters, fishermen and campers that use this river access area. Under Alternative 3, PacifiCorp Fishing Access #6 is proposed for development as a substitute area for overnight camping and river access. Even if Fishing Access #6 were to be developed for camping, it would not provide a similar level of solitude, or the more natural and remote setting the Stateline lower bench area at provides. This is due to its close proximity to the access road, and lack of suitable shade trees with level, smooth camping sites.

Several existing designated dispersed camps and user created camps would be permanently closed and rehabilitated. Stateline Recreation Site lower bench area (BLM land) would be permanently closed to motorized access and camping. Replacement campsites would be provided at the upper Stateline bench and at Fishing Access #6, if PacifiCorp lands were available for development. This would cause a moderate increase in recreation use level at this site and require an increased level of existing development and maintenance. Non-motorized, dispersed camping would be available throughout the planning area.

Several newly constructed trails and roads converted to trails would be provided, greatly enhancing non-motorized recreation opportunities and access to remote areas. However, no new bridges would be provided, eliminating loop trail opportunities. Existing user created, rapid scouting trails would be improved.

Kayaking opportunities would likely become available year-round in Segment 1 (assuming enhanced river flows for fisheries). However, whitewater boating opportunities may be greatly reduced during the summer months, in Segments 2 and 3 (assuming reduced/stabilized flows for fisheries). Permitted boating numbers would subsequently be reduced, enhancing the semi-primitive recreation experience for those boaters able to conduct a float trip (see Appendix H, Recreation, Private Boating and Commercial Boating for management recommendations). However, this would have long-term negative impacts to commercial whitewater boating companies and opportunity for boaters to choose float days.

Interpretive/environmental education efforts and day use opportunities would be improved and expanded over the existing situation (but at a reduced level from Alternatives 2 and 4). These efforts would be designed to improve visitor information services, while increasing visitor compliance with rules and regulations and reducing vandalism and resource damage. Only limited day use and scenic overlook sites would be available along Topsy Road, reducing the recreational experience and educational opportunities (compared with Alternatives 2 and 4). Existing user created overlooks at Hell's Corner and Salt Caves would be closed to motorized travel.

Road Management - Alternative 3 would receive the most extensive road closures, seasonal use restrictions and road restoration efforts of all alternatives (see Map 19a). Road mileage reductions would decrease motorized travel opportunities. Road treatments designed to reduce erosion and vehicle rutting (through spot surface treatments or road relocation) would help keep motorized travel on existing roads (and out of meadows). The opportunities for a semi-primitive motorized recreation experience would be reduced under this alternative, as many roads are improved for resource protection.

Many roads presently available for a semi-primitive motorized experience would be permanently closed or converted to non-motorized use. This reduction in access in the planning area would be a long-term negative impact to motorized recreation compared to the other alternatives. However, opportunities for activities such as hiking, biking and horseback riding away from vehicle traffic would be greatly increased under this alternative. Additional non-motorized trails not currently open to public use would be available in Segment 3 in California (assuming management agreements or BLM acquisition of PacifiCorp lands was completed).

Road management, especially construction of new roads or closure/decommissioning of existing roads not only affects the miles of road open to vehicle travel, but also focuses recreation use. The majority of visitors traveling by vehicle tend to recreate a very short distance (often 1/4 mile or less) from where they park. To give an indication of the effect that road system management has on the amount of access, the area within 1/4 mile of each open road was calculated. For Alternative 3, about 356 acres would be accessible from motorized vehicles in Segment 1, 2,828 acres in Segment 2, and 1,182 acres in Segment 3 (refer to Table

5-1). Relative to Alternative 1, this alternative would entail a 32 percent reduction in motorized access in Segment 1, a 10 percent reduction in Segment 2, and a six percent reduction in Segment 3.

Cultural Resource Management - The restoration and rehabilitation of historic structures under Alternative 3 would enhance the recreation experience by providing for the long-term availability for viewing and interpretation of these important structures.

Vegetation Management - Alternative 3, with the greatest amount of vegetation treatment acres would, in some cases, have the greatest opportunity for short-term negative effects on recreation users (see Map 23). This would be because of increased noise, dust and smoke from greater amounts and types of vegetative treatments. There would also be greater numbers of stumps and small tree and brush piles which some recreationists may find disagreeable.

The installation of barriers to prevent access across wet meadows would reduce the area OHV users have used in the past.

Terrestrial Species/Habitat Management - Under Alternative 3, the greatest amount of vegetation treatments would be conducted to restore vegetation diversity that would maintain and enhance wildlife populations. This should have a positive long-term effect on recreation activities through increased opportunities for wildlife viewing and more primitive hunting. There would be a short-term negative effect from additional noise, dust, and smoke from greater amounts and types of vegetative treatment. However, the closing of roads and recreation sites for protection of wildlife species (ex: Frain Ranch and Klamath River campground) would reduce the amount of roads for hunting access and developed sites available for motorized camping.

Watershed Management Actions - The likely reduction in available water releases for whitewater rafting in Segments 2 and 3 would negatively affect recreation (see Cumulative impacts section). Compared to the other alternatives, Alternative 3 would close additional roads and recreational developments and use areas within riparian reserves (see Map 19a). This would reduce the availability of designated sites and primitive camping areas available for motorized camping, and would be a long-term negative impact to dispersed recreationists.

Pursuing increased water flows for the Bypass Reach (Segment 1) on weekends during spring through fall, and increased instream flows for fish habitat and passage at other times would greatly enhance kayaking and boating opportunities. This would lead to increased whitewater boating use of the Bypass Reach (where there is presently a miniscule amount).

Aquatic Species/Habitat Management - Enhancing fish habitat and passage through riparian/vegetation treatments, riverbank structural changes and channelization efforts should positively affect recreational fishing opportunities by increasing numbers and sizes of resident fish (see Map 27). Providing for fish passage would enhance the diversity of fishing opportunities by re-establishing native anadromous fisheries currently available only below Iron Gate Reservoir. Enhancements at J.C. Boyle Dam fish ladders should increase opportunities for viewing fish and interpretation of fish migration patterns.

If emergency water release chute under this alternative was removed rather than rebuilding or retrofitting it, the present safety concerns for fishermen from unexpected emergency flow releases along the Bypass reach would be eliminated. Extensive channel width treatments may provide additional whitewater boating opportunities at reduced water release levels (by creating a narrower river channel and deeper rapids), and recreational fishing (through the creation of additional deep pools and more stabilized flows). The removal of most or all stream channel irrigation diversions would eliminate or reduce the size of some existing man-made rapids in Segment 3. This could negatively affect the whitewater boating experience, although these rapids are in the flatter section of the river. The addition of large logs into the river channel would create additional obstacles, and increase potential safety hazards to whitewater boating.

Range Management - Under Alternative 3, cattle grazing would likely only occur to meet other management or restoration objectives. This would benefit those recreationists who find cattle objectionable.

Fire and Fuels Management - Under Alternative 3, greater short-term negative effects, (such as additional blackened tree boles and dead brush and trees) would be visible to recreationists through the increased use of prescribed fire. However, recreationists would have long-term benefits from maintenance and enhancement of forest and range health. These benefits would include the long-term maintenance of scenic quality and values, recreation sites and use areas and existing recreation opportunities.

Cumulative Impacts - In this alternative, one developed campground (Topsy), and limited designated dispersed campsites, developed day use sites and interpretive facilities would be available for public use. Stateline Recreation Site (lower bench area) would be closed to camping when Fishing Access 6 is available for development. Several newly constructed trails would be provided for additional non-motorized recreation opportunities primarily in Segment 2. No motorized tour routes or bridges would be provided. The bridge below J.C. Boyle dam would be open for non-motorized use. The overall recreation facility development scenario would provide a spectrum of recreation opportunities, from developed campgrounds to primitive campsites, and from semi-primitive motorized access to primitive non-motorized trails. However, under Alternative 3 the number of developed facilities would be reduced from Alternative 1. Management controls, regulations and patrols would remain present but at a reduced level to enhance solitude for most visitors. Public access to the planning area would be improved the least under this alternative, and have the greatest reduction in open roaded access. The greatest opportunity for solitude and more primitive recreation pursuits would be available under this alternative.

Recreation use such as fishing and camping will be expected to remain near the present level and increase slightly over time due to the limited road improvements and reduction in developed facilities. Kayaking opportunities would likely become available in segment 1 with increased/stabilized flows, however, whitewater boating use in Segment 2 and 3 would be expected to decrease over time if the amount of water releases is much below 1500cfs. This could impact the viability of commercial whitewater boating companies and commercial/private passenger's ability to float the river. Some displacement of OHV visitors would be expected as roads and areas presently used are closed or rehabilitated. Additional firearm use restrictions in about one-half of the planning area would be implemented to protect visitors and property. Some opportunities for primitive (non-designated) camping and designated camping close to the river would be lost due to road or campsite closures or relocations.

The greatest amount of vegetation management (compared to the other alternatives) should sufficiently reduce fuel loadings and reduce the risk of catastrophic (forest stand replacing) wildfires. There would be additional short-term impacts from increased noise, dust and smoke from vegetation management and prescribed fire operations. Increased water quality and quantity would benefit the recreational experience, and stream restoration efforts may facilitate whitewater floating at lower water levels, after implementation. Livestock grazing would be greatly reduced in Alternative 3, benefiting those recreationists who find grazing objectionable.

Alternative 4

Scenery Management - See "Impacts Common to All Alternatives"

Recreation Facilities and Management - Alternative 4 provides the greatest amount of developed camping, day use, interpretive facilities and hiking trails of all the proposed alternatives (see Map 16). This alternative would benefit those recreationists seeking a more structured, and/or less primitive, recreation experience. While opportunities for dispersed, more primitive recreation and solitude would be available, it would be the most limited under this alternative.

Many of these development proposals would be recommended for PacifiCorp lands, in Oregon and California. To achieve these developments, management agreements, BLM acquisition or PacifiCorp development would be necessary. In addition, it would be necessary to acquire funding or grants from PacifiCorp for increased law enforcement and for enhancing/developing recreation

This alternative also provides the greatest amount of Off-highway vehicle (OHV) opportunities or maintained roads. OHV tour routes would be on existing (but greatly improved) roads and designated, signed and have informational brochures to provide scenic tour opportunities for users. This would improve management of existing OHV use, through information/education efforts while improving protection of resource values associated with these routes. New vehicle bridges would greatly expand motorized loop tour opportunities. New tour routes would be provided, primarily in Segment 3 in California (PacifiCorp lands not currently open) assuming management agreements or BLM acquisition were completed.

While motorized travel on designated tour routes is expected to increase over the present, long-term resource damage to roads and other resources is expected to decrease, due to better road management, educational and partnership efforts. Additional law enforcement patrols, recreation site caretakers, along with educational efforts, would be provided to reduce vandalism and increase compliance with regulations.

Opportunities for unregulated target shooting and varmint hunting would be restricted during the summer season. While this management action would displace this activity to areas outside of camping and visitor use areas during a portion of the year, visitor safety would be significantly improved. Additional areas for target shooting and hunting would be available on non-motorized access only on Segment 3 (California) PacifiCorp lands, assuming management agreements or BLM acquisition was pursued. This would be a long-term benefit for hunters, as these areas are presently closed to public access.

Fishing access, especially in Segment 1, would be greatly improved. Like Alternative 2, several new fishing access trails and parking areas would be provided. In addition, a fishing access platform, expanded fishing trail, and improved parking areas are proposed for Segment 1. In Segment 2, additional new trail access would also be provided (compared with Alternative 2). Accessibility to those with disabilities would be the most enhanced under this alternative, and would be available at several sites in Segment 1, 2 and 3 (presently available at one site each in Segments 1 and 2 only). Some primitive, non-developed fishing access opportunities would be eliminated under this alternative. Some opportunities for solitude would be permanently lost.

A wide variety of camping opportunities would be available/provided. Fully developed campgrounds, with on-site caretakers would continue to be available, including new campgrounds in Segment 1 (Big Bend Park) Segment 2 (Powerhouse site), and Segment 3, (Shovel Creek site on PacifiCorp lands). The Klamath River campground in Segment 2 would be greatly expanded and upgraded, and would become a fee site. New and additional facilities would be provided and some existing facilities would be relocated in Segment 2 and 3, to reduce resource damage and provide for human waste containment. Non-motorized, dispersed camping would be reduced and in some cases eliminated in Segment 2. However, additional areas for dispersed camping would be available on some Segment 3 (California) PacifiCorp lands, assuming management agreements or BLM acquisition was completed. New group camping sites would be available in Segments 2 and 3. Campgrounds with RV hook-ups (water and power) could be available at Topsy campground and Shovel Creek site.

Several new trails, in addition to those proposed in Alternative 2, would be provided, greatly improving non-motorized recreation opportunities and access to remote areas. However, the Klamath River Edge trail from Frain Ranch (river right) to the Turtle camp area would be maintained for motorized travel, a loss to non-motorized recreationists. No dedicated non-motorized footbridges would be provided (bridges would be open to shared motorized and non-motorized use). Existing river rapid-scouting trails would be upgraded, improving boater safety.

Boating and kayaking river access would have the greatest improvements under Alternative 4. New facilities would be provided in Segment 1 (on PacifiCorp lands, assuming enhanced river flows), including a new kayak launch, parking area and restroom and improved in Segment 2 (Frain ranch, Caldera rapid and Tom Creek), and Segment 3 (Stateline and Fishing Access 6). Fishing Access 1, immediately outside the planning area would also provide improved boating access.

Improved road conditions and providing regular road maintenance would likely enhance commercial boating operations by improving access, passenger comfort and reducing vehicle breakdowns. Pursuing the timing of consistent river flows, to provide for mid-morning launches, would improve commercial boating marketability and viability while maintaining the Scenic River recreational ORV.

Motorized boating would be allowed under this alternative, for Segment 3 only. This is unlikely to affect recreationists in Segment 3, as motorized use would be expected to remain negligible and flow levels may be insufficient.

This alternative provides the greatest level of interpretive/environmental education efforts and developed day use facilities. These efforts would be designed to improve visitor information services, while increasing visitor compliance with rules and regulations and reducing vandalism and resource damage. Additional day use and scenic overlook sites would enhance the recreational experience by highlighting scenic vistas and educational opportunities.

Road Management - Road treatments designed to reduce erosion and vehicle rutting (through surface treatments) would help keep motorized travel on existing roads (and out of meadows). The availability of semi-primitive motorized tour routes would be most limited under this alternative. Main access routes would be greatly improved, allowing passenger type vehicle access. Several roads presently available for a semi-primitive motorized experience would be permanently improved, closed, seasonally closed and available for administrative access only, or converted to non-motorized trails. Compared to the other alternatives, Alternative 4 would provide the greatest improvement in motorized access (see Maps 20a and 20b). This would significantly increase motorized recreation use. It would also change the existing recreation management emphasis from semi-primitive motorized recreation opportunity spectrum (ROS) class to a roaded natural ROS class. This action would require an RMP amendment.

Road management, especially construction of new roads or closure/decommissioning of existing roads not only affects the miles of road open to vehicle travel, but also focuses recreation use. The majority of visitors traveling by vehicle tend to recreate a very short distance (often 1/4 mile or less) from where they park. To give an indication of the effect that road system management has on the amount of access, the area within 1/4 mile of each open road was calculated. For Alternative 4, about 508 acres would be accessible from motorized vehicles in Segment 1, 3,125 acres in Segment 2, and 2,014 acres in Segment 3 (refer to Table 5-1). Relative to Alternative 1, this alternative would entail a three percent reduction in motorized access in Segment 1, a less than one percent reduction in Segment 2, and a 37 percent increase in Segment 3.

Cultural Resource Management - See "Impacts Common to All Alternatives". In addition: Alternative 4 would provide the greatest enhancements of interpretation of cultural resources through displays, brochures and direct contact with recreationists. This would enhance the visitor experience and increase awareness to protecting these resources.

Vegetation Management - Alternative 4 would increase vegetative treatments compared to Alternative 1, especially around recreation sites and to enhance important wildlife habitat. (see Map 24). This would provide additional protection around recreation use areas by reducing fuel loadings and thereby reduce the risk for a catastrophic wildfire to occur. A catastrophic wildfire would cause a long-term negative impact to recreationists through a drastic reduction in vegetative diversity and scenic quality, and through the loss of recreation sites, use areas and opportunities.

Terrestrial Species/Habitat Management - Alternative 4 would have the greatest positive benefit to recreation users as it would highlight Watchable Wildlife around recreation sites and use areas. Management actions would enhance structures and habitat for viewing game and other desirable species. This would benefit recreation users by enhancing the quality of recreation experience.

Watershed Management Actions - Pursuing increased water flows for the Bypass Reach (Segment 1) on weekends during spring through fall, and increased instream flows for fish habitat and passage at other times would greatly enhance kayaking and boating opportunities. This would lead to increased whitewater boating use for the Bypass Reach (where there is presently a miniscule amount). This whitewater use would be managed to maintain a roaded natural recreation experience (see Appendix H, Recreation, Private Boating; and Commercial Boating for management recommendations). Continuing to pursue the pending water rights claim for 1500cfs during the primary whitewater use period would maintain the Scenic River recreation value (Segment 2).

The closure of roads parallel to the river or streams should have minimal impact on most motorized recreation access (see Map 20a). Many of these road closures are proposed where road access is duplicated or available nearby. The installation of fencing and barriers to prevent access across wet meadows would have a minor long-term negative affect on those OHV enthusiasts that enjoy driving across meadows. These enthusiasts would likely seek out other nearby unregulated areas with similar qualities.

Aquatic Species/Habitat Management - Alternative 4 provides the greatest enhancements for improving recreational fishing opportunities (see Map 28). Fish habitat and passage improvements through riparian/vegetation treatments, structural changes and channelization efforts, should positively affect recreational fishing opportunities by increasing numbers and sizes of resident fish. Providing for enhanced fish passage at J.C. Boyle dam should improve fishing opportunities by enhancing the ability of native fish to migrate. Enhancements at the J.C. Boyle fish ladder should increase opportunities for viewing fish and interpretation of fish migration patterns. Removal of sidecast material along the Bypass reach affected by the canal would enhance the creation of a hiking trail and fishing access along this reach. Channel width treatments would enhance whitewater boating (by creating additional, deeper rapids), and recreational fishing (through the creation of additional deep pools).

Range Management - Alternative 4 would provide additional enhancement measures (such as fencing recreation sites) to reduce negative impacts if cattle grazing were to resume around recreation sites and use areas. This would provide a positive psychological benefit to those recreationists who find cattle grazing to be objectionable.

Fire and Fuels Management - Alternative 4 increases the use of prescribed fire and vegetative treatments as a management tool to reduce fuel loadings (compared to Alternative 1) around recreation sites and along roads. This would more likely achieve both short and long-term goals of reducing the chance of a catastrophic wildfire. By reducing the risk of a catastrophic wildfire, scenic quality, the desired recreation experience and recreation sites would be maintained. However, under Alternative 4, there would be greater short-term negative impacts to recreation visitors. This is because there would be increased noise and dust from greater use of mechanical equipment in fuel treatment areas, and more smoke, blackened tree boles and dead brush from increased prescribed fire activities near recreation sites.

Cumulative Impacts - In Alternative 4, five developed campgrounds (Topsy, Klamath River, Turtle, Lower Frain and Shovel Creek) would be provided, and the largest increase in additional designated dispersed campsites and developed day use sites would be available for public use (compared to Alternative 1). Barrier free access to facilities and existing trails would be improved. The most new trails would be constructed (compared to the other alternatives) to provide additional non-motorized recreation opportunities, including providing fishing access to the entire length of Segment 1 (Bypass reach). Some primitive, difficult to use fishing access and solitude opportunities would be unavailable. New motorized accessible bridges would be provided near Frain Ranch and Shovel Creek. The greatest number of motorized tour routes would be identified, in conjunction with increased OHV and other educational efforts.

The overall recreation facility development scenario would provide a spectrum of recreation opportunities, from developed campgrounds and designated campsites, and from roaded natural motorized access to primitive non-motorized trails. Management controls, regulations and patrols (i.e., management setting) would be noticeable (at the highest level compared to the other alternatives) but would remain subtle to most visitors. This management setting may cause some recreationists to seek out more primitive or less structured areas. Public access to the planning area would receive the greatest improvement for safer travel, allowing access by passenger type vehicles in many areas. This would change the character or recreation opportunity setting from a semi-primitive motorized to a roaded natural experience, and would result in a need to amend the RMP. Visitation would be expected to significantly increase due to these road improvements. Several roads presently available for a semi-primitive motorized recreation experience would be unavailable under this alternative. Several opportunities for primitive (non-designated) camping would be lost due to road or campsite closures or improvements to existing campsites.

Recreation use such as fishing and camping will be expected to increase significantly over time due to extensive road improvements and developed facilities. Whitewater boating use would also be expected to increase over current levels, due to more consistent water releases providing for mid-morning launches. Kayaking and boating opportunities would be expected to improve with more consistent flows, especially for Segment 1. Motorized boating would be permanently unavailable in Segments 1 and 2, except under special use authorization, but would be available in Segment 3. Some displacement of OHV visitors and loss of OHV opportunities would be expected as roads and areas presently open are closed or rehabilitated. Additional firearm use restrictions in about one-half of the planning area would be implemented to protect visitors and property. Some opportunities for primitive (non-designated) camping would be lost due to road or campsite closures or improvements to existing campsites.

Increased vegetation management (compared with Alternative 1) would help to reduce fuel loadings and the risk of catastrophic (forest stand replacing) wildfires. There would be additional short-term impacts from increased noise, dust and smoke from vegetation management and prescribed fire operations. Increased water quality and quantity would benefit the recreational experience.

Irretrievable, Irreversible, and Unavoidable Adverse Impacts

For Segment 2 in Alternative 3, pursuing run-of-the-river flows below the J.C. Boyle powerhouse at a level considered unsafe for whitewater boating (<1,500 cfs), would reduce or eliminate the opportunity for summer whitewater boating. The river flow level may not maintain the Wild and Scenic River recreational ORV.

The current situation, with later than "traditional or historical" water releases, (as compared to prior to 1994, when the upper Klamath River received national wild and scenic river designation) may significantly impact the long-term viability of commercial whitewater boating. Flows for only boating trips past noon, would cause a decrease in whitewater boating launches and commercial boating revenues. This is caused by the reduced ability of companies to market or "sell" a trip due to the lateness of getting off the river and returning to a company's home base.

Roads to be permanently closed, rehabilitated, converted to non-motorized use or available for administrative use only would be an unavoidable loss of motorized recreation opportunities, including access to primitive camping and fishing sites. Because many roads currently open would be closed or eliminated, opportunities for relatively unrestricted OHV use would be irretrievably lost.

Many opportunities for maintaining and providing semi-primitive motorized recreation experiences would be irretrievably lost under Alternative 4. Several roads, including primary access routes and recreation facilities would be greatly improved or receive upgrades. This would allow access by low clearance vehicles such as passenger cars, likely increasing the number of visitors into the canyon. Several opportunities for more rugged and primitive road touring would be permanently lost. More primitive recreation facilities would be upgraded or replaced with ones that have a higher level of development.

Under Alternatives 2 and 4, increased law enforcement, ranger patrols and use restrictions may have an unavoidable adverse effect on those recreationists seeking a more primitive and less structured recreation experience. This may permanently displace and cause an adverse impact to these recreation users in other areas with less restrictions and patrols.

Under Alternative 3, reduced law enforcement, ranger patrols and use restrictions may have an unavoidable adverse effect on other recreationists, if lawlessness and vandalism continues and prevails. This may cause an unavoidable adverse impact by permanently displacing those recreation users seeking a safer, more structured environment to other areas with greater patrols and visitor contact.

Most designated developed camps and many opportunities for primitive (non-designated) camping would be irretrievably lost due to road or campsite closures under Alternative 3. This would displace those recreationists seeking a more primitive camping experience to other areas outside the river canyon, which would be an unavoidable adverse impact.

Some primitive (non-developed) fishing access opportunities would be permanently eliminated under some alternatives. With a loss of primitive access opportunity or if recreation use increases, some opportunities for solitude would be lost. These would be unavoidable impacts from proposed management actions. The continued use of the Klamath River Edge trail from Frain Ranch to the Turtle camp area for motorized access would be an unavoidable loss to non-motorized recreationists in Alternative 4.

Under Alternative 4, the greatest increase in recreation use would be expected. Greater crowding of fishing facilities, developing facilities where there is presently limited or no development, improved motorized access and greater visitor contact would likely change the character of the typical recreation experience in the canyon. The experience would no longer meet the criteria for the semi-primitive motorized recreation opportunity spectrum (ROS), likely becoming a roaded natural or rural classification. This would likely displace and negatively affect those recreationists who seek a more primitive recreation experience, and would be an irretrievable and unavoidable impact. It would also necessitate an RMP amendment.

Motorized boating would be permanently unavailable in all segments with Alternatives 2 and 3, except under special use authorization.

Table 5-1.—Area accessible by motor vehicle (acres) within the planning area[1]

	Alternative			
Segment	1	2	3	4
1	523	356	356	508
2	3,145	2,975	2,828	3,125
3	1,265	1,514	1,182	2,014
Total	4,933	4,845	4,366	5,647

[1] For this analysis of consequences, the extent of “motorized accessibility” for each alternative was calculated using geographic information system software by determining the area of land that is: (1) within 1/4 mile of an open or seasonally open road that is within the planning area; (2) on slopes less than 35 percent; and (3) on the same side of the river as the road that is within 1/4 mile, and not in the river itself.

Roads/Access

Assumptions

It is anticipated that road improvements (both spot and contiguous) would be maintained over time, in order to continue to achieve transportation management objectives.

Implementation of any road action proposed on private land or land managed by an agency other than the BLM will be contingent upon approval from the affected land owner or agency. Road actions that are linked to other proposed actions (i.e., “connected actions”) will, when practicable, be sequenced so as not to cause undue reductions in access that would complicate implementation of the related project.

The potential for increased or more concentrated recreation use, and its potential to affect road maintenance needs, has been considered and addressed in the development of proposed road improvements.

For all alternatives, the approximately four miles of mapped roads that traverse private ranch and non-industrial timber land in Segment 3 of the planning area were considered to be only open for administrative access, that is, open only at the discretion of the landowner.

PacifiCorp Facilities - If PacifiCorp determines that some facilities or road right-of- ways are no longer needed, or if those facilities are affected by FERC relicensing in such a way that they are removed, the management objectives for roads used to access those facilities will be reevaluated.

Impacts Common to all Alternatives

Scenic, cultural, fisheries, range management, fuels management, and land tenure actions are not expected to have any effects on the road network.

Road Management Actions - In all alternatives, access to private land on existing rights of way will not be lost through BLM actions, although access points may change and, if affected owners are willing, some rights of way may be changed.

No Road Management Actions are recommenede for non-PacifiCorp private land. The BLM would cooperate with private landowners willing to implement Road Management Actions designed to improve watershed conditions.

Road obliteration is proposed under all alternatives and road decommissioning is proposed in Alternatives 2-4 (refer to Tables 5-3a and 5-3b). Chapter 4 describes the different practices to perform these road treatments.

The existing Pokegama Seasonal Closure will continue in all alternatives. In each alternative, the closure area includes 1.4 miles of road on private land. The extent of the closure will vary between alternatives, but no alternative would reduce the extent of the closure. Other road treatments planned within the closure vary by alternative and may include improvements, decommissioning, obliteration and construction.

It is recommended that two roads on PacifiCorp land in Segment 3 remain closed to public access, 1) the road that parallels the west side of the river, and, 2) the road that crosses the river near the mouth of Shovel Creek.

Vegetation Management - Depending on the alternative, proposed vegetation management actions could cause small increases in peak flows in small streams (refer to the Watershed Values - Tributary Streamflow discussion). Higher peak flows could overwhelm the capacity of culverts and other stream crossings, leading to diversion of flow paths onto roads and erosion of the road surface. The risk of this occurring as a result of proposed actions is low, and proposed stream crossing improvements would reduce the potential for this to occur.

Heavy vehicle traffic associated with vegetation treatments would have the potential to damage road surfaces or road drainage features. Were this to occur to a degree greater than expected, for the type of work being done, the damage would be repaired in a timely manner to ensure that more extensive damage does not result.

Where the construction of short access roads is required to implement vegetation management projects, there would be potential for unauthorized use of these roads and subsequent resource damage. In order to help prevent these impacts, any such roads would be obliterated as rapidly as possible according to existing RMP standards.

Watershed Management Actions - Stream crossing improvements (refer to Tables 5-2a and 5-2b) are included within all alternatives, though the number and type of crossings vary by alternative (refer to Table 4-8). Types of crossing improvements would include culvert installation or enlargement and placement of low water fords. By installing new crossings or replacing deteriorated crossings, these actions would ensure the long-term viability of the road network and reduce resource damage associated with the road network and traffic.

Impacts of Specific Alternatives

(Refer to Tables 4-8, 5-2a, 5-2b, 5-3a, 5-3b, 5-4; Maps 17a thru 20a, Maps 17b thru 20b; and Appendix H)

Alternative 1

Recreation Management - Since no actions to increase or concentrate recreation use are proposed, no additional impacts to the road network are anticipated (see Map 13).

Road Management -

BLM:

Segment 1: Spot improvements and more regular maintenance on the upper portion of the Topsy Road along Segment 1 would make this road easier and safer to drive and thereby provide better access into the planning area (see Map 17a).

Segment 2: In Segment 2, the 0.4 miles of road construction adjacent to the existing Chert Creek road (which is causing damage to the stream), would allow the existing road to be obliterated. Likewise, short spur roads constructed north of Frain Ranch would allow obliteration of the Old Homestead road (see Map 17a).

Obliteration of the road near Chert Creek, roads in T.40S, R.6E, Section 35, roads in the riparian reserves of the river, and the Salt Caves access road will reduce access to the river to a minor extent, but other roads provide similar access.

The existing seasonal Pokegama Closure and administrative closure of about 2.5 miles of powerline access roads would reduce the need for road surface maintenance, but would also reduce open road system mileage (refer to Table 5-4).

Spot improvements on roughly 2.5 miles of the Topsy Road that cross BLM land in Segment 2 would improve overall access to this part of the planning area.

Segment 3: In Segment 3 the Hessig Creek road, which passes through BLM land, would continue to be closed to public access in this alternative (see Map 17a).

PacifiCorp:

Segment 1: The short portion of Topsy road that passes though PacifiCorp land in the northeast corner of Segment 1, and the portion of the Powerhouse road that crosses PacifiCorp land would receive spot improvements. This would improve vehicle travel and access to the canyon, as well as to lands adjacent to the canyon.

Segment 2: In Segment 2 the construction of about one-third of a mile of road on PacifiCorp land (T.41S, R.5E, section 12, and T.41S, R.6E, section 7) would allow the existing road to be obliterated but maintain access to the area via other routes.

Obliterating more than a mile of roads in the vicinity of Frain Ranch and at the south end of the Klamath River Edge road will reduce access to the river to a minor extent, but other roads provide similar access. Continuation of the Pokegama Closure affects less than two miles of road on PacifiCorp lands. Administrative closure (gating) of powerline roads on PacifiCorp land would reduce road damage and long-term maintenance needs.

Segment 3: The more than nine miles of roads on PacifiCorp land that access irrigation diversions, rangelands, and timber stands in Segment 3 will remain closed to general public use in this alternative, thus reducing possible road damage and long-term maintenance needs. Spot improvements on about 0.5 miles of the Topsy Road as it passes through PacifiCorp land will improve overall access to the planning area.

State of Oregon:

About one-quarter of a mile of road on state land in Segment 2 would be recommended for administrative use closure in Alternative 1, which would affect public access only to a minor extent (see Map 17a).

USFS:

Short lengths of road that cross National Forest system lands in Segment 3, would continue to be closed to public access, as the roads that access them are gated where they intersect Topsy Road.

Cumulative Impacts - In this alternative, approximately 45 miles of road would be open for year-round public access and eight would be open for seasonal access (Refer to Table 5-4). The overall road system and safety to travelers would be improved with just under one mile of new road construction, just under five miles of road obliteration, and spot improvement on just under five miles of road (Refer to Tables 5-2a, 5-2b, 5-3a, 5-3b). Public access to the planning area would be improved, but some access within certain areas would be reduced, although similar access will remain with other existing roads.

Alternative 2

Recreation Management - Increased road maintenance would be required along access routes to newly built, expanded, or upgraded campgrounds and facilities, since recreation actions will likely lead to concentrated and perhaps increased use. Proposed road treatments (described below) will mitigate the impacts of increased traffic, as will the fact that most recreation use in the planning area occurs during the dry season, when roads are less prone to damage (see Map 14).

Road Management - Road treatments proposed in Alternative 2 are focused primarily on public and PacifiCorp lands in Segment 2, but would affect the road network and public access throughout the entire planning area (see Maps 17a thru 20a).

BLM:

Segment 1: A new, short (<0.1 miles) spur road would provide access to the proposed Big Bend recreation site.

Proposed spot improvements to the upper portion of the Powerhouse and Topsy Roads within and adjacent to Segment 1 would make these roads easier and safer to drive and thereby provide better access into the planning area.

Administrative use closure of a few short lengths (less than 0.5 miles total) of roads would reduce public access and would reduce maintenance needs and deterioration of the road surface.

Segment 2: A new bridge constructed across the river at the site of an old bridge north of Frain Ranch would expand public nonmotorized use on both sides of that portion of river. Construction of short spur roads to access recreation sites on both sides of the river (probably less than 0.1 miles each), will maintain access to popular dispersed camps while allowing other, longer roads to be obliterated.

Obliterating approximately seven miles of road in the Frain Ranch area, around Salt Caves, and near Chert Creek would decrease public access slightly. However, access to all these areas, except the river near Salt Caves, would still be available from other nearby roads.

Continuing the existing seasonal Pokegama Closure (7.5 miles of road in Segment 2 - 4.5 of which are on BLM land) and installing other administrative road closures (2.5 miles of powerline access roads) would reduce public access to a small extent, but also will reduce the need for road surface maintenance.

Spot improvements (proposed for more than six miles of the Powerhouse road, more than three miles of the Topsy Road, a short length of the Frain Ranch access road, a river access road on the north side of the river near the state line, and a native surface road near Hoover Ranch) will improve access along both sides of the river and also reduce resource damage caused directly by roads and road use. The improved road to Hoover Ranch would become the sole motorized access route to the area.

Segment 3: In Segment 3 the Hessig Creek road, which passes through BLM land, would continue to be closed to public access.

PacifiCorp:

Segment 1: Reconstructing the bridge immediately downstream from J.C. Boyle Dam would increase public and administrative access. New administrative use closures proposed for slightly more than a mile of roads that access PacifiCorp lands and facilities would reduce maintenance needs and deterioration of the road surface. Spot improvements to a short portion of Topsy Road and a portion of the Powerhouse Road would improve access to the canyon, as well as to lands adjacent to the canyon (see Map 18a).

Segment 2: Constructing a short (less than 0.3 miles) connecting road on the north end of Frain Ranch would allow obliteration of more than half a mile of road on PacifiCorp land, as well as a portion of road on adjacent BLM land.

Obliteration of more than half a mile of road on the north end of Frain Ranch, nearly 3 miles of road in riparian reserves in the vicinity of Frain Ranch, short lengths of spur roads near Caldera Rapid, and many other user-created roads in the southern portion of the Frain Ranch area outside of riparian reserves would decrease motorized travel on PacifiCorp lands.

Limited administrative use closures of powerline roads west of the river and two miles of road in the Pokegama Closure would decrease public access, but would reduce road damage and long-term maintenance needs.

Limited spot improvements on the segment of the Powerhouse road east of the Hells Corner overlook, as well as spot resurfacing on the Topsy Road, would improve public safety of the roads.

Segment 3: New roads near the Beswick Hot Springs will provide access to the proposed Shovel Creek campground and day use area but would not substantially expand the transportation system.

Implementing administrative use closures on the upper portion of the Negro Creek road, as well as associated spur roads, would eliminate public motorized access to low voltage powerlines that cross the drainage.

Permitted public use (a type of administrative use) proposed on about 2.5 miles of road to the south of the river would expand available road travel options near Shovel Creek and up to the panther Canyon Overlook. Public use on these roads would be permitted only when the roads were dry enough to avoid being damaged, and portions of these roads would be improved to reduce erosion and road-surface damage. The road leading to Access 6 would also be improved to allow easier access by vehicles towing trailers.

State of Oregon:

Segment 2: Less than 0.3 miles of obliteration recommended for a road on state forest land would not substantially affect access to those lands, as other roads provide access (see Map 18a).

Administrtative use closures recommended for about three-quarters of a mile or roads on state land would reduce public access while retaining land owner access.

USFS:

Segment 3: Short lengths of road that cross National Forest system lands would continue to be closed to public access, as the roads that access them are gated where they join Topsy Road.

Watershed Management Actions - Proposed reductions in the use of irrigation diversions in the Shovel Creek drainage would reduce the amount of water that passes over or adjacent to the lower portion of the Shovel Creek road. This would reduce puddling on the road surface.

Cumulative Impacts - In this alternative, approximately 36 miles of road would be open for year-round public access, seven would be open for seasonal access, and 16 would be available for administrative or permitted public use (see Tables 5-2a, 5-2b, 5-3a, 5-3b, 5-4). A total of slightly more than one mile of new road would be constructed, almost two miles of road would be decommissioned, about 10 miles would be obliterated, and over 18 miles of road would be improved. Decommissioning of short spur or connector roads on BLM and other lands would eliminate the opportunity for motorized access to a relatively small portion of the total area. Overall, the transportation system will be improved for safer travel, but there will be a 16 percent reduction in open road mileage (refer to Table 5-4).

Alternative 3

Road Management - Road management actions proposed in this alternative focus primarily on restoring natural processes and systems and reducing motorized access. Projects designed to improve road surfaces are less common in Alternative 3 than in Alternatives 2 and 4, while the extent of decommissioning and new closures is the highest of all alternatives (see Maps 18a thru 20a).

BLM:

Segment 1: Designating nearly two miles of hydropower facility access roads as administrative use only would reduce public access and maintenance needs, but would not affect the operation of the J.C. Boyle facilities.

Spot improvements implemented on the portions of the Powerhouse road and Topsy road designed to reduce road-related damage to natural resources, would also improve safety and ease of travel.

Segment 2: Construction of about 0.2 miles of road would occur on BLM in order to maintain motorized access to the Klamath River Campground when the existing spur road leading into this site is obliterated.

Road obliteration (more than seven miles, including the full length of the existing Klamath River Campground spur road), decommissioning (short spur roads), seasonal closures (10 miles of BLM road within the Pokegama Seasonal Closure - which would be expanded in this alternative), and administrative use closures (almost four miles, focused on the powerline access roads near the Klamath River Campground and Old Homestead road north of Frain Ranch), would significantly reduce the amount of open roads in this segment of the planning area.

Road improvements in Alternative 3 are less extensive than in Alternatives 2 and 4, and would focus on improving travel on the Topsy Road and on the Hoover Ranch access road.

Segment 3: The lower portion of the access road to the Stateline recreation site would be obliterated (contingent on the relocation of that recreation site). Access to the campgrounds on the upper bench would not be affected.

The Hessig Creek road, which passes through BLM land, would also be decommissioned in this alternative.

PacifiCorp:

Segment 1: The recommendation to close nearly two miles of access roads on PacifiCorp land to public use would reduce damage to adjacent resources and maintenance needs on those roads. Public motorized access to the fish ladder area and the bridge site immediately downstream from J.C. Boyle dam will be removed by these actions.

Spot improvements to short portions of the Topsy Road and Powerhouse Road that pass though PacifiCorp land in Segment 1 would improve access to the canyon, as well as to lands adjacent to the canyon.

<u>Segment 2:</u> Construction of a short (less than 0.3 miles) connecting road on the north end of Frain Ranch would slightly add to the road system, but would allow obliteration of more than half a mile of road on PacifiCorp land, as well as a portion of road on adjacent BLM land.

Obliteration of more than fivemiles of road (primarily at Frain Ranch on both sides of the river and also near Chert Creek), limited road decommissioning near Caldera rapid, limited administrative use closures (powerline roads), and continuation of the seasonal Pokegama Closure (less than two miles of road) would reduce public access, as well as road damage and long-term maintenance needs.

Limited spot improvements, including minor road widening on the Powerhouse Road and the Topsy Road, would improve the safety of the roads, but would require increased maintenance. Resurfacing the Powerhouse Road where it crosses Chert Creek meadow will substantially prolong the length of time this road can be used without causing resource damage.

<u>Segment 3:</u> Obliteration of the lower portion of the road to Stateline recreation site (contingent on the relocation of that recreation site), and the decommissioning Hessig Creek road would reduce administrative access to areas of BLM and PacifiCorp land, and would also make access to adjacent private land more inconvenient.

It is recommended that the entire length of the Shovel Creek road would be open only for administrative use, and some spurs off that road could be obliterated.

Approximately four miles of roads on both sides of the river that access PacifiCorp ranch and forest lands and adjacent public lands. Portions of these roads would be improved to reduce erosion and road-surface damage. These actions would also result in improved administrative access. Improvement of the road leading to Access 6 would allow safer travel, especially by vehicles with trailers.

State of Oregon:

<u>Segment 2:</u> Effects to motorized access on state land in Segment 2 in this alternative do not differ greatly from those of Alternative 2. Road obliteration recommended for short segments of road on state forest land (0.4 miles) would cause slight reductions in access.

Access on about three-quarters of a mile of roads on state land would be reduced as a result of the recommended administrative use closure.

USFS:

<u>Segment 3:</u> Short lengths of road that cross National Forest system lands would continue to be closed to public access, as the roads that access them are gated where they join Topsy Road.

Watershed Management Actions - Proposed reductions in the use of irrigation diversions in the Shovel Creek drainage would reduce the amount of water that passes over or adjacent to the lower portion of the Shovel Creek road. This would reduce puddling on the road surface.

Cumulative Impacts - In this alternative, approximately 22 miles of road would be open for year-round public access, 23 miles would be closed to public access, and another 15 would be open for seasonal access (see Table 5-4). Less than one mile of new roads would be constructed, three miles would be decommissioned, 10 miles of road would be obliterated, 23 miles would be closed to public access, and about 13 miles of road would be improved. A small portion of the transportation system will be improved to safer travel, but there will be a substantial reduction in open roads (refer to Tables 5-2a, 5-2b, 5-3a, 5-3b, 5-4, and Maps 19a and 19b).

Alternative 4

Recreation Management - Increased road maintenance would be required along access routes to newly built, expanded, or upgraded campgrounds and facilities, since these actions will likely lead to concentrated, and perhaps increased, use. Proposed road treatments (described below) will mitigate the impacts of increased traffic, as will the fact that most recreation use in the planning area occurs during the dry season, when roads are less prone to damage (see Map16).

Road Management - Road management actions in this alternative provide access and opportunities for a range of recreation activities while ensuring that increased use of roads and improved motorized access does not have excessive impacts on natural resources (see Maps 20a and 20b).

BLM:

Segment 1: Resurfacing ("contiguous improvement") of portions of the Powerhouse and Topsy Roads on BLM land would ensure that convenient recreation access is available and that roads experiencing increased use would not deteriorate as a result.

Segment 2: A new bridge across the river would be constructed at the site of an old bridge north of Frain Ranch. This bridge would be open for public motorized use, and will provide more convenient access for day use and overnight trips, as well enabling better management of recreation sites on both sides of that portion of river.

The 0.5 miles of new road built adjacent to the existing Chert Creek road (which would be obliterated) and short spur roads built north and west of Frain Ranch will maintain access to popular recreation sites.

Decommissioning of roads (about 0.3 miles, focused in riparian reserves of the river and tributary streams, the Frain Ranch area, and the Salt Caves area) would eliminate motorized access opportunities in a relatively small portion of Segment 2. Access to the areas along these roads would still be available from other nearby roads.

About 5.5 miles of road on BLM land would continue to be affected by the Pokegama seasonal closure. Another mile of roads on BLM land will be open only for administrative access, which may make access to one parcel of private land in California more inconvenient.

More than 13 miles of road on BLM land would be improved in this alternative, slightly more than is proposed in Alternative 2. Road improvements (including resurfacing, widening, and installation of pull-outs) and minor realignments on the Topsy Road will make the road more accessible for low-clearance vehicles for its entire length in Oregon and subsequently increase driver safety and ease of travel. The Powerhouse Road would be improved to similar standards from the J.C. Boyle Powerhouse to the Caldera Rapid overlook. From the Caldera Rapid overlook to the Hells Corner overlook, the road would be maintained at lower standards, although maintenance would be more frequent than at present. The Klamath River Campground spur road, a short section of the Frain Ranch access road, the Tom Substation river access road, and portions of the Klamath River Edge road would also be improved, resulting in better travel conditions.

Segment 3: The Hessig Creek road, which passes through BLM land, would continue to be closed to public access in this alternative.

PacifiCorp:

Segment 1: Reconstructing the bridge immediately downstream from J.C. Boyle Dam would increase public and administrative access through Segment 1. The roads leading to the proposed bridge site are in good condition on both sides of the river, so no improvement beyond the current maintenance program is expected to be required (see Map 20a).

About one-half mile of native surface roads that provide access to a portion of the flume would be closed to public access.

The portion of the Powerhouse Road that is located on PacifiCorp land would be resurfaced and would provide safer more convenient travel.

Segment 2: About one-third of a mile of new road recommended for construction on PacifiCorp land adjacent to Chert Creek (extending onto BLM as well), would replace the existing Chert Creek road and thereby maintain a secondary motorized access route to the Hoover Ranch area (see Map 20a).

The recommended obliteration of slightly more than two miles of road on PacifiCorp land (including the existing Chert Creek road, one mile of excess roads in the vicinity of Frain Ranch, and the Klamath River Edge road) would reduce overall motorized access within the canyon.

Two miles of road that are on PacifiCorp land will continue to be affected by the Pokegama seasonal closure.

Road improvements would provide safer travel on about 2.5 miles of PacifiCorp road, primarily along the Powerhouse and Topsy Roads.

Segment 3: Recommended new roads built on PacifiCorp land near the Beswick Hot Springs would provide needed access to the proposed Shovel Creek campground and day use area but would not add significantly to the transportation system (see Map 16).

Public use would be allowed on about 2.5 miles of road to the south of the river when the roads were dry enough to avoid being damaged. This change in road status would add substantially to the open road system in this segment.

Extensive improvements would occur on the road leading to Access 6 to facilitate safer and easier use by vehicles pulling trailers.

USFS:

Segment 3: Short lengths of road that cross National Forest system lands would continue to be closed to public access, as the roads that access them are gated where they intersect Topsy Road.

Watershed Management Actions - Stream crossing improvements are proposed at seven sites. Although these crossings currently do not pose risks to the road network, some puddling does occur on the Powerhouse road and the Frain Ranch access road. By installing culverts at such sites, the proposed actions would eliminate standing water on road surfaces.

Cumulative Impacts - In this alternative, approximately 49 miles of road would be open for year-round public access, and 10 would be open for seasonal access. Less than two miles of new roads would be constructed, less than one mile of road would be decommissioned, about six miles would be obliterated, and about 22 miles of road would be improved. Overall a large portion of the transportation system will be improved for safer travel and there would be a slight increase in open road mileage as compared to the other alternatives (refer to Tables 5-2a, 5-2b, 5-3a, 5-3b, 5-4, and Maps 17a thru 20a).

Irretrievable, Irreversible, and Unavoidable Adverse Impacts

For all alternatives, an irretrievable loss in road use opportunities would occur during the time that roads are seasonally or permanently closed (see Maps 17b thru 20b). Unavoidable short-term impacts (inconvenience) to vehicle travelers on roads in and adjacent to the planning area would occur during road construction and improvement activities. The current situation, with later than “traditional or historical” water releases, (as compared to prior to 1994, when the upper Klamath River received national wild and scenic river designation) may significantly impact the long-term viability of commercial whitewater boating. Later than “traditional or historical” water releases, much past 12 noon, would cause a decrease in whitewater boating launches and commercial boating revenues. This is caused by the reduced ability of companies to market or “sell” a trip due to the lateness of getting off the river and returning to a company’s home base. This drop in commercial use would also reduce the BLM’s ability to generate special recreation use fees, which are based on commercial boating use gross revenues. These fees are returned to the area and used by the BLM for visitor contact and maintenance.

Table 5-2a.—Proposed/recommended road improvements, by segment (miles)

	Alternative			
	1	2	3	4
Segment 1				
Spot	0.6	4.4	4.4	–
Contiguous	–	–	–	4.4
Segment 2				
Spot	4.3	10.1	3.3	3.1
Contiguous	–	1.6	0.7	9.8
Segment 3				
Spot	–	2.3	1.7	2.3
Contiguous	–	0.1	0.1	0.1
Total				
Spot	4.9	16.8	9.6	5.4
Contiguous	–	1.7	0.8	14.3
Net Impact				
Miles	4.9	18.5	10.4	19.7
Percent of open road network affected[1]	8%	31%	17%	29%

[1] Calculated as the percent of roads (not including roads that are proposed for decommissioning or obliteration) within each alternative that would be improved.

Table 5-2b.—Proposed/recommended road improvements, by ownership (miles)

	Alternative			
	1	2	3	4
BLM				
Spot	3.6	12.3	6.3	1.8
Contiguous	–	0.9	0.4	11.9
PacifiCorp				
Spot	1.0	4.4	3.1	3.5
Contiguous	–	0.8	0.4	2.3
State of Oregon				
Spot	0.3	–	–	–
Total				
Spot	4.9	16.8	9.6	5.4
Contiguous	–	1.7	0.8	14.3

Table 5-3a.–Proposed BLM and recommended PacifiCorp road construction, decommissioning, and obliteration, by segment (miles)

	Alternative			
	1	2	3	4
Segment 1				
Construction	–	0.1	–	0.1
Segment 2				
Construction	0.9	0.2	0.3	1.0
Decommissioning	–	1.9	1.0	0.3
Obliteration	4.9	9.2	12.6	5.6
Segment 3				
Construction	–	0.8	0.3	0.5
Decommissioning	–	–	2.1	–
Obliteration	–	0.5	0.7	0.1
Total				
Construction	0.9	1.1	0.6	1.6
Decommissioning	–	1.9	3.1	0.3
Obliteration	4.9	9.7	13.3	5.7
Net impact				
Miles	-4.9	-10.5	-15.8	-4.4
Percent of existing road Network	-6%	-15%	-21%	-7%

Table 5-3b.–Proposed BLM and recommended PacifiCorp road construction, decommissioning, and obliteration, by ownership (miles)

	Alternative			
	1	2	3	4
BLM				
Construction	0.4	0.2	0.2	0.5
Decommissioning	–	1.6	1.6	<0.1
Obliteration	3.5	4.8	7.7	3.5
PacifiCorp				
Construction	0.5	0.9	0.4	1.0
Decommissioning	–	0.4	1.5	0.3
Obliteration	1.4	4.6	5.3	2.2
State of Oregon				
Obliteration	–	0.3	0.3	–
Total				
Construction	0.9	1.1	0.6	1.6
Decommissioning	–	1.9	3.1	0.3
Obliteration	4.9	9.7	13.3	5.7

Table 5-4.–Proposed BLM and recommended PacifiCorp road status[1] designation, by segment (miles)

	Alternative			
	1	2	3	4
Segment 1				
Open	10.6	8.2	5.6	10.1
Admin. Use	–	2.4	5.0	0.5
Segment 2				
Open	26.6	19.9	8.5	27.8
Seasonal Closure	8.3	7.4	15.1	9.2
Admin. Use	4.6	4.8	5.9	1.2
Segment 3 [2]				
Open	7.3	7.4	7.8	8.0
Seasonal Closure	–	–	–	0.5
Admin. Use	5.6	8.8	12.3	10.1
Planning Area				
Open	44.5	35.5	21.9	45.9
Seasonal Closure	8.3	7.4	15.1	9.7
Admin. Use	10.2	16.0	23.2	11.8
Total roads available for some level of motorized access	63.1	58.9	60.2	67.4
percent of existing roads	94%	84%	78%	93%

[1] This table refers only to those roads that are open to public and/or administrative access for at least part of each year.
[2] With the exception of Topsy Road, roads on non-PacifiCorp private land in Segment 3 were assumed to be closed to use by the general public.

Cultural Resources and Native American Traditional Use

Assumptions

Natural processes and human activity impact cultural resources. Natural processes, such as wildfire, earthquakes, and erosion, can cause permanent negative impacts. Many of these impacts are unavoidable, however, some can be reduced. For example, fuel treatments can reduce the effects of catastrophic fires or bank stabilization measures can slow down the effects of erosion.

Potential for negative impacts to cultural resources caused by human activity will vary by degree and location of ground disturbing activities permitted under each alternative. Activities, such as construction of recreation sites or oak thinnings, have the potential for irreversible impacts, however, those impacts can be reduced through cultural resource surveys and mitigation measures mandated by sections 106 and 110 of the National Historic Preservation Act of 1966, as amended through 1992 (NHPA). Section 106 of the NHPA requires all federal agencies to "take into account the effect of the undertaking on any" cultural resource. Section 110 establishes the National Register of Historic Places, a program that ensures that historic properties are identified, evaluated, and nominated to the National Register, a roster of historic properties maintained by the National Park Service. Site protection, investigation, and interpretation would be similar under all alternatives.

Positive impacts occur when management actions decrease existing or potential site disturbance, such as closing areas off to public use or supporting educational programs. Project designs can be modified to avoid potential direct impacts to sites.

Currently, Klamath Falls Resource Area does not perform sub-surface sampling or testing methods as part of cultural resource surveys, thus covered cultural sites, such as lithic scatters, may be missed due to heavy organic ground cover. These buried sites are in danger of being negatively impacted by project activities. However, if cultural resources are encountered during proposed project activities, then all work would stop and the lead area archaeologist would be notified. Upon notification, the archaeologist would conduct an investigation and develop a plan (with consultation as necessary) to mitigate the situation.

Many of the projects are proposed on PacifiCorp lands and the implementation of these projects depends on PacifiCorp's own actions, agreements, or eventual land acquisitions. The nature of the impacts on cultural resources explored in this chapter are the same for all proposed projects whether the project is on PacifiCorp or BLM lands. Should adjacent PacifiCorp lands later be included within proposed projects where federal money is appropriated, then cultural resource surveys would need to be performed on the PacifiCorp lands prior to project implementation.

Impacts Common to All Alternatives

Scenery Management - Scenic values would be enhanced by supplementing fuel treatments with vegetation screening treatments. Using vegetation to screen facilities serves to protect cultural resources because it hides the resources from view. The use of fuel treatments, to meet long-term scenic quality objectives as described in the Fire and Fuels section, can have both a negative effect because it removes vegetative cover that serves to hide the resources from view, and a positive effect because it reduces wildfire temperatures which may cause damage to lithic materials.

Recreation Management - *Recreational trails (motorized and nonmotorized):* Trails can provide access into otherwise inaccessible areas. This exposes cultural resources to vandalism and theft. However, access also provides opportunities to experience the rich history of the area and to gather Ethnobotanical resources.

Dispersed and developed recreational sites (proposed and enhancement of existing facilities): There is direct conflict between recreation use and the protection of cultural resources at some locations. Mitigation helps reduce impacts, but impacts would continue to occur. Recreation opportunity draws people, which, can lead to at the very least, unintentional damage, such as people picking up pretty rocks, which happen to be artifacts, and increased soil compaction caused by increased foot traffic. Improved toilet facilities benefit cultural resources because they concentrate foot traffic and discourage random defecation. Dispersed camping increases damage to cultural resources because recreationists are dispersed throughout the canyon among cultural sites. Campground improvement and development of designated dispersed camping sites focus recreational use into designated areas that avoid cultural sites.

Interpretive/environmental education projects: Interpretive projects provide the public with knowledge of the canyon. Knowledge spurs respect for all the resources, including cultural. When people know that such resources exist in the area, they tend to treat those resources with respect when they encounter them. Unfortunately, knowledge can also spur contempt and greed, which can lead to an increase in intentional damage and looting. Overall, it is expected that interpretation will benefit cultural resource management.

Firearm use: People tend to use historic features for target practice, which can cause considerable damage. Repairing bullet damage can be costly. Materials used in the original construction of structures may no longer exist or be readily available thus, firearm use can cause a negative impact to historical features.

Whitewater rafting (private and commercial): While on the water, rafting does not affect cultural resources. However, rafts can penetrate areas that have little or no access. Resource damage can occur when the rafts stop along the shorelines. People may explore the landscape during a lunch stop and "discover" a cultural resource site. This can cause direct impact to the cultural context of a site as people intentionally pick up artifacts and kick at the ground looking for more. Unintentional impacts occur when rafters are unaware of the existence of a cultural resource. For example, they may build a campfire ring out of rocks originally used to construct a prehistoric feature.

Motorized watercraft use: Motorized watercraft is prohibited in Segments 1 and 2 in all the alternatives, In Segment 3 it is allowed in Alternative 4 and only by special use authorization in Alternatives 2and 3. The same concerns surrounding whitewater rafting apply to the use of motorized watercraft, if visitors stop and explore the shorelines.

Road Management (decommissioning, maintenance, obliteration) - The Road network channels human pressure into certain regulated areas, reducing human pressure in less accessible areas, which can positively impact cultural resources. Spot improvements and maintenance of roads positively affect cultural resources by reducing runoff erosion and gullying. In addition, decommissioning roads has a positive impact because it decreases access and potential disturbance to cultural resources. On the other hand, decommissioning roads can be negative because it reduces Native American access to culturally significant areas.

Cultural Resource Management - *Prehistoric site management:* Pursuing a nomination to add the canyon onto the National Register of Historical Places and developing a monitoring program is proposed in all alternatives. The value of having the canyon on the National Register would be that the area has national recognition and can be considered in planning for federal or federally assisted projects, and qualifies for federal assistance for historic preservation when funds are available. A monitoring program would encourage cooperative working relationships between the federal government and outside groups. Cooperating groups would ensure the protection of cultural sites by implementing a plan designed to evaluate the effectiveness of mitigation strategies and document any disturbances based on frequent visitations to sites.

Historic site management: In all alternatives, the information that historic structures hold would be collected through extensive documentation. The documentation procedure would incorporate more then recording the site on State Historic Preservation Office (SHPO) site forms and mapping the site's location. Documentation would include a historic document review, which is defined as a study of published and unpublished documents, records, files, registers, and other sources, resulting in an analysis and synthesis of all reasonably available data. While this action would not protect the site from further deterioration, it would assure that valuable information is collected that can help with interpreting the history of the canyon.

Native American traditional use management: An Ethnobotanical study is proposed from J.C. Boyle Dam to Copco Reservoir. An Ethnobotanical study would inventory known information concerning culturally important plants and their locations in the canyon. The process would include a complete literature search and Native American interviews. Although this information would not be published for public distribution, it would help in the management of the canyon. The information would be used to avoid conflicts between proposed project development and Native American Traditional use areas. The information could be used to design vegetative treatments, such as mechanical thinning or prescribed burning, to control evasive plants and enhance Ethnobotanical resources. This knowledge could also effect road management decisions. Based on coordination and consultation efforts with local tribes, traditional use areas could be opened to ensure Tribal member access or closed to protect Ethnobotanical resources.

Terrestrial Species/Habitat Management - Proposed projects that would improve wildlife habitat include vegetation treatments, road decommissioning, and the creation of perches, roosts, and nest sites. Vegetation treatments focus on manually or mechanically thinning oak groves and brush fields, and manually or mechanically thinning around potential nest and roost trees. In addition to improving wildlife habitat, thinning oak groves decreases fuels (see the Fire and Fuels section in Impacts Common to all Alternatives for explanation) and most importantly encourages acorn growth. Acorns were and still are an important food staple for Native Americans in this area and are considered a culturally important resource (Holt 1946:308). However, oak thinning projects can have negative impacts to cultural resources if ground-disturbing equipment is used and the improved habitat draws feral pigs. Cultural resources sustain excessive damage when pigs root for food.

Perches, roosts, and nest sites can vary in shape and size. Creating perches and nesting sites can consist of modifying power poles, pruning branches, and topping/blasting treetops. Implementing fuel reduction or vegetation thinning projects could create roost areas. Nest boxes would be installed on old bridges or buildings. The installation of these devices can vary from drilling holes to strapping boxes on with bailing wire. Most of the buildings that occur in the canyon are considered historical resources. Mounting the perches and nest boxes to the historical buildings can cause minimal damage. However, damage could continue to occur as birds attracted to the nest boxes defecate, scratch, or excavate new cavities.

Watershed Management Actions - Riparian enhancement, meadow restoration, and sediment replenishment projects are proposed in all but Alternative 1. Actions (such as vegetation treatments, road decommissioning, and willow planting) would be designed to improve meadow and riparian conditions, which positively affects the Klamath River's fisheries and water quality. The river's water quality, especially in regard to fisheries, is an important aspect to local Native American cultures. Some view the fisheries as a Native American traditional property. Meadow and riparian improvements help reduce the effects of erosion and encourage the growth of Ethnobotanically important plants. Plants such as reeds, willow, and cattail were used to make baskets and other utility items. Native Americans today continue to gather Ethnobotanical materials for food and crafts.

Stream/fisheries flows: Because the streambank is unstable and susceptible to extreme water flux and flooding due to PacifiCorp's operations, cultural resources located in these areas are under the threat of being eroded away.

Water attraction flow projects and large wood treatments are proposed in all the alternatives, to improve fisheries. Fisheries are an important cultural value to local Native American populations. Given that the anadromous fisheries have declined since the construction of Copco I Dam in 1917, this type of management could prove to have a neutral or beneficial effect. Because of the importance of the fisheries to local Native American cultures, this would be considered a positive affect on the fisheries as a cultural resource value.

Instream structures/irrigation diversions: To enhance the aquatic species habitat, fish ladders, reduction in the existing river channels, removal of old bridge abutments, and redesigning mainstream irrigation diversions in Segment 1 are proposed. Many of these projects are located along the streambank where cultural resources, such as habitation sites, basketry material gathering locations, and fish habitat exist. The short-term, ground-disturbing aspects of these projects can be mitigated to ensure that any cultural materials present are avoided. The long-term affects of these projects on cultural resources can be positive because they stabilize the riverbanks, reducing erosion effects on cultural sites, and improve fisheries habitat, which is a cultural value.

Range Management - Livestock congregation and trampling can negatively impact cultural resources (prehistoric sites or traditional uses), especially along fence lines and around water sources. In addition, the maintenance of existing fences and the possible construction of additional fences are ground disturbing activities that can impact cultural resources.

Fence maintenance and construction of new fences are proposed in all of the alternatives. A fence could impact a cultural site if materials from the site are used in the construction of the fence line. If the fence crosses a site, the holes dug to secure the fence posts can cause damage. Cattle and horses congregate and follow a fence line creating a trail that can compact or disturb the soils at a site. The weight of cows and horses on wet soils leave deep footprints. Artifacts may be stepped on by a cow or horse and broken. In addition, vegetation that once covered and hid a cultural site can be grazed down to bare earth by cows and horses. A fence can also have positive impacts. Fences can be routed around sites and designed to ensure that cows and/or horses (and sometimes people) will not enter a cultural site area.

Fire and Fuels Management - Fire and fuel treatments can have both a positive and negative effect on prehistoric resources. According to the Programmatic Agreement between the State Historic Preservation Officer (SHPO) and Oregon State BLM, the primary focus of concern for cultural resource surveys are the ground disturbing activities of fire suppression and/or containment such as building fire lines and landing sites. If these ground-disturbing activities are conducted through a site, the impacts are negative. In addition, fire and vegetative treatments, such as thinnings, remove vegetative cover. Vegetative cover hides the resources from vandalism and looting.

However, prescribed fire can have a positive affect on prehistoric resources. Excessive amounts of fuel cover can feed a wildfire, elevating the temperatures to the point that damages cultural resources. Prescribed fire temperatures can be controlled and maintained below 550 degrees Fahrenheit (300 degrees C). This is critical because the threshold temperature for creating mechanical and chemical changes for stone artifacts is 650 degrees Fahrenheit (350 degrees C). The threshold temperature for wood is 550 degrees Fahrenheit

(300 degrees C) for wood. The removal of overgrown, thick vegetation and ground cover through prescribed fire treatments can reduce the probability of a catastrophic fire event, that could cause damage to cultural resources especially around historic sites.

Ethnobotanical resources can benefit from fuel treatments. For example, Ipos (Perideridia sp.) root, an important Ethnobotanical plant is gathered in early spring (Spier 1930:164). Encroaching trees in a meadow full of Ipos could be cut back using mechanical thinning treatments or prescribed burn treatments. Such treatments open the meadow and encourage Ipos growth.

PacifiCorp Facilities - Maintenance of powerlines and other PacifiCorp facilities may cause direct negative impacts to cultural resources. Continued high flow releases from J.C. Boyle Powerhouse may cause streambank erosion, thus damaging cultural sites along the river.

Impacts of Specific Alternatives

(Refer to Maps 4, 13-16, 18a, 19a, 27, and Appendix H)

Alternative 1

Refer to Impacts Common to All Alternatives for discussions of actions to: Scenery Management, Road Management, Terrestrial Species/Habitat Management, Watershed Management, Range Management, Fire and Fuels Management and PacifiCorp Facilities. Other resource actions are discussed below.

Scenery Management - Refer to Impacts Common to All Alternatives section.

Recreation Management - For discussion related to: interpretive/environmental educational projects, Firearm use, Whitewater rafting, and Motorized watercraft use refer to Impacts Common to All Alternatives.

Recreation trails (motorized and nonmotorized): Under Alternative 1, only the maintenance of the Klamath River Edge Trail is proposed. No new trails would be constructed so no new potential impacts to cultural resources should occur. There would be no restrictions on non-motorized use, such as mountain biking, hiking, and horseback riding and motorized recreation is limited to designated roads on BLM land, but otherwise occurs unregulated therefore impacts to known and unknown sites may continue to occur.

Maintenance activities of the Klamath River Edge Trail and main road surfaces would have minimal to no impact to cultural resources because the actions would be mitigated. However, improvements to facilities tend to draw people to the canyon and increased human pressure can lead to both intentional damage, such as looting and vandalism, and unintentional damage to cultural resources. Implementing a no restriction policy can also lead to intentional and unintentional damage by allowing people to freely roam into areas where cultural resources may be located (see Map 13).

Dispersed and developed recreation sites (proposed and enhancement of existing facilities): Alternative 1 focuses on maintaining, enhancing, and monitoring the use of existing camping facilities. Proposed enhancement of Turtle Camp and Klamath River Campground involves the installation of barriers to define campsites. The barriers could consist of semi buried boulders to half buried posts. Although this activity is ground disturbing, the effect is minimal to cultural resources. Previous development of the campgrounds has disturbed the campground locations. If a buried site exists under the top soil horizon, it is possible that the holes dug for the barriers could be deep enough to damage the site's archaeological context. Existing recreation management agreements with PacifiCorp would continue.

Cultural Resource Management - *Prehistoric site management:* Sites will continue to be protected through pre-disturbance surveys, but both intentional and unintentional impacts are possible.

Historic site management: Historic structures are rapidly deteriorating in the canyon or have deteriorated past the point where preservation techniques would no longer be effective.

Native American traditional use management: Refer to Impacts Common to All Alternatives section.

Land Tenure - No changes are suggested in land tenure in Alternative 1 although both RMPs have an objective to acquire lands with the designated or suitable scenic river corridor (in river Segments 2 and 3) and in the designated ACEC in river Segment 2.. Thus there would be no additional effects on cultural resources.

Cumulative Impacts - The "No Action" Alternative 1 continues existing management activities. Adverse impacts associated with current activities would continue. However, the impacts would be minimized or avoided by conducting cultural resource surveys and enacting mitigation measures before any ground disturbing activities occur as mandated by Section 106 of the National Historic Preservation Act (NHPA).

Alternative 2

Refer to Impacts Common to All Alternatives for discussions of actions to: Scenery Management, Road Management, Terrestrial Species/Habitat Management , Watershed Management, Range Management, Fire and Fuels Management and PacifiCorp Facilities. Other resource actions are discussed below.

Recreation Management - Recreation trails (motorized and nonmotorized): The proposed Big Bend Fishing Access Trail would open up an area that is presently difficult to access due to the steep rocky slopes. Cultural sites presently located in hard to reach areas are currently protected only by their inaccessibility. Trails into these areas provide easier access, thus potentially exposing these sites to vandalism and looting. However, access also provides opportunities to experience the rich history of the area and, for Native Americans, to gather Ethnobotanical resources.

Although new trails open areas up to increased public use, converting old roads to trails, such as the road from Frain Ranch to below Spring Island, and closing trails to motorized vehicles, such as the Caldera Rapid area, can reduce impacts to cultural resources. These proposed restrictions reduce the number of people that use the area, which in turn, reduces the extent of vandalism and looting. These restrictions could also limit Native American access to Ethnobotanical resources, especially for the elderly who may have difficulty walking.

Motorized recreation would continue to be limited to designated roads. Maintenance of road surfaces would focus on reducing erosion impacts and improve safety and ease of travel. Erosion can negatively affect cultural resources by increasing deterioration and exposing artifacts and features. Thus any maintenance designed to reduce erosion impacts serves to positively affect cultural resources. Similar to trail improvements, any improvements to roads could potentially allow more people to visit areas that could have cultural sites.

Off-highway vehicle use would be limited to designated roads. This would positively benefit cultural resources because unregulated use leads to irreversible site disturbance. Off road riding may present more tempting challenges or thrills, but damage may occur at some cultural sites. Off-highway vehicle tires can cut deep into the soils, dispersing it, and compacting it. In addition, this type of disturbance increases erosion affects. OHV use also can produce excessive noise. Noise can negatively impact the use of Native American traditional use areas (see Map 14).

The construction of a non-motorized bridge is proposed at the old bridge site above Frain Ranch, below BLM campground. Re-establishing a bridge at this site would be beneficial for Native Americans desiring access to gather Ethnobotanical materials. However, the bridge would facilitate access to more area by the general public, thus intentional or unintentional damage could occur to cultural resources of all kinds.

Dispersed and developed recreational sites (proposed and enhancement of existing facilities): Alternative 2 focuses on enhancing and expanding existing camping facilities, and developing a few new camping facilities. Enhancement and expansion of facilities such as Topsy Reservoir campground, the Klamath River Campground, and Turtle Camp involves defining campsites by installing barriers, moving campsites, building campsites, and hardening campsites and parking areas. Although the installation of the barriers is a ground disturbing activity, the potential effect is minimal to cultural resources because the campground locations are previously disturbed areas due to past development of the campgrounds and heavy use of the areas. Hardening, such as laying gravel, in the developed campground areas can serve to protect any undetected buried cultural resources from soil compaction and artifact collecting (see Map 14).

Site improvements include designating group and individual campsites, hardening the parking area and boat ramp by laying rock, constructing permanent bathrooms, and constructing a non-motorized bridge. There is potential for direct conflicts between recreation use and the protection of cultural resources. Confining usage to specific locations helps to decrease impacts to the cultural resources by drawing people away from the resources. However, improved facilities attract increased usage, which can lead to unintentional damage, vandalism, soil compaction, and artifact collecting. Construction of a non-motorized bridge would provide access to the west side of the river. Access exposes previously undisturbed cultural resources to potential disturbance, yet provides Native Americans an opportunity to harvest Ethnobotanical materials.

Development of a Shovel Creek Campground on PacifiCorp land would increase human presence in the area. Increased human pressure generally leads to increased deterioration of cultural resources over the long-term.

Allowing dispersed camping, as proposed in some areas increases the potential for damage to cultural resources because recreationists are dispersed throughout the area where cultural sites may be located.

Interpretive/environmental education projects: Interpretive day-use displays are proposed at the Powerhouse site, Spring Island, Frain Ranch, Topsy Road portals, and Section 35 Overlook. In addition, interpretive brochures focused on Topsy Road and Off-Highway Vehicle (OHV) tour opportunities would be developed. Providing OHV users with tour opportunities helps to focus OHV impacts to designated roads and areas away from cultural resources (see Appendix H).

Firearm use: Refer to Impacts Common to All Alternatives section.

Whitewater rafting (private and commercial): Management actions would enhance whitewater opportunities in Alternative 2 by upgrading toilets at Spring Island; hardening parking and access to Tom Creek Substation, Hoover Ranch, and River Access #1; and developing a raft take-out at Fishing Access #6 on PacifiCorp land. Constructing toilets has a positive effect on cultural resources because it discourages random defecation, however, impacts to buried cultural resources could potentially occur during construction. Hardening parking and access areas focuses usage impacts to specific areas designed to avoid any cultural resources present and reduces erosion. Developing a raft take-out at Fishing Access #6 would increase the traffic in the area, but the project would decrease conflicts between recreation and cultural resources in other areas.

Motorized watercraft use: Refer to Impacts Common to All Alternatives section.

Road Management - Alternative 2 proposes to decommission several roads; implement spot improvements and maintenance; replace the J.C. Boyle Dam Bridge; and construct some new roads (see Map 18a).

The J.C. Boyle Dam Bridge is located in a very disturbed area. Replacing the bridge would have no effect on cultural resources.

The potential for adverse damage caused by the construction of new roads would be mitigated. During the planning process, proposed roads can be relocated or redesigned to avoid cultural resources. Construction would be monitored to ensure that no harm comes to any buried cultural materials not discovered during the initial surface survey. However, roads do provide access into hard to reach places. This increases the human traffic into such areas, which can lead to cultural resource damage.

Cultural Resource Management - *Prehistoric site management:* Prehistoric sites are fragile, nonrenewable resources that are rapidly disappearing. Alternative 2 emphasizes site preservation utilizing two techniques: site burial and access control. Site burial includes placing filter fabric over the site, covering with soil, and planting or seeding with native vegetation. The filter fabric serves to separate the cultural deposit from the fill material. The advantage of this technique would be to protect the site from further trampling, vandalism, and erosion.

Proposed fencing and roadblocks would control access. Fencing deters human and/or animal traffic and has a relatively low installation and maintenance cost. Potential impacts, although greatly reduced, could still occur because a fence can be climbed or cut by those who are bent on destruction.

Historic site management: Historic structures are rapidly deteriorating or have deteriorated past the point where preservation techniques are no longer effective. Alternative 2 focuses on stabilizing several historic structures that still stand in the canyon. These are Hoover 41 Ranch House, the Community Hall at the Beswick Complex, and the Truitt Saloon. Stabilization is defined as the practice of making a structure stable or structurally sound and minimizing its deterioration while preserving its current appearance. Stabilization has a positive affect on historic structures by reducing deterioration, so that the resource will be around for several more generations to learn from and enjoy.

In Alternative 2, a proposal to nominate the Topsy Road as a National Historic Trail is offered. National historic trails are recognized as important to American Culture in the National Trails System Act of 1968. The advantages of nominating the Topsy Road would be development, interpretation, stabilization, protection, and visitor use of the trail. Enhanced coordination and cooperation with landowners, other federal agencies and interested public would be possible, and cooperative management efforts could be funded through limited financial assistance that is available through this program.

Native American traditional use management: Refer to Impacts Common to All Alternatives section.

Land Tenure - Developing management agreements for, or the BLM acquisition of, PacifiCorp land would help facilitate protection for cultural resources and maintain the historic, prehistoric and traditional use values identified for the canyon. This alternative considers more land in California than Alternative 1 and proposes to include a portion of the Shovel Creek drainage. This alternative would have a more positive effect on the overall management of these resources than Alternative 1 because many known sites would be included.

Cumulative Impacts - The focus of Alternative 2 is to enhance opportunities and resources. Resulting impacts would be similar to Alternative 1, but the potential extent or degree of those impacts would increase. Mitigation measures would also be increased in this alternative with the resulting impacts from all management actions being minimal.

Alternative 3

Refer to Impacts Common to All Alternatives for discussions of actions to: Scenery Management, Road Management, Terrestrial Species/Habitat Management, Watershed Management, Range Management, Fire and Fuels Management and PacifiCorp Facilities. Other resource actions are discussed below.

Recreation Management - *Dispersed and developed recreational sites (proposed and enhancement of existing facilities):* Non-motorized camping and day use are encouraged in Alternative 3 (see Map 15). No new developed campgrounds are proposed. Some existing areas of dispersed camping would be closed to non-motorized access. Reducing the camping opportunities would be an overall benefit to cultural resources as compared to Alternatives 2 and 4. This would reduce or eliminate sources of ground disturbing activity, but some negative impacts could still occur. Cultural resources could continue to be impacted by vandalism and illegal artifact collecting.

Interpretive/environmental education projects: Refer to Impacts Common to All Alternatives section.

Firearm use: Refer to Impacts Common to All Alternatives section.

Whitewater rafting (private and commercial): Existing developed whitewater facilities would be maintained and primitive areas such as Hoover Ranch River Access would be closed or maintained for semi-primitive motorized river access. River Access #6 would be developed and the number of commercial trips per day and client limit would be reduced. All of these actions proposed in Alternative 3 would reduce rafting usage in the Canyon, which decreases potential impacts on cultural resources located along the river.

Motorized watercraft use: Refer to Impacts Common to All Alternatives section.

Road Management - Alternative 3 would result in less potential damage to sites because more road decommissioning, seasonal road closures, and enforcing regulated road use are improved (see Map 19a).

Cultural Resource Management - *Prehistoric site management:* Prehistoric sites are fragile, nonrenewable resources that are rapidly disappearing. Alternative 3 emphasizes site preservation by controlling access. Sites 35KL18, CA-sis-1721, and 35KL20 would be closed to motorized vehicles. Restricting access would reduce traffic in the area, which would greatly reduce unintentional disturbance, intentional vandalism, erosion, compaction, and illegal artifact collecting.

Historic site management: Historic structures are rapidly deteriorating or have deteriorated past the point where preservation techniques are no longer affective. Alternative 3 focuses on utilizing several techniques to preserve the historic structures that still stand in the canyon. These techniques are stabilization, with an emphasis on rehabilitation. Rehabilitation is defined as maintaining a structure as it currently exists and to protect it from deterioration. Stabilization is defined as the practice of making a structure stable or structurally sound and minimizing its deterioration while preserving its current appearance. Both techniques have a positive affect on historic structures. Although they can be costly, they reduce deterioration so that the resource will be around for several more generations to learn from and enjoy.

In Alternative 3, a proposal to nominate the Topsy Road as a National Historic Trail is offered (see Map 15). National historic trails are recognized as important to American Culture in the National Trails System Act of 1968. The advantages of nominating the Topsy Road would be development, interpretation, stabilization, protection, and visitor use of the trail. Enhanced coordination and cooperation with landowners, other federal agencies and interested public would be possible, and cooperative management efforts could be funded through limited financial assistance that is available through this program.

Native American traditional use management: Refer to Impacts Common to All Alternatives section.

In-stream structures/irrigation diversions: To enhance aquatic species habitat, some mainstream and tributary diversions would be recommended for removal in Alternative 3. Diversions are located along the riverbank where cultural resources exist and impacts could potentially occur. Although the area around the diversions was disturbed when the diversion was constructed, the short-term, ground-disturbing aspects of diversion removal can be mitigated to ensure that any cultural materials present are avoided. However, some of the diversions are cultural features, some were built by the Native Americans to harvest fish and later used by pioneers for irrigation. Removal of these cultural features would cause significant adverse impacts.

Terrestrial Species/Habitat Management - In Alternative 3, manual and mechanical vegetation treatments, removal of decayed nest boxes and an emphasis not to install new boxes are proposed. Removal of nest boxes and manual treatments would have no impact on cultural resources. Vegetative treatments, such as oak grove thinnings, would have a positive impact because the practice decreases fuels and encourages acorn growth, a culturally important plant (Holt 1946:308). However, the use of ground-disturbing equipment for mechanical vegetation treatments can negatively impact cultural resources, if no mitigation measures are taken. In addition, the improved habitat draws wild boars. Cultural resources sustain excessive damage when wild boars root for food.

Watershed Management Actions - *Stream/fisheries flows:* Alternative 3 provides several options for managing water attraction flows and promotes an extensive installation of large wood treatments. Depending upon which options are chosen, new structures would need to be constructed and/or old structures would need to be removed. These activities have the potential for causing extreme damage to cultural materials. However, most of the proposed actions are in areas of past disturbance. Disturbance of previously disturbed areas has no additional affect on cultural resources. Actions proposed in previously undisturbed areas would be surveyed, mitigated and monitored as needed. In addition, because these actions are designed to improve fish habitat, they would be viewed as having a positive effect on fisheries as a cultural resource. The Klamath River's fisheries, as a cultural resource, are important to local Native American populations.

In-stream structures/irrigation diversions: To enhance aquatic species habitat, some mainstream and tributary diversions would be recommended for removal in Alternative 3 (see Map 27). Diversions are located along the riverbank where cultural resources exist and impacts could potentially occur. Although the area around the diversions was disturbed when the diversion was constructed, the short-term, ground-disturbing aspects of diversion removal can be mitigated to ensure that additional damage to any cultural materials present are avoided.

Land Tenure - Developing management agreements for, or the BLM acquisition of, PacifiCorp land would help facilitate protection for cultural resources and maintain the historic, prehistoric and traditional use values identified for the canyon. This alternative is similar to Alternative 4 in that it proposes to develop management agreements for, or acquire all PacifiCorp land in the Planning Area.

Cumulative Impacts - Alternative 3 emphasizes natural resource enhancement and de-emphases human use. Although de-emphasizing human use in the canyon would promote protection for cultural resources, the potential for impacts still exists. Impacts would occur to a lesser degree than described in Alternative 2 and to a slightly higher degree then in Alternative 1. This is because initially more human activity would occur in the canyon to implement projects designed to enhance natural resources. Once those projects were completed, human activity in the canyon would decrease.

Alternative 4

Refer to Impacts Common to All Alternatives for discussions of actions to: Scenery Management, Road Management, Terrestrial Species/Habitat Management, Watershed Management, Range Management, Fire and Fuels Management and PacifiCorp Facilities. Other resource actions are discussed below.

Recreation Management - *Recreation trails (motorized and nonmotorized):* Several actions are proposed to enhance and improve non-motorized and motorized trails in Alternative 4. In addition to the construction of new non-motorized trails and converting old roads to trails, Alternative 4 focuses on developing new OHV trails and creating an improved parking area at the Salt Caves Overlook. All of these actions have the potential to impact cultural resources (see Map 16).

Allowing motorized access to areas that has had tightly controlled access in recent years (primarily PacifiCorp lands), increases the exposure of cultural resources to vandalism and illegal digging. However, it allows access to land that were, in the past, Native American traditional use areas. Although new trails open areas up to increased public use, converting old roads to trails can reduce impacts to cultural resources. These proposed restrictions reduce the number of people that use the area,, in turn, reduces the extent of vandalism and looting. Unfortunately, restrictions also limit Native American access to traditional use areas, especially for the elderly who may have difficulty walking.

Dispersed and developed recreational sites (proposed and enhancement of existing facilities): Alternative 4 focuses on enhancing and expanding existing camping facilities and developing new camping facilities. Enhancement and expansion of facilities such as Topsy Reservoir campground may involve adding electrical and water hook-ups. Ground disturbing activities such as this minimally effect cultural resources because campground locations are previously disturbed areas due to past campground development and heavy use of the areas.

Some dispersed use sites would be more formally developed by, hardening the bench area, developing group campsites, improving raft take-out facilities, constructing permanent bathrooms, and constructing a motorized bridge. There is potential for direct conflicts between recreation and the protection of cultural resources. However, hardening sites and confining usage to specific locations helps to decrease impacts to the cultural resources by drawing people away from the resources. However, improved facilities attract increased usage, which leads to unintentional damage, vandalism, soil compaction, and artifact collecting. Construction of a motorized bridge would provide access to the west side of the river. Access exposes previously undisturbed cultural resources, yet provides Native Americans an opportunity to visit traditional use areas.

Development of a Shovel Creek Campground would increase human presence in the area. Increased human pressure leads to increased deterioration of the cultural resources found in the area (see Map 16).

Interpretive/environmental education projects: Refer to Impacts Common to All Alternatives section.

Firearm use: Refer to Impacts Common to All Alternatives section.

Whitewater rafting (private and commercial): Management would enhance whitewater opportunities in Alternative 4 by upgrading toilets at Spring Island; hardening or surfacing parking and access roads, developing a boat launch, installing a toilet and campsites at Tom Creek Substation and Hoover Ranch; and developing a raft take-out at River Access #6. Constructing toilets has a positive effect on cultural resources because it discourages random defecation however, impact to buried cultural resources could potentially occur during construction. Hardening parking and access areas focuses usage impacts to specific areas designed to avoid any cultural resources present, and reduces erosion. Developing the Tom Creek Substation, Hoover Ranch and a raft take-out at River Access #6 would increase the traffic in the area and increase conflicts between recreation and cultural resources. Mitigation would be needed.

Motorized watercraft use: Refer to Impacts Common to All Alternatives section.

Cultural Resource Management - Prehistoric site management: Prehistoric sites are fragile, nonrenewable resources that are rapidly disappearing. Alternative 4 emphasizes site preservation utilizing four techniques: earth burial, filter fabric, vegetation, and fencing. Sites CA-SIS-1721 and 35KL20 would be protected using a combination of techniques: earth burial, filter fabric, and vegetation. The process would be as follows: filter fabric would be placed over the site; a covering of sterile earth fill would be spread over the site; and, native vegetation would be planted in the earth fill or the area could be reseeded. The filter fabric serves to separate the cultural deposit from the fill material. The advantage of this technique would be to protect the site from further trampling, vandalism, and erosion. These techniques can be expensive when adding up the cost of the fill, transpiration, filter fabric, placement labor, seeds or plants, and labor to reseed or plant. These actions however, can prevent ongoing damage to cultural sites.

Site CA-SIS-2135 would be protected using fencing. Fencing deters human and/or animal traffic and has a relatively low installation and maintenance cost. Unfortunately, a fence can be climbed or cut by those who are bent on destruction.

Establishing a caretaker protect site 35KL18would. Establishing a caretaker would be a very expensive move that would need yearly funding. However, having a continuous presence would deter vandalism and looting. In addition, it would provide someone in the canyon to answer questions, and enforce rules and safety.

Historic site management: Historic structures are rapidly deteriorating or have deteriorated past the point where preservation techniques are no longer affective. Alternative 4 focuses on stabilizing and rehabilitating several historic structures that still stand in the canyon (see Appendix H). These are Hoover 41 Ranch House, the Community Hall at the Beswick Complex, and the Truitt Saloon. Rehabilitation is defined as maintaining a structure as it currently exists and to protect it from deterioration. Stabilization is defined as the practice of making a structure stable or structurally sound and minimizing its deterioration while preserving its current appearance. Stabilization and rehabilitation have positive affects on historic structures. Although both techniques can be costly, stabilization and rehabilitation reduce deterioration so that the resource will be around for several more generations to learn from and enjoy.

In Alternative 4, a proposal to nominate the Topsy Road as a National Historic Trail is offered (see Map 16). National historic trails are recognized as important to American Culture in the National Trails System Act of 1968. The advantages of nominating the Topsy Road would be to clarify who is responsible for the management; coordination and cooperation with landowners, other federal agencies and interested public; development; interpretation; stabilization; protection; and visitor use of the trail. Limited financial assistance is available through this program.

Native American traditional use management: Refer to Impacts Common to All Alternatives section.

Terrestrial Species/Habitat Management - In Alternative 4, wildlife projects focus on the creation of perches, roosts, and nest sites that can vary in shape and size. Creating perches and nesting sites can consist of modifying power poles, pruning branches, topping/blasting treetops, maximizing the use of duck boxes, and installing nest boxes onto buildings. Implementing fuel reduction or vegetation thinning projects to create roost and nesting areas can negatively affect cultural resources. The treatments focus on mechanically thinning oak groves and brush-fields. Although the project areas would be surveyed and all sites avoided during the project, ground-disturbing equipment is used and damage is possible.

Watershed Management Actions - Meadow restoration proposed in Alternative 4 using three techniques: fencing, road removal, and revegetation. Actions designed to improve meadow conditions positively affects water quality and thus can positively affect the Klamath River's fish. The fish are an important aspect to local Native American cultures. Some view the fish as a Native American traditional property. Meadow improvements help reduce the effects of erosion.

Stream/fisheries flows: Refer to Impacts Common to All Alternatives section.

Instream structures/irrigation diversions: Refer to Impacts Common to All Alternatives section.

Land Tenure - Development of management agreements with PacifiCorp, or the BLM acquisition of, PacifiCorp land, would help facilitate protection for cultural resources and maintain the historic, prehistoric and traditional use values identified for the canyon, which would be a positive effect.

Cumulative Impacts - Alternative 4 effects are very similar to Alternative 2 except that the potential for impacts is much higher. The expansion of human use opportunities could result in irretrievable cultural resource loss. Drawing more people into the area by expanding access and facilities, increases the probability that cultural resources will be negatively affected through illegal collection of artifacts, vandalism, erosion, compaction, and unintentional disturbance.

Irretrievable, Irreversible, and Unavoidable Adverse Impacts

Any loss of a structure or site that is a part of history, potentially could be considered an irreversible impact. Activities, such as construction of recreation sites, building roads, or other projects that use wheeled or tracked vehicles, have the potential to cause irreversible impacts to cultural sites if they damage or destroy a site to a point that the inherent information could not be obtained. However, those impacts can be reduced through cultural resource surveys and mitigation measures mandated by Section 106 of the National Historic Preservation Act of 1966, as amended through 1992 (NHPA).

Vegetation and Soils

Special Status Plant Species

Assumptions/Impacts Common to All Alternatives

Under all alternatives, no negative effects on federal candidate, state listed, state candidate, Bureau sensitive, or Survey and Manage plant species would be expected because BLM policy is to conserve these species through protection of their habitats and populations. Surveys for special status plant species before ground disturbing activities would be designed to have a high probability to locate populations of these species. Under current BLM policy, effects on Bureau assessment and Bureau tracking species could occur at the discretion of the local manager.

Impacts of Specific Alternatives

(Refer to Maps 5, 6, 21 - 24, and Appendix H)

Alternative 1

Under this alternative, vegetation treatments, using both mechanical methods and prescribed fire, would be limited to current levels. Therefore, direct impacts to populations undetected during pre-project surveys or indirect impacts to habitat would be less likely than under alternatives with higher levels of ground disturbing management actions (see Map 21).

Due to the potential for wildfires from the higher fuel loads persisting over a longer period of time, special status plant populations may be affected by disturbance associated with fire suppression activities, and through alteration of the nutrient cycling regime of a site from the application of chemical flame-retardants. The vehicles and machinery entering the planning area to suppress any wildfires would increase the potential of disturbance of populations undetected by pre-project surveys. Additionally, higher fuel loads would result from ongoing wildfire suppression activities. Wildfires that burn in heavy, hazardous fuel loads would be high intensity, possibly canopy-replacing fires, to which many of the native understory species are not adapted. These fires would alter habitat and negatively affect populations of special status plant species.

Prescribed fire applied to areas could impact special status plant species if the fire is applied outside the season to which these plants are adapted to the occurrence of fire. However, the reduction of hazardous fuel levels and the reintroduction of fire as an ecosystem process could positively affect special status plant species that are adapted to a natural fire frequency and intensity.

Alternative 2

Under this alternative, vegetation treatments would occur over a larger area in order to promote the enhancement of Scenic River and ACEC values, primarily scenic and wildlife (see Map 22). Therefore, direct impacts to populations undetected by pre-project surveys would be more likely than in Alternative 1, but less likely than alternatives with higher levels of ground disturbing management actions. Indirect impacts to habitat would also be more likely under this alternative than in Alternative 1, however, these effects on habitat would be designed to be beneficial to native species in the long-term.

Fuels treatments would emphasize use of mechanical equipment, therefore, direct impacts to populations undetected by pre-project surveys would also be more likely than in Alternative 1.

However, indirect effects to habitat would be designed to benefit native species in the long-term.

The potential for impacts from wildfire management activities would be lower than in Alternative 1 since mechanical treatments would reduce hazardous fuel loads at a higher rate. However, the potential for impacts from fire suppression activities and high intensity, canopy-replacing fires, would be higher than Alternative 3 where large areas and high rates of both mechanical and prescribed fire habitat restoration activities are proposed.

The potential for direct impacts to populations undetected by pre-project surveys from the development of recreation sites is higher in this alternative than in Alternative 1. The potential for indirect impacts to habitat of special status plants from activities adjacent to these recreations sites is also increased. Increased levels of recreation activities also has the potential to increase the rate of introduction of noxious weeds which can impact special status plants directly through competition, and indirectly through alteration of habitat. If PacifiCorp's lands in California were acquired or managed by BLM under cooperative agreement, this potential to introduce noxious weeds through recreational activities would be expanded to these areas, which have restricted public access under current management.

Alternative 3

Under this alternative, large areas are proposed for vegetation treatments using both mechanical methods and prescribed fire in order to restore the stands to a more historically natural condition and maintain the health of the vegetation (see Map 23). Therefore, the potential for direct impacts to populations undetected by pre-project surveys would be highest of all the alternatives. However, the habitat and fuel reduction objectives would be designed to produce plant communities more typical of historic conditions under which these special status species evolved.

The more rapid reduction of heavy fuel loads would reduce the potential for impacts from fire suppression activities and high intensity, canopy replacing fires in the long-term. However, the increased level of ground disturbing activities may alter habitat such that early successional species, including noxious weeds, would have a competitive advantage in the short-term.

Prescribed fire applied to areas could impact special status plant species if the fire is applied outside the season to which these plants are adapted to the occurrence of fire. However, the reduction of hazard fuel levels and the reintroduction of fire as an ecosystem process could positively affect special status plant species that are adapted to a natural fire frequency and intensity.

The extensive removal of roads proposed in this alternative has the potential to have a beneficial effect on special status plant populations. For example, removal of roads that cross wet meadows will result in a more functional habitat, thus improving habitat for the red-root yampah (Perideridia erythrorhiza) and Howell's false caraway (Perideridia howellii) populations, which occur in these meadows.

Alternative 4

Under this alternative, vegetation treatments would be increased over current levels, but the additional areas treated would be concentrated around roads, high recreation use areas, and in important wildlife habitat (see Map 24). Therefore, direct impacts to populations undetected by pre-project surveys would be more likely than in Alternative 1, less likely than in Alternative 3, and similar to Alternative 2 but distributed differently across the landscape. Potential for indirect impacts to habitat would be similar to Alternative 2, however, these effects on habitat would be designed to be beneficial to native species in the long-term.

Fuels treatments would emphasize use of mechanical equipment; therefore, direct impacts to populations undetected by pre-project surveys would also be similar to Alternative 2. However, indirect effects to habitat would be designed to benefit native species in the long-term.

The potential for impacts from wildfire management activities would be similar to Alternative 2 since mechanical treatments would reduce hazardous fuel loads at a higher rate than in Alternative 1. However, the potential for impacts from fire suppression activities and high intensity, canopy-replacing fires would be higher than Alternative 3 where large areas and high rates of both mechanical and prescribed fire habitat restoration activities are proposed.

The potential for direct impacts to populations undetected by pre-project surveys from the more extensive development of recreation sites is relatively high in this alternative. The potential for indirect impacts to habitat of special status plants from activities adjacent to these recreations sites is also relatively high. Higher levels of recreation activities also has the potential to increase the rate of introduction of noxious weeds which can impact special status plants directly through competition, and indirectly through alteration of habitat. If PacifiCorp's lands in California were acquired or managed by BLM under cooperative agreement, this potential to introduce noxious weeds through recreational activities would be expanded to these areas, which have restricted public access under current management.

Noxious Weeds

Assumptions/Impacts Common to All Alternatives

The implementation of an Integrated Weed Management (IWM) program as defined in EA-014-93-09 is common to all alternatives. Integrated management of noxious weeds will include systematic inventories of the planning area, education, prevention, and control using manual, mechanical, chemical and biological methods.

Impacts of Specific Alternatives

(Refer to Maps 5, 6, 21-24, and Appendix H)

Alternative 1

Under this alternative, the potential for the introduction of noxious weeds into the planning area and the potential for the spread of noxious weeds within the planning area would remain the same (see Map 21). The vegetation management and recreation development activities would create disturbed conditions under which many noxious weeds have a competitive advantage relative to other species native to the site. The continued implementation of the Integrated Weed Management program would tend to decrease or at least stabilize the abundance and distribution of noxious weeds within the planning area.

Due to the potential for wildfire from the persistence of high fuel loads over a longer period of time, weed populations may have a competitive advantage under conditions resulting from the soil disturbance associated with fire suppression activities, and from alteration of the nutrient cycling regime of a site as a result of the application of chemical flame-retardants. The vehicles and machinery entering the planning area to suppress any wildfires would increase the potential for the introduction of noxious weeds from sources outside the planning area. Additionally, higher fuel loads would result from ongoing wildfire suppression activities. Wildfires that burn in heavy, hazardous fuel loads would be high intensity, possibly canopy replacing fires. These fuel conditions increase the potential for even greater disturbance in the event of wildfire, creating conditions under which many noxious weeds have a competitive advantage.

There would be the potential for introduction of noxious weeds into the area from sources outside the planning area on the vehicles and machinery used to implement prescribed fire projects.

Alternative 2

Under this alternative, vegetation treatments would occur over a larger area than Alternative 1, in order to promote the enhancement of Scenic River and ACEC values, primarily scenic and wildlife (see Map 22). Therefore, the disturbed conditions under which many noxious weeds have a competitive advantage would be more extensive than in Alternative 1, but less extensive than under alternatives with higher levels of ground disturbing management actions. Increased numbers of vehicles and machinery entering the planning area to implement these treatments would increase the potential for the introduction of noxious weeds into the area from sources outside the planning area. Post-project inventories proposed under this alternative would promote the early detection and treatment of new noxious weed populations established as a result of these actions.

Fuels treatments would emphasize the use of mechanical equipment, therefore, the disturbed conditions under which many noxious weeds have a competitive advantage would also be created by these activities. The vehicles and machinery entering the planning area to implement these treatments would increase the potential for the introduction of noxious weeds from sources outside the planning area. However, post-project inventories proposed under this alternative would promote the early detection and treatment of new noxious weed populations established as a result of these actions.

The potential for impacts associated with the disturbance created by wildfire management activities would be lower than in Alternative 1, since mechanical treatments would reduce hazardous fuel loads at a higher rate. However, the potential for impacts from fire suppression activities and high intensity, canopy-replacing fires would be higher than Alternative 3 where large areas and high rates of both mechanical and prescribed fire habitat restoration activities are proposed.

Increased levels of recreation activities, also has the potential to increase the rate of introduction of noxious weeds. If PacifiCorp lands in California were acquired or managed by BLM under cooperative agreement, this potential to introduce noxious weeds through recreational activities would be expanded to these areas, which have restricted public access under current management.

Alternative 3

Under this alternative, large areas are proposed for vegetation treatments using both mechanical methods and prescribed fire in order to restore the stands to a more historically natural condition (lower fuel loads) and maintain the health of the vegetation (see Map 23). Therefore, this alternative would create the largest area in the short-term that would create disturbed conditions under which many noxious weeds have a competitive advantage relative to other species native to the area. However, the habitat and fuel reduction objectives would be designed to produce plant communities more typical of historic conditions, which may be more resistant to noxious weed invasion in the long-term.

The greater extent of these activities would also have the most potential for the introduction of noxious weeds from the vehicles and machinery entering the planning area to implement these treatments. However, post-project inventories proposed under this alternative would promote the early detection and treatment of new noxious weed populations established as a result of these actions.

The more rapid reduction of heavy fuel loads would reduce the potential for impacts from fire suppression activities and high intensity, canopy-replacing fires in the long-term. Therefore, the activities and conditions associated with wildfire management would have less potential to create the disturbed conditions under which many noxious weeds have a competitive advantage. Additionally, in the long-term, less vehicles and machinery would be entering the planning area to suppress wildfires, and the potential would be reduced for the introduction of noxious weeds into the area from sources outside the planning area.

Prescribed fire applied to areas through the random selection process and areas selected by the Interdisciplinary Team would reduce hazardous fuel levels, reintroduce fire as an ecosystem process, and thereby promote the development of the native plant communities adapted to a natural fire frequency and intensity. These plant communities would be more resistant to invasion by noxious weeds.

Alternative 4

Under this alternative, vegetation treatments would be increased over current levels, but the additional areas treated would be concentrated around roads, high recreation use areas, and in important wildlife habitat (see Map 24). Therefore, the area disturbed by these treatments would be larger than in Alternative 1, smaller than in Alternative 3, and similar to Alternative 2, but distributed differently across the landscape. The numbers of vehicles and machinery entering the planning area to implement these treatments would have a similar potential as Alternative 2 for the introduction of noxious weeds from sources outside the planning area. However, the periodic inventories adjacent to high use recreation areas would promote the early detection and treatment of new noxious weed populations established as a result of these actions.

Fuels treatments would emphasize use of mechanical equipment; therefore, the disturbed conditions under which many noxious weeds have a competitive advantage created by these activities would be over a similar area as under Alternative 2. The vehicles and machinery entering the planning area to implement these treatments would have the potential for the introduction of noxious weeds from sources outside the planning area. However, the periodic inventories adjacent to high use recreation areas would promote the early detection and treatment of new noxious weed populations established as a result of these actions.

The potential for impacts from wildfire management activities would be similar to Alternative 2 since mechanical treatments would reduce hazardous fuel loads at a higher rate than in Alternative 1. However, the potential for impacts from fire suppression activities and high intensity, canopy-replacing fires would be higher than Alternative 3 where large areas and high rates of both mechanical and prescribed fire habitat restoration activities are proposed.

The more extensive development of recreation sites under this alternative has the potential to create the disturbed conditions under which many noxious weeds have a competitive advantage relative to other species native to the area. Increased numbers of vehicles and machinery entering the planning area to implement these treatments, and the higher level of recreational use would increase the potential for the introduction of noxious weeds into the area from sources outside the planning area. If PacifiCorp lands in California were acquired or managed by BLM under cooperative agreement, this potential to introduce noxious weeds through recreational activities would be expanded to these areas, which have restricted public access under current management. However, the periodic inventories adjacent to high use recreation areas would promote the early detection and treatment of new noxious weed populations established as a result of these actions.

Forest and Woodlands

Assumptions/Impacts Common to All Alternatives

Vegetation treatments proposed under each alternative (see Appendix H) are designed to restore ecosystem health to the affected plant communities. In conifer forests and woodlands, this would be done mainly by thinning, followed by fuels reduction treatments, as described in Chapter 4. Brushfields would be kept in an early seral condition, mainly by prescribed burning, to maximize big game browse.

Since vegetation management prescriptions for treated acres are basically identical in all alternatives, the impacts to the vegetation from these treatments are assumed to be proportional to the area treated in each alternative.

For conifer forests and woodlands, beneficial impacts include improved stand condition and vigor, increased stand resistance to epidemic level insect attack, and reduced fuel levels and lower risk of catastrophic stand-replacing wildfires. Oak woodlands, in the long-term, would be restored to more natural oak savannas with large, full-crowned trees and grass understory. Mixed brush would be maintained by fire as younger, more palatable stems. Rabbitbrush-sagebrush areas and dry meadows would be maintained by removal of invasive oaks and other plants, by cutting or prescribed fire. Treatment areas would have disturbed soil, and would provide potential sites for noxious weed establishment.

Watershed management would potentially have impacts on vegetation commensurate with the area of vegetation treatments within riparian reserves. In these areas, vegetation would be subordinate to riparian and aquatic species values, and be modified and designed to enhance those values.

Terrestrial wildlife species and habitat would be benefited by the general vegetation treatments, as well as specific site treatments, like clearing under eagle nest trees to reduce moisture competition for the nest tree.

Fire and fuels would be directly affected by vegetative treatments, since reduction of fuels by mechanical methods or fire, are part of the proposed treatments. Fuel treatments would reduce risk of catastrophic stand-replacing wildfires, although the short-term risk of accidental fire during treatment operations will be greater.

The impacts of land tenure actions will vary with the area of land converted from private to public ownership, or to conservation easements, or management agreements. Due to the proposed land allocation of PacifiCorp lands in California as a river management area, a more certain source of funding may become available and these lands would be more likely to be treated to improve vegetative condition than other private lands.

Other resource management concerns would have little or no impact on vegetation, and will not be analyzed under each alternative. Scenery management would require maintenance of existing visual values. Thinnings, fuel reduction, and most prescribed burning would maintain these values. Construction of recreational facilities would convert a relatively small area of vegetation to other uses. Only a few acres of the over 19,765 acres in the planning area would be so directly affected. Protection of cultural sites would also have similar negligible impacts. Roads as proposed in the four alternatives would have only minor impacts on vegetation. Access to many treatment units is difficult under all alternatives; not every unit has a road leading to it. In these situations, temporary trails may be used to bring in equipment and work crews. Other treatment methods, such as helicopter yarding or helicopter ignition of burn units, are also available. Livestock grazing, as proposed, would have little impact on vegetation.

Impacts of Specific Alternatives

The following discussion of impacts is organized in groups of management actions that have similar project objectives and potential consequences.

(Refer to Maps 6, 21- 24, and Appendix H)

Alternative 1

Vegetation, Terrestrial Species and Habitat, and Fire and Fuels Management - As shown on Table 4-11, vegetative treatments for this alternative total 1,171 acres for the first decade of the plan. This is the smallest acreage of treatment of the four alternatives, and, in turn, would provide the smallest area of improved vegetative condition, reduced fuels, reduced risk of catastrophic wildfire, and improved wildlife habitat (see Map 21).

Watershed, and Aquatic Species and Habitat Management - The area of vegetative treatments within riparian reserves is 227 acres, or 19% of the total treatment area. Intensity, or area of treatment, could be modified to accommodate or enhance specific riparian or aquatic values.

Land Tenure - Even though acquisition of private lands is allowed under the current RMPs no vegetative treatments were planned to occur on PacifiCorp lands in this alternative.

Cumulative Impacts - Since this alternative has the smallest area of vegetative treatment; it also has the effect of minimizing the beneficial impacts of these treatments. Forest and woodland densities and fuel loads would continue to accumulate in non-treated areas, with increasing risk of insect attack and increased risk of catastrophic wildfire.

Alternative 2

Vegetation, Terrestrial Species and Habitat, and Fire and Fuels Management - Vegetative treatments for this alternative total 4,510 acres for the first decade of the plan. This is a “moderate” amount of treatment; more than Alternative 1, less than Alternative 3, and about equal to Alternative 4. It would provide a moderate level of beneficial impacts from improved vegetative condition, reduced fuels, and improved wildlife habitat (see Map 22).

Watershed and Aquatic Species and Habitat Management - The area of vegetation treatments within riparian reserves is 1,372 acres, or 30% of the total treatment area. Intensity or areas of treatment could be modified to enhance specific riparian or aquatic values.

Land Tenure - The additional proposed acquisition of private lands, or development of management agreements or conservation easements would primarily be in the Frain Ranch,, Shovel Creek, and Hayden Creek areas. This limitation has the effect of limiting the beneficial impacts of vegetation treatment outside these areas.

Cumulative Impacts - Since this alternative has a medium level of vegetative treatment, it has the effect of increased beneficial impacts compared to Alternative1, less than Alternative 3, and about the same as Alternative 4. Forest and woodland densities and fuel loads would continue to accumulate in non-treated areas, with increasing risk of insect attack and increasing risk of catastrophic wildfire.

Alternative 3

Vegetation, Terrestrial Species and Habitat, and Fire and Fuels Management - Vegetative treatments for Alternative 3 total 6,958 acres for the first decade (see Map 23). This is the largest of the four alternatives, and in comparison, maximizes the beneficial impacts from improved vegetative condition, reduced fuels, and improved wildlife habitat.

Watershed, and Aquatic Species and Habitat Management - The area of vegetative treatments within riparian reserves is 1,761 acres, or 25% of the total treatment area. Intensity or area of treatment could be modified to accommodate or enhance specific riparian or aquatic values.

Land Tenure - Acquisition of lands, and execution of management agreements and conservation easements would be maximized under this alternative, and would help maximize vegetative treatment acres and positive impacts.

Cumulative Impacts - Since this alternative has the highest amount of vegetative treatment, it will also result in the highest level of beneficial impacts.

Alternative 4

Vegetation, Terrestrial Species and Habitat, and Fire and Fuels Management - Vegetative treatments for this alternative total 4,580 acres for the first decade of the plan (see Map 24). This is a "moderate" level of treatment, approximately the same as Alternative 2, more than Alternative 1, but less than Alternative 3. It would provide a moderate level of beneficial impacts from improved vegetative condition, reduced fuels, and improved wildlife habitat.

Watershed, and Aquatic Species and Habitat - The area of vegetative treatment within riparian reserves is 958 acres, or 21% of the total treatment area. Intensity, or areas of treatment could be modified to accommodate or enhance riparian or aquatic values.

Land Tenure - Acquisition of lands and development of management agreements or conservation easements would be at a high level, and would allow vegetative treatments to be maintained at a medium to high level.

Cumulative Impacts - Since this alternative has a medium level of vegetative treatment, it has the effect of increased beneficial impacts compared to Alternative 1, less than Alternative 3, and about the same as Alternative 2. Forest and woodland densities and fuel loads would continue to accumulate in non-treated areas, with increasing risk of insect attack and increased risk of catastrophic wildfire.

Irretrievable, Irreversible, and Unavoidable Impacts

For areas where vegetation treatments do not occur, then forest and woodland densities and fuel loads would continue to accumulate with increasing risk of insect attack and increased risk of catastrophic wildfire. This would have irreversible impacts to scenery, vegetative and biological resources if a wildfire were to occur.

Irrigated Meadows

Assumptions Common to All Alternatives

Any actions that initiate a change in management to irrigation systems or use of irrigated meadows would only be made as recommendations to PacifiCorp.

Impacts of Specific Alternatives

(Refer to Maps 5, 6, 21-24, and Appendix H)

Alternative 1

The irrigated meadows in Segment 3 would continue to be managed for commodity production, and would continue to consist of a mixture of native and introduced pasture grasses. Bullrush and willow dominated riparian communities would persist on the margins of pastures and near irrigation ditches. Dense sod mats would continue to form when decomposition of this pasture vegetation is impaired by moist conditions. Populations of yellow starthistle and other noxious weeds would continue to be a problem around the margins of the pastures and on the drier sites, and consistent treatment would be required to achieve control (see Map 21).

Alternative 2

It would be recommended that the 290 acres of irrigated meadows along the river in Segment 3 be adaptively managed to provide diverse native vegetation and wildlife habitat. Water deliveries to meadows that are irrigated solely (25 acres) or partly (70 acres) with water from the Negro Creek diversion would be reduced (see Map 22).

The desired vegetation would include tufted hairgrass and various species of native sedges and rushes. Willows and rushes would expand from their current extent at sites on the margins of the river and irrigation ditches, as well as establishing in areas with soils that are naturally inundated or that are hydrologically connected to the river or Shovel Creek via gravel lenses. On drier sites, existing meadow communities would persist unless other species are planted or become established. Native grass species that may be planted or become established would include California brome, western fescue and others. Yellow starthistle could expand as irrigation is curtailed, and appropriate weed control would be required. In the long-term, the extent and timing of irrigation would be based on monitoring results regarding the degree of natural inundation and the condition and composition of plant communities.

As a result of proposed management of the Segment 3 floodplain meadows, riverine riparian vegetation communities would develop deeper root systems and would receive lighter grazing pressure than at present. This would reduce bank erosion and associated detrimental impacts on existing riparian vegetation.

Improved irrigation efficiency or elimination of ditches would reduce the amount of seepage water available to riparian communities that have become established along ditches.

Alternative 3

It would be recommended that the 290 acres of irrigated meadows along the river in Segment 3 be adaptively managed to provide diverse native vegetation and wildlife habitat (see Map 23). Water deliveries to meadows (103 acres) that are irrigated with water from the Shovel Creek and Negro Creek diversions would be reduced and eventually eliminated. Use of some or all diversions from the river could also be altered and possibly eliminated, depending on the success of efforts to restore the natural functionality of desired vegetation communities.

The desired vegetation would include tufted hairgrass and various species of native sedges and rushes. Willows and rushes would expand from their current extent at sites on the margins of the river and irrigation ditches, as well as establishing in areas with soils that are naturally inundated or that are hydrologically connected to the river or Shovel Creek via gravel lenses. On drier sites, existing meadow communities would persist unless other species are planted or become established. Native grass species that may be planted or become established would include California brome, western fescue, and others. Starthistle could expand as irrigation is curtailed, and appropriate weed control would be required. In the long-term, the extent and timing of irrigation would be based on monitoring results regarding the degree of natural inundation and the condition and composition of plant communities.

As a result of proposed management of the Segment 3 floodplain meadows, riverine riparian vegetation communities would develop deeper root systems and would receive lighter grazing pressure than at present. This would reduce bank erosion and associated detrimental impacts on existing riparian vegetation.

Improved irrigation efficiency or elimination of ditches would reduce the amount of seepage water available to riparian communities that have become established along ditches. This effect would be more pronounced in this alternative than in Alternative 2.

Alternative 4

The irrigated meadows in Segment 3 would continue to be managed for commodity production, and would continue to consist of a mixture of native and introduced pasture grasses. Bullrush and willow dominated riparian communities would persist on the margins of pastures and near irrigation ditches (see Map 24). Dense sod mats would continue to form when decomposition of this pasture vegetation is impaired by moist conditions. Populations of yellow starthistle and other noxious weeds would continue to be a problem around the margins of the pastures and on the drier sites, and consistent treatment would be required to achieve control.

Riparian/Wetland Vegetation Communities

This portion of the environmental consequences discussion will focus primarily on the effects of proposed actions on riparian vegetation communities and the conditions that favor or impair their development, and will not describe potential consequences to "riparian reserves" and "riparian corridors" (refer to the discussion of Aquatic Conservation Strategy Components in the Watershed Values section).

Assumptions

The responses of riparian vegetation communities to proposed actions generally are not influenced by land ownership. A more detailed discussion of the location (including ownership) of specific types of impacts can be found in the Riparian Reserves section of the Aquatic Conservation Strategy Components discussion (in the Watershed Values section).

Coarse woody debris (CWD) plays important roles in developing conditions favorable for vegetation development. In streams, CWD can deflect streamflow and create pools, gravel bars, and areas where vegetation can develop. On terrestrial sites, CWD provides habitat, stabilizes soil, acts as a short-term regulator of soil moisture, and is a source of nutrients (Naiman et al. 1992, Wilford 1984).

The effectiveness of CWD in shaping riparian areas varies with piece stability and stream energy. In smaller streams and in wet meadows, relatively small pieces can help create sites for riparian vegetation to develop. In the river, large, stable CWD pieces contribute to developing sites for vegetation colonization. Generally, CWD stability increases as the ratio of piece length to channel width increases, and is enhanced when the piece is "anchored" or partly buried by bedrock, large rocks, trees or other CWD pieces, or gravel bars (Lienkamper and Swanson 1987).

Impacts Common to All Alternatives

Recreation Management - Campgrounds and other types of recreation developments within the planning area are generally not located on sites that have potential to support extensive riparian vegetation communities. Such sites are typically saturated for varying lengths of time during the year, and are not well-suited for recreation developments. Exceptions do occur, however, and the location or use of some existing or proposed recreation developments may affect the composition and extent of riparian vegetation communities.

In all alternatives, camping would remain unrestricted. Dispersed sites near or in riparian areas are expected to receive similar levels of use in all alternatives. In Alternatives 1 and 3, use would be limited by poor access. In Alternatives 2 and 4, overall visitation within the planning could increase, but use would be focused primarily in developed recreation sites. Camping and associated activities can cause trampling of vegetation, soil compaction and displacement, and noxious weed introduction or dispersal.

OHV use would be limited to open roads and, consequently, damage to wet meadows and riparian areas (such as soil compaction, rutting, and removal of vegetation) would be reduced.

Road Management - Improved road surfaces and drainage features would reduce the delivery of road-generated runoff and sediment to riparian communities and would beneficially affect riparian vegetation and soils. Delivery of runoff and sediment from road surfaces can cause erosion of streambanks and other surfaces, can alter the hydrology of sites (for example, by decreasing groundwater inputs and reducing the length of time that a site is inundated), and can bury vegetation in low-lying areas adjacent to roads.

Improved road surfaces would be passable during wet weather, thereby eliminating the need for off road driving to circumvent impassable areas. The extent of road improvements near riparian areas varies by alternative.

It would be recommended that the bridges that cross Shovel Creek and Rock Creek be upgraded or retrofitted to allow passage of 100-year flood events. If implemented, these projects would disturb small portions of riparian vegetation but would reduce bank erosion and the risk of catastrophic bridge failure (and associated channel scour).

Cultural Resource Management - Utilization of Ethnobotanical resources is not expected to substantially affect riparian vegetation. Other proposed resource management activities may enhance the vigor or abundance of some native species.

Watershed Management - In the long-term, improved water quality and reduced nutrient loading in the Klamath River would reduce some of the competitive advantages that reed canary grass currently exploits. As a result, other native plants that are currently less widely distributed than reed canary grass would increase in abundance.

In a few wet meadows or tributary streams (Rock Creek Meadow, areas near Hayden Creek, and Middle Chert Creek meadow), enhanced or prolonged baseflow would favor the development of more extensive riparian vegetation communities or increased proportions of riparian obligate or facultative vegetation within existing riparian communities. There is a slight risk of increased peak flows in some streams. Higher peak flows, if they occur would potentially cause increased bank erosion and loss of riparian vegetation. This impact would be episodic, rather than ongoing, and would not significantly affect vegetation communities in the long-term.

Vegetation Management - *Upland vegetation treatments:* Vegetation treatments adjacent to riparian communities could reduce shading and CWD delivery, with consequent effects on evapotranspiration, soil moisture and organic matter content, and noxious weeds. By reducing the degree of shading within riparian areas, proposed treatments could maintain conditions that favor reed canary grass (Antieau, 1998).

Treatments in mixed conifer and riparian forest communities would reduce the short-term recruitment of smaller diameter CWD pieces and ensure the long-term recruitment of larger CWD pieces. The recruitment of large CWD may be reduced by some treatments in special habitat types, including some areas along the river.

Detrimental effects to riparian areas from upland vegetation treatments will be minimized by applying best management practices and designing management prescriptions for areas near waterbodies to ensure that riparian vegetation and soils and beneficially affected in the long-term.

Noxious weeds: Noxious weed treatments would occur within riparian vegetation communities in all alternatives. Although all herbicide label stipulations will be followed, some non-target species may be affected by chemical treatments. Overall, noxious weed management would beneficially affect the diversity and ecological function of riparian plant communities.

Range resources: In all alternatives, livestock use in riparian areas in Segment 2 would be reduced from current levels, and special habitats, including some riparian communities, would be exclosed from grazing. These actions would improve the vigor of riparian plants and enhance the nutrient content and structure of associated soils.

PacifiCorp Facilities - A low-voltage PacifiCorp transmission line traverses Exclosure Meadow (T41S-R6E-section 8). Maintenance of this line occurs sporadically (as needed) and requires use of mechanical equipment, leading to soil compaction and vegetation disturbance. A proposed mitigation measure would limit scheduled maintenance to periods when soils are dry, thereby reducing detrimental impacts of this ongoing activity.

Measures designed to limit the use and detrimental impacts of the emergency spillway are common to all alternatives. Decreased scouring at the site would result in reduced delivery of large boulders to the west bank of the river, thereby reducing scour of sediment and vegetation against the east bank. If PacifiCorp determines that the spillway is no longer needed, the site could be rehabilitated, and native vegetation reestablished.

The presence and operation of hydroelectric facilities can detrimentally affect riparian processes by creating daily fluctuations in downstream water levels during the growing season, blocking the supply of seeds and rooting matter from upstream, flushing seeds and seedlings during peaking operations, and reducing the supply of sediment available for incorporation into stream banks and gravel bars (Scott et al. 1993). The extent of some of these impacts varies by alternative. The physical barriers presented by J.C. Boyle Dam and other upstream dams would likely remain in place in all alternatives.

Fire and Fuels Management - Periodic prescribed fire could maintain and enhance wet meadows and riparian mixed conifer-hardwood forests by preventing encroachment of juniper and reducing competition among riparian plants. Fuel reductions accomplished by prescribed fire would reduce the likelihood of stand replacement fires in riparian forests. Prescribed fire use could result in the unintended mortality of some overstory trees, which would reduce shade but could result in beneficial short-term increases in CWD loading (Bragg 2000)

Impacts of Specific Alternatives

(Refer to Maps 5, 6, 21-24, and Appendix H)

Alternative 1

Recreation Management - *Site development:* No site development in the vicinity of riparian areas would occur in this alternative.

Site upgrades/expansion: No site upgrades or expansion would occur that would have the potential to substantially affect riparian areas.

Site rehabilitation/relocation: Decreased use at the dispersed sites on the west bank of the river near Frain Ranch would be reduced, and trampling of vegetation communities near these sites would decrease.

Trail network: Trails would cross through one wet meadow on the west bank of the river near Frain Ranch and near one wet meadow near Hell's Corner. Some trampling of vegetation communities and diversion of flow paths could occur. The trail near Frain Ranch would be located on the bed of an obliterated road, and the effects of the trail on riparian processes would be much less than the effects of the existing roads (see Map 13).

Trail maintenance would occur annually, and could include bucking of small diameter CWD. Although the stability of this material would be decreased in the two small tributary streams that the trail would cross, trail maintenance would have a negligible effect on channel forming processes that shape riparian communities. Project design features will limit the effect of trail maintenance on the stability of large CWD.

Recreation uses: No impacts from OHV use or camping would occur beyond that which is common to all alternatives.

Road Management - Relative to the other alternatives, Alternative 1 has the least extensive program of road obliteration in riparian areas. About 0.3 miles of road that traverse wetlands or riparian forests would be obliterated. Less than 0.1 miles of new road would be constructed in riparian communities. Road construction would affect portions of the floodplain of Chert Creek, but would occur coincident with obliteration of a road that is closer to the stream and is impairing riparian processes (see Map 17a and Appendix H).

Road obliteration would reduce compaction, allow revegetation and restoration of hydrologic flow paths, and reduce OHV use in four wet meadows in Segment 2. OHV use in two other meadows would be reduced as a result of obliteration of nearby roads. In the long-term, riparian vegetation may develop in some areas along old roads, and the growth and eventual mortality of trees growing on old roads would supply CWD to nearby riparian areas.

The extent of open roads near riparian areas is slightly lower in this alternative than in Alternative 4, but is higher than Alternatives 2 and 3. Wet meadows and riparian communities along streams (including the river) would be affected by reductions in CWD supply due to bucking and clearing of roadside hazard trees and fallen trees.

Road improvements designed to reduce runoff and sediment delivery would likely enhance the vigor of riparian vegetation in Rock Creek meadow, along Chert Creek and adjacent meadows, along Way Creek, and in the meadows along the lower portion of Shovel Creek. Other riparian areas may also be beneficially affected, though to a lesser degree.

Nine stream crossings in Segment 2 would be removed or improved in this alternative. Improved crossings at seven sites along streams would reduce detrimental impacts (such as diversion of flow paths, bank erosion, sediment delivery from roads, and disrupted transport of organic matter) to riparian processes along Frain Creek, Crayfish Creek, and two small streams near the powerhouse.

Crossing removal in two wet meadows will occur coincident with road removal, and will improve the hydrological and ecological function of riparian areas. Use of mechanical equipment to improve or remove crossings may cause short-term damage to riparian vegetation and soils, although BMPs will be applied to reduce the likelihood of such impacts.

Watershed Management - In Segment 1, flow regimes would not change from current conditions, and the encroachment of reed canary grass and other riparian vegetation into the river channel would continue. In Segments 2 and 3, peaking operations at the powerhouse would continue to cause large daily fluctuations in water levels. Proposed changes in flow regimes would cause the magnitude of these fluctuations to be reduced slightly from current levels, though a zone of riparian vegetation subject to frequent inundation and exposure would still exist. Stabilized flows during late spring of average and wet water years would enhance the probability of successful establishment of riparian species along the river, although flow fluctuations would likely continue to impair riparian processes. Peaking flows would potentially have detrimental effects on the dispersal, establishment, and vigor of species that rely on seeds or cuttings.

Terrestrial Species/Habitat Management - Limited site-specific actions to benefit pond turtles, eagles, and woodpeckers would occur in this alternative. Proposed actions would result in reduced understory density and increased vigor of large trees. In the short-term, shade and CWD recruitment would be reduced. Desirable native riparian plant species could become established in areas affected by the proposed action, although conditions favored by reed canary grass could be created in some areas.

Aquatic Species/Habitat Management - Large scale process-based stream restoration treatments along the river would not occur in this alternative. The restricted supply of coarse sediment in the river would continue to impair the development of alluvial surfaces upon which riparian vegetation can become established. Unnaturally high width to depth ratios would persist in the river and tributary streams, accelerated rates of bank erosion and downcutting would continue, and floodplain inundation would occur rarely. Suitable sites for development of streamside riparian vegetation communities would be limited, and existing sites would continue to be damaged by altered rates of channel forming processes.

Vegetation Management - *Upland treatments:* Treatments within riparian reserves would affect the availability of sunlight, water, and CWD to wetland and riparian communities. The extent of proposed vegetation management actions is lowest in Alternative 1; about six percent of the acreage within riparian reserves would be affected. Few of these acres are near mapped riparian vegetation communities, however, and direct effects to riparian vegetation would be limited (see Map 21). Along small streams, proposed actions would reduce delivery of channel-forming CWD and could impair processes that create conditions suitable for some types of riparian vegetation (Beechie and Sibley 1997).

Riparian treatments: Seven wet meadows, covering about 15 acres, would receive passive restoration in the form of road obliteration and exclosure construction. These actions would reduce vehicle traffic through areas with soils sensitive to compaction and displacement, reduce the introduction and dispersal of noxious weeds, and improve conditions for development of native vegetation.

Range Management - Use levels in the planning area would not change substantially on either public or private land, relative to current conditions. Use in some wet meadows in Segment 2 would be decreased due to construction of exclosures. Trampling and consumption of riparian vegetation would continue in most areas that are currently affected by livestock use.

Fire and Fuels Management - The existing Fuels Management EA would continue to be in effect in the planning area. The fuels management program in this alternative would be less extensive than in other alternatives.

Cumulative Effects - Compared to other alternatives, a relatively small amount of riparian areas would be beneficially affected by restoration treatments. Proposed road obliteration and exclosure construction will affect about 13 acres of wet meadow habitat. Increased baseflow in small streams and reduced impacts from nearby roads would improve the condition of riparian vegetation in many wet meadows and riparian areas associated with small streams.

Together, road and vegetation management actions would maintain and restore the processes by which large CWD is supplied (via natural mortality of trees) to riparian areas along Chert

Creek and a portion of the river in Segment 2. In other areas, maintenance and use of roads and campgrounds would continue to reduce delivery of CWD to riparian areas.

Alternative 2

Recreation Management - *Site development:* The proposed Shovel Creek campground would be located on the relic floodplain of the Klamath River in Segment 3 (see Map 14). The hydrologic and geomorphic character of this area is no longer affected by annual flooding by the river, thereby changing the disturbance regime to which riparian communities adapt. Land use over the past century has also profoundly changed the vegetation community at the site. Despite these alterations, portions of the area are influenced by springs or are still hydrologically connected to the river via subsurface flow paths, and sedges, willows, and other riparian species are present. The proposed action would reduce the potential of the site to meet desired future conditions for riparian areas. Development of a large campground and associated facilities would entail site clearing, surface grading, and construction of roads and other impervious surfaces. These actions would alter surface and subsurface flow paths, with consequent effects on nutrient routing and oxygen availability. Riparian vegetation communities would be permanently covered or altered as a result.

Boat launches would not be built in areas that support extensive riparian areas. Development of these sites would have minor direct effects on riparian vegetation, and indirect effects would be limited due to the small extent of these sites.

Site upgrades/expansion: Increased use at some sites along the river (due to improved access or upgraded facilities) would lead to increased potential for interference with natural processes. No such sites are located within riparian communities, although some, such as the sites north of Frain Ranch and at Turtle Camp, are in close proximity to riverine and wet meadow riparian areas. Indirect impacts at these sites would include bank and vegetation trampling, wood cutting, and perhaps some unauthorized OHV use. Concentration of recreation use at developed dispersed sites would limit impacts near other, unimproved sites to their current levels.

Site rehabilitation/relocation: Rehabilitation at sites on the east side of the river at the south end of Frain Ranch and to the north of Frain Ranch would benefit the riparian communities adjacent to these sites. Native vegetation will, over time, contribute organic matter and ameliorate soil compaction. Some management intervention (planting of vegetation or manual de-compaction of soil) may be required to ensure that these areas recover to desired conditions.

Relocation of the northernmost site at the Klamath River Campground would reduce trampling and other detrimental impacts to a relatively extensive stand of willow that is nearby.

Trail network: Trails would cross numerous riparian areas along the river, four wet meadow areas in Segment 2, and portions of the relic floodplain in Segment 3, as well as portions of the riparian area along the middle portion of Shovel Creek. Where trails cross wet meadows and floodplains, minor impacts of trampling of vegetation communities and diversion of flow paths would occur. These trails will be located on the beds of decommissioned roads, and the effects of the trails on riparian processes will be much less than the effects of the existing roads (see Map 14).

Trail maintenance would occur annually, and could include bucking of small diameter CWD. The stability of this material during high streamflow events would be decreased. Project design features will limit the effect of trail maintenance on the stability of large CWD. Trail maintenance would have a negligible effect on channel forming processes that shape riparian communities.

Recreation uses: 49 acres of meadows would be made inaccessible to OHV use in this alternative. The designation of specific OHV tour routes, along with increased management presence, would potentially decrease motor vehicle damage to wetland soils and plant communities. Overall, less soil compaction and displacement in wet meadows would occur.

Road Management - In this alternative, about 0.9 miles of road that traverse wetlands or riparian forests will be decommissioned or obliterated. These actions would reduce compaction and allow revegetation and restoration of hydrologic flow paths in six wet meadows in Segment 2 and riparian areas adjacent to Shovel Creek. In the long-term, riparian vegetation may develop in some areas along old roads, and the growth and eventual mortality of trees growing on old roads would supply CWD to nearby riparian areas.

Improved access into and within the planning area could lead to increased OHV use in some wet meadows that would not be exclosed. Monitoring results will be reviewed to determine if additional areas need protection from OHV use.

Construction of one new bridge could cause direct and indirect detrimental impacts riparian areas. The total area directly affected would be relatively small. The bridges would be built in the vicinity of a site a bridge existed previously, in an area that does not support extensive riparian vegetation. The bridge would be designed to pass 100-year flood events, and indirect detrimental effects on channel processes, and thus bank and floodplain vegetation, would be minimized.

Bucking and clearing of roadside hazard trees and fallen trees would continue to affect CWD delivery to riparian communities. Due to extensive road obliteration within riparian reserves, detrimental impacts to CWD delivery would be substantially lower in this alternative than in Alternatives 1 and 4, though slightly higher than in Alternative 3. In general, detrimental effects of roads on CWD recruitment would be more pronounced in wet meadow areas than in streamside riparian areas.

Road improvements designed to reduce runoff and sediment delivery would likely enhance the vigor of riparian vegetation in Rock Creek meadow, along Chert Creek and adjacent meadows, along Way Creek, and in the meadows along the lower portion of Shovel Creek. Other riparian areas may also be beneficially affected, though to a lesser degree (see Map 18a).

Twenty stream crossings would be removed or improved in this alternative. These sites occur on tributary streams, primarily in Segment 2, but also in the Shovel Creek drainage in Segment 3.

Improved crossings at between 12 and 16 (depending on future needs to access powerlines) would reduce detrimental impacts (such as diversion of flow paths, increased bank erosion, increased sediment delivery from roads, and disrupted transport of organic matter) to riparian processes along Frain Creek, Crayfish Creek, Chert Creek, and two small streams near the powerhouse.

Crossing removal at between four and eight sites in four wet meadows and along Shovel Creek and Hayden Creek would occur coincident with road removal, and will ensure that crossings do not continue to affect riparian processes. Past channel and riparian adjustments to the effects of the crossing structure (i.e., eroded streambanks or bare ground) may persist. Use of mechanical equipment to improve or remove crossings could cause short-term damage to riparian vegetation and soils, although BMPs will be applied to reduce the likelihood of such impacts.

Watershed Management - Baseflows in Segment 1 would be increased, and riparian vegetation would likely be more vigorous as a result of increased water availability. Vegetation that has encroached into the stream channel would eventually be pushed back to the wetted edge established by the increased baseflows. Peak flows in this segment would continue to be of reduced magnitude and frequency, and riparian vegetation would continue to encroach into the river channel. The reduced rate of down-ramping during peak flow events would reduce the rate at which the water table declines, which could enhance the establishment of willows and other riparian shrubs.

In Segments 2 and 3, the magnitude of water level fluctuations caused by peaking operations would be greatly reduced. On a daily basis, water surface levels would fluctuate by less than a foot (as measured at the USGS J.C. Boyle gage). Stabilized flows and reduced peaking would enhance the probability of successful establishment of riparian species other than reed canary grass. The timing and duration of riparian inundation hydroperiods would still be affected by J.C. Boyle operations, but too a much lower degree than at present. Water table elevations near the river would be high in the spring and gradually recede over the course of the summer. Within that seasonal pattern, water table elevations would fluctuate on a daily basis.

In tributary streams, enhanced or prolonged baseflow would favor the development of more extensive riparian vegetation communities or increased proportions of riparian obligate or facultative vegetation within existing riparian communities. In some streams, increased peak flows would potentially cause increased bank erosion and loss of riparian vegetation. This impact would be episodic, rather than ongoing, and would not significantly affect vegetation communities in the long-term.

If management recommendations regarding the irrigated meadows in Segment 3 were implemented, increased water would remain in Shovel and Negro Creeks during the growing season, which would likely increase the extent and vigor of riparian communities. Reduced use and increased efficiency of irrigation ditches would reduce the extent of riparian communities associated with the diversions.

Terrestrial Species/Habitat Management - The geographic scope and intensity of proposed actions to benefit pond turtles, eagles, and woodpeckers in this alternative are increased relative to Alternatives 1 and 4 and are approximately equivalent with Alternative 3. Proposed actions would result in reduced understory density and increased vigor of large trees. In the short-term, shade and CWD recruitment would be reduced. Desirable native riparian plant species could become established in areas affected by the proposed action, although conditions favored by reed canary grass could be created in some areas.

Aquatic Species/Habitat Management - Process-based stream restoration treatments (such as gravel replenishment and CWD placement) applied to the river would potentially affect extensive areas of riverine riparian areas. In combination with proposed changes in flow regimes and structural treatments (including channel geometry modifications and sidecast removal), these actions would beneficially affect multiple processes that shape riparian communities.

Partial restoration of the sediment regime in the river would lead to formation of point bars that could support riparian obligate and facultative vegetation communities. Willow, cottonwood, and sedge-rush communities could develop where conditions currently do not support these vegetation types.

Removal of road sidecast from the river at some sites below the flume access road in the upper portion of Segment 1 would allow recovery of vegetation communities that are currently buried. Installation of bankfull benches in this reach would create sites favorable for development of riparian communities.

Channel realignment in the vicinity of old bridges, diversion structures, and in areas with very high width-to-depth ratios would increase bank stability and would increase the extent of areas with the potential to support riparian communities. Patterns of floodplain inundation (with both water and sediment) would be partially restored, resulting in more diverse assemblages of riparian vegetation species and age classes.

Proposed actions designed to limit fish stranding in secondary channels would likely have no effect on riparian vegetation, since the processes that control secondary channel formation and inundation frequency would not be specifically addressed.

Limited CWD placement in tributary streams would restore processes that create favorable sites for vegetation development. Restoration treatments would be focused primarily in reaches of Hayden and Shovel Creeks that have been most impacted by past land use. Expected results include increased inundation of floodplains and development of channel features (such as off-channel ponds and pools), and would favor riparian obligate and facultative plant species. Planting of desired species (e.g., willow or sedges) would occur at some treatment sites and would expedite recovery of riparian habitat.

Vegetation Management - *Upland treatments:* Treatments within riparian reserves would affect the availability of sunlight and CWD to wetland and riparian communities. With proposed actions affecting about 36 percent of the acreage within riparian reserves, the extent of proposed vegetation management actions is higher in Alternative 2 than in Alternatives 1 and 4.

Portions of treatment units are adjacent to small wet meadows along the river, Exclosure and Rock Creek Meadows, and the irrigated meadows in Segment 3. Short-term reductions in small CWD and long-term increases in the availability of large CWD would, in the long-term, benefit these meadows. Along small streams, proposed actions would reduce delivery of small CWD and thereby impair channel-forming processes that create conditions for riparian vegetation establishment.

Riparian treatments: A variety of treatments are proposed for approximately 216 acres of riparian and wetland plant communities in Alternative 2.

Obliterating roads or constructing obstructions to OHV would enhance a total of about 49 acres within 12 wet meadows or cattle use. These actions would reduce soil compaction and displacement, reduce the introduction and dispersal of noxious weeds, and improve conditions for development of native vegetation (see Map 18a).

Additional treatments would occur as necessary in the meadows near Hayden Creek and at Exclosure Meadow (T41S-R6E-section 8) in order to facilitate restoration, and may include prescribed burns, reseeding, soil treatments, and recontouring of areas that have been ditched or diked. These actions would accelerate the recovery of soil properties and hydrologic processes, and would restore native plant communities.

About 155 acres of riparian mixed conifer-hardwood forest along the lower portions of Shovel and Negro Creeks would be thinned in Alternative 2. The proposed action would remove selected young conifers and alder in order to release cottonwood and mid-seral pine. This would maintain the late-seral condition of this forest, thereby ensuring the long-term vitality of large coniferous and deciduous trees to provide shade, CWD, and wildlife habitat. Similar, though less intensive, treatments would occur in portions of the riparian hardwood forests along Hayden Creek (approximately 3 acres).

Proposed blackberry and reed canary grass treatments would reduce the extent of these species and enhance the structure, diversity, and function of riparian communities along the river and Shovel Creek.

Range Management - In addition to the effects that are common to all alternatives, use levels in Segment 3 would decrease relative to current conditions. This would likely improve the health of riparian communities that are not within exclosures.

Fire and Fuels Management - The existing Fuels Management EA would continue to be in effect in the planning area. The fuels management program in this alternative would be more extensive than in Alternative 1 but less extensive than Alternative 3.

Cumulative Effects - Riverine processes and landforms that create conditions favorable for riparian vegetation establishment would be partially restored in this alternative. Road and vegetation management actions would maintain and restore the processes by which large CWD is supplied to riparian areas. The extent of native riparian communities along the river would likely increase, especially in Segments 2 and 3.

Flow regimes more reflective of natural conditions would benefit riverine riparian communities. The reduced magnitude of daily flow fluctuations would improve vegetation recruitment and establishment. Riparian conditions in Segment 3 would be improved by restoration of the floodplain wet meadows and reduced grazing.

The composition and condition of riparian mixed conifer-hardwood forests along Shovel, Negro, and Hayden Creek would be beneficially affected by vegetation treatments, road obliteration, and instream restoration projects.

Increased baseflow in small streams and reduced impacts from nearby roads would improve the condition of riparian vegetation in many wet meadows and riparian areas associated with small streams.

Removing or reducing the use of irrigation diversions would adversely affect riparian communities that have developed along ditches or in areas of ditch seepage, though channel restoration in natural streams that have been adversely affected by diversion structures would eventually create areas that could support riparian vegetation.

Alternative 3

Recreation Management - *Site development:* The proposed Shovel Creek Hot Springs day use area would impact a small area on the relic floodplain in Segment 3. Some loss of riparian vegetation could occur, and the function of other adjacent areas may be altered as a result of runoff and trampling (see Map 15).

Site upgrades/expansion: No site upgrades within riparian areas are proposed in this alternative.

Site rehabilitation/relocation: Visitor use of sites near riparian areas would decrease as a result of road decommissioning and obliteration. Sites would be rehabilitated at Turtle Camp and on both sides of the river at Frain Ranch. Native vegetation would, over time, contribute organic matter and ameliorate soil compaction. Some management intervention (planting vegetation or manually de-compacting soils) may be required to ensure that these areas recover to desired conditions.

Relocation of sites within the Klamath River Campground to a distance of at least 100 feet from the river would reduce detrimental impacts to nearby vegetation communities, including a relatively extensive stand of willow. Some trampling of nearby vegetation would continue to occur, since use in this part of the canyon would still be concentrated in the campground (see Map 15).

The raft launch area and campsites on the lower bench at Stateline would be relocated to Access 6, which is located on the relic floodplain of the river. Both Stateline and Access 6 are located on benches above the current flood prone area, so direct effects on riparian vegetation as result of the relocation would be limited. Riparian vegetation at Access 6 (associated with irrigation diversion points and seepage from ditches) could potentially be affected by visitor use near the new site, although in this alternative irrigation diversions along the river may be removed.

Trail network: Trails would cross four wet meadow areas in Segment 2 and portions of the riparian area along the middle portion of Shovel Creek. Where trails cross wet meadows and floodplains, trampling of vegetation communities and diversion of flow paths would occur. Some of these trails will be located on the beds of decommissioned roads, and the effects of the trails on riparian processes will be much less than the effects of the existing roads.

Trail maintenance would occur annually, and could include bucking of small diameter CWD. The stability of this material during high streamflow events would be decreased. Project design features will limit the effect of trail maintenance on the stability of large CWD. Trail maintenance would have a negligible effect on channel forming processes that shape riparian communities. The floodplains in Segment 3 that will be affected by trails are bordered by mixed brush and open oak vegetation communities that would not contribute large volumes of CWD, so trail maintenance would cause very minor impacts to the abundance of CWD.

Recreation uses: Fifteen wet meadows, encompassing about 62 acres, would be protected from OHV use. Decreased patrols would reduce opportunities for visitor contact and enforcement. Monitoring of OHV damage to riparian areas would occur, and additional actions to protect wet meadows would be taken if necessary.

Road Management - In this alternative, no new roads would be constructed in riparian communities and about 1.1 miles of road that traverse wetlands or riparian forests would be obliterated (see Map 19a).

Road decommissioning and obliteration would reduce compaction, allow revegetation and restoration of hydrologic flow paths, and reduce OHV use in seven wet meadows in Segment 2 and the Shovel Creek riparian area. In the long-term, riparian vegetation may develop in some areas along old roads, and the growth and eventual mortality of trees growing on old roads would supply CWD to nearby riparian areas.

Bucking and clearing of roadside hazard trees and fallen trees would continue to affect CWD delivery to riparian communities. Due to extensive road obliteration within riparian reserves, detrimental impacts to CWD delivery would be substantially reduced in this alternative relative to Alternatives 1 and 4, and slightly lower relative to Alternative 2. In general, detrimental effects of roads on CWD recruitment would be more pronounced in wet meadow areas than in streamside riparian areas.

Road improvements designed to reduce runoff and sediment delivery would likely enhance the vigor of riparian vegetation in Rock Creek meadow, along Chert Creek and adjacent meadows, and along Way Creek. Other riparian areas may also be beneficially affected, though to a lesser degree.

Twenty-four stream crossings would be removed or improved in this alternative. These sites occur on tributary streams, primarily in Segment 2 but also in the Shovel Creek drainage.

Improved crossings at between 13 and 17 sites (depending on future needs to access powerlines) would reduce detrimental impacts (such as diversion of flow paths, bank erosion, sediment delivery from roads, and disrupted transport of organic matter) to riparian processes along Frain Creek, Chert Creek, Shovel Creek, Negro Creek, two small streams near the powerhouse, and downslope from Exclosure Meadow.

Crossing removal at between seven and eleven sites in wet meadows and along Chert, Hayden, and Shovel Creeks will occur coincident with road removal, and will ensure that crossings do not continue to affect riparian processes. Past channel and riparian adjustments to the effects of the crossing structure (i.e., eroded streambanks or bare ground) may persist. Use of mechanical equipment to improve or remove crossings may temporarily damage riparian vegetation and soils, although BMPs will be applied to reduce the likelihood of such impacts.

Watershed Management - Alternative 3 proposes the greatest increase in baseflows in Segment 1. Increased water availability would likely increase the vigor of riparian vegetation. Vegetation that has encroached into the stream channel would eventually be pushed back to the wetted edge established by the increased baseflows. The proposed increase in the frequency of flows capable of scouring the channel and transporting sediment would increase the diversity of riverine features and thereby increase the species and structural diversity of riparian communities along the river. The reduced rate of down-ramping during peak flow events would reduce the rate at which the water table declines, which could enhance the establishment of willows and other riparian shrubs.

In Segments 2 and 3, the run-of-the-river flow regime would benefit riverine riparian areas. Flow fluctuations that inundate and expose riparian areas would be mostly eliminated, and the pattern and timing of floodplain inundation would resemble that which occurred prior to the construction of J.C. Boyle Dam. For example, areas that are inundated by 3,000 cfs events would be submerged in late winter or early spring, rather than in the middle of summer. Water table elevations near the river would be high in the spring and gradually recede over the course of the summer. These conditions, in concert with altered geomorphic conditions (discussed below), would favor the establishment of willows and shrubs.

In tributary streams, enhanced or prolonged baseflow would favor the development of more extensive riparian vegetation communities or increased proportions of riparian obligate or facultative vegetation within existing riparian communities. In some streams, increased peak flows would potentially cause increased bank erosion and loss of riparian vegetation. This impact would be episodic, rather than ongoing, and would not significantly affect vegetation communities in the long-term.

If management recommendations regarding irrigation diversions are implemented, the use of irrigation diversions would be decreased and the timing of use would be shifted. Increased water would remain in Shovel and Negro Creeks during the growing season, which would likely increase the extent and vigor of riparian communities. Reduced use and increased efficiency of irrigation ditches would reduce the extent of riparian communities associated with the diversions.

Terrestrial Species/Habitat Management - The geographic scope and intensity of proposed actions to benefit pond turtles, eagles, and woodpeckers in this alternative are increased relative to Alternatives 1 and 4 and are approximately equivalent with Alternative 2. Proposed actions would result in reduced understory density and increased vigor of large trees. In the short-term, shade and CWD recruitment would be reduced. Desirable native riparian plant species could become established in areas affected by the proposed action, although conditions favored by reed canary grass could be created in some areas.

Aquatic Species/Habitat Management - Process-based stream restoration treatments (including gravel replenishment, CWD placement, and development of more natural flow regimes) applied to the river would potentially affect extensive areas (see Map 27). In combination with proposed structural treatments (including channel geometry adjustments and sidecast removal), these actions would beneficially affect multiple processes that shape riparian communities.

Restoration of the sediment regime in the river would lead to formation of point bars that could support riparian obligate and facultative vegetation communities. Willow, cottonwood, and sedge-rush communities could develop where conditions currently do not support these vegetation types. The episodic nature of unregulated sediment transport regimes would lead to development of a wide array of fluvial features and seral stages (due to occasional disturbances). Increased diversity in community composition and structure would result. Restoration of sediment regimes as proposed in Alternative 3 takes a holistic approach and is more likely to result in beneficial effects over a wider area than the actions proposed in Alternatives 2 and 4.

The removal of road sidecast from the river below the flume access road in the upper portion of Segment 1 would allow recovery of vegetation communities that are currently buried. Installation of bankfull benches in this reach would create sites favorable for development of riparian communities. The extent of area restored to natural conditions would be more extensive in this alternative than in Alternatives 1 (which does not propose any channel restoration in Segment 1), 2 and 4, and the expected beneficial effect to riparian vegetation is highest in this alternative.

Channel realignment in the vicinity of old bridges, diversion structures, and in areas with high width-to-depth ratios would increase bank stability and would increase the extent of areas with the potential to support riparian communities. Spatial and temporal patterns of floodplain inundation (with both water and sediment) would be partially restored, resulting in more diverse assemblages of riparian vegetation species and age classes. The extent of proposed instream restoration treatments is highest in this alternative.

Proposed actions designed to reduce the occurrence and inundation frequency of secondary channels would favor the development of riparian communities. Increased channel roughness, reduced frequency of flows with sufficient power to scour vegetation, and increased deposition of gravel would create conditions favorable for riparian vegetation.

Extensive CWD placement in fish-bearing tributary streams (including the river) would restore processes that affect vegetation development. Expected results include increased inundation of floodplains and development of channel features (such as lateral point bars and off-channel wetlands) that would favor riparian plant species. Planting of desired species (e.g., willow or sedges) that would occur at some treatment sites would enhance the recovery of riparian communities.

Vegetation Management - *Upland treatments:* Treatments within riparian reserves would affect the availability of sunlight and CWD to wetland and riparian communities. With proposed actions affecting about 47 percent of the acreage within riparian reserves, the extent of proposed vegetation management actions is highest in Alternative 3 (see Map 23).

Portions of treatment units are adjacent to small wet meadows along the river, Exclosure and Rock Creek Meadows, and the irrigated meadows in Segment 3. Short-term reductions in small CWD and long-term increases in the availability of large CWD would, in the long-term, benefit these meadows. Along small streams, proposed actions would reduce delivery of small CWD and thereby impair channel-forming processes that create conditions for riparian vegetation establishment.

Riparian treatments: A variety of treatments are proposed or considered for approximately 240 acres of riparian and wetland plant communities in Alternative 3.

Obliterating roads and constructing obstructions to OHV or cattle use, would enhance a total of about 62 acres of meadows. OHV and cattle use would be eliminated from 15 meadows, including areas near Hayden Creek and along the river. These actions would reduce soil compaction and displacement, reduce the introduction and dispersal of noxious weeds, and improve conditions for development of native vegetation.

Additional measures would be implemented as necessary in the meadows near Hayden Creek and at Exclosure and Rock Creek meadows (and be recommended for portions of private timber land) in order to facilitate restoration, and may include prescribed burns, reseeding, soil treatments, and recontouring of areas that have been ditched or diked. These actions would accelerate the recovery of soil properties and hydrologic processes, and would restore native plant communities.

About 170 acres of riparian mixed conifer-hardwood forest along the lower portions of Shovel and Negro Creeks would be thinned in Alternative 3. The proposed action would remove young conifers and alder in order to release cottonwood and mid-seral pine. This would maintain and restore late-seral conditions, thereby ensuring the long-term vitality of large coniferous and deciduous trees to provide shade, CWD, and wildlife habitat. Similar treatments would occur in portions of the riparian hardwood forests along Hayden Creek (approximately eight acres). Other riparian forests in the planning area, including deciduous forest patches along the river, would be evaluated for treatments ranging from light understory thins to planting of desired trees species.

Proposed blackberry and reed canary grass treatments would reduce the extent of these species and enhance the structure, diversity, and function of riparian communities along the river and Shovel Creek.

Range Management - No grazing use would occur within the planning area, except as needed to meet vegetation management objectives. Riparian communities would benefit, as trampling and bank shear caused by cattle would decrease, and riparian vegetation would not be consumed as forage.

Fire and Fuels Management - The existing Fuels Management EA would continue to be in effect in the planning area. The fuels management program would be most extensive in this alternative.

Cumulative Effects - Efforts to restore natural flow regimes and riverine processes and landforms that create conditions favorable for riparian vegetation establishment would be most extensive and have the highest likelihood of success in this alternative. Instream restoration projects and altered irrigation management would cause a net benefit to wetland and riverine riparian areas in Segment 3.

Road and vegetation management actions would maintain and restore the processes by which large CWD is supplied to riparian areas. The extent of native riparian communities along the river would likely increase throughout the planning area.

Flow regimes reflective of natural conditions would benefit riverine riparian communities. Riparian conditions in Segment 3 would be improved by restoration of the floodplain wet meadows and limited grazing.

The composition and condition of riparian mixed conifer-hardwood forests along Shovel, Negro, and Hayden Creek would be beneficially affected by vegetation treatments, road obliteration, and instream restoration projects. Road obliteration would benefit riparian areas along Chert Creek and near the mouth of Frain and Crayfish Creeks.

Alternative 4

Recreation Management - *Site development:* The proposed Shovel Creek Campground would be located on the relic floodplain of the Klamath River. The current hydrologic and geomorphic character of this area is no longer affected by annual flooding by the river, thereby changing the disturbance regime to which riparian communities adapt. Land use over the past century has also profoundly changed the vegetation community at the site. Despite these alterations, portions of the area are influenced by springs or are still hydrologically connected to the river via subsurface flow paths, and sedges, willows, and other riparian species are present. The proposed action would adversely affect the potential of the site to meet desired future conditions for riparian areas. Development of a large campground and associated facilities would entail site clearing, surface grading, and construction of roads and other impervious surfaces. These actions would alter surface and subsurface flow paths, with consequent effects on nutrient routing and oxygen availability. Riparian vegetation communities would be permanently covered or altered as a result (see Map 16).

Boat launches would not be built in areas that support extensive riparian areas. Development of these sites would have minor direct effects on riparian vegetation, and indirect effects would be limited due to the small extent of these sites.

Visitor use near the proposed Big Bend campground would cause trampling of riparian vegetation along the river.

Site upgrades/expansion: Increased use at some sites along the river (due to improved access or upgraded facilities) would lead to increased potential for interference with natural processes. Recreation use levels in this alternative would be higher than in the other alternatives. No existing recreation sites are located within riparian communities, although some, such as the dispersed sites at the Old Bridge area and Turtle Camp, are in close proximity to riverine and wet meadow riparian areas. Impacts at these sites would include bank and vegetation trampling, wood cutting, and perhaps some unauthorized OHV use. Concentration of recreation use at developed dispersed sites would limit impacts near other, unimproved sites to their current levels.

The proposed expansion of the Klamath River Campground would lead to increased use at this site. Damage to riparian vegetation caused by bank trampling would increase. In addition, more hazard trees near the river would be felled, potentially decreasing CWD recruitment in nearby riparian areas.

Site rehabilitation/relocation: No rehabilitation of recreation sites near riparian communities would occur.

Trail network: Trails would cross numerous riparian areas along the river, five wet meadow areas in Segment 2, the relic floodplains in Segment 3, and portions of the riparian forest along the middle and upper portions of Shovel Creek. The trail network adjacent to Shovel Creek would be most extensive in this alternative (see Map 16).

Where trails cross wet meadows and floodplains, minor impacts of trampling of vegetation communities and diversion of flow paths would occur. These trails will be located on the beds of decommissioned roads, and the effects of the trails on riparian processes will be much less than the effects of the existing roads.

Trail maintenance would occur annually, and could include bucking of small diameter CWD. The stability of this material during high streamflow events would be decreased. This impact will be greatest in this alternative. Project design features will limit the effect of trail maintenance on the stability of large CWD. Trail maintenance would have a negligible effect on channel forming processes that shape riparian communities. The floodplains in Segment 3 that will be affected by trails are bordered by mixed brush and open oak vegetation communities that would not contribute large volumes of CWD, so trail maintenance would involve very little CWD management.

Recreation uses: A total of 17 acres in nine wet meadows would be exclosed from OHV use. Along with the designation of specific OHV tour routes and increased management presence, these actions would greatly decrease motor vehicle damage to wetland soils and plant communities.

Road Management - In this alternative, about 0.5 miles of road that traverse wetlands or riparian forests would be obliterated. Slightly less than 0.5 miles of new road would be constructed in riparian communities and on the relic floodplain in Segment 3 (see Map 20a).

Road construction would occur primarily in the vicinity of the Shovel Creek Campground, and would permanently remove floodplain vegetation and alter surface and subsurface flow paths. The extent and composition of riparian communities would change, and there would be an increased likelihood of noxious weeds introductions, causing an overall adverse effect to riparian communities.

Road obliteration would reduce compaction, allow revegetation and restoration of hydrologic flow paths, and reduce OHV use in four wet meadows in Segment 2 and portions of the Shovel Creek riparian forest. In the long-term, riparian vegetation may develop in some areas along old roads, and the growth and eventual mortality of trees growing on old roads would supply CWD to nearby riparian areas.

Construction of two bridges could cause direct and indirect detrimental impact riparian areas. The total area directly affected would be relatively small. Bridges would be built in the vicinity of where previous bridges existed, in areas that do not support extensive riparian vegetation. Bridges will be designed to pass 100-year flood events, and indirect detrimental effects on channel processes, and thus bank and floodplain vegetation, would be minimized.

Improved access into portions of the planning area could lead to increased OHV use in sensitive areas that are not exclosed. Monitoring results will be reviewed to determine if additional areas need protection from OHV use (see Map 16 and 20a).

The extent of open roads near riparian areas is greatest in this alternative, and wet meadows and riparian communities along streams (including the river) would be affected by reductions in CWD supply due to bucking and clearing of roadside hazard trees and fallen trees.

Road improvements designed to reduce runoff and sediment delivery would likely enhance the vigor of riparian vegetation in Rock Creek meadow, along Chert Creek and adjacent meadows, along Way Creek, and in the meadows along the lower portion of Shovel Creek. Other riparian areas may also be beneficially affected, though to a lesser degree.

Thirteen stream crossings would be removed or improved in this alternative, more than in Alternative 1 but less than in Alternatives 2 and 3. These sites occur on tributary streams, primarily in Segment 2 but also in the Shovel Creek drainage in Segment 3. Improved crossings at nine sites would reduce detrimental impacts (such as diversion of flow paths, increased bank erosion, increased sediment delivery from roads, and disrupted transport of organic matter) to riparian processes along Chert Creek, Frain Creek, and two small streams near the powerhouse.

Crossing removal in two wet meadows in Segment 2 would occur coincident with road removal, and will ensure that crossings do not continue to affect riparian processes. Past channel and riparian adjustments to the effects of the crossing structure (i.e., eroded streambanks or bare ground) may persist. Use of mechanical equipment to improve or remove crossings may temporarily damage riparian vegetation and soils, although BMPs will be applied to reduce the likelihood of such impacts.

Watershed Management - In Segment 1, baseflows would increase relative to current conditions, perhaps making a larger area suitable for riparian vegetation. Vegetation that has encroached into the stream channel would eventually be pushed back to the wetted edge established by the increased baseflows. Peak flows in this segment would continue to be of reduced magnitude and frequency, and riparian vegetation would continue to encroach into the river channel. The reduced rate of down-ramping during peak flow events would reduce the rate at which the water table declines, which could enhance the establishment of willows and other riparian shrubs.

In Segments 2 and 3, peaking operations at the powerhouse would continue to cause daily fluctuations in water levels during some periods of the year. Proposed flow regimes would cause reductions in the frequency and magnitude of these fluctuations, though a zone of riparian vegetation that is frequently inundated and exposed would still exist. Stabilized flows during late spring of average and wet water years would enhance the probability of successful establishment of riparian species along the river, although flow fluctuations would likely continue to impair riparian processes. Peaking flows would potentially have detrimental effects on the dispersal, establishment, and vigor of species that rely on seeds or cuttings.

In tributary streams, enhanced or prolonged baseflow would favor the development of more extensive riparian vegetation communities or increased proportions of riparian vegetation within existing riparian communities. Beneficial effects of enhanced or prolonged baseflow are lower in this alternative than in Alternatives 2 and 3.

In some streams, increased peak flows would potentially cause increased bank erosion and loss of riparian vegetation. This impact would be episodic, rather than ongoing, and would not significantly affect vegetation communities in the long-term.

Terrestrial Species/Habitat Management - Limited site-specific actions to benefit pond turtles, eagles, and woodpeckers would occur in this alternative. Proposed actions would result in reduced understory density and increased vigor of large trees. In the short-term, shade and CWD recruitment would be reduced. Desirable native riparian plant species could become established in areas affected by the proposed action, although conditions favored by reed canary grass could be created in some areas.

Aquatic Species/Habitat Management - Large-scale process-based stream restoration treatments along the river would not occur in this alternative. Site-specific treatments would benefit small areas of riparian vegetation (see Map 27 and Appendix H).

The limited scope of efforts designed to restore the sediment regime at highly visible locations along the river would likely not be sufficient to substantially increase the number or overall extent of point bars or other surfaces suitable for certain types of riparian vegetation. Some existing point bars would increase in size, and riparian vegetation could colonize these sites.

Structures installed in Segment 1 would create features that could support riparian vegetation. Establishment of desired species would be most likely to occur near the wetted edge associated with recreation releases.

Actions designed to reduce width-to-depth ratios would be less extensive than in the Alternatives 2 and 3. Seven sites would be reviewed for potential treatments, which, if implemented, would increase bank stability and the extent of areas with the potential to support riparian communities. Spatial and temporal patterns of floodplain inundation (with both water and sediment) would be restored on a very localized basis, resulting in more diverse assemblages of riparian vegetation species and age classes in certain areas.

Proposed actions designed to reduce the occurrence and inundation frequency of secondary channels would favor the development of riparian communities. Increased channel roughness, reduced frequency flows with sufficient power to scour vegetation, and increased deposition of gravel would create conditions favorable for riparian vegetation.

Limited CWD placement in tributary streams would restore processes that affect vegetation development. Restoration treatments would be focused primarily in reaches of Hayden and Shovel Creek that have been most impacted by past land use. Expected results include increased inundation of floodplains and development of channel features (such as lateral point bars and off-channel wetlands), and would favor establishment of riparian plant species. Planting of desired species (e.g., willow or sedges) that would occur at some treatment sites would enhance riparian communities.

Vegetation Management - *Upland treatments:* Treatments within riparian reserves would affect the availability of sunlight and CWD to wetland and riparian communities. With proposed actions affecting about 25 percent of the acreage within riparian reserves, the extent of proposed vegetation management actions is less than in Alternatives 2 and 3 but greater than Alternative 1 (see Map 28).

Portions of treatment units are adjacent to small wet meadows along the river, Exclosure and Rock Creek Meadows, and the irrigated meadows in Segment 3. Short-term reductions in small CWD and long-term increases in the availability of large CWD would, in the long-term, benefit these meadows. Along small streams, proposed actions would reduce delivery of small CWD and thereby impair channel-forming processes that create conditions for riparian vegetation establishment.

Riparian treatments: Obliterating roads, and constructing obstructions to OHV would enhance about 19 acres of riparian habitat in nine wet meadows or cattle use. These actions would reduce soil compaction and displacement, reduce the introduction and dispersal of noxious weeds, and improve conditions for development of native vegetation. A small area within Rock Creek meadow that has been impacted by OHV use would be manually de-compacted and revegetated, thereby accelerating recovery of ecosystem functions.

Range Management - Use levels in Segment 3 would decrease slightly relative to current conditions. This would likely improve the health of riparian communities, though not to the degree as would occur in Alternatives 2 and 3. Trampling and consumption of riparian vegetation would continue to detrimentally affect riparian communities associated with springs and upland wet meadows.

Fire and Fuels Management - The existing Fuels Management EA would continue to be in effect in the planning area. The fuels management program in this alternative would be less extensive than Alternative 3 but more extensive than Alternative 1.

Cumulative Effects - Flow regimes proposed in this alternative would enhance riparian communities relative to current conditions, but to a lesser degree than in Alternatives 2 and 3. Peaking operations that would occur during certain periods of some years would continue to alter and/or impair riparian processes.

The extent of instream treatments in Segments 2 and 3 would likely not be sufficient to cause large scale alterations in riparian communities, although proposed flow regimes downstream from the powerhouse would be more conducive to establishment of species other than reed canary grass.

Together, road and vegetation management actions would maintain and restore the processes by which large CWD is supplied to some riparian areas. Increased recruitment and stability of large CWD would lead to development of conditions favorable for riparian vegetation establishment, although the lack of coarse sediment would prevent many of these areas from forming. In other areas, maintenance of roads and campgrounds would decrease large wood supplies to riparian areas.

Irretrievable, Irreversible, and Unavoidable Impacts

In Alternatives 2 and 4, the proposed Shovel Creek Campground (and associated access road) would cause irretrievable adverse effects to riparian vegetation and processes associated with the relic floodplain of the river.

In Alternatives 2 and 4, construction of bridges and boat launches would cause across the river would cause irretrievable adverse effects to small area of riparian vegetation.

In Alternatives 2 and 3, the recommended removal or altered operations of irrigation withdrawals would cause irretrievable adverse affects to riparian vegetation associated with irrigation ditches.

Soils

Soils can be detrimentally or beneficially affected by land management actions. Physical soil properties that may be affected by management activities include bulk density, organic matter content, porosity, and texture. Disturbance that may impact soil properties include compaction, surface mixing and disruption (known as displacement), fire (primarily through loss of soil cover and consumption of organic matter), and soil erosion (Childs et al. 1989).

This discussion will focus on the principal soil series in the planning area (the Bogus, Greystoke, McMullin,, Skookum, Jenny, Lassen, Lithic Haploxerolls, Kuck, and Medford series), since these series account for about ninety percent of the soils in the planning area (see Map 6) . In addition, potential effects to highly productive soils will also be discussed.

Assumptions

The GIS-based component of this analysis relies on the assumption that the characteristics of map units are those of the dominant soil series within that map unit. Because numerous soil series can occur within a single map unit, and these series can have markedly different characteristics, this assumption is not always valid. For the purposes of landscape level analysis, however, the generalization of soil characteristics allows for a relatively straightforward analysis.

Impacts Common to All Alternatives

To ensure protection of soil resources, site-specific characteristics of soils will be considered during project design, and Best Management Practices will be applied to all projects. Of particular concern is susceptibility of soils to detrimental impacts such as compaction, displacement, or surface soil erosion (Table 5-5). Mechanical equipment would not be used when the soil is moist, in order to reduce compaction and puddling. Designating skid trails and using equipment that is appropriate to on-site conditions would limit the extent of soil displacement associated with the use of mechanical equipment. Mechanical equipment would not be used on slopes greater than 35 percent.

Within the Greystoke soil series, 48 acres within the planning area have been classified as fragile non-suitable woodlands under the BLM Timber Productivity Capability Classification system. This inventory classifies timber stands based on their inherent soil properties and landform characteristics. Sites are designated as fragile, non-suitable woodlands if they are judged to be biologically and/or environmentally incapable of supporting a sustained yield of timber. These areas would be excluded for mechanical vegetative treatments due to their occurrence on slopes in excess of 50 percent.

Soil compaction - Soil compaction is the process whereby soil macropores are removed or reduced by physical pressure and vibration of the soil surface, this results in an increase in soil bulk density. These macropores are critical to soil health as they are where soil organisms reside, fine roots of plants reside, and the means by which water infiltration into soil occurs.

Soil compaction and the associated reduction of macropores may occur with all alternatives and is associated with mechanized ground based equipment. Soil compaction may also be negatively effected by both motorized and non-motorized recreation use, which may occur in and around campgrounds, and off highway vehicle trails (OHV). Livestock, and impacts from other large herbivores (horses, elk, and deer) may also compact soil. Both human and large herbivore impacts to soil resources are of particular concern in and around riparian areas and wetlands as these soils are susceptible to compaction and erosion when moist.

Due to past fire suppression, the potential exists for catastrophic wildfires within the planning area. This type of fire would eliminate a high percentage of both vegetative ground cover and organic soil horizons. This would lead to exposed mineral soils and higher levels of surface soil erosion.

Prescribed fire applied to areas through the random selection process and areas selected by the Interdisciplinary Team would reduce hazardous fuel levels, reintroduce fire as an ecosystem process, and thereby promote the development of perennial native plant communities. However, fire directly affects soil by consuming organic matter, altering nutrients, creating water-repellent conditions, decreasing infiltration rates, and removing soil surface cover (Hungerford et al. 1990, DeBano 1990. and Childs et al. 1989). Although fire generally causes short-term effects, where soils are shallow and have low natural fertility or are susceptible to erosion, fire can have a more significant effect on productivity. To reduce surface soil erosion, some areas selected for prescribed burning may require seeding with native perennials to promote a stable soil surface.

Soil displacement - Soil displacement occurs when a portion or all of the surface soil is moved by mechanical action. Displacement can result in the alteration or destruction of surface structure by reducing the amount of pore space and aggregation of individual soil particles. If displacement occurs when soil is wet “puddling” may result, which may create a soil surface that is hard and impermeable when it dries. (Childs et al 1989).

Soil displacement may occur with all alternatives from mechanized ground based equipment, as well as motorized recreational equipment.

Surface soil erosion - Surface soil erosion (including sheet, rill and gully erosion, and dry raveling) is the detachment and down slope movement of individual soil particles or aggregates. It is caused by the energy of rainfall and running water acting on bare soils, or by surface disturbance on steep slopes. Removal of ground cover can greatly increase the potential for surface soil erosion (Baker and Jemison 1991).

Surface soil erosion may be increased in each alternative by any action that removes surface ground cover. This includes actions caused by ground based machinery, motorized and non-motorized recreation, livestock and other large herbivores (horses, elk, and deer), and prescribed fire and wildfires. Erosion is accelerated when these actions occur in and around riparian or wetland resources.

Highly Productive Soils - A small portion (approximately 70 acres) of the planning area in Oregon contains Terrabella clay loam soils, which are prime farmland soils (as defined by the U.S. Department of Agriculture – see glossary). These soils are located in the vicinity of the Hayden Creek, Chert Creek, and Way Creek wet meadows. These soils are highly productive in terms of biomass production and have a potential for high botanical diversity. These are some of the areas where both vegetative and hydrologic restoration efforts would be focused, as well as the establishment of riparian exclosures to help protect riparian resources from livestock. Due to the highly productive nature of these soils, it is thought that restoration of these areas, and protection of these soil resources would provide immense long-term benefits to other resources such as wildlife, cultural, botanical, recreation, and hydrologic function.

Soil Monitoring - A common accepted parameter for measuring the degree of detrimental soil disturbance is change in bulk density or degree of soil compaction that has occurred in an area over pre-project levels. Soil bulk density is the ratio of mass to volume for a given sample of soil and is commonly used as a measure of the compaction of a given soil. The higher the bulk density value, the more compact a soil is. Bulk density is expressed in grams/cubic centimeter (g/cm3).

Under all alternatives, 20% of all ground disturbing activities occurring on the resource area, including the planning area will be quantitatively monitored to determine project effects on soil resources. This monitoring will determine if Best Management Practices were followed for the project, and compliance with RMP and regional soil bulk density and areal ground disturbance standards and guidelines.

Table 5-5.—Susceptibility of major soil map units to detrimental impacts

Soil Map Unit Name	Detrimental Impact				
	Compaction	Puddling	Displacement	Erosion	Slope
Bogus	X	X	X	X	X
Bogus-Skookum	X	X	X	X	
Greystoke stony loam	X	X	X	X	X
Jenny	X	X	X	X	
Lassen-Kuck	X	X	X	X	X
Lithic Haploxerolls				X	X
Medford	X	X	X	X	
Skookum-Bogus	X	X	X	X	X
Skookum-Rock outcrop McMullin	X		X	X	X
Skookum-Rock outcrop-Rubble land	X		X	X	X

Table derived from USDA-SCS 1993, and USDA–1983.

Impacts of Specific Alternatives

(Refer to Maps 6, 13-16, 19a, 21-24, and Appendix H)

Alternative 1

Under this alternative, the potential for ground disturbing activities within the planning area would remain the same as directed by the existing RMPs. The vegetation management and recreation development activities would employ heavy equipment and create a potential for ground disturbing activities and potential soil compaction and/or soil displacement (see Maps 13 and 21). Existing unregulated OHV use at areas such as Frain Ranch would continue under this alternative, this type of recreational use has removed ground cover on this bench and causes surface soil erosion.

Under this alternative, livestock grazing would remain at current levels. Approximately 24 acres of riparian reserves would be excluded from livestock grazing, thus reducing some of the impacts of livestock to soil resources in riparian areas. Decommissioning of approximately 5 miles of existing roads and the subsequent revegetation of these areas would result in less long-term surface soil erosion and area of soil compaction within the planning area. Short-term increases in erosion within these localized areas would occur following these treatments.

Cumulative Impacts - This alternative has the least area of vegetative treatments, riparian reserve livestock exclusion, road decommissioning, hydrologic restoration, and recreation development activities. Under this alternative the short-term impacts to soil resources are small with a potential for long-term negative impacts due to surface soil erosion associated with catastrophic fire, livestock and large herbivore impacts to fragile riparian soils, surface soil erosion associated with current roads, and current soil impacts from unregulated OHV's. However, there are fewer potential impacts from recreation development and associated increased motorized and non-motorized use than under alternative 2 or 4.

Alternative 2

Under this alternative, vegetation treatments would occur over a larger area than Alternative 1 in order to promote the enhancement of Scenic River and ACEC values, primarily scenic and wildlife (see Map 22). Within much of the planning area, mechanical ground based equipment would be employed to accomplish vegetation treatments. Therefore, the potential for detrimental soil impacts including soil compaction, displacement, and surface soil erosion would be more extensive than in Alternative 1, but less extensive than under alternatives with higher levels of ground disturbing management actions.

Impacts from increased recreation use would be greater than Alternative 1 or Alternative 3, but less than Alternative 4 (see Map 14). Livestock grazing would remain at current levels. Approximately 50 acres of riparian reserves would be excluded to livestock grazing, thus reducing some of the impacts of livestock to soil resources in riparian areas. Riparian reserve livestock exclusion is greater than Alternative 1 and 4, but less than Alternative 3. The 370 acres of irrigated meadows in Segment 3 would be managed to restore native plant communities appropriate for the site. Natural patterns of inundation and infiltration would be restored. These lands are currently managed as pasture land, the restoration of these productive lands would potentially benefit soil resources by reducing surface soil erosion. Closure and decommissioning of roads deemed not necessary for management activities would be greater than Alternative 1 or 4, but less than Alternative 3. Ripping and revegetation of these sites proposed as part of road full decommissioning (or obliteration) would lessen long-term impacts of surface soil erosion and soil compaction in these areas. Short-term increases in erosion within these localized areas would occur following these treatments.

Over the long-term the potential for impacts associated with catastrophic fire would be lower than in Alternative 1, since mechanical vegetation treatments would reduce hazardous fuel loads at a higher rate. However, fuel treatments would also emphasize the use of ground based mechanical equipment. The use of this equipment may have short-term detrimental effects on soil resources by increasing soil bulk density over pre-treatment levels.

Approximately 327 acres of the planning area in California contains soils within the Medford series and 174 acres within the Jenny series. These soils area classified as moderate to good agricultural soils (USDA – SCS, 1983). Within Segment 3, approximately 370 acres of land within these soil series are currently utilized as pastureland. Under Alternatives 2 and 3, these irrigated meadows would be managed to restore native plant communities appropriate for the site. Natural patterns of inundation and infiltration would be restored. The restoration of these productive lands would potentially benefit soil resources as well as other resources by reducing surface soil erosion within these fragile sites, and increasing botanical biodiversity.

If PacifiCorp lands in California were acquired or managed by BLM under cooperative agreement, the potential for higher levels of detrimental soil disturbance may increase on these lands, which have restricted public access under current management.

Cumulative Impacts - This alternative has a moderate amount of vegetative treatments, and therefore moderate associated long-term benefits and short-term impacts associated with these treatments. Riparian reserve livestock exclusion is moderate when compared to other alternatives, and would afford moderate protection to fragile riparian and wetland soils and the associated surface soil erosion from livestock stock trampling. The restoration of irrigated pastures to native plant communities would have potential benefits to soil resources through reductions in surface soil erosion of these productive soils. Road decommissioning, hydrologic restoration, and recreation development activities and associated impacts to soil resources are moderate in comparison to other alternatives. Regulated OHV use under this alternative may reduce surface soil erosion and soil compaction associated with this recreational activity.

Alternative 3

Under this alternative, large areas are proposed for vegetation treatments using both mechanical methods and prescribed fire in order to restore the stands to a more historically natural condition (lower fuel loads) and maintain the health of the vegetation (see Map 23). Therefore, this alternative would have a greater risk of potential detrimental soil impacts occurring over a high percent of the planning area. These impacts can be primarily attributed to the emphasis of ground-based machinery, which may increase soil bulk density; and higher erosion levels associated with short-term removal of ground cover by prescribed fire.

Under Alternative 3, little cattle grazing would likely occur, and only to meet other management or restoration objectives. This would reduce if not eliminate soil impacts such as surface soil erosion and soil compaction that may be caused by livestock. Soil impacts would continue to exist in the planning area from wild horses, and other large herbivores such as elk and deer. Approximately 75 acres of riparian reserves would be excluded to remaining livestock, thus reducing some of the impacts to soil resources in riparian areas. However, an indirect impact of no livestock grazing could be an increased danger of wildfire due to a build up of additional fine fuels. Both prescribed fire and wildfire, as mentioned above have the potential to increase surface soil erosion. The 370 acres of irrigated meadows in segment 3 would be managed to restore native plant communities appropriate for the site. Natural patterns of inundation and infiltration would be restored. These lands are currently managed as pasture land, the restoration of these productive lands would potentially benefit soil resources by reducing surface soil erosion.

Under this alternative, riparian and wetland restoration projects would be greater than other alternatives. Restoration of natural hydrological processes in the long-term would benefit soil resources by reducing surface soil erosion. As many of these projects would utilize ground based machinery, impacts to soil resources including soil compaction, soil displacement, and surface soil erosion could be caused in the short-term. Timely rehabilitation of areas with native perennial ground cover would minimize these effects. Under this alternative, road closures, regulations, and decommissioning would be greater than other alternatives. The closure of roads, decommissioning of roads, and subsequent vegetative rehabilitation of roads would have a long-term positive effect on soil resources by reducing soil compaction and reducing surface soil erosion associated with roads. Short-term increases in erosion within these localized areas would occur following these treatments (see Map 19a).

Approximately 327 acres of the planning area in California contains soils within the Medford series and 174 acres within the Jenny series. These soils area classified as moderate to good agricultural soils (USDA – SCS, 1983). Within Segment 3, approximately 370 acres of land within these soil series are currently utilized as pastureland. Under Alternatives 2 and 3, these irrigated meadows would be managed to restore native plant communities appropriate for the site. Natural patterns of inundation and infiltration would be restored. The restoration of these productive lands would potentially benefit soil resources as well as other resources by reducing surface soil erosion within these fragile sites, and increasing botanical biodiversity.

If PacifiCorp lands in California were acquired or managed by BLM under cooperative agreement, the potential for higher levels of detrimental soil disturbance may increase on these lands, which have restricted public access under current management.

Cumulative Impacts - This alternative has the greatest amount of vegetative treatments, riparian reserve livestock exclusion, road decommissioning and regulated use, and hydrologic restoration. Under this alternative the short-term impacts to soil resources are greater than other alternatives due to the use of ground based machinery for vegetation and hydrologic restoration purposes, there is also potential for greater long-term positive soil benefits due to these restoration activities. Negative impacts due to recreation development activities are similar to Alternative 1, with the exception of greater control of OHV's, which would lessen potential negative soil impacts such as surface soil erosion and soil compaction.

Little cattle grazing would likely occur, and only to meet other management or restoration objectives. This would reduce if not eliminate soil impacts such as surface soil erosion and soil compaction that may be associated with livestock. Some animal related soil impacts would continue to exist in the planning area from wild horses, and other large herbivores such as elk and deer. The restoration of irrigated pastures to native plant communities would have potential benefits to soil resources through reductions in surface soil erosion of these productive soils.

Alternative 4

Under this alternative, vegetation treatments would be increased over current levels, but the additional areas treated would be concentrated around roads, high recreation use areas, and in important wildlife habitat (see Map 24). Therefore, the amount of soil resources impacted could be greater than in Alternative 1, smaller than in Alternative 3, and similar to Alternative 2, but distributed differently across the landscape.

Fuel treatments would emphasize use of mechanical equipment; therefore, the potential for detrimental soil conditions including soil compaction, soil displacement, and surface soil erosion would be similar to Alternative 2.

The potential for impacts from vegetation management activities would be similar to Alternative 2 since mechanical treatments would reduce hazardous fuel loads at a higher rate than in Alternative 1. However, the potential for impacts from fire suppression activities and high intensity, canopy-replacing fires would be higher than Alternative 3 where larger areas of both mechanical and prescribed fire habitat restoration activities are proposed.

The more extensive development of recreation sites under this alternative has the potential to increase risk to soil resources (see Map 16). In addition to developed recreation, off highway vehicle recreation would probably increase for the planning area. This could result in higher levels of detrimental soil disturbance including soil compaction, surface mixing and disruption, fire, and surface soil erosion. If PacifiCorp lands in California were acquired or managed by BLM under cooperative agreement, the potential for higher levels of detrimental soil disturbance may increase on these lands, which have restricted public access under current management.

Under this alternative, livestock grazing would be similar to Alternatives 1 and 2. Soil resources would be impacted greater than Alternative 3 and similar to Alternatives 1 and 2. Approximately 40 acres of riparian reserves would be excluded to remaining herbivores, thus reducing some of the impacts to soil resources in riparian areas.

Cumulative Impacts - This alternative has a moderate amount of vegetative treatments, and therefore moderate long-term benefits and short-term impacts associated with these treatments. Under this alternative, hydrologic restoration opportunities are limited and therefore, short-term soil resource impacts and long-term benefits are as well limited. Cattle exclusion in riparian reserves is moderate, and therefore soil resource benefits to fragile wetland soils and reduced livestock trampling would also be moderate. This alternative emphasizes recreational development, with less emphasis on habitat restoration. This alternative would emphasize campground expansion and would improve road surfaces and trail opportunities. Campground expansion would potentially cause an increased risk to soil resources for soil compaction of the immediate area around the campground and surface soil erosion if vegetation ground cover were not managed for these areas. Improved road surfaces may cause less surface soil erosion than current secondary unimproved roads. Due to trail enhancement, reduction in surface erosion may be offset by both expansion and increased use of both motorized and non-motorized trails.

Irretrievable, Irreversible, and Unavoidable Impacts

Development of recreation facilities (campgrounds and trails) would result in an irretrievable commitment of resources. Construction of hardened surfaces such as tent pads, or installation of structures would remove soils from a productive condition. Surfaced or heavily used and maintained trails would result in irretrievable impacts to soil productivity, especially in riparian zones. The impacts from existing and newly constructed roads would be an irretrievable loss of soil productivity.

The amount of area affected by each alternative differs, with Alternative 3 being the least impacting and Alternative 4 having the most irretrievable impacts to soils. These impacts, however, represent small acreages within the planning area for all alternatives.

Terrestrial Species/Habitat (Wildlife Resources)

Assumptions

Effects on wildlife are the same whether the actions occur on public lands or private lands. Therefore, this discussion is not separated out by land ownership, but mention of locations of specific impacts is made when appropriate.

Impacts Common to All Alternatives

Scenery Management - With the exception of vegetation management for fuels/fire control, no actions are planned for improving scenic quality. Other than effects described in the vegetation management section, there would be no direct effects on wildlife. The restrictions on activities due to scenic quality may slow the process of habitat restoration and cause some indirect effects due to this delay. However, most planned wildlife projects can be adapted to these restrictions.

Recreation Facilities and Management - *Campsites w/in riparian reserves (include day use areas, toilets):* Facilities within the riparian reserves maintain or encourage a continued human presence. This human activity may increase disturbance and stress to wildlife. Camping and recreational development in riparian reserves also limits available habitat for aquatic and riparian dependant species due to some species avoiding the disturbance caused by human activity. This directly affects species that nest or live in the riparian zone but also may affect species such as the bald eagle, osprey, or otter that forage along the river. Human activity may cause alteration in feeding activity or total avoidance of certain areas. This can be localized to an individual campsite such as increased use by magpies and other scavenging species or result in the avoidance of the entire campground by foraging big game species. Human use may also have indirect impacts to wildlife due to soil compaction or trampling of vegetation.

Maintaining or developing campsites and recreation areas may have an effect on pond turtle nesting habitat. Turtles use deep soil areas with mild slopes adjacent to water habitats to lay their eggs. A hole is excavated in the soil by the turtle and the eggs are laid and then covered. The heat from the sun hatches the eggs and the young travel across land to the water. These potential turtle nesting areas are the same areas preferred for recreational development, due to proximity to water and ease of development. Compaction caused by human and vehicular traffic would decrease areas that allow excavation by turtles. Development of parking or tent pads, placement of buildings, signs and/or parking bumpers would remove potential nesting habitat and create additional obstacles for the young turtles on their way to the water. Maintaining screening cover and other vegetation between sites would have an indirect impact on the nesting habitat for pond turtles by keeping sun off of the soil and thus not heating the eggs under the soil.

Abundant screening cover between sites may have a mitigating affect on land-birds and small mammals by maintaining escape and foraging habitat.

Trails: Development of trails has a potential to cause disturbance to wildlife and destruction of habitat. Use of the trail would increase the number of wildlife encounters and resultant displacement or disturbance of wildlife. The amount of this disturbance or stress would vary by frequency of use, type of traffic, and amount of noise accompanying the use on the trails. Foot use would have less noise but may have a longer duration of disturbance. Wildlife often react more physically to disturbance from humans on foot. People walking by often causes animals to move quickly out of the area, whereas the animals may just remain motionless or 'freeze' while a vehicle passes by and then slowly move away from the trail. The 'Freezing' is also an emotional stress with heightened awareness and increased heart rate. Although the vehicle traffic may not have as much localized affects, the vehicle traffic can cover more ground in a given time period so the area disturbed and number of animals displaced could be greater.

Loss of habitat would result from construction of the trails through removal of vegetation and compaction of the tread area. Reduction in quality and use of certain habitats results from repeated human disturbance.

Upland trail development (foot or OHV trails) would increase the potential for disturbance to wildlife throughout the canyon areas. This disturbance would result in short term stress and displacement, but would be less critical than the disturbance in the riparian zones as there would still be adequate wildlife escape cover. The total effect of the disturbance would depend on season of disturbance or importance of habitat. Disturbance that occurs during critical periods such as nesting or wintering periods would have greater effects on each particular animal. Effects would become greater if the trails are near important nesting or foraging areas. Many of the existing and proposed trails in the planning area are located in the riparian areas of the Klamath River. This is a very important habitat type in the Klamath River Canyon.

As trails age and use patterns become more routine the affect of the disturbance may moderate as some animals become acclimated to the use patterns. However this acclimation is a long-term process.

Boating facilities: Launch facilities have continuing impacts to aquatic systems by disrupting the natural connectivity within the riparian reserves and limiting development of riparian vegetation. The impacts of boat ramps/launch facilities mainly occur during the construction phase due to the removal of vegetation and the presence of heavy equipment during the installation phase. The removal and loss of habitat could be important if the habitat is limited or location is in or near critical habitat (i.e. nest sites, dens, etc.)

Indirect impacts would result because the boat ramps would attract more water based activity and this would cause increased disturbance to water dependant species such as pond turtles, wading birds, otters, etc. Pond turtles need extensive sunning periods for development of eggs. Repeated disturbances increase time needed for clutch development and reduce clutch size.

Boat launch facilities could have some beneficial effects. They create good basking areas for waterfowl, pond turtles, and shore birds. However, the benefits are only realized when not used by recreationists for long periods of the day.

Upland recreation sites and interpretive sites: Facilities encourage continued human presence. This human activity may increase disturbance and stress to wildlife. Human activity may cause alteration in feeding activity or total avoidance of certain areas. This can be localized to individual sites such as increased use by magpies and other scavenging species, or result in the avoidance of the entire area by foraging big game species. Human use may also have indirect impacts to wildlife due to soil compaction or trampling of vegetation preferred by wildlife.

Development of campsites and recreation activities in the uplands may attract people away from riparian zones. This could reduce the impacts adjacent to the river.

Abundant screening cover between sites may have a mitigating affect on land-birds and small mammals by maintaining escape and foraging habitat.

Whitewater and motorized boating: Activities on the water create a major disturbance to wildlife that rely on the open water habitats. Boats are more visible, create more disturbance, and cover more area than activities on shore.

Firearm use restrictions: Restrictions on firearm use would have little affect on wildlife populations. The occasional firearm discharge is generally associated with road or trail usage. Impacts from use of roads will be discussed under the roads sections.

Most firearm use is related to shooting at non-animate targets or regulated game populations or varmints or ground squirrels. Occasional removal of individual animals would have a negative impact on those animals but would have little negative effect or possibly a beneficial effect on the population.

Cultural Resource Management - *Historic site preservation:* Historic structures provide a variety of man-made wildlife habitats. This ranges from hiding places for mice, woodrats, raccoons, etc. to nesting or roosting structures for birds and bats.

Interpretive panels/outreach: These types of programs and structures could attract additional people to the area. This would increase the potential for disturbance to wildlife.

The panels could be adapted to provide nesting or roosting areas for bats and birds. The panels and brochures could also be used to educate the public on ways to reduce impacts to wildlife while enjoying the cultural resources.

Vegetation Management - Restoration of natural communities would have a beneficial effect on most wildlife. Since many communities are outside the natural range of conditions, the faster that the fuel loads are reduced and fire is returned to the system the better for wildlife.

Short term disturbance and displacement would occur during the treatment phase. More disturbance would occur during the mechanical treatments since more acres would be treated in a given time period.

Duration of the displacement would depend on the speed in which vegetative recovery occurs. Some species (bluebirds, quail, etc.) would respond immediately while others (such as woodpeckers, deer, etc.) would respond as the vegetation starts to produce better mast crops or higher quality browse.

Terrestrial Species/Habitat Management - Projects designed to benefit particular species or types of wildlife may occasionally have negative impacts to the species' counterpart. Shrubfield species would be impacted when areas are treated to improve meadow habitat or improve conditions for early seral species. A good mix of all types of seral stages within the vegetative communities would be beneficial to all wildlife species.

Watershed Management Actions - *Riparian restoration:* Vegetation manipulation in riparian reserves would have short-term negative impacts due to disturbance or habitat alteration. This would be of very short duration since riparian zones recover vegetation quickly. If riparian vegetation becomes too dense, it could have a negative impact on turtles or other wildlife that need to cross riparian reserves. This could be alleviated by continued management of the vegetation to provide a mix of seral stages Projects proposed under the wildlife and vegetation sections would benefit pond turtle habitat. Improvement of riparian habitat would have a beneficial effect on wildlife especially riparian dependant species. Since the riparian habitat is a scarce commodity, any improvement would be beneficial.

Meadow restoration: Meadows are unique habitat features that need to be managed for a variety of wildlife species. Special emphasis is placed on maintaining wet meadows even if they are man-made, due to the importance of this habitat type. Most proposals involve removing roads or adding fencing to protect meadows.

Aquatic Species/Habitat Management - *Alteration of instream flows (including temperature):* Stream flows that would increase fish populations would be very advantageous to eagles, osprey, kingfishers etc. Flow fluctuations and timing of these fluctuations could affect feeding opportunities for wildlife. If high flows are limited and are used heavily by rafters, then feeding opportunities would be limited during high flows. Pond turtles need adequate time to sun during the day for egg production. If flows are irregular or changing during this period the turtles may not get adequate time for egg development. Current peaking operations result in a lack of riparian vegetative encroachment, normalizing channel widths, and wide temperature variations. Projects that would benefit fisheries would be beneficial to wildlife species, especially those that feed on similar invertebrates or on the fish.

Ladder attraction flows, bypass out flows, emergency water release chute: These actions have very little potential to affect wildlife. They would be beneficial to those wildlife species that feed on similar invertebrates or on the fish.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): Development of a stream channel with deeper pools and side channels would be beneficial to wildlife. The side channels, especially if developed with deep pools, would be great refugia areas away from most human disturbance. The alternatives with more proposed stream improvements would result in greater benefits to wildlife.

Range Management - Well managed grazing would have minimal effects on wildlife and may have some beneficial effects such as removing decadent growth on grasses and stimulating regrowth. Current BLM livestock grazing management systems and levels in Segments 1 & 2 have proven to be compatible with wildlife and their habitat.

In Segment 3, nearly all of the livestock grazing occurs on private lands (primarily PacifiCorp). The livestock management is more intense and grazing occurs in some areas year around. Grazing livestock can create conflicts with wildlife species for forage. PacifiCorp would determine the intensity and level of livestock use and impacts would remain unless the cooperative agreements are developed as proposed under Alternatives 2-4.

Fire and Fuels Management - Wildlife species evolved with fire as a natural process in developing habitats. Lack of fire has resulted in many “dis-climaxes” or individual plant species having unnatural population levels due to unnatural conditions. For example, white fir has become predominant in many mixed conifer stands and juniper is taking over numerous pine stands and meadow areas. This invasion of natural plants in unnatural situations or numbers has also resulted in a shift in wildlife species and numbers. Returning fire to the ecosystem would have beneficial impacts to wildlife habitat. There may be some disturbance or short-term impacts on wildlife but long-term impacts would be beneficial.

Land Tenure - Blocking up ownership in an area or combining ownerships under a single cooperative management agreement allows more consistent and easier management of an area. This consistent management scheme would be beneficial to wildlife management. This is especially important on winter ranges, or other management of critical habitats.

Impacts of Specific Alternatives

(Refer to Maps 7, 13-16, 17a-20a, 21-24, 27-28, and Appendix H)

Alternative 1

Recreation Facilities and Management - *Campsites w/in riparian reserves (include day use areas, toilets):* As recreation sites are developed and improved, the level of impacts would increase. Under Alternative 1, the impacts would not change much since the development would be limited to the existing areas and the level of human activity would remain as is or increase slightly. The enhancement and development of new designated dispersed recreation facilities would have the least negative impact on terrestrial wildlife in this alternative when compared to the other alternatives (see Map 13). For riparian wildlife species, like the pond turtle, negative impacts would still continue at existing recreation facilities.

Trails (Include fishing access pts, rapids scouting, and to interpretive sites): No additional trails would be constructed under Alternative 1. Turtle camp trail, recently re-opened by recreation OHV users, would be reestablished as a non-motorized trail. The use of this trail for vehicular use has impacted the meadow, reducing meadow vegetation and increased compaction. Restoration of the Turtle Camp trail to a non-motorized trail would be beneficial to wildlife, as it would allow recovery of the impacted meadow.

When compared to the other alternatives, Alternative 1 would cause the least impact to wildlife from the construction of non-motorized trails and use of designated OHV routes. The greatest negative impact from motorized trails occurs in Alternative 4.

Boating facilities: Limited improvements to some recreation facilities may occur, however, no additional facilities would be constructed. These facilities are having continued minor impacts on aquatic systems by disrupting the natural connectivity within the riparian reserves and limiting development of riparian vegetation.

Upland recreation sites and interpretive sites: Use of the old housing site at J.C. Boyle powerhouse is proposed to continue as a bus/RV/overflow parking for the nearby boat launch. Although in an already massively altered site, this is an important denning area for herptiles, which could be negatively affected by continued use.

Whitewater and motorized boating: As recreation use is developed, more impacts are expected. Alternative 1 is not expected to develop the boating activities to a point where the disturbance becomes a major problem for wildlife.

Firearm use restrictions: Restrictions placed on firearm use due to campgrounds, trails, or other human activity could reduce the effectiveness of population control through hunting. This is not expected to be a problem under Alternatives 1, 2, or 3.

Road Management - *Road treatments (decommissioning/closures, improvements):* Under Alternative 1, minimum treatments (spot improvements) would be implemented in order to maintain existing roads or to meet ACS objectives (see Map 17a). Road densities may be reduced under this alternative but only to a limited degree. Road closures would usually result from some other action that is occurring in the canyon. Some roads removed from the base would be converted to hiking trails. For the most part, those impacts occurring to wildlife from roads within the Planning area would continue.

Some roads such as the powerline roads would be designated ‘regulated use’. This would reduce the use of these roads by the general public, especially during important time periods, which would reduce disturbance to wildlife.

Culvert installations: Installation or removal of culverts has the potential for some short-term disturbance to wildlife and destruction of habitat due to equipment usage. Culverts can be used by herptiles and small mammals as hiding areas for safer passage from one side of the road to the other.

Cultural Resource Management - Historic site preservation and maintenance of old structures would continue to provide the manmade habitats that certain species of wildlife have adapted to using (see Map 4 and Appendix H).

Vegetation Management - Vegetation treatments would continue based on existing management for the Scenic corridor of the Planning area, typically out of river view. Upland vegetation treatments would be limited in size and location due to existing management. Indirect impacts may result from increased road traffic on marginal road surfaces within the Planning area (see Map 21).

This alternative enhances terrestrial and riparian wildlife habitat by implementing some vegetation treatments and fuel load reduction projects. However, this alternative provides for least in maintaining the diversity in vegetation needed to sustain diverse wildlife species. The greatest benefits to wildlife habitat from vegetation treatments occur in Alternative 3.

Terrestrial Species/Habitat Management - Fuel reduction and vegetation treatments around large trees and in riparian zones is minimal in this alternative, but would benefit eagle and osprey nest sites by reducing potential for catastrophic wildfire. These projects would also benefit pond turtles and other species that need more open riparian habitat.

Existing and additional man-made nest structures would provide more perch and nest sites for species such as for wood ducks, raptors, robins, and swallows.

Vegetation management of some of the oak stands would improve mast crops for turkeys, deer, certain woodpeckers, bluebirds, etc. Even though these treatments are limited in acreage, (~ 20% of BLM oak stand acres in Segment 2), the treatment areas identified are some of the highest used deer winter range units in the canyon. Beneficial impacts to wildlife from treating these units would be moderate.

Watershed Management Actions - *Riparian restoration:* (Refer to the discussion in Impacts Common to All Alternatives.) When compared to the other alternatives, Alternative 1 provides fewest watershed improvements projects and would have the fewest positive impacts to wildlife. The greatest benefits for wildlife habitat from watershed actions occur in alternative 3.

Meadow restoration: (Refer to the discussion in Impacts Common to All Alternatives.)

Aquatic Species/Habitat Management - *Alteration of instream flows (including temperature):* (Refer to the discussion in Impacts Common to All Alternatives.) No changes in the flow regimes would be pursued as part of Alternative 1. This would result in continued impacts to the aquatic ecosystem from existing operations. Current lack of riparian vegetative encroachment, and normalizing channel widths, due to peaking operations would continue. The lack of available riparian vegetation would continue to be a limitation for the aquatic wildlife species in the planning area. Heavy recreation use during higher summer flows would have a disturbance impact to wildlife.

Ladder attraction flows, bypass out flows, emergency water release chute: Very little work is planned under this alternative except for some stabilization at the release chute. No impacts to wildlife are expected.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): In-stream structures would not be placed as part of Alternative 1. Existing channels would be anticipated to remain largely in their existing over-widened conditions. Some lateral erosion sites within Segments 1 and 3 would continue to move until reaching a geomorphic limitation such as bedrock. Fisheries access to side channels (chute cutoffs) would not be changed under this alternative.

Range Management - Well managed grazing would have minimal effects on wildlife and may have some beneficial effects such as removing decadent growth on grasses and stimulating regrowth.

Under Alternative 1, the area in Segment 2 would be managed as part of the Ward pasture. Under current management this pasture would be managed to protect or enhance big game winter range. As such it would receive limited use in early spring and occasionally a short fall use period.

Fire and Fuels Management - Alternative 1 proposes to treat fuels reduction on a random process, which would be a slow reintroduction of fire to the ecosystem. This process would take a long time to affect the recovery of current conditions.

Land Tenure - Land acquisition as described in the Klamath Falls and Redding Ramp's would be implemented under Alternative 1, little or no other acquisition would be pursued. No land conservation easements would be pursued as part of this alternative. The ability to administer the lands within the Klamath River planning area would generally remain as is. Alternative 1 results in a higher risk of development of riparian lands within Segment 3, which may result in adverse impacts riparian dependant species.

The largest potential for negative impact to wildlife would be if the existing private lands were subdivided and developed. Alternative 1 results in a higher risk of development of riparian lands within Segments 2 and 3, which may result in adverse impacts to riparian dependant species.

Cumulative Impacts - Overall there are few negative cumulative impacts and some positive impacts to wildlife in this alternative when compared to the other alternatives.

Few new recreation facilities are proposed in this alternative, which provides the least negative impacts to riparian associated wildlife when compared to the other alternatives.

New non-motorized trails would be constructed to provide additional recreation access in project boundary area where human activity has not occurred. This would be a slight negative impact to wildlife from increased encounters with people. The negative impacts from non-motorized trail activity in this alternative would be greater than the motorized activities due to the longer periods of time that wildlife would be exposed to people. The greatest negative impact to riparian and terrestrial wildlife would occur in Alternative 4.

In this alternative wildlife habitat would have limited long term positive benefits from the vegetation treatments proposed. However, the benefits to wildlife would not be as great when compared to Alternative 3.

Watershed improvements projects would have a positive benefit to wildlife habitat in Alternative 1. The greatest benefits for wildlife habitat from watershed actions occur in Alternative 3.

The largest potential for high long-term negative impacts to wildlife would result on private lands that could be subdivided and developed in river Segment 3 when compared to the other alternatives.

Alternative 2

Recreation Facilities and Management *Campsites w/in riparian reserves (include day use areas, toilets):* Under Alternative 2 the increased recreational use levels at campsites within riparian areas would increase the disturbance to wildlife in the riparian areas (see Map 14). Wildlife avoidance of areas adjacent to these sites would increase. Acres of impacted habitat would increase due to increased use and more areas developed. - Enhancement and development of new designated dispersed recreation facilities would provide negative impacts to wildlife especially where pond turtle habitat is limiting. Relocating one group site at Turtle camp would help provide some additional habitat for turtles. The development of the new Beswick campground in Segment 3 would disrupt wildlife movements and eliminate some habitat when compared to Alternative 1. Locating the campground near Shovel Creek would have further impacts to riparian habitat important for wildlife.

Trails (Include fishing access points, rapid scouting, and to interpretive sites): Trail development and usage would increase under Alternative 2. This would allow increased disturbance to wildlife. Since most of the trail development is planned in riparian zones the impact would be greater due to loss of this important habitat. The construction of nonmotorized trails in this alternative would have moderate negative impacts to wildlife, especially in riparian areas. The most negative impacts to wildlife dependent on riparian habitat occur in Alternative 4.

Boating facilities: Limited improvements to some recreation facilities may occur, however, no additional facilities would be constructed. These facilities are having a minor continued impact to the aquatic system by disrupting the natural connectivity within the riparian reserves and limiting development of riparian vegetation. Maintaining existing facilities within the riparian reserves maintains a limited vegetative community at the sites. Recreational development in riparian reserves limits available habitat for aquatic and riparian dependant species.

Upland recreation sites and interpretive sites: Development of an interpretive site at J.C. Boyle powerhouse is proposed within an already massively altered site. This area is an important denning area for herptiles. Development at this site could increase wildlife and human encounters. Installation of an interpretive site and parking area is not anticipated to have additional impacts to terrestrial habitat. Landscaping this area for the interpretive site could have beneficial impacts by providing additional vegetation for landbirds. Interpretive sites on Topsy grade if appropriately sited (i.e., outside of drainage bottoms) would not be anticipated to affect the aquatic habitats within the canyon.

Whitewater and motorized boating: Disturbance could result in displacement from feeding areas for wading birds, eagles, otter, etc. Pond turtles require several hours of sunning for egg development. Repeated disturbance could prevent this egg development.

As recreation use is developed, more impacts are expected. More use is expected under Alternative 2, which could affect wildlife through continued disturbances. Alternatives 1 and 3 are expected to develop the boating activities to a lesser degree.

Firearm use restrictions: Restrictions placed on firearm use and hunting activities due to campgrounds, trails, or other concentrated human use areas, could reduce the effectiveness of population control through hunting. This is not expected to be a problem under Alternatives 2.

Road Management - Additional roads and road improvements are planned under Alternative 2 so impacts from increasing human use would be greater. Proposed road closures would accelerate a reduction in wildlife disturbance. Decommissioning of approximately 10.5 miles of roads are proposed under this alternative for Segments 1 & 2. However, in Segment 3, three miles of additional roads would be open to the public. This alternative opens the

PacifiCorp lands in California to designated OHV tour routes. These lands were closed to the public in Alternative 1. Negative impacts to wildlife would be moderate from noise and vehicle traffic. The greatest negative impact from motorized trails occurs in Alternative 4.

Cultural Resource Management - Historic site preservation: Maintenance of old structures would continue to provide the manmade habitats that certain species of wildlife have adapted to using. Restoration or renovation could enhance these opportunities as long as the restoration occurs with natural products. Installing metal roofs or plastic siding would have a negative effect on the use of these structures as habitat (see Map 4 and Appendix H).

Vegetation Management - Alternative 2 would have more treatment units proposed. These treatment units would concentrate on little seen areas in the uplands in segment 2 and the river corridor in segment 2 and 3 (see Map 22). Species that use riparian habitat would be benefited. Upland species in Segment 3 would receive very few benefits from vegetative treatments. This alternative enhances terrestrial and riparian wildlife habitat by implementing more vegetation treatments and fuel load reduction projects when compared to Alternative 1. This alternative provides for maintaining the diversity in vegetation needed to sustain diverse wildlife species, however, the greatest benefits to wildlife habitat from vegetation treatments occur in Alternative 3.

Terrestrial Species/Habitat Management - Existing and additional man-made nest structures would provide more perch and nest sites for wood ducks, raptors, robins, swallows, and similar species than Alternative 1.

Vegetation management of some of the oak stands would improve mast crops for turkeys, deer, certain woodpeckers, bluebirds, and other species that depend on these crops. Even though these treatments are limited in acreage, (~ 20% of BLM oak stand acres in segment 2), the treatment areas identified are some of the highest used deer winter range units in the canyon. Beneficial impacts to wildlife from treating these units would be high.

Additional fuel reduction and vegetation treatments around large trees and in riparian zones would benefit eagle and osprey nest sites by reducing potential for catastrophic wildfire. These projects would also benefit pond turtles and other species that need more open riparian habitat. More riparian areas would be treated under this alternative than Alternative 1.

Additional structures would be installed on buildings and around campgrounds to create more perch and nest sites to benefit species such as wood ducks, raptors, robins, and swallows. Structures would also be created in trees to add potential nest sites for eagles and osprey.

Management treatment areas in all vegetation types are proposed. Some treatment areas are recommended for PacifiCorp land. These proposed units would improve the variety of seral stages available and benefit wildlife by providing more opportunities for wildlife use. The units would also be scattered throughout the canyon area so they would benefit more individuals. Thirty-four percent of the oak stands would be treated to improve mast crops for turkeys, deer, certain woodpeckers, bluebirds, etc. Timber stands would be treated (~ 40 %) to reduce fuel loads and density. This would improve forest health yet maintain all habitats, especially nesting, roosting, foraging habitat for spotted owls. Brush fields would be rejuvenated to provide improved habitat for big game and land birds.

Releases of turkeys and peregrines proposed under this alternative would allow these species to take advantage of additional habitats. This would benefit the populations as a whole.

Watershed Management Actions - *Riparian restoration:* Revegetation of the decommissioned roads in riparian zones would be beneficial to wildlife and habitat. The removal of roads adds more habitat area and the revegetation speeds the recovery process. Watershed improvement projects would have a greater positive benefit to wildlife habitat in

Alternative 2 as compared to Alternative 1. The greatest benefit for wildlife habitat from watershed actions occurs in Alternative 3.

Blackberry eradication along streams and roads is proposed under Alternatives 2 and 3. In areas where the blackberries are preventing natural riparian vegetation from occurring, this removal could allow more vegetation diversity to develop and thus be a positive influence on habitat. However, blackberry clumps provide escape cover and food for many species of birds and small mammals. Blackberries are also a major seasonal food item for black bears and land birds in late summer, and elk during late fall and winter. Removal of these bushes would have an overall negative effect on wildlife.

Meadow restoration: Most of the dry and wet meadows on BLM would be treated under this alternative, which would provide improved forage and habitat for big game, upland game, non-game birds, and others.

Aquatic Species/Habitat Management - *Alteration of instream flows (including temperature):* Under Alternative 2 the base river flows would be increased resulting in less fluctuation of total flow. These more consistent flows would improve the riparian habitat for wildlife. It would also benefit the foraging and resting habitat for aquatic species. This alternative is close to the current situation. These flows would have little effect on species that are compatible with these flows such as small shorebirds. However, this would result in continued impacts to the aquatic ecosystem from existing operations. Eagle foraging areas, pond turtle sunning opportunities would be negatively affected.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): Under Alternative 2, areas would be reviewed and problem areas would be restructured to prevent fish stranding and create deeper pools in the side channels. There would be short-term impacts while the construction work is being completed. However, most of this type of work would be done in late summer during low flows. That time period coincides with the period of time for least wildlife conflicts.

Range Management - If PacifiCorp lands were placed under a cooperative management agreement or federal management, the livestock use would be adjusted to benefit other resources, including wildlife. Under Alternatives 1, 2, and 4 the area in segment 2 would be managed as part of the Ward pasture. Under current agreements this pasture would be managed to protect or enhance big game winter range. As such it would receive limited use in early spring and occasionally a short fall use period.

Fire and Fuels Management - Alternative 2 proposes more vegetation treatments in which fuel reductions are part of the treatment. This alternative would be more advantageous to wildlife than Alternative 1.

Land Tenure - The greatest potential for long term negative impact to wildlife would be if the existing PacifiCorp lands were subdivided and developed. In Alternative 2, the potential would exist to enter into a long-term cooperative management agreement with PacifiCorp or acquire their lands within the project alternative boundary within river Segments 2 and 3. A long-term cooperative management agreement between BLM and PacifiCorp throughout the river canyon would provide a positive benefit for wildlife. However, if PacifiCorp's lands were sold to developers this could provide a negative impact to terrestrial and riparian wildlife species. The acquisitions possible under Alternatives 2, 3 and 4 would have the potential to provide long-term positive impacts for habitat management for all wildlife species in the alternative project boundary areas.

Cumulative Impacts - Overall there are few negative cumulative impacts and some positive impacts to wildlife in this alternative when compared to the other alternatives.

New recreation facilities are proposed in this alternative, which provides moderate negative impacts to riparian and terrestrial associated wildlife when compared to Alternatives 1 and 3. The proposed Beswick Recreation Site would disrupt wildlife movements and eliminate some habitat along the river in Segment 3, when compared to Alternative 1. Relocating one recreation site (in river Segment 2) would be a positive impact by providing some additional riparian habitat for turtles.

New non-motorized trails would be constructed to provide additional recreation access in the project boundary area where human activity has not occurred. This would be a moderate negative impact to wildlife from increased encounters with people. The negative impacts from non-motorized trail activity in this Alternative would be greater than the motorized activities due to the longer periods of time that wildlife would be exposed to people. The greatest negative impact to riparian and terrestrial wildlife from non-motorized and motorized trail activities would occur in Alternative 4.

In this alternative wildlife habitat would have long term positive benefits from the vegetation and fuel load reduction treatments proposed. However, the benefits to wildlife would not be as great when compared to Alternative 3.

Watershed improvement projects would have a positive benefit to wildlife habitat in Alternative 2. The greatest benefits for wildlife habitat from watershed actions occur in Alternative 3.

Long-term negative impacts to wildlife would result on PacifiCorp lands that could be sold and subdivided in river Segments 2 and 3 when compared to the other alternatives. Entering into a long-term cooperative management agreement between BLM and PacifiCorp to provide consistent vegetation and wildlife management in the river canyon would provide long-term positive benefits to riparian and terrestrial wildlife species.

Alternative 3

Recreation Facilities and Management *Campsites w/in riparian reserves (include day use areas, toilets):* Enhancement and development of new designated dispersed recreation facilities would create negative impacts to wildlife especially where pond turtle habitat is limiting. Relocating one group site at Turtle camp would help provide some additional habitat for turtles Alternative 3 would have the least impacts to wildlife from recreation management actions since several campsites would be removed or scaled down (see Map 15).

Trails (Include fishing access points, rapid scouting, and to interpretive sites): The construction of nonmotorized trails has moderate negative impacts to wildlife, especially in riparian areas. Alternative 3 would have the least amount of impacts from these actions because many of the trails would be closed and human use would be reduced. The most negative impacts to wildlife dependent on riparian habitat occur in Alternative 4.

Boating facilities: Limited improvements to some recreation facilities would still occur in this alternative, however, no additional facilities would be constructed. These facilities are having continued minor impacts on aquatic systems by disrupting the natural connectivity within the riparian reserves and limiting development of riparian vegetation. Maintaining existing facilities within the riparian reserves maintains a limited vegetative community at the sites. Recreation development in riparian reserves limits available habitat for aquatic and riparian dependant species

Upland recreation sites and interpretive sites: Development of an interpretive site at J.C. Boyle powerhouse is proposed within an already massively altered site. This area is an important denning area for herptiles. Development at this site could increase wildlife and human encounters. Installation of an interpretive site and making parking available to the public is not anticipated to have additional impacts to terrestrial habitat. Landscaping this area for the interpretive site could have beneficial impacts by providing additional vegetation for landbirds. Interpretive sites on Topsy grade if appropriately sited (i.e., outside of drainage bottoms) would not be anticipated to affect the aquatic habitats within the canyon.

Whitewater and motorized boating: As recreation use decreases, less disturbance impacts are expected. Alternative 3 is expected to generate the fewest boating activities thus the disturbance impacts are minor.

Firearm use restrictions: Restrictions placed on firearm use and hunting activities due to campgrounds, trails, or other concentrated human use areas, could reduce the effectiveness of population control through hunting. This is not expected to be a problem under Alternatives 3.

Road Management - *Road treatments (decommissioning/closures, improvements):* Several road closures are planned under Alternative 3 and this alternative would have the least miles of open road per section especially in Segment 2, resulting in the greatest benefit to wildlife (see Map 19a and 19b).

Cultural Resource Management - *Historic site preservation:* Maintenance of old structures would continue to provide the manmade habitats that certain species of wildlife have adapted to using. Restoration or renovation could enhance these opportunities as long as the restoration occurs with natural products. Installing metal roofs or plastic siding would have a negative effect on the use of these structures as habitat (see Map 4 and Appendix H).

Vegetation Management - In Alternative 3, the vegetative treatments would occur throughout the planning area to the greatest extent of any alternative. These treatments would be beneficial to all types of wildlife.

Terrestrial Species/Habitat Management - Emphasis on returning the communities to natural conditions would down play the use of nest structures. This would result in fewer opportunities to use man-made structures. However, more natural structures may be available due to improved tree stand composition and structure.

Management of areas in all vegetation types would be maximized under this Alternative. This would provide the most benefits for wildlife. Some species dependant on dense timber stands, such as spotted owls in Negro Creek, would be negatively affected due to reduction in quality of habitat.

Riparian areas would be managed heavily to return them to more natural conditions. This would be the best alternative to get quick recovery of the riparian areas for wildlife habitat. Irrigated fields would be converted to wet meadows through passive irrigation from ground water or use of canal systems. These wet meadows are a scarce resource so improvement or maintenance of these meadows, even though not totally natural would be a benefit to riparian species.

Watershed Management Actions - *Riparian restoration:* The benefits from this activity would increase through the alternatives with the most benefits from Alternative 3. Revegetation of the decommissioned roads in riparian zones would be beneficial to wildlife and habitat. The removal of roads adds more habitat area and the revegetation speeds the recovery process. These actions are proposed under all alternatives, however, they occur more frequently under Alternative 3 and provide the most benefits.

Blackberry eradication along streams and roads is proposed under Alternative 3. In areas where the blackberries are preventing natural riparian vegetation from occurring, this removal could allow more vegetation diversity to develop and thus be a positive influence on habitat. However, blackberry clumps provide escape cover and food for many species of birds and small mammals. Blackberries are also a major seasonal food item for black bears and land birds in late summer and elk during late fall and winter.

Meadow restoration: Treatment of dry and wet meadows on BLM proposed under this alternative would provide improved forage and habitat for big game, upland game, non-game birds, and others. Alternative 3 would result in the greatest benefits for wildlife habitat from watershed actions.

Aquatic Species/Habitat Management - *Alteration of instream flows (including temperature):* Alternative 3 proposes a more natural flow with normal seasonal peaks, etc. This would be beneficial for natural development of riparian habitat but may have negative impacts on some species or population numbers that rely on the consistent late summer flows.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): The amount of this in-stream structure work would be maximized under Alternative 3 to restore the river to natural conditions. There would be short-term impacts while the construction work is being completed. However, most of this type of work would be done in late summer during low flows. That time period coincides with the period of time for least wildlife conflicts (see Map 27).

Range Management - If PacifiCorp lands were placed under a cooperative management agreement or federal management, the livestock use would be adjusted to benefit other resources, including wildlife. Alternative 3 would result in the least impact on wildlife from livestock grazing.

Fire and Fuels Management - Under Alternative 3, fire would be an integral part in restoration of the ecosystem. The long-term beneficial impacts from fire treatments would be positive for all wildlife.

Land Tenure - The greatest potential for long-term negative impact to wildlife would be if the existing PacifiCorp lands were subdivided and developed. In Alternative 3, the potential would exist to enter into a long-term cooperative management agreement with PacifiCorp or acquire their lands within the project alternative boundary within river Segments 2 and 3. A long-term cooperative management agreement between BLM and PacifiCorp throughout the river canyon would provide a positive benefit for wildlife. However, if PacifiCorp's lands were sold to developers this could provide a negative impact to terrestrial and riparian wildlife species.

The acquisitions possible under Alternatives 2, 3 and 4 would have the potential to provide long-term positive impacts for habitat management for all wildlife species in the alternative project boundary areas.

Cumulative Impacts - Overall Alternative 3 provides the most positive benefits to wildlife when compared to the other alternatives. Recreation facilities and activities are generally de-emphasized in this alternative reducing the conflicts with wildlife.

Some new recreation facilities are proposed in this alternative, which provides moderate negative impacts to riparian and terrestrial associated wildlife when compared to Alternatives 1, 2 and 4. The proposed Beswick Recreation Site would disrupt wildlife movements and eliminate some habitat along the river in Segment 3, when compared to Alternative 1. Relocating some recreation sites (in river Segment 2) would be a positive impact by providing some additional riparian habitat for turtles. The most negative impacts to wildlife dependent on riparian habitat occur in Alternative 4.

New non-motorized trails would be constructed to provide additional recreation access in the project boundary area where human activity has not occurred. This would be a moderate negative impact to wildlife from increased encounters with people. The negative impacts from non-motorized trail activity in this Alternative would be greater than the motorized activities due to the longer periods of time that wildlife would be exposed to people. The greatest negative impact to riparian and terrestrial wildlife from non-motorized and motorized trail activities would occur in Alternative 4.

In this alternative wildlife habitat would have the most long term positive benefits from the vegetation and fuel load reduction treatments proposed.

The greatest benefits for wildlife habitat from watershed actions occur in Alternative 3.

Long-term negative impacts to wildlife could result on PacifiCorp lands if it was sold and subdivided (in river Segments 2 and 3) when compared to the other alternatives. Entering into a long-term cooperative management agreement between BLM and PacifiCorp to provide consistent vegetation and wildlife management in the river canyon would provide long-term positive benefits to riparian and terrestrial wildlife species.

Alternative 4

Recreation Facilities and Management - *Campsites w/in riparian reserves (include day use areas, toilets):* Since Alternative 4 would maximize development, which is often proposed in or near the riparian areas, it would also have the greatest negative affect on wildlife dependant on these habitats. There are more proposed recreation facilities in riparian zones with deep soils in this alternative making this the most impacting alternative to pond turtle habitat. The development of the new Beswick campground in segment 3 would disrupt wildlife movements and eliminate some habitat when compared to Alternative 1 or 3. Locating the campground near Shovel Creek would have further impacts to riparian habitat important for wildlife (see Map 28).

Trails (Include fishing access pts, rapids scouting, and to interpretive sites): With the emphasis on human use, trails proposed in Alternative 4 would have the greatest potential for negative impacts on wildlife due to the number of trails. The construction of nonmotorized trails in this alternative has moderate negative impacts to wildlife, especially in riparian areas. The most negative impacts to wildlife dependent on riparian habitat occur in this alternative.

Boating facilities: A new boating take-out site would be developed at Fish Access #6, and limited improvements to some recreation facilities may occur. The take-out site at Stateline would be removed. These facilities are having continued minor impacts to the aquatic system by disrupting the natural connectivity within the riparian reserves and limiting development of riparian vegetation. Maintaining existing facilities within the riparian reserves limits the diversity of the vegetative community at the sites. Recreation development in riparian reserves limits available habitat for aquatic and riparian dependant species.

Upland recreation sites and interpretive sites: Uses of uplands for recreational purposes, such as dispersed camping, and OHV use would expand

Development of an interpretive site at J.C. Boyle powerhouse is proposed within an already massively altered site. This area is an important denning area for herptiles. Development at this site could increase wildlife and human encounters. Installation of an interpretive site and making parking available to the public is not anticipated to have additional impacts to terrestrial habitat. Landscaping this area for the interpretive site could have beneficial impacts by providing additional vegetation for landbirds. Interpretive sites on Topsy grade if appropriately sited (i.e., outside of drainage bottoms) would not be anticipated to affect the aquatic habitats within the canyon.

Whitewater and motorized boating: The amount of boating activity that could occur under Alternative 4 could affect wildlife through continued disturbances. As more boats travel along the river, the disturbances become more frequent. As these disturbances start to occur more frequently, the periods available for foraging or sunning become smaller and the cumulative effects could start to affect the health of certain animals do to lack of foraging time or opportunity to sun.

Firearm use restrictions: Restrictions placed on firearm use and hunting activities around campgrounds, trails, or other concentrated human use areas, could reduce the effectiveness of population control through hunting. This is not expected to be a problem under Alternatives 1,2, or 3.

Road Management - *Road treatments (decommissioning/closures, improvements):* Human use is emphasized in Alternative 4 and therefore, the amount of open roads would be greatest. This alternative opens the PacifiCorp lands in California to designated OHV tour routes. These lands were closed to the public in Alternative 1. Negative impacts to wildlife would be moderate from noise and vehicle traffic. The greatest negative impact from motorized trails occurs in Alternative 4 (see Map 16 and 20a).

Bridge upgrades (Rock Creek and/or upper Frain): Construction of a bridge would facilitate traffic to move more freely and encourage more use of the area. This would create more potential for disturbance to wildlife. Bridges can provide additional nest structures for birds such as swallows or robins and can also provide good daytime or nocturnal roosts for bats. The rocks around the base of the abutments can also provide important habitats for aquatic mammals. This habitat is not in short supply but the rock riprap would make wildlife viewing very accessible.

Cultural Resource Management - *Historic site preservation:* Maintenance of old structures would continue to provide the man-made habitats that certain species of wildlife have adapted to using. Restoration or renovation could enhance these opportunities as long as the restoration occurs with natural products. Installing metal roofs or plastic siding would have a negative effect on the use of these structures as habitat (see Map 4 and Appendix H).

Vegetation Management - The establishment of more developed recreation sites in this alternative would alter some vegetative treatment areas. This alternative has the second highest amount of treatment proposed. Most treatments would be in upland or modified if in the riparian zones (see Map 24).

Terrestrial Species/Habitat Management - Fuel reduction activities around large trees and in riparian zones would benefit eagle and osprey nest sites by reducing potential for devastating fire. These fuel reduction projects would also benefit pond turtles and other species that need more open riparian habitat.

Existing and man-made nest structures would provide additional perch and nest sites for ducks, raptors, robins, swallows, etc. These types of structures would be maximized under this alternative near recreation developments to provide more wildlife viewing opportunities. These structures would benefit those species that can become acclimated to recreational activity.

Management of the vegetative communities would be reduced from the amount proposed in Alternative 3. They would still be scattered throughout the area. Wildlife effects would still be positive from improved mast crops, diverse brush fields, and improved riparian habitat. Due to the constraints from proximity to recreation sites, the restoration of vegetative communities would be slower than in Alternative 3 but still better than Alternatives 1 and 2.

This alternative enhances terrestrial and riparian wildlife habitat by implementing more vegetation treatments and fuel load reduction projects when compared to Alternatives 1 and 2. This alternative provides for maintaining the diversity in vegetation needed to sustain diverse wildlife species, however, the greatest benefits to wildlife habitat from vegetation treatments occur in Alternative 3.

Watershed Management Actions - *Riparian restoration:* Revegetation of the decommissioned roads in riparian zones would be beneficial to wildlife and habitat. The removal of the road adds more habitat area and the revegetation speeds the recovery process. These actions are proposed under all alternatives, however, they occur less frequently under Alternative 4.

Meadow restoration: (See discussion under Alternative 2.)

Watershed improvements projects proposed in this alternative would have a greater positive benefit to wildlife habitat than alternatives 1 and but less than 2 or 3. The greatest benefits for wildlife habitat from watershed actions occur in alternative 3.

Aquatic Species/Habitat Management - *Alteration of instream flows (including temperature):* Flow rates and timing of flows would respond to needs of recreation in Alternative 4. This alternative is close to the current situation. These flows would have little effect on species that are compatible with these flows such as small shorebirds. However, this would result in continued impacts to the aquatic ecosystem from existing operations. Eagle foraging areas, pond turtle sunning opportunities would continue to be negatively affected.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): Under Alternative 4 the channel work would be in response to river recreation opportunities such as white water rafting. There would be short-term impacts while the construction work is being completed. However, most of this type of work would be done in late summer during low flows. That time period coincides with the period of time for least wildlife conflicts.

Range Management - Under Alternatives 1, 2, and 4 the area in segment 2 would be managed as part of the Ward pasture. Under current agreements this pasture would be managed to protect or enhance big game winter range. As such it would receive limited use in early spring and occasionally a short fall use period.

Grazing management would not change much through this alternative. If PacifiCorp lands were placed under a coordinated management agreement or federal management, the grazing management would be adjusted to benefit other resources in addition to livestock management.

Fire and Fuels Management - Fire and fuel treatments would be prioritized around recreation developments under Alternative 4. Wildlife that are tolerant of human use at developed sites and respond favorably to prescribed fire would be benefited most. Areas outside of recreation sites would only be treated through the random selection process. This would result in a slow reintroduction of fire to the ecosystem.

Land Tenure - The greatest potential for long-term negative impact to wildlife would be if the existing PacifiCorp lands were subdivided and developed. In Alternative 4, the potential would exist to enter into a long-term cooperative management agreement with PacifiCorp or acquire their lands within the project alternative boundary within river Segments 2 and 3. A long-term cooperative management agreement between BLM and PacifiCorp throughout the river canyon would provide a positive benefit for wildlife. However, if PacifiCorp's lands were sold to developers this could provide a negative impact to terrestrial and riparian wildlife species.

The acquisitions possible under Alternatives 2, 3 and 4 would have the potential to provide long-term positive impacts for habitat management for all wildlife species in the alternative project boundary areas.

Cumulative Impacts – Overall, Alternative 4 provides the greatest negative impacts to wildlife when compared to the other alternatives. Recreation facilities and increased visitor use are emphasized in this alternative increasing conflicts with wildlife.

Many new recreation facilities are proposed in this alternative, which provides high negative impacts to riparian and terrestrial associated wildlife when compared to Alternatives 1, 2 and 3. The proposed new recreation facilities would disrupt wildlife movements and eliminate some habitat along the river in Segments 2 and 3, when compared to Alternative 1. Not relocating some recreation sites (in river Segment 2) would be a negative impact riparian habitat for turtles. The most negative impacts to wildlife dependent on riparian habitat occur in Alternative 4.

New non-motorized trails would be constructed to provide additional recreation access in the project boundary area where human activity has not occurred. This would be a moderate negative impact to wildlife from increased encounters with people. The negative impacts from non-motorized trail activity in this Alternative would be greater than the motorized activities due to the longer periods of time that wildlife would be exposed to people. The greatest negative impact to riparian and terrestrial wildlife from non-motorized and motorized trail activities would occur in Alternative 4.

In this alternative wildlife habitat would have moderate positive long term positive benefits from the vegetation and fuel load reduction treatments when compared to Alternatives 1 and 2. The greatest benefits to wildlife from vegetation treatments would occur in Alternative 3.

Watershed improvements projects proposed in this alternative would have a greater positive benefit to wildlife habitat than alternatives 1 and but less than 2 or 3. The greatest benefits for wildlife habitat from watershed actions occur in Alternative 3.

Irretrievable, Irreversible, and Unavoidable Impacts

Development of recreation facilities (campgrounds and trails) in pond turtle nesting areas would be an irretrievable commitment of resources. Surfacing, development of tent pads, or installation of structures would remove areas from availability to the turtles.

Surfaced or heavily maintained trails would result in irretrievable impacts to vegetation under and along the trails, especially in riparian zones. However, these are small acreages within the planning area.

The impacts from existing and newly constructed roads would be an irretrievable loss of vegetation important for wildlife. The roaded areas change by each alternative with Alternative 3 being the least impacting and Alternative 4 having the most irretrievable impacts to vegetation used by wildlife.

Watershed Values

Mainstem Klamath River Streamflow

Assumptions

As part of the FERC relicensing process, PacifiCorp, numerous stakeholders, and BLM are developing and implementing studies that will assess flow needs required to meet river management objectives, including maintenance of flow-dependent ORVs and attainment of

ACS objectives. As results from these studies become available, they will be reviewed and incorporated into this analysis. Final results will not be available until 2003 at the earliest.

Regardless of other ongoing planning and regulatory processes (including the Klamath Basin Adjudication, the development of a long-term operations plan by the USBR, the FERC relicensing process, and the development of instream flow recommendations downstream from Iron Gate Dam), this analysis assumes that BLM adjudication claims (for Segment 2) and recommended flow regimes (for Segments 1, 2, and 3) will be implemented. As discussed in Chapter 4, flow recommendations would potentially be refined on the basis of relicensing studies or other analyses, or as new information regarding fisheries and riparian management becomes available.

For the river within the planning area, numerical analyses of issues related to instream flow needs and hypothetical hydrographs are limited at present, especially for Segment 1. In this discussion, a conceptual description of possible flow regimes will be developed in order to provide information needed to assess potential effects of recommended flow regimes on flow-dependent resources (such as fisheries, recreation, riparian vegetation, etc.)

The effects of claimed and recommended flow regimes, were they to be implemented, will be discussed in regards to five parameters that describe the flow regime (Poff et al. 1997):

- Magnitude ~ the amount of water released at a given time, including peak flows and baseflows (with regards to the operation of J.C. Boyle powerhouse, daily releases of flow from one or two turbines are often referred to as “peaking”);
- Duration ~ the length of time that flows of a given magnitude persist;
- Frequency ~ the number of times that flows of a given magnitude occurs during a particular time period;
- Timing ~ for a given time scale (e.g., daily, seasonally), a description of when flows are likely to occur; and,
- Rate of Change ~ the rate at which flows change during the transition period between different flow magnitudes (with regards to operation of the J.C. Boyle powerhouse, this is often referred to as the “ramp rate”, or the act of “ramping”).

The magnitude of peak flows and summer average daily flows varies considerably between years with above or below average precipitation. In order to more comprehensively analyze the various alternatives, potential effects to flow regimes will be discussed for “average,” “wet,” and “dry” water years. Water years 2000, 1996, and 1994, respectively, were selected as representative of annual and summer (May to October) flow regimes for these water year types. Due to reservoir regulation and time lags in movement of water through irrigated areas, these water year types do not match the classification of water year types for the USBR Klamath Project, which are based on April through September inflows into Upper Klamath Lake.

Discussions regarding operations of the J.C. Boyle facilities under each alternative are based on operational patterns that occurred during the representative water years listed above, and should not be interpreted as additional constraints on PacifiCorp operations (beyond recommendations to provide flow regimes suitable for attainment of BLM management objectives).

Impacts Common to All Alternatives

The BLM will continue to pursue its pending instream flow claims to support the fisheries, recreation, and scenic ORVs in Segment 2.

BLM’s recommendations for Klamath River instream flows will be constrained by upstream and downstream water uses. Numerous ongoing planning and regulatory processes will continue to affect the volume, and in some cases, the timing of water flowing in the river through the planning area. The BLM will continue to participate in efforts to determine how flows required to meet BLM objectives can be balanced with flows required for other resource values including hydroelectric power generation. Seasonal streamflow patterns in the river will continue to be affected by water management in the upper Klamath Basin (as discussed in BHI, 1996).

The recharge area for the springs that provide baseflow in Segment 1 has not been clearly identified. It is possible that future pumping of groundwater on lands outside of the planning area could reduce the discharge of these springs. An ongoing USGS assessment of groundwater hydrology in the Klamath Basin, including the planning area, may provide information useful for determining the potential impact of groundwater use on the planning area.

If the instream flow claims of the Klamath Tribes are decreed in the Klamath Basin Adjudication, the minimum, or baseflows, throughout the planning area would be 700 cfs throughout the year.

Because of the size of the Klamath River watershed, it is assumed that management actions proposed in various alternatives for recreation, roads, cultural resources, vegetation and wildlife would have a negligible effect on flows in the mainstem river and thus are not discussed below.

Impacts of Specific Alternatives

(Refer to Tables 5-6, 5-7, Figure 5-1, Maps 6, 17a-20a, 21-24, and Appendix H)

Alternative 1

Flow regimes proposed in this alternative focus on securing water rights for instream flows in Segment 2. A summary of allocations of water for instream flows in Alternative 1 is depicted in Table 5-6.

Segment 1 - No alterations to flow releases from J.C. Boyle Dam would occurin this alternative.

Baseflows would remain at about 100 cfs in the upper portion of the reach and between 300 and 500 cfs in the lower portion of the reach. Due to regulation of water releases at the dam, there would be little variation in baseflows in the upper portion of Segment 1. Downstream from the springs, baseflows would be higher in winter than in summer.

Peak flows would occur when the capacity of the flume and powerhouse is exceeded during periods in winter and spring. Generally, this would occur in average and wet water years, but not in dry water years. The magnitude and duration of peak flows would be reduced as a result of operation of the J.C. Boyle facilities.

Rates of change between baseflow periods and peak flow events would continue to be drastic. Transitions from 100 to more than 8,000 cfs could occur over periods of days, and shifts of up to 3,000 cfs could occur within 30 minutes (as was recorded in January 1997).

Segments 2 and 3 - Streamflow regimes designed to maintain the recreation, scenery, and fisheries ORVs would be pursued by the BLM as stated in water right claims amended in 1999. In addition, the BLM would recommend that the timing of releases at J.C. Boyle powerhouse be adjusted to resemble the release schedule that occurred during the summer of 1994, at the time of Wild and Scenic River designation.

Table 5-6.–Summary of resulting (recommended) flow regimes.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Segment 1				
Minimum flows	Instream flows sufficient for favorable channel conditions and fish passage are emphasized	Increased baseflows would enhance fish migration	Increased baseflows with seasonal variation, would enhance fish migration and ecological processes	Increased baseflows would enhance recreational fishing and fish migration
Ramp rate	No Changes	Reduced ramp rate during the recession of flood peaks would result	Reduced ramp rate during the onset and recession of flood peaks would result	Reduced ramp rate during the recession of flood peaks would result
Peak flows, pulse flows, and recreation releases	No Changes	No Changes	Occasional releases to produce “geomorphic flows” and “pulse flows” would result	Increased flow releases would enhance whitewater recreation
Segment 2				
Minimum flows	Instream flows sufficient for favorable channel conditions and fish passage are emphasized	Provide sufficient flows for adult and juvenile stages for trout	Increased baseflows provide for all 3 life stages of trout	Flows optimize whitewater recreation opportunities while providing flows sufficient for adult and juvenile stages of trout
Ramp rates	No Changes	Reduce ramp rate	Reduce ramp rate, if peaking occurs	Reduced ramp rate
Daily flow fluctuations	No action, except as regarding minimum flows	Modify run-of-the-river flow regime would result	Run-of-the-river flow regime would result	No action, except as regarding minimum flows and ramp rates
Recreation releases	No Changes	Scheduled powerhouse releases would resemble timing, volume and duration that occurred at the time of Wild and Scenic designation.	No releases would be made to support whitewater recreation	Scheduled powerhouse releases would enhance whitewater opportunities
Adaptive management	No flow changes anticipated unless as a result of the FERC relicensing process	Instream flows revised as necessary, through the FERC relicensing process and other studies	Instream flows revised as necessary, through the FERC relicensing process and other studies	Instream flows revised as necessary, through the FERC relicensing process and other studies
Water rights	Adjudicated water rights secured for recreation and fisheries instream flows	Adjudicated water rights secured for recreation and fisheries instream flows	Adjudicated water rights secured for recreation and fisheries instream flows	Adjudicated water rights secured for recreation and fisheries instream flows
Segment 3	Flows in this segment are essentially the same as in Segment 2.			

Water right claims (pending) are to support fisheries at 625 cfs from April 1 to June 15, and 525 cfs for other periods. Flows required to support recreation and scenic values are on the order of 1,500 cfs. When the water is available, baseflow downstream from the powerhouse would be 1,500 cfs. As discussed above, flow recommendations may change as new information becomes available.

Peak flows in Segments 2 and 3 would be much like they are at present. Flows in excess of about 3,000 cfs would occur for about two months in wet years, about a month in average years, and perhaps not at all in dry years. The duration of peak flows would continue to be artificially curtailed by operation of the J.C. Boyle Dam and other upstream dams. Increased release of water from J.C. Boyle Reservoir (to meet instream flow recommendations) would increase the amount of active storage and thus lead to dampening of flood peaks relative to current conditions, but not by any significant amount.

The abrupt onset of water spilling from the dam would result in rapid transitions from 3,000 cfs to flood peaks in excess of 11,000 cfs, with occasional shifts of up to nearly 3,000 cfs over a 30-minute period (as was recorded in January 1997).

Power generation would continue to cause short duration increases and decreases in flow releases (Figure 5-1). In fall, early winter, and late spring of average water years, flows would vary between baseflow and 3,000 cfs on an almost daily basis. When possible, given the operational constraints of the J.C. Boyle facilities, baseflows would likely be regulated at approximately 3,000 cfs during late winter and early spring to provide maximum power generation. During summer months, flows would vary between baseflow and 1,500 cfs on an almost daily basis, with flows up to 3,000 cfs occurring on some weekends.

In wet years, flows would be at or above 3,000 cfs for about two months during late winter and early spring. Flows during summer and fall either would be stable at around 1,500 cfs or would fluctuate between baseflow and 1,500 or 3,000 cfs on a daily basis.

In dry years, average daily flows would be near 1,500 cfs, with fluctuations from baseflow to 3,000 cfs through early winter. Average daily flows from late winter through summer would be less than 1,000 cfs, and as low as 500 cfs in mid-summer. Ramping from baseflow to 1,500 cfs would occur, though for shorter durations than in average or wet years.

The ramp rate during the transition from baseflow to peaking would be equal to or less than the current rate of nine inches of water depth per hour, or “stage” (PacifiCorp 2000). The length of time required to complete this transition would be reduced, since the magnitude of baseflows would increase relative to current conditions.

Cumulative Effects -The flow regime in all segments of the river would continue to be highly regulated. Baseflow in Segment 1 would continue to be depleted by diversions to the powerhouse. The magnitudes and durations of baseflows in Segments 2 and 3 would be higher and longer than at present, especially during early summer.

The release of water (from the powerhouse) to fulfill instream flow claims would affect the timing of power generation. Ramping at the powerhouse and rapid onset of water spilling from the dam would continue to cause daily flow fluctuations of much higher magnitude and at greater rates of change than occur elsewhere on the Klamath River.

Alternative 2

Flow regimes proposed in this alternative are designed to meet BLM management objectives, including maintaining and enhancing ORVs and attaining ACS objectives.

A summary of allocations of water for instream flows in Alternative 2 (including recommendations for Segment 1) is depicted in Table 5-6.

Segment 1 - Increased baseflows would be recommended in this segment in order to reduce the temperature differential at the powerhouse and to support fish passage from the powerhouse to the dam. The magnitude and timing of increased baseflows would be determined during the FERC relicensing process. Accretions from the springs at river mile 223 would continue to add between 200 and 400 cfs to flows at the downstream end of Segment 1.

Peak flows would occur when the capacity of the flume and powerhouse is exceeded during periods in winter and spring. Generally, this would occur in average and wet water years, but not in dry water years. Spill from the reservoir into Segment 1 would occur at similar frequencies and durations as at present. While instream flow releases from the powerhouse may make more storage capacity available in J.C. Boyle Reservoir during summer, such releases would likely not cause any change in operations during the periods when high flow events necessitate spilling from the dam into Segment 1.

Rates of change as flow increase from baseflow to peak flow events would not be altered from current conditions. The BLM would recommend that rates of change be more gradual as flows recede, in order to prevent fish stranding and to allow processes that shape channel and riparian features to occur.

Segments 2 and 3 - Streamflow regimes designed to maintain and enhance the recreation, scenery, and fisheries ORVs would be pursued by the BLM. The "modified run-of-the-river" flow regime recommended in this alternative would incorporate the BLM water right flow claims, but would include additional elements designed to resemble natural flow regimes (refer to Table 5-6).

The modified run-of-the-river flow regime would include the following elements (see Figure 5-1).

- Minimum flows;
- A reduced ramp rate;
- Flow releases from the Powerhouse that would fluctuate within a defined range (the "flow allowance") around the daily average flow into J.C. Boyle Reservoir (plus the accretions from the springs in Segment 1); and,
- During periods when the sum of the average daily flow plus the flow allowance is less than required for recreation uses, additional peaking releases could occur to reach the recreation flow timing, volume and duration that approximated those that existed at time of designation.

Water right claim flows are required to support fisheries at 625 cfs from April 1 to June 15 and 525 cfs for other periods. Flows required to support recreation and scenic values are on the order of 1,500 cfs. The fisheries flow would serve as the absolute minimum flow. As discussed above, flow recommendations may change as new information becomes available. Baseflow downstream from the powerhouse would be determined by subtracting the flow allowance from the average daily flow into the system (reservoir inflow plus springs). Portions of the baseflow would be supplied from Segment 1 baseflows. Flow recommendations would potentially change as new information and new methods of modeling discharge-habitat relationships are applied (such as will occur during the FERC relicensing process).

Average daily flow data from water years 1994, 1996, and 2000 suggest that daily average flows would exceed 1,500 cfs until approximately the end of June in wet years, through the end of May in average years, and perhaps not at all in dry years. Even when average daily flows recede to less than 1,500 cfs, instantaneous flows would not be less than 625 or 525 cfs (the minimum discharge depends on the time of year).

Peak flows in Segments 2 and 3 would be much like they are at present. Flows in excess of about 3,000 cfs would occur for about two months in wet years, about a month in average years, and perhaps not at all in dry years. J.C. Boyle operations could affect flows during the initial and final stages of flood peaks (when flows are less than 3,300 cfs and within the operational control of the Powerhouse), but not as much as occurs currently. Overall, the onset and recession of peak flows would be much more gradual than at present.

Power generation would continue to cause daily fluctuations in discharge from the powerhouse, though they would be less dramatic than at present. During late winter and early spring of wet and average water years, flows would likely be at or above 3,000 cfs, and power generation would be maximized. In late fall and late spring of these water year types, extensive peaking outside of the flow allowance would likely not be necessary to meet recreation flow needs. In summer, average daily flows would likely be near 1,000 cfs, and some peaking in excess of the flow allowance would be necessary to meet recreation management objectives.

For much of the length of dry water years, peaking in excess of the flow allowance would be necessary to meet recreation management objectives. In order to maintain the recreation ORV, the schedule of peaking releases would resemble that which was occurring at the time of Wild and Scenic River designation. During periods when average daily flows are very low (at the fisheries absolute minimum flow during summer, for instance), it may be difficult to attain recreation flow objectives, given the reduced flow rate.

During the FERC relicensing process, the Department of the Interior would recommend that the ramp rate during the transition from baseflow to peaking be reduced from the current rate of 9 inches of stage per hour. The length of time required to complete transitions from baseflow to peaking flows could be increased (even though the difference between daily maximum and minimum flows would be reduced).

If implemented, recommendations regarding irrigation diversions operated by PacifiCorp in the Shovel Creek drainage would add upwards of 5 cfs of baseflow (in addition to the existing baseflow from Shovel Creek) to the lower portion of Segment 3 during summer months and other times of the year.

Cumulative Effects - The flow regime in all segments of the river would be highly regulated most of the time, but in a manner that approximates natural conditions more closely than the current flow regime. Ecologically important elements of natural flow regimes would occur in Segments 2 and 3.

Though they would continue to be depleted by diversions to the powerhouse, baseflows in Segment 1 would be increased relative to current conditions.

The magnitudes and durations of baseflows in Segments 2 and 3 would be higher and longer than at present, especially during early summer. The timing of power generation would be affected by the recommended flow regime. Although the magnitude of difference between daily maximum and minimum flows and the ramp rate would be reduced, ramping at the powerhouse would continue to cause daily flow fluctuations of greater frequency, higher magnitude, and at greater rates of change than would occur on adjacent reaches of the Klamath River (the Keno reach and the river downstream from Iron Gate Dam).

Alternative 3

Flow regimes proposed in this alternative are designed to meet BLM management objectives, including enhancing flow-dependent natural resource ORVs, attaining ACS objectives, and restoring riverine landforms and ecological processes. If this alternative is implemented, additional studies will be required to design flow regimes that would meet BLM management objectives.

A summary of allocations of water for instream flows in Alternative 3 (including recommendations for Segment 1) is depicted in Table 5-6.

Segment 1 - The BLM would recommend that releases from J.C. Boyle Dam be of greater magnitude and that spills occur more frequently than at present. Increases in baseflow and occasional moderate-magnitude “pulse” releases would be recommended to improve aquatic habitat and fish passage in Segment 1. These releases would be intended to restore the annual and seasonal variability characteristic of a natural flow regime, scour riparian areas and mobilize sediment. Additional modest increases in baseflow would potentially result from recommended alterations in the operation of the fish ladder and bypass screen.

Baseflows throughout the segment would vary on an annual and seasonal basis, and would generally be highest in late winter and spring. The range of values for recommended instream flows in Segment 1 will be determined with appropriate methodologies if Alternative 3 is selected. The rate of change (ramp rate) during transition periods would be low, in order to emulate natural processes.

Peak streamflows, or geomorphic flows, of sufficient magnitude and duration to alter channel features and move coarse sediment would occur on an annual basis. These geomorphic flows would have magnitudes on the order of 2,700 to 3,300 cfs and would be released in years when forecasted spill from J.C. Boyle Dam is less than or equal to 2,700 cfs. This range is based on the lowest recorded annual flood peak, and the volume of the flood that corresponds to a 1.5 year recurrence interval, derived from the relatively unimpaired peak flow regime downstream from the powerhouse. Spills in excess of the bankfull discharge would occur in years with an above average snowpack in the Upper Klamath Lake drainage basin.

During the FERC relicensing process, the Department of the Interior would recommend that a ramp rate be set for transitions from “normal” operations to flood passage operations. This would reduce the extreme rates of change that can occur at the beginning and end, and also during, spills from J.C. Boyle Dam. Rates of change between baseflow periods and peak flow events would be designed to reflect snow melt rates and runoff timing in the Upper Klamath Lake drainage basin, as well as inflows from Spencer Creek.

Segments 2 and 3 - Streamflow regimes designed to enhance the fisheries ORV and maintain the recreation and scenic ORVs would be pursued by the BLM. The “run-of-the-river” flow regime recommended in this alternative would incorporate the BLM instream flow claims, but would include elements designed to restore natural flow regimes.

The run-of-the-river flow regime would include the following elements (see Figure 5-1):

- Minimum flows;
- If and when peaking occurs, a reduced rate; and,
- Flow releases from the powerhouse that mirror the average daily flow of water into J.C. Boyle Reservoir (plus accretions from the springs in Segment 1) and minimize flow fluctuations associated with peaking.

Water right claim flows required to support fisheries are 625 cfs from April 1 to June 15 and 525 cfs for other periods. Flows required to support recreation and scenic values are on the order of 1,500 cfs. The fisheries flow would serve as the absolute minimum flow. As discussed above, flow recommendations may change as new information becomes available. Baseflow downstream from the powerhouse would be equivalent to inflows to the system (reservoir inflow plus springs), and would not vary substantially on a daily basis. Portions of these flows would be supplied from the dam (via Segment 1 baseflows). Flow recommendations would potentially change as new information and new methods of modeling discharge-habitat relationships are applied, such as will occur during the FERC relicensing process.

Average daily flow data from water years 1994, 1996, and 2000 suggest that flows in excess of 1,500 cfs would persist until approximately the end of June in wet years and through the end of May in average years, and may not occur at all in dry years. Even when flows recede to less than 1,500 cfs, baseflows would not be less than 625 or 525 cfs (the minimum discharge depends on the time of year). In this alternative, a substantial portion of baseflow for Segments 2 and 3 would be supplied from Segment 1, rather than from the powerhouse, especially during late winter and spring when baseflow releases from the dam would be highest.

Peak flows in Segments 2 and 3 would be much like they are at present. Flows in excess of about 3000 cfs would occur for about two months in wet years, about a month in average years, and perhaps not at all in dry years. Operations of J.C. Boyle facilities would no longer substantially reduce the magnitude or duration of flood peaks, although peak flows would continue to be affected by flow regulation in the upper basin. The onset and recession of flood peaks would be much more gradual than at present.

During late winter and early spring of wet water years, releases from the powerhouse would likely be at, or above, 3,000 cfs, and power generation would be maximized. In average water years, geomorphic flow releases from the dam would reduce the volume of water available for hydroelectric generation.

As there could be some situations when peaking occurs, During the FERC process the Department of the Inteior would recommend that the ramp rate during the transition from baseflow, to peaking, be reduced from the current rate of 9 inches of stage per hour. This would help to reduce daily discharge fluctuations.

If implemented, recommendations regarding irrigation diversions operated by PacifiCorp in Shovel Creek and Negro Creek would add up to 15 cfs of baseflow to the lower portion of Segment 3 during portions of the year. Recommended operations of the diversions from the river would result in slightly higher flows during the summer months.

Cumulative Effects - River flows would continue to be regulated, but in a way that incorporates the geomorphically and ecologically important elements of natural flow regimes in all segments of the planning area.

Although flows in Segment 1 could still be depleted by diversions at J.C. Boyle Dam, baseflows would be enhanced and channel-forming peak flows would be more frequent and of longer duration.

The magnitudes of baseflows in Segments 2 and 3 would be higher than at present. Daily flows would be stable, and would mirror inflows to the reservoir and the accretions from the springs in Segment 1.

Alternative 4

Flow regimes proposed in this alternative focus on securing BLM water right claim flows in Segment 2 and recommending releases from J.C. Boyle Dam to support fisheries and recreation use.

A summary of instream flow regimes in Alternative 4 (including recommendations for Segment 1) is depicted in Table 5-6.

Segment 1 - The BLM would recommend that baseflows be increased in this reach. The final baseflow recommendation will be based on both recreation and fisheries objectives. Flow studies proposed for the FERC relicensing process would determine appropriate minimum flows needed for recreational kayaking or rafting of this river reach. Scheduled recreation releases would enhance overall whitewater opportunities on the river. Any increase above the minimum 100 cfs would improve fisheries and recreational fishing. Baseflows would persist for large portions of any given year. Due to regulation at the dam, there would be little seasonal variation in baseflows in the upper portion of Segment 1. Downstream from the springs, baseflows would be higher in winter than in summer.

Peak flows would occur when the capacity of the flume and powerhouse is exceeded during periods in winter and spring. Generally, this would occur in average and wet water years, but not in dry water years. Spill from the reservoir into Segment 1 would occur at similar frequencies and durations as at present. While instream flow releases from the dam may make more storage capacity available in J.C. Boyle Reservoir during summer, such releases would likely not cause any change in operations during the periods when high flow events necessitate spilling from the dam into Segment 1.

Rates of change as flow increase from baseflow to peak flow events (spill) would not be altered from current conditions. The BLM would recommend that rates of change be more gradual as flows recede from peak flows to baseflow, in order to prevent fish stranding and to allow processes that shape channel and riparian features to occur.

Segments 2 and 3 - Streamflow regimes designed to enhance the recreation and scenic ORVs and maintain the fisheries ORV would be pursued by the BLM as stated in water right claims amended in 1999. In addition, the BLM would recommend that the timing and magnit ude of releases at J.C. Boyle Powerhouse be adjusted to enhance recreational boating opportunities. As discussed above, flow recommendations may change as new information becomes available.

Baseflows in the river downstream from the powerhouse would increase from 300 cfs to, at a minimum, 625 cfs from April 1 to June 15, and 525 cfs for other periods. Were recreation flows to be released according to the existing claim, baseflow would be 1,500 cfs from Memorial Day to Labor Day.

Peak flows in Segments 2 and 3 would be much like they are at present. Flows in excess of about 3000 cfs would occur for about two months in wet years, about a month in average years, and perhaps not at all in dry years. The duration of peak flows would continue to be artificially curtailed by operation of the J.C. Boyle Dam and other upstream dams. Increased release of water from J.C. Boyle Reservoir (to meet instream flow requirements) would increase the amount of active storage and thus lead to dampening of flood peaks relative to current conditions, but not by any significant amount.

The abrupt onset of water spilling from the dam would be reflected in rapid transitions from 3,000 cfs to flood peaks in excess of 11,000 cfs, with occasional shifts of up to nearly 3,000 cfs over a 30 minute period (as was recorded in January 1997).

Power generation would continue to cause daily streamflow fluctuations (see Figure 5-1). In fall, early winter, and late spring of average water years, flows would vary between baseflow and 3,000 cfs on an almost daily basis. During late winter and early spring, baseflows would be regulated at approximately 3,000 cfs to provide maximum power generation. During summer months, flows would vary between baseflow and 1,500 cfs on an almost daily basis, with flows up to 3,000 cfs occurring on some weekends.

In wet years, flows would be at or above 3,000 cfs for about two months during late winter and early spring. Flows during summer and fall either would be at or above 1,500 cfs (through about the end of June) or would fluctuate between baseflow and 1,500 or 3,000 cfs on a daily basis.

In dry years, average daily flows would be near 1,500 cfs, with fluctuations from baseflow to 3,000 cfs through early winter. Average daily flows from late winter through summer would be less than 1,000 cfs, and as low as 500 cfs in mid-summer. Ramping from baseflow to 1,500 cfs would occur, though for shorter durations than in average or wet years. The timing and duration of flow releases from the powerhouse would optimize whitewater rafting opportunities by reaching flow levels of 1,500 cfs by 9:00 AM. These flows would persist for about four hours, and would be scheduled to run from Memorial Day weekend to Labor Day weekend.

During the FERC relicensing process, the Department of the Interior would recommend that the ramp rate during the transition from baseflow to peaking be reduced from the current rate of nine inches per hour. When peaking occurred, the length of time required to complete transitions from baseflow to peaking flows would be increased (even though the difference between daily maximum and minimum flows would be reduced).

Cumulative Effects - The flow regime in all segments of the river would continue to be highly regulated, but would provide a greater range of recreational opportunities.

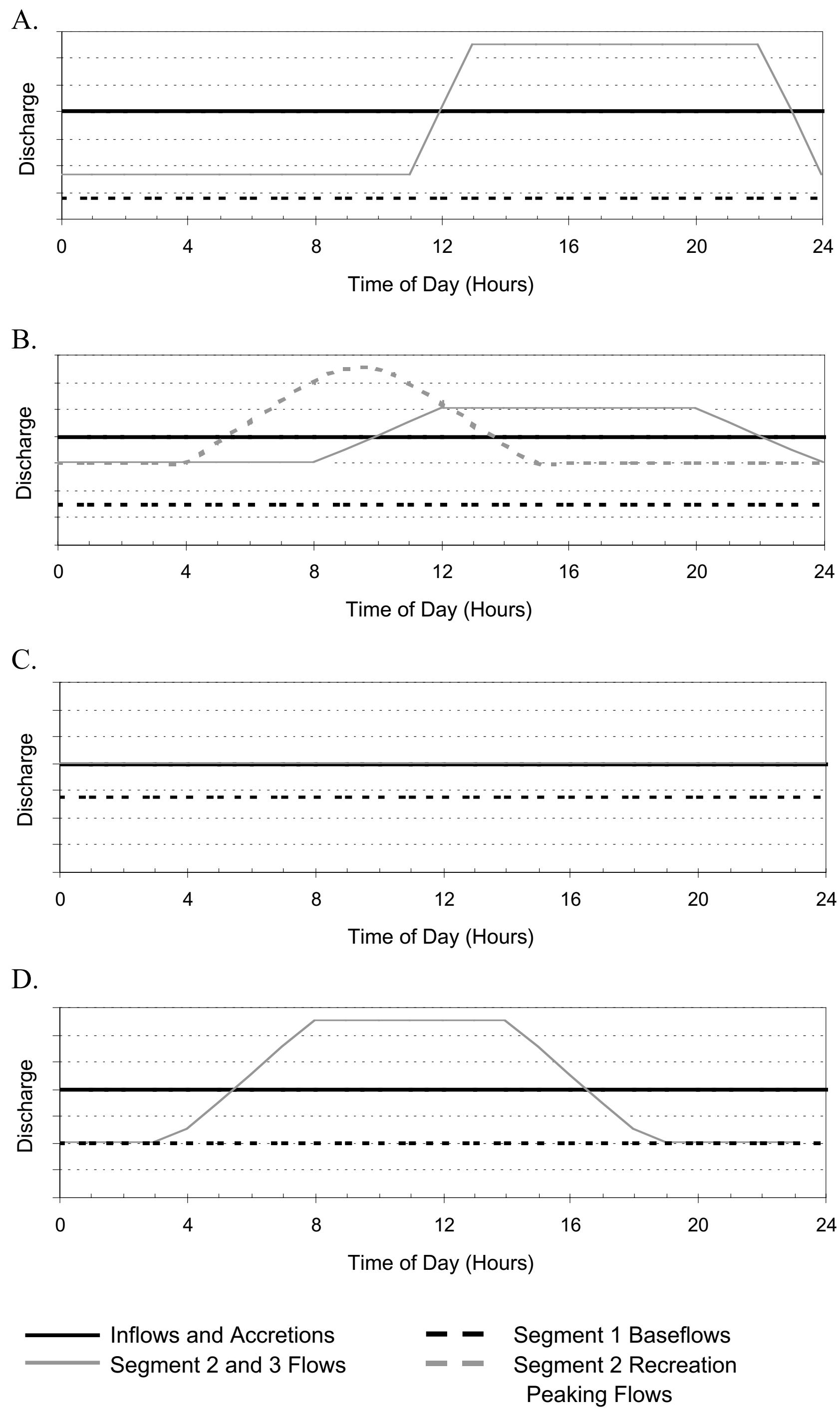
Baseflow in Segment 1 would continue to be depleted by diversions to the powerhouse. Recommended baseflow releases at the dam would benefit recreation users and the fishery.

The magnitudes and durations of baseflows in Segments 2 and 3 would be higher and longer than at present, especially during early summer. The release of water to fulfill instream flow claims would affect the timing of power generation. Although the magnitude of difference between daily maximum and minimum flows and the ramp rate would be reduced, ramping at the powerhouse would continue to cause daily flow fluctuations of greater frequency, higher magnitude, and at greater rates of change than would occur elsewhere on the Klamath River.

Table 5-7.–Hydrologic units within the planning area

Analysis Catchment		Subwatershed (6th-field hydrologic unit)		Watershed (5th-field hydrologic unit)	
Name	**Area (Sq. mi)**	**Name**	**Percent of Subwatershed within Planning Area**	**Name**	**Percent of Watershed within Planning Area**
Segment 1	2.3	Topsy Frontal	*(Watershed Boundary Lines are being Finalized)*	Middle Upper Klamath River	15%
Upper Segment 2 (NW)	3.0	Stateline Frontal			
Upper Segment 2 (SE)	3.0				
Way Creek	3.1				
Lower Segment 2	5.7				
Upper Segment 3	3.9				
Hessig Creek	2.4				
Hayden Creek	1.3	Hayden Creek	2%		
Shovel Creek	3.6	Shovel Creek	7%	Klamath River - Copco	5%
Lower Segment 3	2.6	Deer Creek Frontal	6%		

Figure 5-1.– Conceptual daily hydrographs - Conceptual daily hydrographs for Segments 2 and 3 associated with Alternatives 1 through 4 (A through D, respectively). These hydrographs were developed to be representative of summer average daily flows.



Tributary Streamflows

Assumptions

Potential cumulative effects to streamflow resulting from management actions were analyzed by dividing the planning area into 10 "analytical catchments." About a third of the planning area is within the watersheds of prominent tributary streams, such as Hayden Creek or Shovel Creek, and catchments for these streams represent the portion of the stream's watershed that is within the planning area. The remainder of the planning area was divided into catchments based roughly on river segment boundaries.

Most streams that are tributary to the Klamath River within the planning area do not originate within the planning area boundaries, and in many cases only a small portion of a tributary's drainage area is within the planning area (Table 5-7). Thus, tributary streamflows are affected more by upper watershed processes than by activities within the planning area. It is assumed for this analysis that land use in the upper portion of tributary watersheds will not change significantly over the life of this plan, and that upper watershed contributions to tributaries within the planning area also will not change substantially.

Because roads are more likely to hydrologically impact streams when they are close to the watercourses, road treatments in the riparian areas of tributary streams will potentially have a much greater relative effect on flow in these streams than will road treatments throughout the planning area as a whole.

The relative effects of management actions on streamflow would likely be higher in small drainages than in large drainages. In small drainage areas, there is a greater chance that a single treatment or series of treatments would extend over a substantial portion of the drainage area. Additionally, summer thunderstorms can have highly localized precipitation patterns that can affect a substantial portion of small drainage areas, and the extent of floodplain areas and wetlands that can buffer runoff events generally is less in small basins than in large basins (Naiman et al. 1992).

It is assumed that proposed management actions regarding recreation, cultural, and wildlife resources, as well as land tenure, would not affect runoff generation and tributary streamflow. The effects of altered flow regimes (such as higher baseflows or increased peak flows) on riparian vegetation, water quality, and fish habitat are discussed in the respective sections of this document.

Impacts Common to All Alternatives

Scenery Management - In order to improve scenery, small areas may be prioritized for vegetation management actions other than those discussed in the Vegetation Management section. These treatments would be limited in scope and extent, and would not be expected to affect streamflow. Areas affected by these treatments would contribute negligibly to cumulative effects.

Road Management - There would be no substantial change in road densities in several minor catchments. Road runoff into streams in these catchments would be reduced through spot or contiguous road improvements, and in Alternatives 2 and 3, more extensive seasonal or administrative use closures.

Road decommissioning, obliteration and improvement would lead to decreased runoff from roads during high intensity precipitation events and snow melt. Infiltration capacity would increase on obliterated roads (Luce 1997). This would decrease overland flow and theoretically increase baseflow.

Hydrologic flow paths could continue to be diverted by roads that are decommissioned, but to a lesser degree than currently occurs.

Vegetation Management - The objective of many proposed vegetation treatments is to restore conditions to within the natural range of variability. So long as these objectives are achieved and management actions do not result in severe or irreversible impacts to soils, long-term changes in flow regimes in small streams as a result of these actions would be within the range of natural channel-forming flows that have occurred in the past.

Following removal of vegetation, baseflow could increase in the short-term due to decreased transpiration demand. In stands that are thinned, increased use of water by remaining trees may negate the expected increase in water available for streamflow (Chamberlain et al. 1991). In areas where only one treatment is proposed, or where treatments will be infrequent (i.e., decades will pass between treatments) the effect on baseflow will eventually diminish (Jones 2000). In areas where community types will be altered and then maintained through fire or successive treatments (such as in oak woodlands, mixed conifer forests, and dry meadows), increases in baseflow may persist for longer periods.

Discharge from springs could increase temporarily following removal of upslope vegetation (McCarthy and Dobrowlowski 1999). This response would occur only in those springs that have fairly shallow recharge zones, as springs with deeper recharge zones would be less likely to be affected by actions within the planning area. The potential for increased water yield would be reduced by increased use of water by remaining vegetation, or re-invigorated understory communities (Chamberlain, et al. 1991; Eddleman and Miller 1991).

Most peak streamflow events in tributaries within the planning area occur as a result of snow melt, and the highest likelihood of elevated streamflows in response to proposed actions would be in areas that have southerly aspects, shallow soils, and extensive (generally, greater than on tree height) canopy openings created by proposed actions. Were they to occur, elevated peak flow magnitudes would persist until canopy closure recovers, which could take one or more decades (Harr 1976; Jones and Grant 1996).

Although slope and soil conditions favorable to runoff generation are common in the planning area, only those treatments occurring within oak and mixed conifer communities would be likely to create new openings large enough to affect snow melt. Most mixed conifer communities occur on north aspects, so treatments in these areas would have less potential to cause changes to snow melt processes.

Short-term increases in peak flows could occur as a result of the impacts of vegetation removal, prescribed fire, and mechanical equipment on soil properties. Following removal of vegetation that intercepts rainfall, the impact of raindrops can dislodge fine soil particles, which then fill pores and reduce soil infiltration rates (Dunne and Leopold 1978). Development of water repellant (hydrophobic) soil conditions that can cause overland flow generation would be most likely following intense wildfire in mixed brush and dry meadow communities. However, this effect can also occur from use of prescribed fire if fuels are very heavy and excessively high soil temperatures result. Infiltration capacity in soils in oak communities can also be reduced following fire (Hester et al. 1997; Gottfried and DeBano 1988; McNabb et al. 1989).

Prescribed fire treatments would be designed to favor low to moderate intensity burn conditions. This could cause small (likely immeasurable) increases in the magnitude of peak flows. Recovery of peak flow regimes would likely occur within five years following low intensity prescribed fire and within 10 years following moderate intensity fire (DeBano et al. 1996), depending on pre-existing soil conditions and fuel loading.

Depending on the alternative, the risk of catastrophic wildland fire would be reduced by varying degrees as a result of proposed vegetation management actions. Were a large, high intensity fire to occur, significant peak flow responses would likely persist for longer than the effects of low intensity natural or prescribed fires (DeBano et al. 1996).

Soil disturbance could result from using mechanical equipment during project implementation. Detrimental impacts that could affect streamflow (such as compaction and development of ruts) will be minimized by restricting the use of equipment to slopes less than 35%, limiting the use of such equipment in areas with fragile soils (i.e., soils that do not have large amounts of coarse fragments and are thus more prone to compaction), and limiting operations within riparian reserves. If mechanical equipment is used while soil moisture is too high, excessive compaction could occur and cause increased runoff. Recovery from soils impacted during project implementation could slowly occur as a result of freeze-thaw processes and the growth of plant root systems. If effects are severe enough, mechanical scarification may be necessary.

Impacts of Specific Alternatives

(Refer to Maps 6, 17a thru 20a, 21 thru 24, and Appendix H)

Alternative 1

Road Management - Although this alternative has the lowest level of road decommissioning and obliteration, three of the analytical catchments that drain into Segments 2 and 3 would have substantially reduced road densities. Proposed road decommissioning and obliteration would likely reduce peak flows in the small streams within these catchments. The road within the riparian reserve of Chert Creek would be obliterated, eliminating the delivery of intercepted subsurface hillslope flow to the stream (see Map 17a).

Peak flows would also be reduced as a result of road improvements that disconnect road drainage features from stream crossings or that reduce the length of road surface or ditch flow paths (by installing cross drain culverts, for example). Road improvements near watercourses are limited in Alternative 1. Portions of Topsy Road and three other road segments (including roads in the Hayden Creek and Shovel Creek analysis catchments) would be improved, and the administrative use closures on roads in Segment 3 would continue. These actions will reduce peak streamflows by reducing runoff generation associated with deteriorated road conditions (such as ruts) and altered hydrologic flow paths.

The portion of the Chert Creek road that will be relocated out of the riparian reserve would likely be rebuilt in a mid-slope position. This new road segment could potentially intercept and divert subsurface flow paths, and could redirect surface runoff. Detrimental impacts to aquatic resources will be limited by implementing appropriate BMPs (such as installing closely spaced drainage features, or, if possible, outsloping the road surface).

The limited extent of road treatments in this alternative will produce fewer beneficial results than the more extensive actions proposed in Alternatives 2, 3, and 4.

Vegetation Management - Proposed actions may have a slight effect on the amount of water available for runoff in the small streams that drain into the river in this segment (see Map 21).

Discharge from a few springs in Segment 2 could potentially increase temporarily as a result of decreased transpiration following upslope vegetation treatments. Some small streams may experience enhanced or prolonged summer baseflow due to reduced transpiration.

The extent of vegetation treatments would likely not be sufficient to cause significant increases in peak streamflows.

Proposed vegetation management actions would reduce the risk of catastrophic wildland fire in some parts of the planning area, though less than in the other alternatives. Were a large fire to occur, peak flows caused by high runoff from hydrophobic soils could increase in small catchments until soils and vegetation communities recover.

Fisheries - The irrigation canal that intersects Hayden Creek immediately upstream from its mouth would not be altered. Flows from Hayden Creek are diverted into the canal and do not connect with the river except during high flow events.

PacifiCorp Facilities - The diversions from Shovel Creek and Negro Creek would continue to be managed as they are at present. Summer flows downstream from the diversion points will continue to be depleted by up to about 15 cfs (or about 75 percent of summer baseflow).

Cumulative Impacts - Discharge from a few springs in Segment 2 would potentially increase as a result of decreased transpiration following upslope vegetation treatments. Baseflows could increase (likely immeasurable) in some small streams as a result of decreased road runoff and decreased transpiration. Baseflows in larger streams would likely not increase substantially, and would remain depleted in the lower portions of Hayden, Shovel, and Negro Creeks (downstream from diversions).

Peak flows could increase (likely immeasurable) in several small streams due to vegetation management treatments, but there would likely be overall decreases in some small streams due to decreased road runoff. Peak flows in large streams would likely not be affected, given the modest extent of proposed vegetation treatments.

Alternative 2

Road Management - Road decommissioning and obliteration is more extensive in this alternative than in Alternatives 1 and 4, but less than in Alternative 3 (see Map 18a).

Four of the analytical catchments that drain into Segments 2 and 3 would have substantially reduced road densities. Proposed road decommissioning and obliteration would likely cause reduced peak flows in small tributary streams within these catchments. The relative impact of reduced road densities would be more pronounced in smaller catchments that do not have large upper watersheds contributing runoff during high flow events, and the effects of proposed road obliteration or relocation in the Hayden and Shovel catchments may not be noticeable.

The road adjacent to Chert Creek would be decommissioned and re-contoured, eliminating the delivery of intercepted subsurface hillslope flow to the stream. Similar effects would occur following the removal of the road that runs parallel to the upper portion of Hayden Creek and the relocation of portions of the road adjacent to Shovel Creek.

Peak flows would also be reduced as a result of road improvements that disconnect road drainage features from stream crossings, or that reduce the length of road surface or ditch flow paths (by installing cross drain culverts, for example). Road improvements near watercourses are fairly extensive in Alternative 2, and include improving roads throughout the planning area (including roads adjacent to Rock, Hayden, and Shovel Creeks), and continuing the regulated use closures on roads in Segment 3. These actions will reduce peak streamflows by reducing runoff generation associated with deteriorated road conditions (such as ruts) and altered hydrologic flow paths.

Vegetation Management - The extent of proposed actions may be sufficient to affect streamflows in many small streams in the planning area. The magnitude of these effects would increase as a greater percentage of a given stream's drainage area is treated (see Map 22).

Discharge from numerous springs in Segments 2 and 3 would potentially increase temporarily as a result of decreased transpiration following upslope vegetation treatments. Two of these springs flow directly into the river, while five of them flow into other fish-bearing streams (Frain, Hayden, and Shovel Creeks). The other springs do not drain directly into major streams.

Increased discharge from springs and reduced transpiration demand would make more water available for baseflow in many small streams.

Treatments in dry meadow, mixed shrub, and oak communities are extensive in Segments 2 and 3. These treatments could cause short-term increases in runoff in the Hayden Creek, Shovel Creek, and Lower Segment 2 analytical catchments. Relative impacts to peak flow would be minor in Hayden Creek and Shovel Creek, considering the large watershed areas. Proposed vegetation management actions would reduce the risk of catastrophic wildland fire in large portions of the planning area.

Fisheries – The irrigation canal that intersects Hayden Creek immediately upstream from its mouth would be retrofitted so as not to divert natural streamflows. The mouth of Hayden Creek would no longer be dewatered during low flow periods.

PacifiCorp Facilities – It would be recommended that the diversions from Shovel Creek be managed to maintain wet meadows adjacent to the river in Segment 3 while also maintaining water quality and aquatic habitat downstream from the diversion points. Less water would be diverted from the creek, and diversions would occur primarily during high flow periods. More water would remain in the creek throughout the summer and fall, increasing baseflows during the low flow period.

The diversion in Negro Creek would be recommended for removal. This would increase summer baseflows in the lower portion of Negro Creek and, subsequently, in Shovel Creek (see Map 26).

Cumulative Impacts - Discharge from numerous springs in Segments 2 and 3 would potentially increase as a result of decreased transpiration following upslope vegetation treatments. Baseflows would likely increase in some small streams as a result of decreased road runoff and decreased transpiration. Baseflows in larger streams would likely not increase substantially, except in the lower portions of Hayden, Shovel, and Negro Creeks. In Shovel Creek and Negro Creek, baseflows could increase downstream from the existing diversions (though not as much as in Alternative 3).

Peak flows may increase in several small streams due to vegetation management treatments, but would likely decrease in small streams overall, due to decreased road runoff. Peak flows in large streams would likely not be affected, due to the limited extent of proposed treatments (relative to the total watershed area).

Alternative 3

Road Management - Proposed road decommissioning and obliteration projects are more extensive in this alternative than in any other (see Map 19a).

Five of the nine analytical catchments that drain into Segments 2 and 3 would have substantially reduced road densities. Proposed road decommissioning and obliteration would likely reduce peak flows in small tributary streams within these catchments. The relative impact of reduced road densities would be more pronounced in smaller catchments that do not have large upper watersheds contributing runoff during high flow events, and the effects of proposed road management actions on peak flows in Hayden Creek may not be noticeable.

The roads that run parallel to portions of Rock, Chert, and Hayden creeks would be obliterated, and portions of the road adjacent to Shovel Creek would be relocated away from the stream. These actions would eliminate or reduce the delivery of intercepted subsurface hillslope flow and road runoff to these streams.

Peak flows would be reduced as a result of road improvements that disconnect road drainage features from stream crossings, or that reduce the length of road surface or ditch flow paths (by installing cross drain culverts, for example). Road improvements near watercourses in Alternative 3 would be limited, though more extensive than in Alternative 1. These actions would be designed to reduce the generation of runoff on road surfaces and delivery of road runoff to watercourses, particularly along the Powerhouse road and Topsy Road, but also along Shovel Creek and the Panther Canyon road. These actions will reduce peak streamflows by reducing runoff generation associated with deteriorated road conditions (such as ruts) and altered hydrologic flow paths.

Vegetation Management - Although large portions of many analytical catchments will be affected by vegetation management actions, overall flow regimes in most large streams will not respond strongly because relatively small portions of their entire drainage basins are within the planning area. The extent of proposed actions may be sufficient to alter streamflows in many small streams in the planning area (see Map 23). Transpiration demand would be reduced across many catchments in the planning area. Baseflow in streams in Segments 2 and 3 would be enhanced or prolonged. Discharge from numerous springs in these segments would potentially increase temporarily as a result of decreased transpiration following upslope vegetation treatments. Two of these springs flow directly into the river, while five of them flow into other fish-bearing streams (Frain, Hayden, and Shovel Creeks). The remainder of the springs that could be affected, do not drain directly into major streams.

Treatments in dry meadow, mixed shrub, and oak communities are extensive in segments 2 and 3. These treatments would cause short-term increases in runoff in the Hayden Creek, Hessig Creek, Shovel Creek, and Lower Segment 2 analytical catchments. Relative impacts to peak flow would be minor in Hayden Creek and Shovel Creek. Due to the extent of proposed treatments relative to the area within its drainage basin, Hessig Creek would probably experience measurable increases in peak flows.

Fisheries - The irrigation canal that intersects Hayden Creek immediately upstream from its mouth would be retrofitted so as not to divert natural streamflows. The mouth of Hayden Creek would no longer be dewatered during low flow periods.

PacifiCorp Facilities - The irrigation diversions in Shovel Creek and Negro Creek would be recommended for removal. This would enhance summer baseflows in these streams by a total of approximately 15 cfs.

Cumulative Impacts - Discharge from numerous springs in Segments 2 and 3 would potentially increase as a result of decreased transpiration following upslope vegetation treatments. Baseflows would likely increase many small streams as a result of decreased road runoff and decreased transpiration. Baseflows in larger streams would likely not increase substantially in larger streams, except in the lower portions of Hayden, Shovel, and Negro Creeks. In Shovel Creek and Negro Creek, baseflows could increase substantially downstream from the existing diversions if recommendations regarding the PacifiCorp irrigation diversions are implemented.

Peak flows may increase (likely immeasurably) in several small streams due to vegetation management treatments, but would likely decrease in small streams overall, due to decreased road runoff. Peak flows in large streams would likely not be affected, due to the limited extent of proposed treatments (relative to the total watershed area).

Alternative 4

Road Management - Proposed road closure and decommissioning and obliteration projects are more extensive in this alternative than in Alternative 1, but much less than in Alternatives 2 and 3. Three of the nine analytical catchments that drain into Segments 2 and 3 would have substantially reduced road densities (see Map 20a).

Proposed road decommissioning and obliteration would likely reduce peak flows in small tributary streams within these catchments. The relative impact of reduced road densities would be more pronounced in smaller catchments that do not have large upper watersheds contributing runoff during high flow events, and the effects of decreased road densities on peak flows in Shovel Creek may not be noticeable. The roads that are parallel to portions of Rock Creek and Chert Creek would be obliterated, eliminating the delivery of intercepted subsurface hillslope flow and road runoff to this stream.

Peak flows would be reduced as a result of road improvements that disconnect road drainage features from stream crossings or that reduce the length of road surface or ditch flow paths (by installing cross drain culverts, for example). Road improvements near watercourses in Alternative 4 would be the most extensive of any alternative. Road improvements would be designed primarily to enhance access and visitor safety, and would not have beneficial impacts as great as in other alts. However, these projects would address documented resource damage (including flow path diversion and road-stream connectivity) and therefore would accomplish some reduction in runoff delivery to streams. This would reduce peak flows.

The portion of the Chert Creek road that would be relocated out of the riparian reserve would likely be rebuilt in a mid-slope position. This new road segment could intercept and divert subsurface flow paths, and could redirect surface runoff. Detrimental impacts to aquatic resources will be limited by implementing appropriate BMPs (such as installing closely spaced drainage features, or, if possible, outsloping the road surface).

Vegetation Management - The extent of proposed actions may be sufficient to slightly increase baseflow and peak discharge in some small streams in the planning area (see Map 24).

Transpiration demand would be reduced across many catchments in the planning area. Baseflow in streams in Segments 2 and 3 would be increased. Discharge from numerous springs in Segments 2 and 3 would potentially increase temporarily as a result of decreased transpiration following upslope vegetation treatments. Two of these springs flow directly into the river, while five of them flow into other fish-bearing streams (Frain, Hayden, and Shovel Creeks). The remainder of the springs that could be affected, do not drain directly into major streams.

Treatments in dry meadow, mixed shrub, and oak communities are extensive in Segments 2 and 3. These treatments could cause short-term increases in runoff in the Hayden Creek, Hessig Creek, Shovel Creek, and Lower Segment 2 analytical catchments. Relative impacts to peak flow would be minor in Hayden Creek and Shovel Creek given the larger drainage areas. Due to the extent of proposed treatments relative to the area within its drainage basin, Hessig Creek would probably experience measurable increases in peak flows.

Fisheries - The irrigation canal that intersects Hayden Creek immediately upstream from its mouth would be retrofitted so as not to divert natural streamflows. The mouth of Hayden Creek would no longer be dewatered during low flow periods (see Map 28).

PacifiCorp Facilities - It would be recommended that the diversions from Shovel Creek and Negro Creek be managed to maintain irrigated meadows adjacent to the river in Segment 3 while also maintaining water quality and aquatic habitat downstream from the diversion points.

Cumulative Effects - Discharge from numerous springs in Segments 2 and 3 would potentially increase as a result of decreased transpiration following upslope vegetation treatments. Baseflows would likely increase in some small streams as a result of decreased road runoff and decreased transpiration. Baseflows in larger streams would likely not increase substantially, although minor increases may occur in Hayden, Shovel, and Negro creeks
It is likely that peak flows would increase slightly in several small streams, due to the combined effects of vegetation management actions and the maintenance of an extensive road network. Peak flows in large streams would likely not be affected, due to the limited extent of proposed treatments (relative to the total watershed area).

Mainstem Klamath River Water Quality

Assumptions

Proposed recreation, road, cultural resource, vegetation, and wildlife management actions would not have a significant effect on overall water quality in the river, therefore the following discussions do not cover individual resource topics like other sections of this EIS. Effects to tributary water quality (discussed later) may affect mixing zones that occur where tributaries enter the river.

The primary controlling variables on water quality in the river within the planning area are upstream conditions and streamflow. Nutrient dynamics within Upper Klamath Lake and reservoirs associated with hydroelectric generation affect numerous water quality parameters within the planning area, including nutrient loading, dissolved oxygen (DO), pH, and chlorophyll-a.

Although various data sets describe conditions within the planning area (refer to Chapter 2), there is little information regarding the relationships between streamflow and water quality dynamics that occur within J.C. Boyle Reservoir, in Segment 1, and downstream from the powerhouse. Because of this and because the streamflows that would occur in each alternative are uncertain and can only be described conceptually, the following analysis is rather general.

For the following discussion, the relationship between streamflow and water temperature was analyzed using data from the summer of 2001. Water temperature measurements at the USGS J.C. Boyle gage were collected every hour for 60 days between mid-July and mid-September (Prendergast, pers. comm., 2001).

Impacts Common to All Alternatives

The Oregon DEQ, California SWRCB, BLM, and other agencies and stakeholders have begun initial work on TMDLs that would include the planning area. The BLM is committed to the TMDL process as a means of improving water quality and will develop and implement a Water Quality Restoration Plan.

The Oregon DEQ is in the process of finalizing Total Maximum Daily Load allocations for external phosphorous loading into Agency and Upper Klamath Lakes. Reduced external phosphorous loading in Upper Klamath Lake would reduce algal biomass, resulting in improvements in water quality in Upper Klamath Lake (namely, less frequent and less severe algal die-offs, increased DO, decreased pH, and decreased chlorophyll-a abundance) (ODEQ 2001). Improvements in lake conditions would lead to similar improvements in water quality in reservoirs and river segments downstream from Link River Dam, including J.C. Boyle Reservoir and the portion of the river within the planning area. River segments upstream from the planning area would, however, continue to receive irrigation return flows which would likely have high concentrations of nutrient and high pHs, and would affect water quality in the planning area.

Stabilization of the emergency overflow spillway would occur in all alternatives (in Alternative 3, removal of the spillway could occur), and would result in decreased scour of bedrock and colluvium at its outfall. This would reduce the supply of fine sediment to the river.

No proposed action would cause continuous or long-term increases in turbidity within the river. Proposed instream restoration treatments could make fine sediment and organic matter available for transport. Appropriate BMPs would be implemented to minimize detrimental impacts associated with these projects (KFRA RMP page F-39). The volume of material available for transport, either, suspended or dissolved, would have a small and short-lived impact on turbidity.

As a component of the FERC relicensing process, numerous stakeholders are participating in the design and implementation of studies that will determine, among other things, the effect of the Klamath Hydroelectric Project on water quality. State water quality agencies will determine (through the Clean Water Act Section 401 evaluation process) whether the presence and operation of project facilities prevents attainment of water quality standards. The use of improved technologies and practices and/or mitigation may be required to minimize or eliminate adverse impacts from the project (DeVito, pers. comm.). Such actions would address water quality impairments in the planning area that are attributable to the hydroelectric project.

Impacts of Specific Alternatives

(Refer to Maps 6, 17a-20a, 21-24, and Appendix H)

Alternative 1

Streamflows - If implemented, flow regimes recommended by the BLM would result in slight reductions in the retention time of water stored in J.C. Boyle Reservoir. These reductions would be most profound in dry water years, when instream flow releases at the powerhouse would affect daily cycles of reservoir filling (refer to the discussion of Klamath River streamflow), and could potentially affect nutrient loading in downstream segments, although the effect of retention time on rates of within-reservoir nutrient cycling is uncertain (Campbell 1999).

Current baseflow releases at the dam (100 cfs minimum, per FERC license) would continue and would have low thermal mass and slow travel times (relative to other alternatives). Summer water temperatures downstream from the dam would range from about 64 to 75 degrees Fahrenheit. Warming of 1 to 2 degrees Fahrenheit occurs by the time flows have traveled a few miles downstream [get location data for temperature logger from PC]. In this alternative, the cooling effect of inflows from the springs located at RM 223would be strongest, and would reduce water temperatures to between about 55 to 62 degrees Fahrenheit by the time flows reach the downstream end of Segment 1 (Prendergast 2001; PacifiCorp 1996).

Increased baseflows downstream from the powerhouse would result in reductions in daily maximum temperatures and increased daily minimum temperatures, primarily as a result of increased thermal mass during low flow periods. Powerhouse operations would continue to accentuate the magnitude and rate of change of daily temperature fluctuations, as described in Chapter 2. Depending on the cycle of storage and release in J.C. Boyle Reservoir, reduced retention times could lead to reduced warming of stored water, and therefore reduced temperatures downstream from the powerhouse.

The water quality of flows released at the powerhouse is similar to that of flows released from the dam. During periods when baseflows of 1,500 cfs are released, water temperatures at the powerhouse would range from about 62 to 72 degrees F. Water temperatures would increase by about 2 to 5 degrees Fahrenheit between the powerhouse and the downstream end of Segment 3. Increased flows relative to current conditions would decrease travel time and, consequently, the magnitude of warming due to exposure to ambient air temperatures and solar radiation.

In all segments, the growth rates of algae would eventually be reduced due to decreased nutrient loading in waters discharged from Upper Klamath Lake. Low flows exacerbate conditions that favor the growth of planktonic and benthic algae. Filamentous algae would continue to grow in relative abundance in Segment 1, and would not be scoured from the riverbed in this segment on an annual basis. The abundance of algae in Segments 2 and 3 could decline due to increased baseflows, which would result in increased water depth and decreased exposure to sunlight.

Levels of DO in Segment 1 would not be affected by proposed actions in this alternative. Increased baseflow downstream from the powerhouse would likely lead to increased flow velocities, increased turbulent aeration, and increased DO concentrations in Segments 2 and 3. Reduced maximum daily water temperatures would result in higher minimum DO levels.

Watershed Restoration - No instream restoration is proposed in this alternative, and channel configurations would remain unchanged or would continue to be negatively impacted by the presence and operation of the hydroelectric project. High width to depth ratios, numerous secondary channels, and thin or absent mantles of alluvial material would continue to adversely affect the rate of temperature increases as water flows through the planning area.

Cumulative Effects - Nutrient loading in the river would decrease over time due to improvements in the quality of water released from Upper Klamath Lake. Temperature regimes in Segment 1 would not change and there would continue to be a steep temperature gradient at the powerhouse.

Extreme fluctuations in temperature downstream from the powerhouse would be reduced. Increased baseflow releases from the powerhouse would increase the proportion of reservoir water to spring water, and could lead to slight increases in water temperature. Warming downstream from the powerhouse would be reduced, though not as much as in other alternatives.

Algae abundance would remain high. DO levels would increase in Segments 2 and 3.

Alternative 2

Streamflows - If implemented, flow regimes recommended by BLM would result in reductions in the retention time of water stored in J.C. Boyle Reservoir. These reductions would be most profound in dry water years, when instream flow releases at the dam and at the powerhouse would affect daily cycles of reservoir filling (refer to the discussion of Klamath River streamflow). This could potentially affect nutrient loading in downstream segments, although the effect of retention time on rates of within-reservoir nutrient cycling is uncertain (Campbell 1999).

Increased baseflows in Segment 1 would alter the balance between reservoir water and spring water in the lower portion of Segment 1. Reduced storage time in the reservoir would likely result in discharge of water that would be slightly cooler relative to current releases. More importantly, increased thermal mass would lead to decreased warming of this water as it flows downstream. The cooling effect of the springs would be reduced, thereby increasing water temperatures at the downstream end of Segment 1 and reducing the temperature gradient that occurs at the powerhouse. The magnitude of these effects would likely be less than in Alternatives 3 and 4.

Increased baseflows downstream from the powerhouse would cause increased daily minimum temperatures, primarily as a result of reductions in the relative proportions of spring inflow. Depending on the cycle of storage and release in J.C. Boyle Reservoir, reduced retention times could lead to reduced warming of stored water, and therefore reduced temperatures downstream from the powerhouse.

The magnitude of daily temperature fluctuations in Segments 2 and 3 would be reduced as a result of reduced flow fluctuations and increased baseflows. Mid-summer daily maximum temperatures would remain near 70 degrees Fahrenheit, but could be reduced slightly (as a result of decreased reservoir storage time). Daily minimum temperatures would be increased (due to the increased contribution of reservoir water). The rate of change between daily minimum and maximum temperatures would also be reduced as a consequence of the reduced ramp rate.

Water temperatures would increase by about 2 to 5 degrees Fahrenheit between the powerhouse and the downstream end of Segment 3. The rate at which water warms as it flows through these segments would be reduced due to increased thermal mass and reduced travel time.

In all segments, the growth rates of algae would eventually be reduced due to decreased nutrient loading in waters discharged from Upper Klamath Lake. Low flows exacerbate conditions that favor the growth of planktonic and benthic algae. Filamentous algae would continue to grow in relative abundance in Segment 1 (though at lower rates than in Alternative 1), and would not be scoured from the riverbed in this segment on an annual basis. The abundance of algae in Segments 2 and 3 could decline due to increased baseflows, which would result in increased water depth and decreased exposure to sunlight.

Levels of DO in Segment 1 would be affected by the release of recreation flows. Releases from the dam typically have low DO. Warmer flows in the lower portion of the reach would lead to lower DO levels, while slightly decreased algal productivity could result in higher available DO. The overall effect of proposed management actions and potential future actions upstream from the planning area is not known.

Increased baseflow downstream from the powerhouse would likely lead to increased flow velocities, increased turbulent aeration, and increased DO concentrations in Segments 2 and 3. Reduced water temperatures would also lead to increased DO levels.

Watershed Restoration - A moderate degree of instream restoration would occur in this alternative (see Map 26). Actions designed to restore channel conditions and/or reduce width-to-depth ratios are proposed for about 4.6 miles of the river. Localized treatments would restore channel features associated with bridge sites and irrigation diversions. The types of treatments proposed in secondary channels would not substantially affect water temperature.

The limited addition of gravel and CWD would create alluvial features that could beneficially affect water quality. Increased areas of gravel would lead to increased hyporheic flows, with consequent reductions in water temperature (Poole and Berman 2001). Interaction between flows, coarse sediment, and CWD would lead to pool formation and local decreases in warming rates.

An increased percentage of gravel and small cobbles within the substrate of the riverbed would lead to more frequent entrainment of particles during high flows. This disturbance mechanism would reduce the competitive advantage that some types of algae currently benefit from. This effect will be less profound in this alternative than in Alternative 3.

Beneficial effects associated with instream restoration would be greater than Alternatives 1 and 4 but less than Alternative 3. In all segments of the planning area, the reductions in width and increases in depth caused by the proposed combination of restoration actions would reduce thermal warming and reduce rates of temperature increases. Additionally, restoration actions would cause DO to increase and algae abundance to decrease.

Cumulative Effects - Nutrient loading in the river would decrease over time due to improvements in the quality of water released from Upper Klamath Lake.

Relative to current conditions, temperatures in the upper portion of Segment 1 would be reduced, temperatures downstream from the springs would be increased, and the temperature gradient at the powerhouse would be reduced. Warming rates would decrease throughout Segment 1.

The rate and magnitude of temperature fluctuations downstream from the powerhouse would be reduced. Increased baseflow releases from the powerhouse would increase the proportion of reservoir water to spring water, and daily minimum water temperatures would increase. Warming downstream from the powerhouse would be reduced, more so than in Alternatives 1 and 4 but less than Alternative 3.

Algae abundance would be reduced all segments. Levels of DO would likely increase in Segments 2 and 3, and may also increase in Segment 1.

Alternative 3

Streamflows - If implemented, flow regimes recommended by BLM would result in reductions in the retention time of water stored in J.C. Boyle Reservoir. These reductions would likely affect reservoir operations on a daily basis during all water year types. This could potentially affect nutrient loading in downstream segments, although the effect of retention time on rates of within-reservoir nutrient cycling is uncertain (Campbell 1999).

Flow releases at the dam would introduce more reservoir water into Segment 1. Reduced storage time in the reservoir would result in discharge of water that would be slightly cooler relative to current releases. Increased thermal mass and decreased travel times (relative to current conditions) would lead to decreased warming of this water as it flows downstream. Baseflow releases would be warmer than the water that is discharged from the springs at RM 223. The higher ratio of reservoir water to spring discharge would cause temperatures downstream from the springs to increase. As a result, the steep temperature gradient at the powerhouse would be reduced.

Increased baseflows downstream from the powerhouse would cause increased daily minimum temperatures, primarily as a result of reductions in the relative proportions of spring inflow. Depending on the cycle of storage and release in J.C. Boyle Reservoir, reduced retention times could lead to reduced warming of stored water, and therefore reduced temperatures downstream from the powerhouse. The magnitude of these effects would be greatest in this alternative.

The magnitude of daily temperature fluctuations in Segments 2 and 3 would be reduced as a result of reduced flow fluctuations and increased baseflows. Mid-summer daily maximum temperatures would remain near 70 degrees Fahrenheit, but could be reduced slightly (as a result of decreased reservoir storage time). Daily minimum temperatures would be increased (due to the increased contribution of reservoir water). The rate of change between daily minimum and maximum temperatures would approximate the rate at which temperature fluctuates due to changes in ambient air temperature and solar radiation inputs.

Water temperatures would increase by about 2 to 5 degrees Fahrenheit between the powerhouse and the downstream end of Segment 3. The rate at which water warms as it flows through these segments would be reduced due to increased thermal mass and reduced travel time. In all segments, the growth rates of algae would eventually be reduced due to decreased nutrient loading in waters discharged from Upper Klamath Lake. The abundance of filamentous algae would be reduced in Segment 1 as a result of increased water depths and annual scour by high flows. The abundance of algae in Segments 2 and 3 could decline due to increased baseflows, which would result in increased water depth and decreased exposure to sunlight. Overall, reductions in algae abundance would be highest in this alternative.

Levels of DO in Segment 1 would be affected by the release of baseflows. Warmer flows in the lower portion of the reach would lead to reduced solubility of DO. Slightly decreased algal productivity could result in higher available DO. The overall effect of proposed management actions and potential future actions upstream from the planning area is not known.

Increased baseflow downstream from the powerhouse would likely lead to increased flow velocities, increased turbulent aeration, and increased DO concentrations in Segments 2 and 3. Reduced water temperatures and would also lead to increased DO levels.

Watershed Restoration - An extensive instream restoration program is proposed in this alternative. Actions designed to restore channel conditions and/or reduce width-to-depth ratios are proposed for about nine miles of the river. Localized treatments would restore channel features associated with bridge sites and irrigation diversions (see Map 27).

Actions designed to reduce the frequency of flow through secondary channels would beneficially affect water temperature, primarily because the current configuration of these channels is such that, during low to moderate (about 300 to 1,500 cfs) flow conditions, flow through them is shallow and, in places, slow. The proposed actions would reduce warming associated with these conditions.

The restoration of coarse sediment and CWD regimes would create alluvial features that could beneficially affect water quality. Increased areas of gravel would lead to increased hyporheic flows, with consequent reductions in water temperature (Poole and Berman 2001). Interaction between flows, coarse sediment, and CWD would lead to pool formation and local decreases in warming rates. The extent of these actions is higher in this alternative than in Alternative 2, and much higher than Alternative 4.

An increased percentage of gravel and small cobbles within the substrate of the riverbed would lead to more frequent entrainment of particles during high flows. This disturbance mechanism would reduce the competitive advantage that some types of algae currently benefit from.

Beneficial effects associated with instream restoration would be greatest in this alternative. In all segments of the planning area, the reductions in width and increases in depth caused by the proposed combination of restoration actions would reduce thermal warming and reduce rates of temperature increases. Additionally, restoration actions would cause DO to increase and algae abundance to decrease.

Cumulative Effects - Nutrient loading in the river would decrease over time due to improvements in the quality of water released from Upper Klamath Lake.

Relative to current conditions, water temperatures in the upper portion of Segment 1 would be reduced, temperatures downstream from the springs would be increased, and the temperature gradient at the powerhouse would be reduced. Warming rates would be decreased throughout Segment 1.

The rate and magnitude of temperature fluctuations downstream from the powerhouse would be greatly reduced, and fluctuations due to powerhouse operations would be eliminated. Increased releases from the powerhouse would lead to increased daily minimum water temperatures. Reductions in warming downstream from the powerhouse would be greatest in this alternative.

Algae abundance would be reduced and DO levels would increase in all segments. These effects would be greatest in this alternative.

Alternative 4

Streamflows - If implemented, flow regimes recommended by BLM would result in slight reductions in the retention time of water stored in J.C. Boyle Reservoir. These reductions would be most profound in dry water years, when instream flow releases at the dam (on weekends) and at the powerhouse would affect daily cycles of reservoir filling (refer to the discussion of Klamath River streamflow). This could potentially affect nutrient loading in downstream segments, although the effect of retention time on rates of within-reservoir nutrient cycling is uncertain (Campbell 1999).

Recreation and fishery baseflow releases at the dam would introduce more reservoir water into Segment 1. Slightly reduced storage time in the reservoir would result in discharge of water that would be slightly cooler relative to current releases. Increased thermal mass would lead to decreased warming of this water as it flows downstream.

Baseflow and recreation releases would be warmer than the water that is discharged from the large springs at RM 223. The higher ratio of reservoir water to spring discharge would reduce the cooling effect that spring inflows have in Segment 1. As a result, the steep temperature gradient at the powerhouse would be reduced, though likely not as much as in Alternative 3.

Increased baseflows downstream from the powerhouse would result in slightly increased daily minimum temperatures, primarily as a result of reductions in the relative proportions of spring inflow. Depending on the cycle of storage and release in J.C. Boyle Reservoir, reduced retention times could lead to reduced warming of stored water, and therefore reduced temperatures downstream from the powerhouse. The magnitude of these effects would be about the same as in Alternative 1, and less than in Alternatives 2 and 3.

The magnitude of daily temperature fluctuations in Segments 2 and 3 would be reduced but not as much as in Alternatives 2 and 3. Mid-summer daily maximum temperatures would remain near 70 degrees Fahrenheit, but could be reduced slightly (as a result of decreased reservoir storage time). The rate of change between daily minimum and maximum temperatures would continue to be affected by ramping at the powerhouse, but would be reduced relative to current conditions.

Water temperatures would increase by about 2 to 5 degrees Fahrenheit between the powerhouse and the downstream end of Segment 3. The rate at which water warms as it flows through these segments would be reduced due to increased thermal mass and reduced travel time, but not as much as in Alternatives 2 and 3.

In all segments, the growth rates of algae would eventually be reduced due to decreased nutrient loading in waters discharged from Upper Klamath Lake. Low flows exacerbate conditions that favor the growth of planktonic and benthic algae. Filamentous algae would continue to grow in relative abundance in Segment 1 (though at lower rates than in Alternative 1), and would not be scoured from the riverbed in this segment on an annual basis. The abundance of algae in Segments 2 and 3 could decline due to increased baseflows, which would result in increased water depth and decreased exposure to sunlight.

Levels of DO in Segment 1 would be affected by the release of baseflows. Warmer flows in the lower portion of the reach would lead to reduced solubility of DO. Slightly decreased algal productivity could result in higher available DO. The overall effect of proposed management actions and potential future actions upstream from the planning area is not known.

Increased baseflow downstream from the powerhouse would likely lead to increased flow velocities, increased turbulent aeration, and increased DO concentrations in Segments 2 and 3. Reduced water temperatures would also lead to increased DO levels.

Watershed Restoration - A limited degree of instream restoration would occur in this alternative. Actions designed to restore channel conditions and/or reduce width-to-depth ratios are proposed for about 1.6 miles of the river. Localized treatments would restore channel features associated with bridge sites and irrigation diversions. The types of treatments proposed in secondary channels would not substantially affect water temperature (see Map 28).

Localized addition of gravel and CWD would create small extents of alluvial features that could beneficially affect water quality. Increased areas of gravel would lead to increased hyporheic flows, with consequent reductions in water temperature (Poole and Berman 2001). Interaction between flows, coarse sediment, and CWD would lead to pool formation and local decreases in warming rates.

An increased percentage of gravel and small cobbles within the substrate of the riverbed would lead to more frequent entrainment of particles during high flows. This disturbance mechanism would reduce the competitive advantage that some types of algae currently benefit from. This effect will be less profound in this alternative than in Alternatives 2 and 3, and could be negligible if the added material disperses and is embedded within a matrix of coarser fragments.

Beneficial effects associated with instream restoration would be greater than Alternative 1 but less than Alternatives 2 and 3. Limited reductions in width and increases in depth caused by the proposed combination of restoration actions would reduce thermal warming and reduce rates of temperature increases, primarily in Segments 2 and 3. Additionally, restoration actions would cause DO to increase and algae abundance to decrease.

Cumulative Effects - Nutrient loading in the river would decrease over time due to improvements in the quality of water released from Upper Klamath Lake.

Relative to current conditions, water temperatures in the upper portion of Segment 1 would be reduced, temperatures downstream from the springs would be increased, and the temperature gradient at the powerhouse would be reduced. Warming rates would be decreased, though not as much as in Alternatives 2 and 3.

The rate and magnitude of fluctuations in temperature downstream from the powerhouse would be reduced. Increased baseflow releases would lead to slight increases in water temperature. Warming downstream from the powerhouse would be reduced, more so than in Alternative 1 but less than in Alternatives 2 and 3.

Algae abundance would be reduced in all segments, though not as much as with Alternatives 2 and 3. Levels of DO would increase in segments 2 and 3, though not as much as with Alternatives 2 and 3.

Tributary Water Quality

Assumptions

Water quality parameters discussed in this analysis include turbidity, nutrients, water temperature, and dissolved oxygen.

Impacts to water quality tend to be cumulative within a watershed. Water quality degradation occurring at a downstream point will generally add to the effects of upstream degradation. As with streamflow, water quality in tributary streams within the planning area is affected by physiographic features and land management activities outside of the planning area.

Turbidity is a measure of the clarity of water, and is an indirect measure of suspended sediment and organic matter concentrations. Sediment is delivered to streams in the planning area from bank erosion, road runoff, and soil erosion from hillslopes. Sediment delivery from road surfaces is a function of surface type and condition, type and condition of road drainage features, and level of use (sediment production increases with increased use, especially during wet periods) (Reid and Dunne 1984). It is assumed that, for a given road, sediment production will be highest if the road is open year round, lowest if the road is open only for administrative access and relatively low if the road is seasonally closed.

Nitrogen is the primary nutrient of concern in the planning area. Nitrogen levels in surface water can increase following vegetation management actions, as breakdown of leaf litter is accelerated due to altered microclimates (sites are warmer and wetter following removal of overstory layers). Once vegetation is removed, the uptake of available nutrients is reduced and they are made available to surface water through leaching or soil erosion. Prescribed fire and wildfire can accelerate these processes through volatilization and ashfall deposition of organic material (Swanston 1991; DeBano et al. 1996).

The temperature of large streams is partly a function of the temperature and quantity of groundwater and tributary inflow, as well as factors such as air temperature, slope aspect, shading, channel geometry, and flow volume (Poole and Berman 2001, Larson and Larson 1996). Assuming no accretions of cold water, streams tend to warm as they flow, a result of heat exchange between the atmosphere and the water in the stream. Downstream shading does not substantially lower temperatures of streams warmed by upstream exposure, and water temperatures of large streams increase if small tributaries are exposed to solar radiation. Shading and hyporheic flows (subsurface flows through gravel) can reduce the rate of warming as water flows downstream (Poole and Berman 2001).

Temperature directly affects the amount of oxygen in water – the colder the water, the more oxygen it can hold. Warming of water will cause reductions in dissolved oxygen concentrations (ODEQ 2000). Too much fine organic debris in streams can also deplete oxygen levels, a result of oxygen use by microorganisms during decomposition. Dissolved oxygen levels are typically lowest in the summer, when water temperatures and microbial decomposition peak.

Bacterial contamination of surface water can occur as a result of livestock grazing or dispersed recreation use near streams. Fecal coliform does not directly affect the suitability of fish habitat, though it can promote algal growth. Contamination can be a potential health hazard in areas where water contact recreation occurs. Bacterial concentrations tend to peak during summer months when low flows combine with high recreation and grazing use.

Impacts Common to All Alternatives

Recreation Management - Development, use, and management of dispersed campsites near Topsy Creek, Frain Creek, and Shovel Creek would include falling of hazard trees and likely some firewood cutting. The overall impacts to stream shading and water temperature would be limited.

Trails built and/or maintained near streams and wetlands could provide a source of fine sediment if not properly located and maintained. Appropriate drainage features would be installed in order to address this concern.

Road Management - The density of roads that are open year-round in the Hayden Creek, Shovel Creek, and Hessig Creek catchments would be low (less than 0.1 miles per square mile in both). The year-round open road density would be less than or approximately equal to one mile per square mile in the Way Creek, Lower Segment 2, and Upper and Lower Segment 3 catchments, and would not vary substantially by alternative. Overall, the potential for sediment delivery from roads in these catchments would be relatively low compared to other portions of the analysis area (although some specific sites near streams could deliver sediment, depending on the alternative).

The installation of enlarged culverts along Frain Creek would reduce diversion of streamflow onto road surfaces and subsequently reduce sediment delivery. Because this creek has a small drainage basin, this action (in addition to other proposed actions that vary by alternative) would have a high likelihood of substantially reducing turbidity in this stream. The road parallel to the lower portion of Frain Creek would remain open in all alternatives (although on a seasonal basis in Alternative 3).

Sediment delivery to streams following road treatments (including decommissioning, obliteration, and treatments at stream crossings) may increase as a result of disturbances to road surfaces and ditches. These increases would occur primarily during the first few runoff events following treatment. Various types of road decommissioning would have different effects on sediment delivery to streams. Road decommissioning would not be likely to result in short-term increases, but would have the lowest likelihood of reducing sediment delivery in the long-term. Obliteration could lead to delivery of sediment pulses in the short-term, but would reduce sediment delivery in the long-term

Noxious Weeds - Label stipulations regarding the use of chemical agents for weed control will be followed, thereby minimizing the risk of introducing toxic chemicals into watercourses.

Vegetation Management – Some decreases of shading along seasonally intermittent or ephemeral streams would result from proposed vegetation management actions. The lack of flow during the summer period precludes the occurrence of detrimental effects to water temperature during the time when water temperature is of greatest concern. Likewise, detrimental impacts to summer DO in intermittent or ephemeral streams would be negligible.

With regards to the effects of vegetation management actions on water quality, actions can be grouped as either wetland restoration treatments, which would generally improve water quality, or upland vegetation treatments, which would have varying effects on water quality. It is assumed that actions within riparian reserves would be more likely to affect water quality than actions that occur further from watercourses.

Range Management – Channel adjustments to livestock and wild horse utilization of riparian vegetation can affect sediment delivery and water temperature. In all alternatives, proposed use levels, coupled with proposed exclosures, would limit these effects on BLM and PacifiCorp land. Restoration of channel features affected by past use is proposed in Alternatives 2, 3, and 4.

Some bacteria could be introduced into surface water from livestock use. The limited number of cattle on BLM land, combined with the livestock exclosure along Shovel Creek, reduces the occurrence of direct introduction of bacteria. Range use on private land in the planning area may introduce some bacteria into Rock and Way Creeks.

These treatments would potentially increase short-term surface runoff and delivery of sediment and nutrients to stream channels, especially in areas where fire is used to complement mechanical treatments. The relative effect of these impacts would be minimal in all of these streams, since the total drainage basin areas are much larger than the proposed treatment units or the proposed treatment units are limited in size. Increases in sediment or nutrient concentrations would be short-lived, since most of the effects of prescribed fire on the hydrological and chemical processes that affect water quality do not persist for more than a few years (Choromanska and DeLuca, 2001; McNabb et al., 1989; Gottfried and DeBano, 1988).

Impacts of Specific Alternatives

(Refer Maps 6, 21-24, and Appendix H)

The following discussions of impacts are not listed by individual resource topics as other sections of this EIS, but are consolidated into "Fish-Bearing Tributary Streams" and "Other Tributary Streams" (non-fish-bearing streams).

Alternative 1

Impacts to tributary stream water quality will result primarily from proposed road treatments and vegetation management actions.

Fish-Bearing Tributary Streams - Limited road treatments in Segments 2 and 3 would cause minor reductions in sediment delivery to Frain Creek, Rock Creek, Hayden Creek, Negro Creek, and Shovel Creek (see Map 17a).

Wetland restoration would occur upstream from the fish-bearing portion of Rock Creek. By restoring the infiltration capacity and vegetation communities in this meadow, and reducing vehicle traffic through the meadow, the role of the meadow as a sediment and nutrient sink (or storage area) would be restored. This would reduce the concentration of sediment and nutrients downstream. Increased groundwater recharge and eventual discharge, as baseflow would decrease downstream summer water temperatures.

Treatments likely to directly affect stream shading and water temperature are limited in Alternative 1. In the first ten-year period, about 90 acres of oak woodlands or mixed conifer woodlands would be thinned within the riparian reserves of fish-bearing streams. Limited thinning would occur adjacent to short segments of Hayden Creek, and along portions of Frain Creek and Rock Creek that are above the upper limit of fish use. Stream shading would be decreased along these streams, although physiographic characteristics (such as north aspects and/or steep canyon walls), the limited extent of treatments, project design features, and expected vegetation recovery would reduce the long-term risks of these actions to water temperature.

Increased baseflow from springs, meadows, and small tributary channels near the mouth of Hayden Creek could slightly increase summer baseflow in the lower portion of Hayden Creek. This would reduce summer water temperatures in this stream, especially since the aquifer discharge would have little opportunity for exposure to solar radiation and warming prior to entering this stream reach.

Dissolved oxygen concentrations in streams near vegetation treatment units could decrease as a result of a potential increase in water temperature or increased volumes of fine organic matter. As discussed above, expected temperature increases are minimal and would be short-lived. Project design features (such as no treatment zones and limited stream crossings) would limit the delivery of organic matter to stream channels. Reduced vegetation density in treatment units would reduce the delivery of fine organic matter via litter fall. No long-term detrimental effect on dissolved oxygen levels is expected as a result of proposed actions.

No toilets would be installed at existing recreation sites in this alternative. Nutrients and human waste could leach into surface water near recreation sites. This would potentially affect fecal coliform concentrations in Frain Creek and Rock Creek.

Other Tributary Streams - Road treatments would reduce sediment delivery into minor tributary streams. Relocation of the Chert Creek road would reduce sediment delivery to this stream in the long-term, though runoff from the proposed replacement road would be high for the first few years. The year-round open road density would be relatively high (but lower than in Alternative 4) in the frontal catchments along the river in Segment 1 and the upper portion of Segment 2.

Stream shading would be reduced along some streams that are tributary to the river in Segment 2. Canopy closure on about 80 acres near non-fish-bearing streams would be reduced by vegetation management actions. The effects of increased exposure on summer water temperature would be minimal, since many of these streams do not flow during the months when solar radiation is highest. In addition, the effect on steep north aspects of some of these streams would be limited, and vegetation recovery would further limit water temperature responses to decreased canopy closure.

No toilets would be installed at existing recreation sites in this alternative. Nutrients and human waste could leach into some streams in Segment 2 that have nearby dispersed campsites.

Cumulative Impacts - In the long-term, proposed actions would maintain or improve water quality in tributary streams.

Sediment delivery to tributary streams would decrease, but not as much as in other alternatives. Nutrient loading in streams could increase in the short-term, but would be reduced in the long-term in some streams. Projects designed to restore conditions in vegetation communities adjacent to streams could cause short-term increases in water temperatures, but are not as extensive in this alternative as in the others. Despite the limited extent of vegetation treatments, detrimental impacts to water temperature would not be offset by other proposed actions (as in Alternatives 2 and 3). Minimal effects to dissolved oxygen and bacterial concentrations are anticipated.

In Shovel Creek and Negro Creek, summer water temperatures and DO levels would continue to be detrimentally affected by irrigation withdrawals. In Hayden Creek, DO levels may decrease in the short-term (until peak flows flush excess organic matter from the stream) but may increase slightly in the long-term due to enhanced baseflows.

Alternative 2

Impacts to water quality would result primarily from proposed road treatments, vegetation management actions, in-stream restoration projects, and recreation developments or facility upgrades.

Fish-Bearing Tributary Streams - Road treatments in Segments 2 and 3 would reduce sediment delivery to Frain Creek, Rock Creek, Hayden Creek, Negro Creek and Shovel Creek. More extensive road decommissioning (relative to Alternatives 1 and 4) in these drainages would result in greater reductions in sediment delivery to stream channels. Large reductions in sediment delivery to Frain, Rock, and Hayden Creeks would occur when the native surface roads that cross or run parallel very closely to these streams are improved, decommissioned, or permanently closed (see Map 18a).

Wetland restoration would occur adjacent to the fish-bearing portions of Frain Creek and Hayden Creek, and upstream from the fish-bearing portion of Rock Creek.

Restoring the infiltration capacity and vegetation communities in the Rock Creek meadow, and reducing vehicle traffic through this meadow would restore the role of the meadow as a sediment and nutrient sink. This would reduce the concentration of sediment and nutrients downstream. Increased groundwater recharge and eventual discharge as baseflow would decrease downstream summer water temperatures.

Restored floodplain connectivity and function adjacent to Frain Creek and Hayden Creek would reduce the effects of peak flows on bank erosion rates and sedimentation. In addition, native vegetation communities in these meadows would capture fine sediments and enhance infiltration rates. Burning the meadows near Hayden Creek would likely reduce infiltration rates and increase runoff and sediment delivery in the short-term, until litter layers and soil properties recover. In order to minimize these effects, the burn will be done at a time that favors low intensity burn conditions, and revegetation will occur afterwards.

Treatments likely to directly affect stream shading and water temperature are more extensive in this alternative than in Alternatives 1 and 4, but are less extensive than in Alternative 3. About 470 acres of oak woodlands, mixed conifer woodlands, or riparian hardwood-mixed conifer woodlands would be thinned within the riparian reserves of fish-bearing streams (see Map 22).

Thinning would occur along short portions of fish-bearing reaches in Hayden and Rock Creek, and along more extensive segments of Negro Creek and Shovel Creek. In Frain Creek, Rock Creek, and Hayden Creek additional vegetation treatments would occur upstream from fish-bearing reaches. Stream shading would be decreased along these streams, more so than in Alternatives 1 and 4. Because the effects of proposed actions on water temperature would be greater in streams with south aspects and low topographic shading, Hayden Creek would have the greatest risk of increased summer water temperatures. Proposed treatments along Hayden Creek, as well as along Negro and Shovel Creeks, would be designed to restore the structure and function of mixed hardwood-conifer forests, including the conditions that favor establishment of streamside deciduous understory communities, while minimizing short-term adverse impacts to water quality.

The impacts of proposed vegetation management actions on water temperature in Hayden, Negro, and Shovel Creeks would be offset by other proposed actions that would enhance summer baseflow, reduce the use of diversions during low flow periods, and reduce channel width to depth ratios.

Increased baseflow from springs, meadows, and small tributary channels near the mouth of Hayden Creek could slightly increase summer baseflow in the lower portion of Hayden Creek. This would reduce summer water temperatures in this stream, especially since the aquifer discharge would have little opportunity for exposure to solar radiation and warming prior to entering this stream reach. In addition, the reconnection of Hayden Creek to its mouth would improve water quality in the stream segment downstream from the irrigation canal.

Baseflow would be higher in Negro and Shovel Creek, primarily as a result of removing or reducing the use of irrigation diversions. Summer flow downstream from these diversions would increase, thereby reducing the magnitude of temperature increases that occur downstream from the diversions.

Instream projects designed to reduce channel widths, increase pool depths, and increase storage of gravel and cobble substrate would reduce exposure to solar radiation and increase hyporheic flows, thereby reducing water temperatures.

Dissolved oxygen concentrations could decrease as a result of a potential increase in water temperature or increased volumes of fine organic matter. As discussed above, expected temperature increases would be offset or limited. Project design features (such as no treatment zones and limited stream crossings) would limit the delivery of organic matter to stream channels. Reduced vegetation density in treatment units would reduce the delivery of fine organic matter via litter fall. No effect on dissolved oxygen levels is expected as a result of proposed actions.

Toilets would be installed at existing or proposed recreation sites near fish-bearing streams in this alternative (see Map 14). Although use of these sites would likely increase, nutrients and human waste would be contained thus eliminating a potential source of contamination of water quality.

Other Tributary Streams - Extensive road decommissioning and improvements would reduce sediment delivery into tributary streams, especially Chert Creek. Turbidity and suspended sediment concentrations would decrease, although short-term increases as a result of disturbances to road surfaces and ditches may persist for the first few runoff events following treatment. The year-round open road density would be reduced (but less than in Alternative 3) in the frontal catchments along the river in Segment 1 and the upper portion of Segment 2.

Excluding vehicle use from wet meadows would improve hydrological and ecological functions, including their role as sediment and nutrient sinks. Infiltration into these meadows during runoff periods would provide a source of baseflow during summer months.

Stream shading would be reduced along some streams that are tributary to the river, primarily in Segments 2 and 3. Canopy closure on about 240 acres near non-fish-bearing streams would be reduced by vegetation management actions. The effects of increased exposure on summer water temperature would be minimal, since many of these streams do not flow during the months when solar radiation is highest. In addition, the steep north aspects of some of these streams would further limit water temperature responses to decreased canopy closure.

Toilets would be installed at existing or proposed recreation sites near one non-fish-bearing stream in this alternative. Although use of nearby sites could increase, nutrients and human waste would be contained thus eliminating a potential source of contamination of water quality.

Cumulative Impacts - Proposed actions would improve water quality in fish-bearing streams and, in the long-term, would maintain or slightly improve water quality in other tributary streams.

Sediment delivery to tributary streams would decrease markedly. Nutrient loading in streams could increase in the short-term, but would be reduced in the long-term. Projects designed to restore conditions in vegetation communities adjacent to streams could cause short-term increases in water temperature, though the risk of such impacts occurring would be reduced by implementation of other actions. In the long-term, summer water temperatures in tributary streams would stay about the same or decrease. Dissolved oxygen concentrations would stay the same or increase in the long-term. Minimal impacts to bacterial concentrations are anticipated.

In Shovel Creek and Negro Creek, summer water temperatures would decrease and DO levels would increase due to reduced irrigation withdrawals and instream restoration projects. In Hayden Creek, enhanced baseflows and stream restoration would cause reduced water temperatures (but less so than Alternative 3). Levels of DO in this stream may decrease in the short-term but would be increased in the long-term.

Alternative 3

Impacts to water quality would result primarily from proposed road treatments, vegetation management actions, in-stream restoration projects, and recreation developments or facility upgrades.

Fish-Bearing Tributary Streams - Road treatments in Segments 2 and 3 would substantially reduce sediment delivery to Frain Creek, Rock Creek, Hayden Creek, Negro Creek and Shovel Creek (see Map 19a). More extensive road decommissioning (relative to Alternatives 1 and 4) in these drainages would result in greater reductions in sediment delivery to stream channels. Large reductions in sediment delivery to Frain, Rock, and Hayden Creeks would occur when the native surface roads that cross or run parallel very closely to these streams are improved, decommissioned, or permanently closed. The closure of the road to the north of Frain Ranch to public use would reduce sediment delivery to the fish-bearing reach of Topsy Creek.

Wetland restoration would occur adjacent to the fish-bearing portions of Frain Creek and Hayden Creek, and upstream from the fish-bearing portion of Rock Creek. Public access to riparian areas near the mouth of Topsy Creek would be limited.

Restoring the infiltration capacity and vegetation communities in the Rock Creek meadow, and reducing vehicle traffic through this meadow would restore the role of the meadow as a sediment and nutrient sink. This would reduce the concentration of sediment and nutrients downstream. Increased groundwater recharge and eventual discharge as baseflow would decrease downstream summer water temperatures.

Restored floodplain connectivity and function adjacent to Topsy Creek, Frain Creek, and Hayden Creek would reduce the effects of peak flows on bank erosion rates and sedimentation. In addition, native vegetation communities in these meadows would capture fine sediments and enhance infiltration rates. Burning the Hayden Creek and Rock Creek meadows would likely reduce infiltration rates and increase runoff and sediment delivery in the short-term, until litter layers and soil properties recover. In order to minimize these effects, the burn will be done at a time that favors low intensity burn conditions, and revegetation will occur afterwards.

Treatments likely to directly affect stream shading and water temperature are most extensive in this alternative. About 540 acres of oak woodlands, mixed conifer woodlands, or riparian hardwood-mixed conifer woodlands would be thinned within the riparian reserves of fish-bearing streams (see Map 23).

Thinning would occur along short portions of fish-bearing reaches Rock Creek, and along more extensive segments of Hayden Creek, Negro Creek, and Shovel Creek. In Frain Creek, Rock Creek, and Hayden Creek additional vegetation treatments would occur upstream from fish-bearing reaches. Stream shading would be decreased along these streams, more so than in Alternatives 1 and 4. Because the effects of proposed actions would be greater in streams with south aspects and low topographic shading, Hayden Creek would have the greatest risk of increased summer water temperatures. Proposed treatments along Hayden Creek, as well as along Negro and Shovel Creeks, would be designed to restore the structure and function of mixed hardwood-conifer forests, including the conditions that favor establishment of streamside deciduous shrub communities, while minimizing short-term adverse impacts to water quality.

The impacts of proposed vegetation management actions on water temperature in Hayden, Negro, and Shovel Creeks would be offset by other proposed actions that would enhance summer baseflow, reduce the use of diversions during low flow periods, and reduce channel width to depth ratios. Alternative 3 would have the greatest extent of such actions.

Increased baseflow from springs, meadows, and small tributary channels near the mouth of Hayden Creek could slightly increase summer baseflow in the lower portion of Hayden Creek. This would reduce summer water temperatures in this stream, especially since the aquifer discharge would have little opportunity for exposure to solar radiation and warming prior to entering this stream reach. In addition, the reconnection of Hayden Creek to its mouth would improve water quality in the stream segment downstream from the irrigation canal.

The irrigation diversions from Negro and Shovel Creek would be recommended for removal. Summer flow downstream from these diversions would increase, thereby reducing the magnitude of temperature increases that occur downstream from the diversions.

Dissolved oxygen concentrations could decrease as a result of a potential increase in water temperature or increased volumes of fine organic matter. As discussed above, expected temperature increases would be offset or limited. Project design features (such as no treatment zones and limited stream crossings) would limit the delivery of organic matter to stream channels. Reduced vegetation density in treatment units would reduce the delivery of fine organic matter via litter fall. No effect on dissolved oxygen levels is expected as a result of proposed actions.

Use of recreation sites near Frain Creek and Topsy Creek would likely be reduced in this alterative. No toilets would be installed at existing recreation sites in this alternative, so even limited continued use of these sites could cause some leaching of human waste into these streams.

Other Tributary Streams - Extensive road treatments would reduce sediment delivery into tributary streams, especially Chert Creek. Motorized use in the planning area would probably decrease, further reducing sedimentation. Turbidity and suspended sediment concentrations would decrease, although short-term increases as result of disturbances to road surfaces and ditches may persist for the first few runoff events following treatment. This alternative would have the greatest reductions in year-round open road density in the frontal catchments along the river in Segment 1 and the upper portion of Segment 2.

Excluding vehicle use from numerous wet meadows would improve hydrological and ecological functions, including their role as sediment and nutrient sinks. Infiltration into these meadows during runoff periods would provide a source of baseflow during summer months, when infusion of cool water can most improve water quality.

Stream shading would be reduced along some streams that are tributary to the river, primarily in Segments 2 and 3. Canopy closure on about 360 acres near non-fish-bearing streams would be reduced by vegetation management actions. The effects of increased exposure on summer water temperature would be minimal, since many of these streams do not flow during the months when solar radiation is highest. In addition, the steep north aspects of some of these streams would further limit water temperature responses to decreased canopy closure.

No toilets would be installed at existing recreation sites in this alternative, so even limited continued use of sites near streams could cause some leaching of human waste into these streams.

Cumulative Impacts - Proposed actions would improve water quality in fish-bearing streams and, in the long-term, would maintain or improve water quality in other tributary streams.

Sediment delivery to tributary streams would decrease more in this alternative than in any other. Nutrient loading in streams could increase in the short-term, but would be reduced in the long-term. Projects designed to restore conditions in vegetation communities adjacent to streams could cause short-term increases in water temperature, though the risk of such impacts occurring would be reduced or offset by implementation of other actions. In the long-term, summer water temperatures in tributary streams would decrease. Dissolved oxygen concentrations would increase in the long-term. Minimal impacts to bacterial concentrations area anticipated.

Summer water temperatures and DO levels in Shovel and Negro Creeks would be beneficially affected by proposed actions. In Hayden Creek, enhanced baseflows and stream restoration would cause reduced water temperatures (more so than Alternative 2). Levels of DO in this stream may decrease in the short-term but would be increased in the long-term.

Alternative 4

Impacts to water quality would result primarily from road improvements and increased use of roads, vegetation management actions, and recreation developments or facility upgrades (see Maps 16, 20a, 24) .

Fish-Bearing Tributary Streams - Road treatments in Segments 2 and 3 would have a mixed effect on sediment delivery to fish-bearing streams. Road decommissioning and spot improvements would reduce sediment delivery to the lower portion of Frain Creek, Hayden Creek, Negro Creek and Shovel Creek, though not as much as in Alternatives 2 and 3 (see Map 20a).

Although road-stream crossings that cause sediment delivery would be improved, many of the proposed road improvements will not directly address sediment production. Increased traffic, more frequent maintenance, and installation of less permeable road surfaces could cause a net increase in sediment delivery to some fish-bearing streams (such as Topsy Creek and the headwaters of Frain Creek). Project design features would limit the delivery of sediment directly into fish-bearing streams.

Wetland restoration would occur adjacent to the fish-bearing portion of Frain Creek, and upstream from the fish-bearing portion of Rock Creek. Restored floodplain connectivity and function adjacent to Frain Creek would reduce the effects of peak flows on bank erosion rates and sedimentation. In addition, native vegetation communities in these meadows would capture fine sediments and enhance infiltration rates.

Restoring the infiltration capacity and vegetation communities in the Rock Creek meadow, and reducing vehicle traffic through this meadow would restore the role of the meadow as a sediment and nutrient sink. This would reduce the concentration of sediment and nutrients downstream. Increased groundwater recharge and eventual discharge as baseflow would decrease downstream summer water temperatures.

Treatments likely to directly affect stream shading and thus water temperature are less extensive in this alternative than in Alternatives 2 and 3. About 370 acres of oak woodlands or mixed conifer woodlands would be thinned within the riparian reserves of fish-bearing streams (see Map 24). No treatments would occur within the riparian hardwood-mixed conifer woodlands adjacent to Hayden, Negro, and Shovel Creeks. Without vegetation treatments, the composition of forested vegetation communities along Shovel and Negro Creeks could change to a denser condition that is more prone to catastrophic disturbance and consequent reductions in shade and CWD recruitment (Bragg 2000).

Thinning would occur along short portions of fish-bearing reaches in Hayden and Rock Creek. In Frain Creek, Rock Creek, and Hayden Creek additional vegetation treatments would occur upstream from fish-bearing reaches. Stream shading would be decreased along these streams, but to a lesser degree than in Alternatives 2 and 3. Because the effects of proposed actions would be greater in streams with south aspects and low topographic shading, Hayden Creek would have the greatest risk of increased summer water temperatures.

Reduced irrigation withdrawals and thus increased summer baseflows in Shovel Creek and Negro Creek would result in reduced warming rates downstream from the diversions and thus lower water temperatures.

Increased baseflow from springs, meadows, and small tributary channels near the mouth of Hayden Creek could slightly increase summer baseflow in the lower portion of Hayden Creek. This would reduce summer water temperatures in this stream, especially since the aquifer discharge would have little opportunity for exposure to solar radiation and warming prior to entering this stream reach. In addition, the reconnection of Hayden Creek to its mouth would improve water quality in the short stream segment downstream from the irrigation canal.

Dissolved oxygen concentrations could decrease as a result of a potential increase in water temperature or increased volumes of fine organic matter. As discussed above, expected temperature increases would be offset or limited. Project design features (such as no treatment zones and limited stream crossings) would limit the delivery of organic matter to stream channels. Reduced vegetation density in treatment units would reduce the delivery of fine organic matter via litter fall. In Shovel Creek and Negro Creek, reduced summer water temperatures would increase DO saturation levels. Overall, no long-term detrimental effects on dissolved oxygen levels are expected as a result of proposed actions, and DO in Shovel Creek and Negro Creek could increase.

Toilets would be installed at existing and proposed recreation sites near fish-bearing streams in this alternative. Although use of these sites would likely increase, nutrients and human waste would be contained thus eliminating a potential source of contamination of water quality.

Other Tributary Streams - Road treatments would reduce sediment delivery into minor tributary streams. Relocation of the Chert Creek road would reduce sediment delivery to this stream in the long-term, though runoff from the proposed replacement road would be high for the first few years. The year-round open road density in the frontal catchments along the river in Segment 1 and the upper portion of Segment 2 would be highest in this alternative, leading to the highest potential for sediment delivery from roads into streams.

Increased traffic, more frequent maintenance, and installation of less permeable road surfaces could cause a net increase in sediment delivery to streams that are crossed by the Powerhouse Road, Topsy Road, and other improved roads.

Excluding vehicle use from wet meadows would improve hydrological and ecological functions, including their role as sediment and nutrient sinks. Infiltration into these meadows during runoff periods would provide an enhanced source of baseflow during summer months. OHV use may impair the function of wet meadows that would not be exclosed.

Stream shading would be reduced along some streams that are tributary to the river, primarily in segments 2 and 3. Canopy closure on about 260 acres near non-fish-bearing streams would be reduced by vegetation management actions. The effects of increased exposure on summer water temperature would be minimal, since many of these streams do not flow during the months when solar radiation is highest. In addition, the steep north aspects of some of these streams would further limit water temperature responses to decreased canopy closure.

Toilets would be installed at existing and proposed recreation sites near one non-fish-bearing stream in this alternative (see Map 16). Although use of nearby sites could increase, nutrients and human waste would be contained thus eliminating a potential source of contamination of water quality.

Cumulative Impacts - Proposed actions would maintain or slightly improve water quality in fish-bearing streams and could degrade water quality in other tributary streams.

Sediment delivery to tributary streams would probably increase. Nutrient loading in streams could increase in the short-term, but would be reduced in the long-term in some streams. Projects designed to restore conditions in vegetation communities adjacent to streams could cause some increases in water temperatures. Detrimental impacts to water temperature would not be offset by other proposed actions (as in Alternatives 2 and 3). Minimal effects to dissolved oxygen are anticipated. Bacterial concentrations would be reduced.

In Shovel Creek and Negro Creek, summer water temperatures would decrease and DO levels would increase due to reduced irrigation withdrawals. Water quality in Hayden Creek would not be substantially improved or degraded by proposed actions.

Irreversible, Irretrievable, or Unavoidable Impacts

Proposed vegetation management actions in forested riparian areas and within riparian reserves would result in short-term decreases in shading of tributary streams and possible warming of water temperatures.

Aquatic Conservation Strategy Values

This section will address the type, location, and intensity of proposed management actions within riparian reserves, and will identify the cumulative effects of these actions on the functionality of the riparian reserve system within the planning area.

Riparian reserves apply only to federal land. In order to assess the relative effects of proposed actions on federal land and recommended actions on non-federal land, "riparian corridors" were delineated for non-federal lands within the planning area.

Refer to Appendix L for a more detailed description of how Riparian Reserves and ACS Objectives would be affected by proposed actions.

Assumptions

Because of the proximity of hydrologic features to one another in some areas, numerous types of riparian reserves overlap. In these situations, effects were discussed only for one type of reserve, in order to avoid "double counting" of effects. Reserve types were prioritized as follows: fish-bearing streams, non-fish-bearing streams, wetlands greater than one acre, wetlands less than one acre, and reservoirs. For example, a vegetation treatment proposed within the reserve of both a fish-bearing stream and a wetland less than one acre would be documented as an effect to the stream.

The overall extent of riparian reserves and riparian corridors in the planning area may be overestimated in this analysis. The extent and seasonality of every intermittent and ephemeral stream has not been ground-truthed. In order to maintain a "margin of safety" in this analysis, non-perennial streams were assumed to be intermittent (though some are likely ephemeral), and thus received a 140 foot buffer (equivalent to the height of one site potential tree). The reserves associated with fish-bearing streams and wetlands are mapped accurately.

The shape of riparian reserves often takes a linear form, following the transition from riverine and riparian environments to upland features. Proposed actions within reserves can be considered as points (such as campsites), lines (such as roads and trails), and polygons (such as vegetation treatment units). Linear and polygon features would have the most influence on the function of riparian reserves, since they would impact larger portions of the reserve system. Despite their relatively small areal extent, linear features would have a disproportionate impact on functions such as connectivity and CWD recruitment. Point features would not be expected to have large overall effects, but could affect local features, and in some cases could cause effects that perpetuate downstream.

Impacts Common to All Alternatives

If it is determined that proposed actions would prevent attainment of ACS objectives, management options to improve conditions would be developed. These could range from modifying proposed actions, to removing from consideration those proposed actions (or elements of proposed actions) that would prevent attainment. The appropriate management option depends on the condition and functionality of the rest of the planning area, the beneficial uses that occur, and the extent of other actions that restore processes to within the range of natural variability (Final SEIS, vol. II, page B-83).

Impacts of Specific Alternatives

(Refer to Tables 5-8 thru 5-14, Maps 25-28, and Appendix H)

Alternative 1

Riparian Reserves: Due to the limited scope of actions designed to restore riparian processes, this alternative is likely to maintain, rather than restore, the functionality of riparian reserves and other land near riparian features.

Recreation facilities would affect about 17 acres within riparian reserves (refer to Table 5-8), and only 4.0 miles of trail (refer to Table 5-9) which is a greater impact than Alternative 3 but less than Alternatives 2 and 4. No new sites would be constructed within riparian reserves. Nine acres would continue be directly impacted by hydroelectric facilities.

This alternative has the lowest level of road decommissioning and road improvements, and the highest open road mileage, within riparian reserves (refer to Tables 5-10a, 5-10b, 5-11a, 5-11b and 5-12). Although some of the roads that cause the most impacts to riparian reserves would be decommissioned or relocated, roads would continue to deliver runoff and sediment to watercourses, and would adversely affect the function of riparian reserves.

Vegetation treatments are proposed within the riparian reserves in order to improve stand condition and promote long-term health of the plant communities (refer to Table 5-13). Actions under this alternative will do little to improve riparian conditions.

The following summarizes the effect of management activities on the ACS Objectives. Refer also to Table 5-14 for a comparison of these effects.

ACS Objective 1 - Watershed and landscape-scale features: Some enhancement of the watershed level features and vegetative community would occur under this alternative. However, the rate of recovery would be the lowest when compared to the other three alternatives.

ACS Objective 2 - Spatial and temporal connectivity: Connectivity within the planning area would be restored somewhat, but overall would not be substantially improved relative to the current degraded condition.

ACS Objective 3 - Physical integrity: Channel configurations in the river would continue to be adversely affected by the current design and operation of the J.C. Boyle facility.

ACS Objective 4 - Water quality: Assuming the Upper Klamath Lake and scheduled Upper Klamath River TMDLs/WQMPs are implemented, water quality in the planning area would eventually improve. Overall, there would be slight improvements in certain water quality parameters, although important water quality concerns (and the effects of altered water quality on beneficial uses) in the planning area would not be comprehensively addressed.

ACS Objective 5 - Sediment regime: Although ongoing effects of the J.C. Boyle facility on coarse sediment supply and transport would not be addressed, the duration of peaking flows would be reduced and existing sediment regimes would generally be maintained or slightly improved.

*ACS Objective 6 - Instream flow*s: Flow regimes proposed in this alternative, while continuing to limit channel processes, would constitute a minor improvement over existing conditions.

Daily stage and discharge fluctuations associated with powerhouse operations would be highest in this alternative.

ACS Objective 7 - Floodplain inundation and water table elevation: Overall, the processes driving floodplain inundation and water table elevation would be maintained and no improvement would occur.

ACS Objective 8 - Plant communities: Riparian areas along tributary streams and in wet meadows would be maintained or restored. Riparian areas along the river would be maintained and would continue to resemble the existing communities.

ACS Objective 9 – Habitat: The proposed road treatments and increased based flows within the no-action alternative would be expected to maintain and potentially enhance the condition of existing habitats within the planning area. This alternative would do the least to enhance the connectivity (over both space and time) and condition of habitats within the planning area.

Alternative 2

Riparian Reserves: Actions proposed in this alternative would have a relatively high likelihood of maintaining or restoring riparian reserve functionality.

Twenty-five acres within riparian reserves would be impacted by recreation facilities, including five new sites within riparian reserves and over 17 acres would be inpacted by new trails (refer to Tables 5-8 and 5-9). Nine acres would continue to be directly impacted by hydroelectric facilities.

The extent of road decommissioning and obliteration in riparian reserves would be slightly less, but open road mileage would be almost double that in Alternative 3. Less road improvements would occur than in Alternative 4, but more would occur than in Alternatives 1 and 3 (refer to Tables 5-10a, 5-10b, 5-11a, 5-11b and 5-12).

Vegetation treatments are proposed within the riparian reserves in order to improve stand condition and promote long-term health of the plant communities (refer to Table 5-13). This alternative proposes a substantial increase over Alternative 1, and is second only to Alternative 3.

The following summarizes the effect of management activities on the ACS Objectives. Refer also to Table 5-14 for a comparison of these effects.

ACS Objective 1 - Watershed and landscape-scale features: Extensive enhancement of landscape scale features would occur under this alternative. The degree of proposed landscape scale treatments would be expected to result in increased recovery over actions proposed in Alternative 1, but less than those actions proposed in Alternatives 3 and 4.

ACS Objective 2 - Spatial and temporal connectivity: The lateral connectivity within riparian areas, and of riparian areas to adjacent upland areas, would be improved by road decommissioning and by stream crossing enhancements. Connectivity within the river would be enhanced, but fluctuating flows would limit the overall restorative benefits of proposed projects, both temporally and spatially.

ACS Objective 3 - Physical integrity: The physical integrity of the aquatic system in the river, including shorelines, banks, and bottom configurations, would be restored to a moderate degree relative to the current degraded condition.

ACS Objective 4 - Water quality: This alternative proposes an approach that would address the most critical water quality concerns within the planning area, and would have a moderate likelihood of resulting in improved water quality and beneficial uses.

ACS Objective 5 - Sediment regime: Ongoing effects to the supply and transport of fine and coarse sediment would be addressed. A moderate level of restoration of sediment regimes would occur.

ACS Objective 6 - Instream flows: Proposed stream flows would more closely resemble natural flows and would constitute a substantial improvement over existing conditions. Daily flow fluctuations would be reduced and the magnitude of the diversion around Segment 1 would be reduced.

ACS Objective 7 - Floodplain inundation and water table elevation: Overall, the processes driving floodplain inundation and water table elevation would be maintained and slightly improved and the intent of this objective would be met.

ACS Objective 8 - Plant communities: Overall, a moderate degree of active and passive restoration of riparian communities would occur in this alternative.

ACS Objective 9 – Habitat: The proposed actions would maintain and enhance aquatic habitat, riparian areas, and upland habitats located throughout the watershed.

Alternative 3

Riparian Reserves: Actions proposed in this alternative would have the highest likelihood of maintaining or restoring riparian reserve functionality (ten acres of recreation facilities and almost six acres of trails). Recreation impacts to riparian processes would be much less extensive than in Alternatives 2 and 4, though some site clearing and development of impervious surfaces would occur (refer to Tables 5-8 and 5-9).

Nine acres would continue to be directly impacted by hydroelectric facilities.

This alternative has the highest level of road decommissioning and obliteration and the lowest open road mileage (about half of the other alternatives) within riparian reserves (refer to Tables 5-10a, 5-10b, 5-11a, 5-11b and 5-12). Overall, road management actions proposed in this alternative would have the highest likelihood of supporting the functionality of riparian reserves.

Potential management agreements or land tenure adjustments would benefit the function of riparian reserves along the river and many perennial and intermittent tributary streams.

Vegetation treatments proposed within the riparian reserves, in order to improve stand condition and promote long-term health of the plant communities, are slightly more than Alternative 2 but significantly greater than Alternatives 1 and 4 (refer to Table 5-13).

The following summarizes the effect of management activities on the ACS Objectives. Refer also to Table 5-14 for a comparison of these effects.

ACS Objective 1 - Watershed and landscape-scale features: Extensive enhancement of landscape level features would occur under this alternative.

ACS Objective 2 - Spatial and temporal connectivity: Connectivity within the planning area would be enhanced and substantial enhancements in connectivity within the river corridor would occur. This alternative provides the greatest potential for recovery of spatial and temporal connectivity of the planning area with upper river reaches and the Spencer Creek Key Watershed.

ACS Objective 3 - Physical integrity: an extensive program of instream restoration would beneficially affect the physical integrity of the aquatic system in the river, including shorelines, banks and bottom configurations.

ACS Objective 4 - Water quality: This alternative proposes the most comprehensive approach to address critical water quality concerns within the planning area, and thus would be the most likely to result in improved water quality and beneficial uses.

ACS Objective 5 - Sediment regime: Overall, Alternative 3 proposes the most comprehensive approach to sediment management in the planning area, and would be the most likely to restore sediment regimes to within the natural range of variability.

ACS Objective 6 - Instream flows: Proposed flow regimes would restore aquatic and riparian habitats in the planning area, and constitute a major improvement over existing conditions.

ACS Objective 7 - Floodplain inundation and water table elevation: Overall, the processes driving floodplain inundation and water table elevation would be maintained and restored, and the intent of this objective would be met.

ACS Objective 8 - Plant communities: Overall, this alternative proposes the most extensive program of active and passive restoration of riparian communities.

ACS Objective 9 – Habitat: This alternative is the most aggressive in enhancing aquatic habitat, riparian areas, and upland habitats across the planning area and would protect habitat.

Alternative 4

Riparian Reserves: Actions proposed in this alternative would have a moderate likelihood of maintaining or restoring riparian reserve functionality.

This alternative would have the highest number of recreation sites, and the greatest level of recreation use, within riparian reserves, including seven new sites (refer to Tables 5-8 and 5-9). Overall, about 25 acres within riparian reserves would be impacted by recreation developments and 18 acres affected by trails.

Nine acres would continue to be directly impacted by hydroelectric facilities.

The magnitude of reductions in road mileage within riparian reserves would be lower than Alternatives 2 and 3 but higher than Alternative 1. This alternative has the highest level of road improvements within riparian reserves (slightly more than Alternative 2). Open road mileage within riparian reserves in this alternative is about the same Alternative 1 (refer to Tables 5-10a, 5-10b, 5-11a, 5-11b and 5-12).

Vegetation treatments are proposed within the riparian reserves in order to improve stand condition and promote long-term health of the plant communities (refer to Table 5-13). These improvements would be slightly greater than Alternative 1, but significantly lower than Alternatives 2 and 3.

The following summarizes the effect of management activities on the ACS Objectives. Refer also to Table 5-14 for a comparison of these effects.

ACS Objective 1 - Watershed and landscape-scale features: A moderate level of enhancement of landscape level features would occur under this alternative.

ACS Objective 2 - Spatial and temporal connectivity: Connectivity within the planning area would be enhanced and impairment of connectivity within the river corridor would be partially addressed. Daily flow fluctuations would limit the benefits of proposed instream restoration projects.

ACS Objective 3 - Physical integrity: The physical integrity of the aquatic system in the river, including shorelines, banks and bottom configurations, would be slightly restored relative to the current degraded condition. The integrity of tributary stream channels could be maintained, restored, or degraded. Overall, it is likely that existing conditions would be maintained, or slightly restored.

ACS Objective 4 - Water quality: Overall, there would be slight improvements in certain water quality parameters, although important water quality concerns (and the effects of altered water quality on beneficial uses) in the planning area would not be comprehensively addressed.

ACS Objective 5 - Sediment regime: Limited restoration of coarse sediment would occur in specific areas, but ongoing effects to coarse sediment supply and transport would not be fully addressed. Elements of the sediment regimes in the river would be restored.

ACS Objective 6 - Instream flows: Proposed flow regimes would continue to affect channel processes and habitat availability, but would constitute a minor improvement over existing conditions.

ACS Objective 7 - Floodplain inundation and water table elevation: Overall, the processes driving floodplain inundation and water table elevation would be maintained or, in some areas, slightly restored.

ACS Objective 8 - Plant communities: Overall, this alternative proposes a limited program of active and passive restoration in riparian communities, with most of the restoration work occurring adjacent to tributaries and in wet meadows.

ACS Objective 9 – Habitat: This alternative would maintain and enhance aquatic habitat, riparian areas, and upland habitats located throughout the planning area.

Table 5-8.–Recreation developments within riparian reserves and corridors (in acres).

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 1								
BLM	–	3	<1	3	–	3	–	3
PacifiCorp	–	–	<1	–	<1	–	1	–
Segment 2								
BLM	9	–	11	1	2	2	14	1
PacifiCorp	3	<1	4	<1	–	–	4	<1
Segment 3								
BLM	–	–	–	–	–	–	<1	–
PacifiCorp	1	<1	1	4	2	<1	2	4
Total	13	4	17	8	4	6	17	8

Table 5-9.–Proposed trails within riparian reserves and riparian corridors (miles).

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 1								
New Trail	–	0.1	5.1	0.3	–	–	5.2	0.4
Existing Roadbed	–	–	–	–	–	–	–	–
Segment 2								
New Trail	2.8	0.8	9.6	–	5.7	–	9.8	–
Existing Roadbed	1.4	–	2.8	–	3.0	–	2.6	–
Segment 3								
New Trail	0.2	0.1	1.8	0.6	–	–	2.5	0.8
Existing Roadbed	–	–	0.3	0.1	0.3	0.1	–	0.1
Total								
New Trail	3.0	1.0	16.5	0.9	5.7	–	17.5	1.2
Existing Roadbed	1.4	–	3.1	0.1	3.3	0.1	2.6	0.1

Table 5-10a.–Proposed/recommended road improvements within riparian reserves and riparian corridors, by segment (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 1								
Spot	–	0.2	0.6	0.2	0.6	0.2	–	–
Contiguous	–	–	–	–	–	–	0.6	0.2
Segment 2								
Spot	0.1	1.0	2.7	1.4	0.1	0.9	0.2	0.3
Contiguous	–	–	0.8	0.2	–	0.2	3.6	1.5
Segment 3								
Spot	–	–	0.6	<0.1	0.1	<0.1	0.6	<0.1
Contiguous	–	–	0.1	–	0.1	–	0.1	–
Total [1]	0.1	1.2	4.8	1.8	0.9	1.4	5.1	2.0

(1) Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table 5-10b.–Proposed/recommended road improvements within riparian reserves and riparian corridors, by ownership (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
BLM								
Spot	0.1	0.7	3.3	1.1	0.7	0.7	0.2	0.2
Contiguous	–	–	0.7	0.1	–	0.1	4.1	1.2
PacifiCorp								
Spot	–	0.4	0.6	0.5	0.1	0.5	0.6	0.1
Contiguous	–	–	0.1	0.1	0.1	0.1	0.1	0.5
Total [1]	0.1	1.1	4.7	1.8	0.9	1.4	5.0	2.0

(1) Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table 5-11a.–Proposed/recommended road construction and decommissioning within riparian reserves and riparian corridors, by segment (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 2								
Construction	<0.1	0.1	0.1	<0.1	–	0.1	0.1	0.1
Decommissioning	–	–	<0.1	0.1	<0.1	<0.1	<0.1	–
Obliteration	2.6	1.0	4.4	1.3	5.6	1.5	3.1	1.1
Segment 3								
Construction	–	–	0.1	0.4	<0.1	0.1	0.1	0.4
Decommissioning	–	–	–	–	<0.1	0.6	–	–
Obliteration	–	–	0.4	0.1	0.6	0.1	0.1	0.1
Total [1]								
Construction	<0.1	0.1	0.2	0.4	<0.1	0.2	0.2	0.5
Decommissioning	–	–	<0.1	0.1	0.1	0.7	<0.1	–
Obliteration	2.6	1.0	4.8	1.4	6.1	1.6	3.2	1.2

(1) Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table 5-11b.–Proposed/recommended road construction and decommissioning within riparian reserves and riparian corridors, by ownership (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
BLM								
Construction	0.1	–	0.1	–	–	0.1	0.1	–
Decommissioning	–	–	–	–	–	0.3	–	–
Obliteration	2.0	0.6	2.5	0.8	3.6	0.9	2.0	0.6
PacifiCorp								
Construction	–	0.1	0.1	0.5	<0.1	0.1	0.1	0.5
Decommissioning	–	–	<0.1	0.1	<0.1	0.4	<0.1	–
Obliteration	0.7	0.4	2.4	0.6	2.5	0.7	1.2	0.5
Total [1]								
Construction	0.1	0.1	0.2	0.5	<0.1	0.2	0.2	0.5
Decommissioning	–	–	<0.1	0.1	<0.1	0.7	<0.1	–
Obliteration	2.7	1.0	4.9	1.4	6.1	1.6	3.2	1.1

(1) Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table 5-12.–Summary of road status[1] designations for roads within riparian reserves and riparian corridors, by segment (in miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 1								
Open	2.9	0.4	2.7	0.3	1.0	0.2	2.7	0.4
Admin. Use	–	–	0.2	0.1	1.9	0.2	0.2	–
Segment 2								
Open	6.6	3.8	5.1	3.4	0.5	1.0	5.1	5.2
Seasonal Closure	0.7	1.1	0.5	0.7	3.1	2.9	1.0	0.1
Admin. Use	0.4	0.8	0.4	0.8	1.1	0.9	1.2	–
Segment 3 [2]								
Open	2.7	2.5	2.9	2.8	2.5	3.1	3.4	2.8
Seasonal Closure	–	–	–	–	–	–	0.3	0.2
Admin. Use	2.9	2.6	2.5	2.6	2.5	2.0	2.0	2.4
Total								
Open	12.2	6.7	10.7	6.5	4.0	4.3	11.2	8.4
Seasonal Closure	0.7	1.1	0.5	0.7	3.1	2.9	1.3	0.3
Admin. Use	3.3	3.4	3.1	3.5	5.5	3.1	3.4	2.4

[1] This table refers only to those roads that are open to public and/or administrative access for at least part of each year.
[2] With the exception of Topsy Road, roads on non-PacifiCorp private land in Segment 3 were assumed to be closed to use by the general public.

Table 5-13.–Proposed/recommended vegetation treatments within riparian reserves and riparian corridors (acres).

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
BLM								
Forest/Woodland	88	80	331	156	389	213	331	156
Dry Meadow/Shrub	2	32	32	102	47	117	32	115
Riparian	1	6	16	14	28	17	3	6
PacifiCorp								
Forest/Woodland	–	1	35	115	47	183	35	138
Dry Meadow/Shrub	–	–	25	37	30	112	31	83
Riparian/Irrigated	3	8	287	223	316	249	12	10
USFS								
Forest/Woodland	–	–	–	–	–	6	–	–
Riparian/Irrigated	–	–	–	–	–	2	–	–
Total								
Forest/Woodland	88	81	367	270	436	403	367	294
Dry Meadow/Shrub	2	32	57	139	76	229	62	198
Riparian/Irrigated	4	14	303	237	341	267	14	16
Grand Total	**94**	**127**	**727**	**646**	**853**	**899**	**445**	**508**

Table 5-14.–Effects[1] on Aquatic Conservation Strategy Objectives

ACS Objective	Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	+	++	+++	++
2	+	++	+++	++
3	0	++	+++	0
4	+	++	++	+
5	0	++	+++	+
6	0	++	+++	0
7	0	++	+++	+
8	0	++	+++	+
9	+	++	+++	++

[1] The relative cumulative effect of the proposed alternatives on the nine ACS objectives is as follows:
"0" indicates that the objective would be maintained,
"+" indicates a slight degree of restoration,
"++" indicates a moderate degree of restoration, and
"+++" indicates an extensive degree of restoration.

Aquatic Species/Habitat

Assumptions/Impacts Common to All Alternatives

For the purposes of this analysis direct impacts are actions that immediately effect aquatic resources (USFWS 1998), actions that disturb an individual animal or alter temporal and/or spatial access to aquatic habitat during and upon completion of projects (i.e. installation of instream rock weirs may directly disturb fish and would immediately change the conditions of instream habitat). Indirect impacts are caused by or result from the proposed actions, are later in time, and are reasonably certain to occur (i.e. increased sediment delivery from native surfaced roads as a result of increased vehicular use within riparian areas would be reasonably expected to affect aquatic habitats).

Cumulative impacts to aquatic resources (discussed at the end of each alternative) are the additive result of all on-site proposed actions (within the planning area) and off-site actions that affect the overall quality, quantity, and stability of aquatic habitat. (For example, on-site actions such as installation of instream structures, the implementation of sediment augmentation, and stabilization of instream flows would collectively be expected to reduce channel width-depth ratios and increase availability and quality of instream habitats).

Off-site actions include those related to upper Klamath Basin water (both quantity and quality) and fisheries (both inland and anadromous fisheries) issues. While upstream impacts indirectly affect resources within the Planning Area, water and fishery proposed actions addressed in the River Plan do not have any direct or indirect impacts on the upper Basin situation. For example this plan would not influence the Bureau of Reclamation's Klamath River Anadromous Fish Restoration and Operation Plan, or the Environmental Protection Agency/State Total Maximum Daily Load development process.

Aquatic Species Populations (Including Threatened, Endangered and Sensitive (TES) Species): Monitoring of aquatic species including TES species is generally recommended in order to understand the impacts of proposed projects and the lack of actions on the populations of aquatic species. Developing information on distribution and abundance of native aquatic species over time would aid in this understanding.

Wild Trout Areas in Oregon and California: No proposed actions were intended to specifically alter the Wild Trout Area designations. The characteristics of the trout (wild, naturally spawned, and genetically unique) that lead to the Wild Trout Area designations in the Oregon and California reaches are not expected to change as a result of any of the proposed alternatives. The proposed aquatic habitat projects and instream flow recommendations within the Klamath River Management Plan would beneficially affect the trout populations for which the Wild Trout Area reaches were designated. The proposed changes in land tenure and the proposed river access trails would potentially increase utilization of the Wild Trout Areas in both reaches.

Turtle Camp Trail: Turtle camp trail has recently been re-opened and used as a vehicular road by recreation OHV users. This trail would be re-closed and maintained for non-motorized use under all alternatives. The existing trail is not directly adjacent to stream edges and has only limited impacts to the aquatic resources. In locations where the trail crosses drainages, use of the trail may locally increase sediment reaching stream channels. Implementation of best management practices pertaining to trail maintenance would be expected to limit impacts to aquatic habitats.

Rock Creek Bridge: Redesign (retrofit) of Rock Creek Bridge and river channel would occur under all alternatives. Fish do not occupy Rock Creek reaches affected by the proposed bridge and channel enhancements. Proposed improvements to route water under the bridge, rather than down the roadbed, would be expected to improve aquatic habitat downstream by reducing sediment transmissions. However, short-term (first wet season) negative effects to aquatic habitat downstream of the bridge site may occur from sediment transport, as a result of in stream work.

Flow Regimes and Sediment Regimes: A variety of project proposals are identified within the various alternatives such as width treatments, side channel treatments, chute cutoff treatments, large and coarse wood treatments, and others. The success of these projects for achieving geomorphic and fisheries objectives is predicated on flow regimes and sediment regimes that will contribute to project stability and functionality. Spill releases function in two ways: first, they provide the stream energy necessary to move sediment (gravels) to and from project locations, and secondly, they provide stream energy sufficient to alter local channel morphology. Without spill releases from J.C. Boyle dam, to the bypass reach, and/or from the powerhouse, that can redistribute sediment within the planning area, the rate of recovery even with active instream work would be seriously delayed. Without spill releases sufficient to alter channel morphology, the rate of recovery for local aquatic habitat diversity would also be prolonged. Lack of sediment entrainment into the water column in these riverine reaches would also reduce the rate of marginal sediment deposition thus affecting rates of bank development and subsequent riparian vegetation recovery.

Use of Mechanical Equipment in Stream Channels: Short-term impacts due to use of equipment in the river will include displacement of existing riparian vegetation, bank soils, and channel substrates. Increased delivery of sediment within the river may occur during the first wet season after construction and would reduce as vegetative recovery occurs (Furniss et al 1991).

PacifiCorp Facilities and Operations: The existing hydroelectric facilities, above and below the Planning Area, negatively affect native fish movement to and from the planning area, sediment supply and transport through the planning reaches, and temperature stability. Without modification of existing facilities and change in operations of those facilities, access to and condition of important aquatic habitats within the planning area would continue to be limited.

No actions or projects were proposed to directly address anadromous fisheries migration through the lower dams of the Klamath Hydroelectric Project (FERC License #2082) as part of the Klamath River Management Plan. No proposed actions or projects were directly proposed to protect/enhance habitat in the Klamath Wild and Scenic River for listed anadromous species as part of the Klamath River Management Plan. In the event that passage of anadromous species is restored through the lower dams of the Klamath Hydroelectric Project (Iron Gate, Copco 1 and Copco 2 Dams) to the Klamath Wild and Scenic River planning area, then potentially 23 miles of anadromous habitat would become available for migration, rearing, and to a lesser extent, spawning habitat within the planning area. In addition, multiple rivers, streams, and springs above the planning area within the Upper Klamath River and Upper Klamath Lakes would also become available to anadromous species. Proposed actions intended to protect and enhance the ORV for fisheries resources, particularly Klamath redband trout, would be expected to beneficially affect the reintroduced anadromous species life-history components.

The emergency spillway located within the bypass reach of the planning area would be treated in to varying degrees under all alternatives. Current conditions are contributing to high sediment loading reaching the river channel immediately downstream of the site, particularly during spill. Efforts should be made to reduce or eliminate the occurrence of the emergency spillway use and protective measures would be conducted to prevent erosive sediments from the site reaching the stream channel.

The powerline system within the canyon is having minimal to no direct impact to the aquatic system. Indirect negative impacts may be occurring as a result of the power company’s efforts to maintain the powerlines and the interrelated/interdependent impacts to maintain the road network to service the lines.

Maintenance of roads in drainage bottoms could potentially result in surface erosion of sediment sources reaching stream channels (Furniss et al 1991). This potentially could affect aquatic resources by increasing sediment transmitted to the aquatic habitat. Increased fines in the river channel can result in increased percentage of substrate embeddedness.

Grazing Use: Livestock grazing can affect the riparian environment by reducing vegetation, and eliminating riparian areas by channel widening, channel aggrading, or lowering of the water table (Platts 1991). Riparian zones are often grazed more heavily than upland zones because they have flatter terrain, water, shade, and succulent vegetation. Reduction in ground cover vegetation and increase in compaction associated with livestock use causes increased runoff (see water quality) and can negatively affect aquatic habitats. No change in grazing management is proposed under this alternative. The existing impacts from grazing management of the BLM and PacifiCorp lands would be expected to continue.

Land Tenure: Both RMPs covering the planning area prescribe acquisition of private land within the Upper Klamath River ACEC (Oregon) and the Upper Klamath River Management Area (California). This would include any privately owned land parcels. The consideration to acquire land outside of the Upper Klamath River Management Area in California (acreage depends on each alternative) applies only to PacifiCorp land.

Impacts of Specific Alternatives

(Refer to Maps 25-28, and Appendix H)

Alternative 1

Scenery Management - Any scenery management actions conducted within the canyon would be completed in a fashion as to maintain the scenic qualities based on time of designation. As a result no ground and vegetation disturbing activities would occur within the river view and riparian reserves. No direct or indirect affects to aquatic resources are anticipated from scenery management under this alternative.

Recreation Facilities and Management - This alternative is the least impacting to riparian vegetation when compared to the other alternatives. Increasing the number of recreational facilities, as proposed in Alternatives 2 and 4, would have a greater negative impact habitat for aquatic dependent species. The existing and proposed enhancement of recreation facilities within the riparian reserves would result in a minor long-term negative impact to riparian vegetation and the connectivity to aquatic habitats (see Map 13). Human use may also have indirect impacts to aquatic resources due to firewood collection, reducing riparian CWD and thus indirectly affecting recruitment of CWD to stream channels.

Designated campsites without toilet facilities, or with improperly sited or designed facilities, could result in elevated releases of human waste contaminates to aquatic habitats (Clark and Gibbons 1991). The additive impact to the aquatic resources is uncertain. The impact to fish would result from direct impact to the fish, or indirectly from changes to their forage (Norris et al 1991). The toxicity of ammonia is dependent on pH, concentration of total ammonia, temperature, and ionic strength. Klamath basin water is generally high in pH prior to reaching the project area, and the reach is on Oregon's 303d list for temperature. In order to prevent cumulative impacts to the aquatic biota, efforts should be made to minimize risks by following RMP BMP guidance on campsite location and facility location.

The construction of the J.C. Boyle powerhouse and rock revetments to protect the powerhouse during peak flows, and construction of caretakers houses has substantively reduced quality of the site for aquatic species. The development of an interpretive day use site at this location is not anticipated to have additional impacts to aquatic habitat.

Limited improvements to boating launching facilities may occur, however, no additional facilities would be constructed. Launch facilities are located within the riparian reserves of the Klamath River. These facilities would have continued negative impacts to aquatic system by disrupting the natural connectivity between the riparian and aquatic habitats and limiting development of riparian vegetation.

Within the planning area most of the existing trail lengths are located in the riparian reserves of the Klamath River (see Map 13). Trail maintenance typically includes cutting/bucking downed woody debris in order to provide unobstructed routes for human uses. Bucking of logs that could eventually reach to the river channel would be expected to reduce the stability of this CWD for creating/improving aquatic habitats. Larger wood would be expected to resist high flows and alter local channel morphology by creating scour pool and sediment depositional areas. Both these channel features are beneficial to aquatic habitat. Application of appropriate BMPs and PDF's to the existing trial network would be expected to protect riparian CWD and minimize the impacts to the aquatic habitats.

Three miles of new trail construction in riparian corridors would result in exposed soil and risk of erosion. The greatest risk of impacts is during the first wet season and would reduce as vegetative recovery occurs (Furniss et al 1991). Cutting downed logs during trail construction or maintenance reduces the value of the log as functional CWD for aquatic habitat.

Uses of uplands for recreational purposes (such as dispersed camping, and OHV use) would have limited impacts to the aquatic ecosystem. Some impact from upland OHV trails running through ephemeral channels, meadows, seeps and springs could result in the development of source areas for sediment transmission to aquatic habitats, particularly during wet periods (see Map 13 and Map 17a).

Road Management – This alternative would be expected to result in the fewest beneficial affects to aquatic habitat from proposed treatments to the existing road network within the Planning area when compared to Alternatives 2, 3, and 4. The proposed actions in this alternative provide a minimum level of stream crossing treatment in order to comply with ACS objectives consistent with the ROD and RMP (see Map 17a).

Most road management actions would be spot treatments having minor positive benefits by reducing sediment reaching aquatic habitats and fisheries. Road densities in riparian reserves are the highest in this alternative when compared to the other alternatives. Some roads removed from the base would be converted to hiking trails and would have reduced but continuing minor negative impacts to riparian and aquatic habitats.

The proposed stream crossing upgrades under this alternative would be expected to have short-term negative indirect impacts to aquatic habitat and aquatic species. Actions would be limited to dry season operations. Based on field review it appears that many affected reaches are intermittent in nature and that no fish species would be affected during construction. Construction actions within the streambed would disturb stream substrate, and potentially increase erosion by loosening riparian soils and stream banks. Increased sediment potentially would reduce habitat quality during the first wet season after construction. Seasonal restriction on instream work, and implementation of RMP BMPs and project PDF's would be expected to minimize negative impacts to the aquatic resources. Long-term enhancement of aquatic habitat would be expected as stream substrate, banks, and riparian habitats re-vegetate and stabilize. Improved stream crossings would provide better aquatic species access to upstream habitats and would be expected to reduce road surface erosion from reaching stream channels.

Bridges or abandoned bridge sites (abutments and footings) over the mainstem Klamath River and tributaries would not be altered under this alternative. Negative impacts to aquatic habitat (impaired width-depth ratio at and below the site) from the former bridge footings would continue.

Cultural Resource Management - No ground disturbing actions are proposed to protect, enhance or restore cultural resources, therefore, no impacts to aquatic resources are anticipated.

Vegetation Management - (Includes actions for fuels/wildlife habitat/silviculture/weed control.)

Riparian vegetation treatments: Vegetation treatments would not occur within the Klamath River riparian reserves. Some vegetation management may occur in tributary riparian reserves outside of the scenic river viewshed. Actions within these tributary riparian areas would be consistent with treatments described within the KFRA Fuels Management EA (BLM 1994) and the KFRA RMP.

Upland vegetation treatments: Vegetation treatments would continue based on existing management for the Scenic corridor of the Planning area, typically out of river view. Upland vegetation treatments would not be expected to impact the aquatic resources directly. Indirect impacts may result from increase road traffic on minimally maintained road surfaces, within the Planning area. Sediment transmission from the road surfaces to stream drainage may occur during the first wet season after use (Furniss et al 1991).

Terrestrial Species/Habitat Management - See discussion of vegetation management for proposed wildlife projects addressing the impacts to plant communities.

No negative impacts to aquatic resources from proposed non-vegetation based wildlife projects would be anticipated under this alternative. Some beneficial impacts to aquatic resources may be realized by maintaining wildlife based road closures. See road management sections for impacts to aquatic resources of proposed and ongoing road management for Alternative 1.

Watershed Management Actions - *Water quality/beneficial uses:* No substantial changes to water quality are anticipated from this alternative, and the associated effects on aquatic habitat would continue.

River flows and water rights: No changes in the flow regimes would be pursued as part of this alternative. The flows proposed within this alternative would continue to affect fish directly and indirectly (Tyrus 1990). Direct effects would include continued risk of stranding, and limitations in spawning activity. Indirect effects would include the continued loss of aquatic habitat and degradation of water quality.

Flow diversion from Segment 1 and ramping operations below the powerhouse would maintain the existing degraded aquatic conditions and species distributions. Diurnal fluctuation in water temperature of up to 12 degrees Fahrenheit would continue. The negative long-term impact to the aquatic resources from such temperature shifts would also be expected to continue. Impacts to fish may include temperature elevation beyond the range preferred for rearing, inhibition of upstream migration of adults, increased susceptibility to disease, reduced metabolic efficiency, and shifts in competitive advantage (Hicks et al 1991).

Altered riparian and geomorphic conditions resulting from peaking operations would continue. The lack of available riparian vegetation would continue to affect the aquatic species in the planning area, especially in Segments 2 and 3. Risk of fish stranding on point bars and side channels that are currently being dewatered during peaking operations would also continue.

Riparian function: See discussion of riparian vegetation treatments for effects to aquatic resources.

Aquatic Species/Habitat Management - *Sediment management:* No changes in sediment management would be pursued. Reaches of river below the J.C. Boyle Dam would remain gravel-limited. The impacts to aquatic species in the planning area due to the lack of spawning gravel recruitment and lack of sediment to aid in stream bank development would be expected to continue.

Instream structures: Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments) would not be placed as part of this alternative. Current channel widths would be anticipated to remain largely in their existing conditions. Existing lateral erosion evident within Segment 1 and 3 would continue to move until reaching a geomorphic limitation such as bedrock. Fisheries access to side channels and chute cutoffs, and inherent risk of fish stranding within these channels due to peaking, would not be changed under this alternative (see Map 25).

Bypass Canal waste treatments: Side cast material in the Bypass Reach would remain in place. Negative impacts to channel function, fish passage, and riparian development would continue. Flood plains with diverse riparian vegetation would not be expected to develop under existing situations. Constraint of the width to depth ratio would continue, thus resulting in high water velocities. High water velocities would maintain and in time increase channel widening, incision, and bed armoring which is currently impairing the bypass reach.

Irrigation diversion treatments: Maintaining the existing and historic irrigation diversions (mainstem and tributary) would be expected to maintain the existing negative impacts to the aquatic resources at the location of the diversion. Width to depth ratios of the river would not be expected to change as a result of this alternative. Mesohabitat types would remain in the current condition. Benefits to aquatic resources would not be anticipated from this action.

Maintaining the diversions of Shovel Creek reduces instream flow during temperature limiting summer months. Due to high water temperatures the Klamath River, tributary refugial areas are of greater importance within the planning area. Continued diversion of Shovel Creek limits the availability of important cold-water refugial habitat at the mouth and within Shovel Creek.

Range Management - Impacts from grazing are common to all alternatives, though Alternative 3 substantially reduces or eliminates grazing use on BLM land and recommends a similar actions for PacifiCorp land.

Fire and Fuels Management - Actions would be consistent with those riparian reserve prescriptions in the Fuels Management EA (BLM 1994). Randomly selected units within the fuels treatment program would continue to be treated, some units may include riparian reserves. Long-term positive impacts would be realized by reducing fuel loading thus protect riparian vegetative communities. This alternative would take the longest to complete fuel reduction in the canyon. As the RMP fuel management program is implemented across the resource area, untreated riparian areas with excessive fuel loading within the canyon would continue to be at a higher risk to stand replacement fires.

Land Tenure - Land acquisition as described in the Klamath Falls and Redding RMPs would be pursued under this alternative; no other acquisition would be pursued. No land conservation easements would be pursued as part of this alternative. The ability to administer the lands within the Klamath River planning area would generally remain as is. Independent efforts by the BLM and other landholders would largely form the basis for watershed level land management. The proposed land tenure adjustments, as described within the RMPs, would be expected to maintain the existing aquatic habitat conditions along the Klamath River. Shovel Creek, identified as the only spawning/rearing tributary in Segment 3, is at risk to being sold by PacifiCorp to private developers. Without BLM acquisition, or developing riparian conservation easements, the development of riparian areas on PacifiCorp land along the Klamath River and Shovel Creek for agricultural and residential purposes would be expected to have a detrimental impact of riparian vegetation and the associated aquatic community.

Hydropower Facilities - *Power production facilities:* Fisheries attraction flows to the bypass reach and fish ladders would remain under current regimes. Similar to other hydroelectric facilities, transport of bed-load, suspended load, and coarse woody debris would be impaired as a result of this alternative, with most material being entrained within J.C. Boyle Reservoir (Stillwater Sciences 2000). Adverse conditions that contribute to poor movement of trout into and above the bypass reach would continue.

Actions to stabilize the emergency spillway and hill slope would likely prevent further degradation of the upper bench and hill slope leading to the river channel. Existing negative impacts to channel function and riparian development on BLM lands would continue.

Transmission lines and rights-of-way - No alterations to the powerlines within the canyon would be proposed.

Cumulative Impacts - No beneficial changes to the Klamath River geomorphology would be expected to occur under this alternative, and habitat value could continue to degrade (due to peaking operations and depletion of gravels). River bank development would not be expected to change due to the lack of riparian development (bankfull benches), continuation of existing flow patterns, and the lack of sediment in the system. The existing risk of fish stranding in side channels, chute cutoffs and point bars would continue. No additional habitats would be made available for fry or juvenile trout as a result of this alternative. Continued management of the river under the existing conditions would be expected to maintain the redband/rainbow trout in the reach in their current limited (or smaller) size classes. Largely due to the operation of power facilities this alternative will maintain the higher rate of downstream movement of fish versus upstream movement of fish.

This alternative would provide the fewest enhancements, and the least protection, to aquatic resources within the planning area in the short-term. There is an increased short-term risk of catastrophic fires impacting riparian habitats. The proposed flows associated with a lack of sediment recruitment may result in negative changes in aquatic habitats. Some improvement to aquatic habitat would occur as a result of water claims and long-term treatment of fuels within the planning area.

Alternative 2

Scenery Management - Limited vegetation management projects are proposed for scenic qualities. The actions proposed under other resources may affect scenic quality and thus scenic management may limit the scope of some projects within the canyon. No direct or indirect affects to aquatic resources are anticipated from scenic management actions proposed under this alternative.

Recreation Facilities and Management - The existing facilities within the riparian reserves disrupt natural habitat connectivity and limit vegetative community development at the site level and indirectly affect the quality and quantity of habitat for aquatic and riparian dependant species. The degree of impact to the riparian system per site varies based on the size of the site and the level of use the site receives.

The proposed location for the Shovel Creek camping facility is adjacent to the riparian corridor of the Klamath River and Shovel Creek on privately owned (PacifiCorp) irrigated pasture (see Map 14). The local vegetative community has substantially been altered from historic conditions; species present are predominately of pasture grass varieties with some riparian dependant vegetation occurring adjacent to the riverbank. To be consistent with NFP and RMP direction, any new camping facility should be constructed outside these riparian corridors, or mitigation may be needed to retain functionality of the riparian reserves and meet ACS objectives. At this location, sitting camp units and support facilities at least 280 feet from the Klamath River and Shovel Creek would be necessary. Access to the river would be based on existing access point were feasible. Any additional access points should be designed so as to protect riparian vegetation and bank stability. Actions proposed that are beyond the extent of those impacts addressed here would need additional NEPA analysis.

Designated campsites without toilet facilities, or sites with improperly designed or sited facilities, could result in elevated releases of human waste contaminates to aquatic habitats (Clark and Gibbons 1991). The risk may occur as direct impacts on the fish or indirectly as impacts on their forage (Norris et al 1991). The additive impacts of Alternative 2 recreation actions on water quality to the aquatic resources are uncertain. In order to prevent cumulative impacts to the aquatic biota, efforts should be made to minimize risks by following RMP BMP guidance on campsite location and by providing restroom facilities where needed based on site usage. Human use may also have indirect impacts to aquatic resources due to firewood collection, reducing riparian CWD, and thus indirectly affecting recruitment of CWD to stream channels.

Construction of a primitive raft launch facility at J.C. Boyle dam would impact aquatic systems by disrupting the natural connectivity of aquatic habitat and the riparian community, limiting development of riparian vegetation, and creating routes for sediment to reach the river.

Several interpretive sites (J.C. Boyle Dam fish ladder, J.C. Boyle Powerhouse, Spring Island, Frain Ranch and Hoover Ranch) are proposed within the riparian reserves on the Klamath River. The interpretive site at J.C. Boyle Powerhouse would be located in a massively altered riparian area with reduced quality of the site for aquatic species and thus would not be expected to have additional impacts so long as all facilities are located on the existing rock and asphalt surfaces.

Construction of interpretive facilities at J.C. Boyle dam may affect the recovery of the vegetative community at the site. A non-hardened (native surface) parking area exists adjacent to the dam access road. Use of this area for parking and creating a trail on the existing native surface road leading to the base of the dam would be expected to have the least impact on the riparian community and thus the least impact on aquatic habitat.

Three miles of existing designated trails, plus over three miles of existing road beds would be maintained as trails under this alternative (refer to Table 5-9). Within the planning area most trail lengths are located in the riparian reserves of the Klamath River (see Map 14). The existing Turtle Camp trail is not directly adjacent to the river edge and has only limited impacts to the aquatic resources. In locations where the trail crosses drainages, use and maintenance of the trail may locally increase sediment reaching stream channels. Implementation of best management practices pertaining to trail maintenance would be expected to limit impacts to aquatic habitats.

Over 17 miles of new trail is proposed to be constructed on and immediately adjacent to riparian reserves under this alternative (refer to Table 5-9), which may impact aquatic habitats. Exposed surfaces (non-vegetated and/or hardened) would be at risk to erosion during the wet season (Furniss et al 1991). The exposed surfaces would potentially increase risk for erosion along the length of trail on the bench. Trail construction would generally include cutting/bucking downed woody debris in order to provide unobstructed routes for human use. Bucking of logs that may reach to the river channel would be expected to reduce the value of these CWD for creating/improving aquatic habitats. Larger wood would be expected to resist high flows and alter local channel morphology by creating scour pool and sediment depositional areas. Both these channel features are beneficial to aquatic habitat.

Flows that enhance recreational rafting and recreational fishing would be pursued under this alternative. See Watershed Process discussion for impacts of varying flows on aquatic resources.

Minimal impacts to the aquatic ecosystem would be anticipated as a result of the proposed upland recreation projects under this alternative. Some impact to canyon drainages may result from upland OHV trails running through ephemeral channels, meadows, seeps and springs. This type of disturbance may result in development of source areas for sediment transmission to aquatic habitats, particularly during wet periods.

Road Management - *Road treatments within riparian reserves:* Approximately seven miles of road would be improved within the riparian reserves under this alternative. Actions would be conducted in order to maintain or enhance existing road networks or to maintain and enhance ACS objectives (Tables 5-10a and 5-10b). The majority of road miles treated in the riparian reserves would be spot treatments or decommissioning (see Map 18a).

Short-term impacts from road decommissioning (Tables 5-11a and 5-11b) could include increased erosion during the first wet season from loosened soils (Furniss et al 1991). Sediments eroded from exposed and ripped road surfaces potentially could reach stream channels. Fine sediment particles in the river and fish bearing streams would impair aquatic habitat recovery, by increasing sediment embeddedness, and reducing subsurface percolating flows. Surface erosion would be expected to abate over time through natural revegetation.

Road networks can accelerate peak flows in small watersheds due to road network increasing the effective drainage network of a watershed (Marcus et al 1990). Reductions in road density through decommissioning would reduce exposed surface area for potential surface erosion, improve surface drainage of roads outside of draws, and increase infiltration of water to subsurface layers, thus reducing ditchline runoff and the potential transport of sediment to riparian and aquatic habitat (Furniss et al 1991, Chamberlin et al 1991). Overall road densities in the riparian areas would be expected to decrease somewhat under this alternative, thus positively affecting peak flow patterns and sediment patterns in the river and fish bearing tributaries.

The proposed maintenance of discrete segments of planning area roads would be expected to reduce sediment production from these road surfaces (Furniss et al 1991). This would in turn improve local water quality in tributary stream that may be affected by these treatments. Local benefits to aquatic species may occur in locations of spot treatments, as reducing sediment loads in the tributary stream would be expected to reduce impacts to the aquatic habitat. Mainstem water quality is not likely to be substantively affected due the small percentage of road treatment proposed under this alternative and the extent of watershed upstream of the planning area.

Stream crossing upgrades within riparian reserves: The proposed stream crossing upgrades under this alternative would be expected to have short-term negative indirect impacts to aquatic habitat and aquatic species. Actions would be limited to dry season operations so no aquatic species would be present during construction. Construction actions within the streambed would disturb stream substrate, and potentially increase erosion by loosening riparian soils and stream banks (Furniss et al 1991). Increased sediment potentially would reduce habitat quality during the first wet season after construction. Long-term enhancement of aquatic habitat would be expected as stream substrate, banks, and riparian habitats re-vegetate and stabilize. Improved stream crossings would provide better aquatic species access to upstream habitats and would be expected to reduce road surface erosion from reaching stream channels.

Bridge treatments and upgrades (Rock Creek, Upper Frain, Lower Frain, Stateline): Upper Frain Ranch and Stateline bridge sites have created flow constrictions, increasing water velocities and subsequently altering channel features, such as width to depth ratio and sediment transport (Rosgen 1996). The downstream channels have higher width to depth ratios (reduce water depths), which negatively affect the local aquatic habitat. Structural enhancement of the banks and adding bank full benches within the bridge's area of influence of the river channel, will improve channel function locally. Increasing span length, or designing bridge abutments to be isolated during high flows would aid in hydrologic function at the site. Increases in flood plain connectivity to the river channel would reduce channel stress from concentration of flow during peak flow events.

Peaking operations make edge habitat only available for short periods of time during low flow periods. Overhead cover including undercut banks, overhanging vegetation, logs, and debris jams are typically important fish habitat in streams (Bjornn and Reiser 1991). Fish within the degraded reaches are limited in accessing these overhead cover habitat types. Efforts to design bridge sites with lower width to depth ratios and enhanced floodplain function would reduce impacts of peaking flows on aquatics species by increasing accessibility of overhead cover habitats.

Improving the abandoned Frain Ranch bridge site would aid in narrowing the active channel width both above and below the site. Reducing the width to depth ratio at this location would increase water depth and provide more available habitat during low flow periods.

Altering the abandoned Stateline bridge site would aid in allowing natural flood inundation at bank full flows. This would reduce channel velocities downstream of the bridge site and improve aquatic habitats.

Redesign of Rock Creek bridge and river channel would occur under this alternative. Fish species do not occupy Rock Creek reaches affected by the proposed bridge and channel enhancements. Proposed improvements to route water through the bridge, rather than down the roadbed, would be expected to improve aquatic habitat downstream by reducing sediment transmissions. However, short-term (first wet season) negative affects to aquatic habitat downstream of the bridge site may occur from sediment transport, as a result of in stream work.

Road treatments upland (decommissioning/closure/upgrade): Limited improvement of the upland road network is proposed under this alternative (see Map 18a). Most actions are identified as a means of improving watershed processes, to maintain the existing road network, and meet identified objectives within the RMP. These proposed projects are not anticipated to directly affect the aquatic resources of the canyon. Reduction in road densities in the canyon and improvement of drainage features for the road lengths potentially could provide indirect long-term benefits to the aquatic resources.

Cultural Resource Management - *Interpretive sites:* Interpretive sites are proposed for the cultural and historic resources of the canyon along Topsy Grade, and Beswick. See Recreation Resources affects analysis for impacts of interpretive site construction for impacts to aquatic resources (see Appendix H).

Site protection actions: Actions to protect prehistoric cultural resource sites within the riparian reserves of the canyon include capping of sites with surfacing materials such as crushed gravel, boulders, and/or dirt fill. Placement of these materials near or adjacent to the river channel could result in a short-term increase in fine particulates reaching aquatic habitat. As vegetative recovery takes place and the initial washing of surface sediment occurs the extent of this impact would be minimal.

Proposed fencing actions would not be expected to generally affect aquatic habitat. Fencing actions proposed to protect cultural sites may have an indirect beneficial affects to riparian resources and aquatic habitat.

Vegetation Management - *Riparian vegetative treatments:* Proposed vegetation treatments that would increase the vegetative diversity, reduce fuel loading to reduce risk of catastrophic fire, and enhance riparian stands to accelerate CWD recruitment to stream channels, would have the greatest value to aquatic resources. A range of actions would occur under this alternative in the riparian reserves from mechanical and hand thinning, mechanical and hand piling, pile burning, and broadcast burning (see Map 22). In riparian reserves the individual proposed treatments would be designed to meet the Aquatic Conservation Strategies and would be reviewed for consistency with River Plan Objectives and resource objectives by the KFRA riparian team and the KFRA ID team.

Indirect impacts to aquatic habitats from riparian vegetation manipulation could result from actions proposed within this alternative. Removal or reduction in the riparian canopy could produce an increase in summer temperatures and a decrease in winter temperatures (Marcus et al 1990). Cumulative impacts to fishery resources of increased stream temperatures can include chronic stress and reduce fishery productivity from exposure to elevated sub-lethal temperatures. Larger streams, such as the mainstem river reaches in the planning area, would be more affected by removal of the taller vegetation within the riparian areas and less affected by understory treatments. In addition, reduced canopy cover can reduce inputs of organic debris and invertebrates from overhanging branches, thereby reducing forage available to aquatic species.

Indirect effects of vegetative management may also occur as a result of using mechanical equipment in the riparian reserves. Road surfaces, landings, skid trails, ditches and disturbed cut areas can alter pathways water takes to stream channels, alter peak flows, and contribute sediment to stream channels (Chamberlin et al 1991). Changes in flow patterns and increased sediment transport would cause negative impacts to aquatic habitat and aquatic species.

Minimal harvesting and non-commercial treatments within the riparian reserves where CWD needs are met, and actions that maintain or contribute to improving riparian and channel function are not expected to have short-term negative impacts to the aquatic resources. Locating mechanical treatments outside the no-entry buffers, and following recommended PDF's, are anticipated to minimize compaction, soil displacement, and reduce surface erosion reaching the stream channel. Application of manual non-commercial treatments located within the no-entry buffer designed to control stocking, reestablish and manage stands and acquire desired vegetation characteristics to meet ACS objectives, are not expected to negatively affect the aquatic resource in the short-term. Implementation of this alternative with the application of the identified mitigation and appropriate KFRA RMP BMP's and the described PDF's are expected to minimize short-term impacts to aquatic resources. In the long-term restored and/or maintained riparian forest stand health would be anticipated to maintain, protect and restore aquatic resources. Alternative 2 proposed treatments would be expected to improve riparian habitat over existing conditions and reduce risk of catastrophic fire similar to actions proposed under Alternative 4, but the extent of protection would be less than Alternatives 3.

Upland vegetative treatments: Proposed upland actions would primarily revolve around thinning and fuel reduction treatments (see Map 22). Upland vegetation treatments would not be expected to directly impact the aquatic resources. Indirect negative impacts from heavy use by logging trucks on the Planning area road network may occur, resulting in elevated sediment production (Chamberlin et al 1991). Increased sediment transmission from road surfaces to stream drainages may occur during the first wet season after treatments, and would reduce as vegetative recovery occurs (Furniss et al 1991).

Terrestrial Species/Habitat Management - No negative impacts to aquatic resources from proposed non-vegetation based wildlife projects would be anticipated under this alternative. Some beneficial impacts to aquatic resources may be realized by maintaining wildlife-based road closures. See road management sections for impacts to aquatic resources of proposed and ongoing road management for Alternative 2.

Watershed Management Actions - *Water quality/beneficial uses:* Alterations in water releases from the hydroelectric facilities would be pursued in order to minimize water quality impairment as a result of annual and daily alterations of the hydrograph. Changes in water release patterns from either the powerhouse or dam would be pursued to reduce temperature gradients. Stream temperatures, which are in part determined by instream flow releases from project dams, are known to strongly influence trout growth (Stillwater 1999). Factors limiting the growth of older trout are not known, but both temperature and food likely affect growth rates. Reduction in daily fluctuations in temperature would be expected to beneficially affect the aquatic species. Biological factors potentially affected, include aquatic habitat, migration, disease resistance, metabolic efficiency, and competition (Hicks et al 1991). Specific fish response may vary depending on species, and location in the river.

Negative impact of altering flows may include increased duration of chronic stress from exposure of fish species to consistently higher temperatures. Refugial habitats from tributary inflow, such as Shovel Creek, may become more important. The proposed instream enhancements, increased pool depths and reduced width to depth ratios, would result in increased habitat complexity which may offset some impacts of exposure to chronic temperature regimes (Poole et al 2001).

River flows: Alterations to instream flow would be pursued in order to enhance fishery and recreational resources. Enhancement of flows under this alternative would assume an increase in base flow during critical summer months both in the bypass reach and below the powerhouse. Stream flows that increase accessibility to overhead cover including undercut banks, overhanging vegetation, logs, and wood jams would enhance fish habitat (Bjorn and Riser 1991). Recommendation that stabilize flows, reduced peaking or run of the river, in tandem with sediment augmentation would be anticipated to foster vegetative growth along the bank and aid toward narrowing the active channel widths, thus improving overhead cover habitat. Stabilizing flows would be expected to result in greater primary production and macro-invertebrate production thus resulting in increased food sources for native fish species (Stillwater 1999).

Continuation of flow diversion from Segment 1, plus ramping/peaking operations below the powerhouse would continue to maintain much of the existing degraded aquatic conditions and species distributions. Diurnal fluctuation in water temperature would continue, but the overall magnitude of daily fluctuations as well as the gradient in the vicinity of the powerhouse would be reduced as a result of increased base flow in the bypass reach. The negative long-term impact to the aquatic resources from such temperature shifts would be reduced. However, impacts to fisheries would continue, including, elevation of temperatures beyond the range preferred for rearing, inhibition of upstream migration of adults, increased susceptibility to disease, reduced metabolic efficiency, and shifts in competitive advantage (Hicks et al 1991).

Conflicts exist between optimal flows for recreational rafting and aquatic resources. Efforts to maintain suitable of daily/seasonal rafting opportunities may come into direct conflict with beneficial flow for aquatic species. The proposed peak flows, for rafting opportunities in Segment 2 and 3, would limit recovery and enhancement of riparian vegetative and maintain widened channels (Marcus et al 1990). The lack of available riparian vegetation would continue to affect the aquatic species in the planning area. Risk of fish stranding on point bars and side channels that are currently being dewatered during peaking operations would continue, however the quantity of area and the rate of flow change would be reduced and thus lessen the impact from existing conditions.

Riparian function: See discussion of riparian vegetation treatments for effects to aquatic resources.

Aquatic Species/Habitat Management - *Sediment Management:* Sediment enhancement would be implemented to replace sediment that has been captured by the project facilities

(Link River dam to J.C. Boyle Dam) and are no longer available to the river channel. Sediment replenishment would enhance instream projects, bank development, and provide additional spawning habitat for native species (trout). The deposition/distribution pattern of additional gravel would largely be based on stream gradient and morphology (Rosgen 1996). In steeper gradient stretches little gravel deposition would be expected to occur, where channel velocities high. In lower gradient stretches such as the Frain Ranch area, and in Segment 3, substantial changes in point bar deposition patterns would be expected to occur. Sediment enhancements would aid in recovery of riparian vegetation by providing rooting areas for riparian species such as willow, alder, cottonwood, sedges, reeds and rushes. Enhanced/recovered riparian vegetation would increase bank strength due to deeper/higher strength root masses and potentially result in bank building (Platts 1991, Marcus et al 1990). Increased riparian vegetation along the river edge would trap fine sediments and contribute to reductions of embeddedness of the larger sediment particles in channel. Bank building may result in narrowing the river channel and reducing the width to depth ratio. Bank vegetation and release from bank water storage, hyporheic flows, would enhance water quality (Poole and Berman 2002), thus providing additional edge aquatic habitats along much of the length of the river during temperature limiting periods in the summer.

The moderate level of sediment regime enhancement proposed would not be expected to substantially contribute to aquatic habitat recovery and enhancement associated with other proposed actions (alteration in flow regimes, bankfull bench installation, cutoff treatments, and channel width treatments).

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): Treating locations with wide channel widths and shallow depths would be anticipated to improve local aquatic habitat (see Map 26). Narrow single thread channels would enhance instream cover to aquatic species and reduce risks of stranding. Cross sectional morphology of stream channels influences the likelihood of stranding (Stillwater 1999). Channels with an abundance of shallow habitat are more likely to have larger areas exposed during down ramping where fish could become separated from the main river flow due to declines in stage.

Proposed channel structures include one or multiple, wing deflectors, “j”-hook type structures, or “w” type channel structures (Rosgen 2001). These structures would aid in formation of mid-channel pools by increasing local shear stress to the existing riverbed and would act as sediment storage areas upstream of the structure. Combined with a sediment replenishment program these structures would then also potentially create spawning habitat for native fish species.

Some treatments in the mainstem channel could incorporate coarse woody debris (CWD). Most treatment with wood in the mainstem would be placement of the wood along the riparian bank edge. In larger stream types, increases in coarse woody debris would block side channels, and create scour pools in the main channel (Murphy and Meehan 1991). Increases in CWD that contribute to logjams in the planning area would enhance the complexity of secondary channels and offchannel sloughs and marshes, effectively increasing habitat complexity and total rearing area. Assuming a sediment augmentation program is implemented sediment deposition potentially may occur upstream or downstream of the log depending on it’s placement in the channel.

The proposed tributary CWD enhancements would be expected to enhance channel morphology, increase retention of organic matter and provide essential aquatic habitat (Murphy and Meehan 1991). Sediment deposition associated with CWD can lead to formation of terraces, thus increasing the size of riparian areas (O’Connel et al 2000). Increased habitat complexity and enhanced riparian vegetative cover would be expected to improve water quality in tributaries such as Hayden Creek or the mouth of Edge Creek, and improve aquatic habitat of resident fish in these systems.

Treatment of side channels/chute cutoffs to limit high flows in these secondary channels would reduce the risk of fish stranding, particularly during hydropower peaking operations. Limiting flow in these cutoffs would concentrate main channel flow, resulting in increased channel velocities in the primary channel. The desired channel response would include increased channel depth and reduced width to depth ratios. The total area of aquatic habitat available for occupancy would be reduced, however the quality and diversity of habitat would be increased.

The proposed treatment of side channels and rerouting the stream channel without a thorough understanding of the site-specific process that formed the channel features may result in negative impact on channel function (Rosgen 1988). Potential site-specific processes would need to be addressed (including meander geometry related to stream size, stream features such as riffle/pool sequences, and hydraulic geometry relationships) in order to protect the channel function. Taking into account channel functions and implementing the proposed river width adjustments, proposed augmentation of sediment (gravel), and proposed instream flows with the treatment of these side channels would be expected to protect and enhance the channel and result in enhanced aquatic habitat diversity.

Long-term beneficial impacts to aquatic resources would be expected from all proposed instream structures, which would enhance channel function, increased hyporheic connectivity, and increase instream habitat complexity.

Bypass canal sidecast actions: Installation of bankfull benches along sections of Segment 1 and removal of side cast within the river channel that is impairing fish passage would alter habitats along approximately 1.25 miles of riverbank. The elevation of these benches would be designed for the average annual peak flow return interval, typically a 1.1 to 1.8 year event, in order to maintain the river continuum for hydrologic function (Rosgen 1998). Placement of bankfull benches along 1.25 miles of the rivers edge dominated by boulder side cast would provide at least some bank stability and a minimal area for riparian vegetation recovery. Installation of bankfull benches with a coordinated transplanting of willow to these bank full benches would be expected to increase the overhanging vegetation along the river edge. Increasing overhead cover habitat would be partially contingent on a sediment replenishment program to provide necessary materials to establish and enhance the bankfull terraces for developing new riparian vegetation (O'Connel et al 2000). In combination, these actions would provide cover habitat for fish species that otherwise doesn't exist in Segment 1 (see Map 26). Additional food sources for aquatic species would also become available from overhanging vegetation through organic matter, such as leaves, insects, and detritus, falling to the river waters (O'Connel et al 2000).

Irrigation diversion treatments (mainstem and tributary): Structural enhancements of all irrigation diversions to improve (reduce) the width to depth ratios of the Klamath River in the Planning area would improve aquatic habitat. Proper design of diversions can also lead to development of pools downstream of the diversion, which also function as aquatic habitat (Rosgen 2001). This action combined with a sediment replenishment program would also be expected to enhance spawning habitat, the structures would function as catchments for gravel-sized bedload.

Range Management - The recommended grazing action on PacifiCorp lands, including deferring grazing until minimum resource condition thresholds are achieved, would be expected to reduce impacts to riparian and aquatic habitats and potentially achieve some degree of recovery within these affected habitats.

Fire and Fuels Management - Extensive use of prescribed fire would occur within the planning area to reduce fuel loads, and to improve plant and wildlife diversity. Most fuel management actions would occur in tandem with proposed vegetation enhancement or constitute a vegetation treatment. Impacts from these types of actions on aquatic resources are described in the Vegetation Management sections. Prescribed fires ignited outside the riparian reserves that are allowed to back into the riparian reserves are not expected to directly negatively affect the aquatic resources.

Contamination of riparian and aquatic habitat from use of volatile chemicals such as gasoline, kerosene, or diesel fuel may occur (as a result of leakage, spill, etc) during fuel management actions within riparian areas. These ignition chemicals have great potential for indirectly negatively affecting aquatic communities and salmonid habitats (Norris et al 1991). With adaptive management in use of ignition fuels, based on transmission potential of the chemical and the buffer distances from streams, the risk to aquatic habitat can be greatly reduced. Implementation of the proposed actions with the application of the identified mitigation and appropriate KFRA RMP BMP's and the described PDF's are expected to the minimize short-term risk of exposure to aquatic resources.

Land Tenure - Implementation of cooperative management agreements, land acquisition, and or land conservation easements would enable the BLM (and cooperators) to administer the lands within the Klamath River planning area to achieve landscape level resource objectives and maintain and enhance resource values. The ability of the BLM to enhance aquatic habitats in the planning area would be expected to improve, through ownership of the lands and would allow a greater range of projects to be implemented, with less administrative clearance needed. Potential land tenure adjustments would eliminate the possibility of residential development of riparian lands within Segment 3. Management of PacifiCorp lands consistent with BLM goals and objectives would be anticipated to enhance and recover aquatic habitat though changes in land use and restoration of riparian habitats.

Hydropower Facilities - *Power production facilities:* Enhancement of flow releases from facilities associated with J.C. Boyle Dam would be pursued under this alternative. The proposed alteration in flow regimes at the powerhouse and changes in spill at the dam would reduce thermal gradients between the Segment 1 and Segment 2, and reduce temperature fluctuations in Segment 2 and 3.

Alteration of fish passage facilities and augmentation of unscreened spill at the J.C. Boyle dam would also be pursued, and would be expected to improve fisheries connectivity between the planning area and upstream habitats. The configuration of the ladder including gradient and fish way entrance is not ideal, and attraction to the ladder is impaired (FishPro 2000). The proposed enhancement of the fish ladder and attraction flow at J.C. Boyle Dam would be expected increase upstream movement of adult fish, currently occupying habitat in planning area reaches of the Klamath River, to important spawning, rearing, foraging areas in the upper river, including Spencer Creek. The proposed increase of unscreened spill from J.C. Boyle dam would enhance unobstructed downstream movement of juvenile salmonids and prey fish into the planning area.

Stabilization of the emergency spillway and implementation of structural controls would likely prevent further degradation of the upper bench and hill slope leading to the river channel. Actions to improve the riparian and channel function impaired by use of the spillway improve aquatic habitats. Channel function and riparian development would be expected to experience some degree of recovery under this alternative.

Transmission line rights-of-way (wildlife proposals): Alterations to the powerlines within the canyon would be proposed in order to enhance the wildlife resources, however, minimal ground disturbing actions are proposed. Maintaining a road network in the canyon to service the transmission line could result in a long-term negative affect to aquatic resources. Erosion of fine sediment to the river channel can result in increased substrate embeddedness and a reduction in aquatic habitat quality for incubation, rearing and forage.

Cumulative Impacts - Changes to the Klamath River geomorphology would be expected to occur under this alternative. River bank development would be expected to change due to the alteration of flow patterns, and augmentation of sediment in the system and implementation of instream projects. Fish stranding would be expected to be reduced as side-channels, chute cutoffs and exposed point bars, which increase stranding risk, would be reduce or eliminated.

Depending of future operations of hydropower facilities proposed actions would reduce the unbalanced longitudinal connectivity, the rates of downstream movement would be similar to upstream movement of fish, and in general, both migratory rates would be higher than under current regimes.

It would be expected that changes in temperature regimes, improvement in flow regimes, enhanced connectivity between the Keno Reach and the Planning area, changes in channel function, and increased reach habitat complexity would beneficially affect the native species. The proposed enhancement of the mainstem channel and tributaries would be expected to improve habitat quality for fry, juvenile, and adult trout. As habitat conditions improve and connectivity improves longitudinally and laterally, the potential would exist for beneficially altering the relative abundance and size class distribution for native species. However, the continuation of ramping/peaking in the planning area would be expected to continue to limit lateral connectivity, reducing the duration of access, to some extent to cover habitats for forage species and fry and juvenile life stages.

This alternative would have greater beneficial affects on aquatic species and habitats than Alternative 1 and 4, but due to continued peaking for rafting, the extent of benefits as those in Alternative 3 would not be achieved.

Alternative 3

Scenery Management (Overlooks, River Corridors) - Limited vegetation management projects are proposed for scenic qualities. The actions proposed under other resources may affect scenic quality and thus scenic management may limit the scope of some projects within the canyon. No direct or indirect effects to aquatic resources are anticipated from scenery management under this alternative.

Recreation Facilities and Management - Proposed recreation actions would have the least impact to aquatic resources under this alternative. The proposed actions to reduce the available recreational opportunities in the canyon would be expected to have direct and indirect negative and beneficial impacts to the aquatic resources (see Map 15).

Maintaining the existing facilities within the riparian reserves disrupts natural habitat connectivity and limits vegetative community development at the site level. The degree of impact to the riparian system per site varies base on the size of the site and the level of use the site receives. The existing camping and recreational developments within the riparian reserves limit available habitat for aquatic and riparian dependant species.

Reduction in the number of recreational sites would be expected to reduce access along the riparian edge. Limited or reduced river access opportunities would be expected to reduce impacts to the aquatic resources.

Indirect impacts may result from increased or even static levels of recreational use due to the removal of fire rings and designated campsites in and adjacent to the riparian reserves. A lower potential for ignition of fuels within the canyon could result from decreased recreational use. Until full fuels management actions have been completed, both the riparian and upland habitats would still be at higher risk of catastrophic fires. As vegetative stands are treated for fuels loading the extent of risk due to human induced ignition would be reduced.

More dispersed non-hardened access trails may become established, and these exposed surfaces (non-vegetated) would be at risk to erosion during the wet season (Furniss et al 1991). Increased human use without toilet facilities, or sites with improperly designed or located facilities, could result in elevated releases of human waste contaminates to aquatic habitats (Clark and Gibbons 1991). The risk to fish may be result from direct impact on the fish or indirect impacts on their forage (Norris et al 1991). Human use may also have indirect impacts to aquatic resources due to firewood collection, reducing riparian CWD and thus indirectly affecting recruitment of CWD to stream channels. In order to prevent cumulative impacts to the aquatic biota, efforts should be made to minimize risks by following RMP BMP guidance, appropriate levels of monitor for usage, and adaptively managing resources based on use impacts.

No new recreation sites would be pursued under this alternative, thus no additional impacts to aquatic habitat would be expected.

Two interpretive sign installations are proposed under this alternative, at Spring Island and Frain Ranch. These proposed interpretive sites are located within the riparian reserves on the Klamath River. Sign locations would be in areas already affected by recreational and vehicular uses and these actions would not contribute additional impacts to riparian reserves.

Approximately 3.5 miles of existing designated trails, plus an additional six miles of new trails, would be maintained under this alternative (see Table 5-9). Within the planning area most trail lengths are located in the riparian reserves of the Klamath River (see Map 15). The existing Turtle Camp trail is not directly adjacent to the river edge and has only limited impacts to the aquatic resources. In locations where the trail crosses drainages, use and maintenance of the trail may locally increase sediment reaching stream channels (Furniss et al 1991). Implementation of best management practices pertaining to trail maintenance would be expected to limit impacts to aquatic habitats.

Approximately four miles of the existing road network along the riparian reserves of the canyon would be converted to hiking trails (see Table 5-9). Impacts from these "new" trails would be similar to those impacts described for existing trails (see Map 15). Some beneficial impacts of road to trail conversion may occur. Hiking trails limit the depth and extent of soil compaction as compared to vehicular access. Road width would be reduced to approximately one half the surface width of vehicular roads to accommodate the hiking/non-motorized trail. This would effectively reduce impacts by an almost equal measure. Ripping extraneous road surface area to improve soil and hydrologic function would be recommended. Conversion of roads to hiking trails would also expand the available surface area for riparian vegetation development. Recovery of riparian vegetation on old road surfaces would be expected to increase surface roughness increasing fine sediment capture. Reductions in surface runoff volume/rate may occur and reduction in sediment transmission to draws and stream channels would be expected to occur. This would in turn reduce the impacts of fine sediment reaching aquatic habitat from existing conditions.

Flows that enhance recreational fishing would be pursued under this alternative. See Watershed Process discussion for impacts of varying flows on aquatic resources.

Minimal impacts to the aquatic ecosystem would be anticipated as a result of the proposed upland recreation projects under this alternative. Some impact to canyon drainages may result from upland OHV trails running through ephemeral channels, meadows, seeps and springs. This type of disturbance may result in development of source areas for sediment transmission to aquatic habitats, particularly during wet periods (Furniss et al 1991).

Road Management - *Road treatments within riparian reserves (improvement/ decommissioning/closure):* Approximately nine miles of road would be affected within the riparian reserves under this alternative, actions would be conducted in order to maintain or enhance ACS objectives, scenic values, or fish and wildlife values (Tables 5-10a and b and 5-11a and b). The dominant road treatment proposed in the riparian reserves would be decommissioning and obliteration (see Map 19a).

Short-term impacts from road decommissioning and obliteration could include increased erosion during the first wet season from loosened soils (Furniss et al 1991). Erosion of exposed and ripped road surfaces potentially could reach stream channels. Fine sediment particles in the river and fish bearing streams would impair aquatic habitat recovery, increase sediment embeddedness, and reduce subsurface percolating flows. Surface erosion would be expected to abate over time through natural revegetation.

Road networks can accelerate peak flows in small watersheds due to road network increasing the effective drainage network of a watershed (Marcus et al 1990). Reductions in road density through decommissioning and obliteration would reduce exposed surface area for potential surface erosion, improved surface drainage of roads outside of draws, and increased infiltration of water to subsurface layers, thus reducing ditchline runoff and the potential transport of sediment to riparian and aquatic habitat (Furniss et al 1991, Chamberlin et al 1991). Overall road densities in the riparian reserves would be expected to decrease somewhat under this alternative, thus positively affecting peak flow patterns and sediment patterns in the river and fish bearing tributaries.

The proposed implementation of administrative use seasonal closures (see Map 19b) of unsurfaced and low use roads within the planning area would protect these road surfaces during the wet season thus reducing the potential and extent of surface erosion reaching stream channels (Furniss et al 1991).

The proposed maintenance improvement of roads would be expected to reduce sediment production from these road surfaces (Furniss et al 1991). This would in turn improve local water quality in tributary stream that may be affected by these treatments. Localized benefits to aquatic species would occur, by reducing sediment delivery to aquatic habitats. Mainstem water quality is not likely to be substantively affected due the small percentage of road treatment proposed under this alternative and the extent of watershed upstream of the planning area.

Stream crossing upgrades: The proposed stream crossing upgrades under this alternative would be expected to have short-term negative indirect impacts to aquatic habitat and aquatic species. Actions would be limited to dry season operations so no aquatic species would be present during construction. Construction actions within the streambed would disturb stream substrate, and potentially increase erosion by loosening riparian soils and stream banks (Furniss et al 1991). Increased erosion potentially would reduce habitat quality during the first wet season after construction. Long-term enhancement of aquatic habitat would be expected as stream substrate, banks, and riparian habitats re-vegetate and stabilize. Improved stream crossing would provide better aquatic species access to upstream habitats and would be expected to reduce roadbed sediment from reaching stream channels.

Bridge treatments and upgrades (Rock Creek, Upper Frain, Lower Frain, Stateline): Upper Frain Ranch and Stateline bridge sites have created flow constrictions increasing water velocities adjacent to and below the site and subsequently over-widened channels downstream, such as width to depth ratio and sediment transport (Rosgen 1996). Lower Frain Ranch bridge site multiple buttressing has resulted in over-widening of the channel at the crossing. These over-widened channels spread flow out across a much larger streambed. The downstream channels have higher width to depth ratios (reduced water depths), negatively affect the local aquatic habitat. Structural enhancement of the banks and adding bank full benches within the bridge's area of influence of the river channel will improve channel function locally (Rosgen 1998). Removal of road prisms within the flood plain would increase flood plain connectivity to the river channel and would reduce channel stress from concentration of flow during peak flow events.

The enhancement of vegetated edge overhead cover habitat would provide cover for fish when instream cover is less suitable. Overhead cover including undercut banks, overhanging vegetation, logs, and debris jams are typically important fish habitat in streams (Bjornn and

Reiser 1991). Efforts to restore affected bank edges, and addressing interrelated impacts of past peaking operations effects on downstream banks by enhancing width to depth ratios and restoring flood plain function, would increase quality and accessibility to overhead cover habitats.

Road treatments upland (decommissioning/closure/upgrade): Decommissioning, obliteration, and improvements to the upland road network is proposed under this alternative (see Matrix Roads and Access Alternative 3). Most actions are identified objectives as a means of improving watershed processes (wetland-meadow habitats), to maintain the proposed road network, and meet identified actions within the RMP. These proposed projects are not anticipated to directly affect the aquatic resources of the canyon (see Map 19a). Reduction in road densities in the canyon and improvement of drainage features for the road lengths potentially could indirectly cumulatively benefit the aquatic resources. Reductions in surface erosion from road networks, improved surface drainage of roads outside of draws, and increased infiltration of surface waters to subsurface layers would in turn potentially reduce additional water and road sediment from reaching aquatic habitat (Furniss et al 1991). Thus positively affecting peak flow patterns and sediment patterns in the river and fish bearing tributaries.

Cultural Resource Management - *Interpretive sites:* Interpretive sites are proposed for the cultural and historic resources of the canyon along Topsy Grade, and Beswick. See Recreation Resources affects analysis for impacts of interpretive site construction for impacts to aquatic resources.

Site protection actions: Actions to protect prehistoric cultural resource sites in the canyon are proposed under this alternative. Many of the protective measures would be conducted within the riparian reserves of the canyon. Most actions would include decommissioning or obliteration of roads currently leading to or through cultural sites, which would prevent further damage from vehicular access. Construction of fencing may also be incorporated so as to reduce/hinder access to cultural sites.

Decommissioning or, obliteration of roads and fence construction in riparian reserves is not expected to have a negative affect on aquatic resources, some beneficial impacts may occur by limiting/reducing vehicle use within the riparian reserves (see Road Closure discussion in Road Management affects analysis).

Vegetation Management - *Riparian vegetative treatments:* Proposed vegetation treatments (see Map 23) that increase the vegetative diversity, reduce fuel loading to reduce risk of catastrophic fire, and enhance riparian stands to accelerate CWD recruitment to stream channels, would have the greatest value to aquatic resources. A range of actions would occur under this alternative in the riparian reserves from mechanical and hand thinning, mechanical and hand piling, pile burning, and broadcast burning. In riparian reserves the individual proposed treatments would be designed to meet the Aquatic Conservation Strategies and would be reviewed for consistency with River Plan objectives and resource goals by the KFRA riparian team and the KFRA ID team.

Indirect impacts to aquatic habitats from riparian vegetation manipulation could result from actions proposed within this alternative. Removal or reduction in the riparian canopy could produce an increase in summer temperatures and a decrease in winter temperatures (Marcus et al 1990). Cumulative impacts to fishery resources of increased stream temperatures can include chronic stress and reduce fishery productivity from exposure to elevated sub-lethal temperatures. Larger streams, such as the mainstem river reaches in the planning area, would be more affected by removal of the taller vegetation within the riparian areas and less affected by understory treatments. In addition, reduced canopy cover can reduce inputs of organic debris and invertebrates from overhanging branches thereby reducing forage available to aquatic species.

Indirect effects of vegetative management may also occur as a result of using mechanical equipment in the riparian reserves. Road surfaces, landings, skid trails, ditches and disturbed areas can alter pathways water takes to stream channels, alter peak flows, and contribute sediment to stream channels (Chamberlin et al 1991). Changes in flow patterns and increased sediment transport would cause negative impacts to aquatic habitat and aquatic species.

Minimal harvesting and non-commercial treatments within the riparian reserves where CWD needs are met, and actions that maintain or contribute to moving stream channels toward PFC are not expected to have short-term negative impacts to the aquatic resources. Locating mechanical treatments outside the no-entry buffers, and following recommended PDF's, are anticipated to minimize compaction, soil displacement, and reduce surface erosion reaching the stream channel. Application of manual non-commercial treatments located within the no-entry buffer designed to control stocking, reestablish and manage stands and acquire desired vegetation characteristics to meet ACS objectives, are not expected to negatively affect the aquatic resource in the short-term. In the long-term restored and/or maintained riparian forest stand health would be anticipated to maintain, protect and restore aquatic resources. Alternative 3 proposes the most extensive vegetative treatments across the full planning area. The proposed actions would be expected to improve riparian habitat over existing conditions and reduce risk of catastrophic fire. This alternative would be expected to move riparian vegetative communities within the natural range of variation in the shortest time frame (see Map 23). This alternative would provide greatly accelerated rates of protection to vegetative communities, including riparian habitats, as compared to Alternatives 1, 2 and 4.

Upland vegetative treatments: Proposed upland actions would primarily revolve around thinning and fuel reduction treatments. Upland vegetation treatments would not be expected to directly impact the aquatic resources. Indirect negative impacts from heavy use of the Planning Area road network may occur, resulting in elevated sediment production (Chamberlin et al 1991). Increased sediment transmission from road surfaces to stream drainages may occur during the first wet season after treatments, and would reduce as vegetative recovery occurs (Furniss et al 1991). Implementation of this alternative with the application of the identified mitigation and appropriate BMP's and the described PDF's are expected to minimize short-term impacts to aquatic resources.

Terrestrial Species/Habitat Management - No negative impacts to aquatic resources from proposed non-vegetation based wildlife projects would be anticipated under this alternative. Some beneficial impacts to aquatic resources may be realized by maintaining wildlife based road closures. See road management sections for impacts to aquatic resources of proposed and ongoing road management for Alternative 3.

Watershed Management Actions - *Water quality/beneficial uses:* Alterations in water releases from the hydroelectric facilities would be pursued in order to eliminate water quality impairment as a result of power operations annual and daily alteration of the hydrograph. Changes in water release patterns from both the powerhouse and dam would be pursued to reduce temperature gradients. Stream temperatures, which are in part determined by instream flow releases from project dams, are known to strongly influence trout growth (Stillwater 1999). Factors limiting the growth of older trout are not known, but both temperature and food likely affect growth rates. Reduction in daily fluctuations in temperature would be expected to beneficially affect aquatic species. Biological factors potentially affected include aquatic habitat, migration, disease resistance, metabolic efficiency, and competition (Hicks et al 1991). Specific fish response may vary depending on species and location in the river.

Negative impacts of altering flows to minimize temperature fluctuation may include increased duration of chronic stress from exposure of fish species to consistently higher water temperatures. Refugial habitats from tributary inflow, such as Shovel Creek, may become more important during certain times of the year. The proposed instream enhancements, increased pool depths and reduced width to depth ratios, would result in increased habitat complexity which may offset some impacts of exposure to chronic temperature regimes (Poole et al 2001).

River flows: Alterations to instream flow would be pursued in order to enhance aquatic and riparian resources. Enhancement of flows under this alternative would assume restoration to unaltered flow from J.C. Boyle dam. This would result in substantial increases in base flow during critical summer months both in the bypass reach and below the powerhouse. Stream flows that increase accessibility to overhead cover including undercut banks, overhanging vegetation, logs, and wood jams would enhance fish habitat (Bjorn and Riser 1991). Implementation of the recommended unimpaired run of the river flow patterns, in tandem with restored sediment regimes would foster vegetative growth along the bank and aid toward narrowing the active channel widths, thus improving overhead cover habitat. Stabilizing flows would be expected to result in greater primary production and macro-invertebrate production thus resulting in increased food sources for native fish species (Stillwater 2000).

Artificial ramping/peaking operations below the powerhouse and high percentages of the river being bypassed from segment one would be eliminated. Diurnal fluctuation in water temperature would end, temperature gradients would be eliminated or reduced as a result of unimpaired flows in the bypass reach. The negative impact to the aquatic resources from such temperature shifts would largely be eliminated. Negative impacts to fisheries from unimpaired flow may include elevation of base temperatures beyond the range preferred for rearing, inhibition of upstream migration of adults, increased susceptibility to disease, reduced metabolic efficiency, and shifts in competitive advantage (Hicks et al 1991).

Conflicts that exist between flows most suitable for recreational rafting and aquatic resources would be resolved in favor of aquatic species. Efforts should be made to determine the optimum flows for all native species of fish that would exist in the canyon. These flows should address the critical link between connectivity to habitat resources both upstream and downstream of the planning area for the fish species present.

Riparian function: See discussion of riparian vegetation treatments for affects to aquatic resources.

Aquatic Species/Habitat Management - *Sediment management:* Restoration of coarse sediment that has been captured by the project facilities (Link River dam to J.C. Boyle Dam) and is no longer supplied to the river in the planning area would occur under this alternative. Treatment would enhance instream projects, bank development, and provide additional spawning habitat for native species (trout). The deposition/distribution pattern of additional gravel would largely be based on stream gradient and morphology (Rosgen 1996). In steeper gradient stretches little gravel deposition would be expected to occur, where channel velocities are high. In lower gradient stretches, such as the Frain Ranch area and below Stateline, substantial changes in point bar deposition patterns would be expected to occur. Sediment enhancements would aid in recovery of riparian vegetation by providing rooting areas for riparian species such as willow, alder, cottonwood, sedges, reeds and rushes. Enhanced/recovered riparian vegetation would increase bank strength due to deeper/higher strength root masses and potentially result in bank building (Platts 1991, Marcus et al 1990). Increased riparian vegetation along the river edge would trap fine sediments and contribute to reductions of embeddedness of the larger sediment particles in channel. Bank building may result in narrowing the river channel and improving the width to depth ratio. Bank vegetation and discharge from bank water storage, hyporheic flows, would enhance water quality (Poole and Berman 2002), thus providing additional edge aquatic habitats along much of the length of the river.

Without some degree of sediment regime recovery most other actions proposed to enhance aquatic habitat; including alteration in flow regimes, bankfull bench installation, cutoff treatments, and channel width treatments would not be expected to substantially contribute to aquatic habitat recovery/enhancement.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): Treating locations with wide channel widths and shallow depths would be anticipated to improve local aquatic habitat (see Map 27). Narrow single thread channels would enhance instream cover to aquatic species and reduce risks of stranding. Cross sectional morphology of stream channels influences the likelihood of stranding (Stillwater 1999). Channels with an abundance of shallow habitat are more likely to have larger areas exposed during down ramping where fish could become separated from the main river flow due to declines in stage.

Proposed channel structures include one or multiple wing deflectors, "j"-hook type structures, or "w" type channel structures (Rosgen 2001). These structures would aid in formation of mid-channel pools by increasing local shear stress to the existing riverbed and would act as sediment storage areas upstream of the structure. Combined with restoration of sediment regimes these structures would then also potentially create spawning habitat for native fish species.

Some treatments in the mainstem channel could incorporate coarse woody debris (CWD). Most treatment with wood in the mainstem would be placement of the wood along the riparian bank edge. In larger stream types, increases in coarse woody debris would "cap" side channels, and cause scour pools (Murphy and Meehan 1991). Increases in CWD that contribute to logjams in the planning area would enhance secondary channels and off-channel sloughs and marshes, effectively increasing habitat complexity and total rearing area. Assuming restoration of sediment is implemented, sediment deposition potentially may occur upstream or downstream of the log depending on it's position in the channel.

The proposed tributary CWD enhancements would be expected to enhance channel morphology, increase retention of organic matter and provide essential aquatic habitat (Murphy and Meehan 1991). Sediment deposition associated with CWD can lead to formation of terraces, thus increasing the size of riparian areas (O'Connel et al 2000). Increased habitat complexity and enhanced riparian vegetative cover would be expected to improve water quality in tributaries such as Hayden Creek or the mouth of Edge Creek, and improve aquatic habitat of resident fish in these systems.

Treatment of side channel/chute cutoffs to limit high flows in these secondary channels would reduce the risk of fish stranding, particularly during hydropower peaking operations. Limiting flow in these cutoffs would concentrate main channel flow, resulting in increased channel velocities in the primary channel. The desired channel response would include increased channel depth and reduced width to depth ratios. The total area of aquatic habitat available for occupancy would be reduced, however the quality and diversity of habitat would be increased.

The proposed treatment of side channels and rerouting the stream channel without a thorough understanding of the site-specific process that formed the channel features may result in negative impacts on channel function (Rosgen 1988). Potential site-specific processes that would need addressing including meander geometry related to stream to size, stream features such as riffle/pool sequences, and hydraulic geometry relationships in order to protect the channel function. Taking into account channel functions and implementing the proposed river width adjustments, proposed augmentation of sediment (gravel), and proposed instream flows with the treatment of these side channels would be expected to protect and enhance the channel and result in enhanced aquatic habitat diversity.

Long-term beneficial impacts to aquatic resources would be expected from all proposed instream structures, which would enhance channel function, increased hyporheic connectivity, and increase instream habitat complexity. Enhancement of the tributary stream Shovel Creek would increase quality and quantity of aquatic habitat on up to two miles of important fish bearing water in Segment 3.

Bypass Canal side cast actions: Removal of the sidecast, resulting from the hydro-power canal and road construction, on historic floodplains and within the river channel would alter aquatic habitats along approximately 1.25 miles of river. Excavation and removal of sidecast material would be down to historic flood prone elevations. Excavation to historic flood prone elevation should be at or near the average bankfull flow return interval. Reaching this elevation is critical in order to restore lateral connectivity and hydrologic function (Rosgen 1998). Restoring the 1.25 miles of the rivers edge impaired by side cast boulder debris would provide some bank stability and minimal area for riparian vegetation recovery. Restoration of flood prone terraces with a coordinated transplanting of willow would be expected to increase the overhanging vegetation along the streams edge. Increasing overhead cover habitat would be partially contingent on a sediment replenishment program to provide necessary materials to establish and enhance the bankfull terraces for developing new riparian vegetation (O'Connel et al 2000). In combination, these actions would provide cover habitat for fish species that otherwise doesn't exist in Segment 1. Additional food sources for aquatic species would also become available from overhanging vegetation through organic matter falling to the river waters, such as leaves, insects, and detritus (O'Connel et al 2000).

Irrigation diversion treatments (mainstem and tributary): All irrigation diversions impairing channel function of the Klamath River in the Planning area would be recommended for removal in the long term. This action would involve incremental implementation in order to protect/restore meadow habitat in the short term. Removal of diversions and installing bankfull benches would protect and enhance the river hydrologic function (Rosgen 1998). Installation of these benches with coordinated riparian vegetative transplanting would be expected to increase the overhanging vegetation along the streams edge. Increasing overhead cover habitat would be partially contingent on sediment deposition to provide necessary materials to establish and enhance the bankfull terraces for developing new riparian vegetation (O'Connel et al 2000). Additional food sources for aquatic species would also become available from overhanging vegetation through organic matter falling to the river waters, such as leaves, insects, and detritus.

Range Management - Livestock grazing can affect the riparian environment by reducing or changing vegetation, and eliminating riparian areas by channel widening, channel aggrading, or lowering of the water table (Platts 1991). Riparian zones are often grazed more heavily than upland zones because they have flatter terrain, water, shade, and succulent vegetation. Reduction in ground cover vegetation and increase in soil compaction associated with livestock use causes increased runoff (see water quality) and can negatively affect aquatic habitats. The recommended deferral of grazing action on all lands within the planning area would be expected to eliminate ongoing impacts to riparian and aquatic habitats and potentially achieve some degree of recovery within these affected habitats.

Fire and Fuels Management - Extensive use of prescribed fire would occur within the planning area to reduce fuel loads, and to improve plant and wildlife diversity. Most fuel management actions would occur in tandem with proposed vegetation enhancement or constitute a vegetation treatment. Impacts from these types of actions on aquatic resources are described in the Vegetation Management sections. Prescribed fires ignited outside the riparian reserves that are allowed to back into the riparian reserves are not expected to directly negatively affect the aquatic resources.

Contamination of riparian and aquatic habitat from use of volatile chemicals such as gasoline, kerosene, or diesel fuel may occur (as a result of leakage, spill, etc) during fuel management actions within riparian areas. These ignition chemicals have great potential for indirectly negatively affecting aquatic communities and salmonid habitats (Norris et al 1991). Implementation of the proposed actions with the application of the identified mitigation and appropriate KFRA RMP BMP's and the described PDF's are expected to the minimize short-term risk of exposure to aquatic resources.

Land Tenure - Implementation of cooperative management agreements, land acquisition, and or land conservation easements would enable the BLM (and cooperators) to administer the lands within the Klamath river planning area to achieve landscape level resource objectives and maintain and enhance resource values. The ability of the BLM to improve aquatic habitats in the planning area would be expected to improve as ownership of the lands would allow a greater range of projects to be implemented as less administrative clearance would be needed to implement projects. Potential land tenure adjustments would eliminate the possibility of residential development of riparian lands within Segment 3. Management of PacifiCorp lands consistent with BLM goals and objectives would be anticipated to enhance and recover aquatic habitat though changes in land use and restoration of riparian habitats.

Hydropower Facilities - *Power production facilities:* Enhancement of flow releases from facilities associated with J.C. Boyle Dam would be pursued under this alternative. The proposed alteration in flow regimes at the powerhouse and changes in spill at the dam would reduce thermal gradients between the Segment 1 and Segment 2, and reduce temperature fluctuations in Segments 2 and 3.

Alteration of fish passage and augmentation of unscreened spill at the J.C. Boyle dam would also be pursued, and would be expected to improve fisheries connectivity between the planning area and upstream habitats. The configuration of the ladder including gradient and fish way entrance is not ideal, and attraction to the ladder is impaired (FishPro 2000). The proposed alteration of the fish passage facilities and attraction flow at J.C. Boyle Dam would be expected increase upstream movement of adult fish, currently occupying habitat in planning area reaches of the Klamath River, to important spawning, rearing, foraging areas in the upper river, including Spencer Creek. The proposed increase of unscreened spill from J.C. Boyle dam would enhance unobstructed downstream movement of juvenile salmonids and prey fish into the planning area.

Restoration of the eroded hill slope and floodplain below the emergency spillway would occur under this alternative by removing all of debris within the floodplain and river channel. Methods to stabilize and prevent further degradation of the site would also occur. Removal of debris on the flood plain would restore connectivity of the riparian areas and stream edge habitats. Channel function and riparian development would be expected to recover to the greatest extent under this alternative.

Transmission line rights-of-way: Extensive alteration of the power lines within the canyon is proposed under this alternative.

<u>Option One</u> - In general, burying power lines outside of riparian reserve's would have limited negative short-term impacts to aquatic habitats. Burial of power lines across drainages would result in exposed surfaces and potentially result in elevated risks of sediment transmissions reaching aquatic habitats (Furniss et al 1991). Construction during dry seasons and use of sediment reduction materials such as mulching would be expected to minimize this risk. Revegetation of exposed soils with native grasses, shrubs and trees would be expected reduce/eliminate long-term sediment concerns.

<u>Option Two -</u> Removal of the low voltage power line system within the canyon would have minimal impact to the aquatic system. Short-term impacts may be occurring as a result of efforts to remove the power lines and the interrelated/interdependent impacts from the removal of road networks only necessary to access the power lines. See road decommissioning discussions in the Road and Access section for impacts of removal power line access roads.

Cumulative Impacts - Beneficial changes to the Klamath River geomorphology would be expected to occur under this alternative. River bank development would be expected to change due to the alteration of flow patterns, augmentation of coarse sediment in the system, and implementation of instream projects. Fish stranding would be expected to be reduced as side-channels, chute cutoffs and exposed point bars, which increase stranding risk, would be reduce or eliminated.

Depending of future operations of hydropower facilities, proposed actions would reduce the unbalanced longitudinal connectivity, the rates of downstream movement would be similar to upstream movement of fish and, in general, both migratory rates would be higher than under current regimes.

It would be expected that changes in temperature regimes, improvement in flow regimes, enhanced connectivity between the Keno Reach and the Planning area, changes in channel function, and increased reach habitat complexity would beneficially affect the native species. The proposed enhancement of the mainstem channel and tributaries would be expected to improve habitat quality for fry, juvenile, and adult trout. As habitat condition improves and connectivity improves longitudinally and laterally, the potential would exist for beneficially altering the relative abundance and size class distribution for native species. Ramping/ peaking in the planning area would not occur and impacts from that activity would end. The rate of recovery of instream and riparian habitat would be enhanced as a result of the cessation of artificial peaking.

This alternative has the greatest potential for achieving fisheries objectives in the Klamath River canyon. This alternative would provide greater beneficial effects to aquatic species and habitats than all other proposed alternatives.

Alternative 4

Scenery Management (Overlooks, River Corridors) - Limited vegetation management projects are proposed for scenic qualities. The actions proposed under other resources may affect scenic quality and thus scenery management may limit the scope of some projects within the canyon. No direct or indirect affects to aquatic resources are anticipated from scenery management actions proposed under this alternative.

Recreation Facilities and Management - The existing facilities within the riparian reserves disrupt natural habitat connectivity, limit vegetative community development at the site level, and indirectly affect the quality and quantity of habitat for aquatic and riparian dependant species. The degree of impact to the riparian system per site varies based on the size of the site and the level of use the site receives.

The proposed location for the Shovel Creek campground is near the riparian corridor of the Klamath River and Shovel Creek on PacifiCorp lands (see Map 16). The local vegetative community has substantially been altered from historic conditions; species present are predominately of pasture grass varieties with some riparian dependant vegetation occurring adjacent to the riverbank. To be consistent with NFP and RMP direction any new camping facility should be constructed outside these riparian corridors, sitting camp units and support facilities at least 280 feet from the Klamath River and Shovel Creek, or the camping facility should be specifically designed to maintain ACS objectives. Access to the river would be based on existing access point were feasible. Any additional access points should be designed so as to protect riparian vegetation and bank stability. Actions proposed that are beyond the extent of those impacts addressed here would need additional NEPA analysis.

Designated campsites without toilet facilities, or with improperly sited or designed facilities, could result in elevated releases of human waste contaminates to aquatic habitats (Clark and Gibbons 1991). The risk to fish may be through direct impact on the fish or indirectly on forage (Norris et al 1991). The additive impacts of Alternative 4 recreation actions on water quality to the aquatic resources are uncertain. In order to prevent cumulative impacts to the aquatic biota, efforts should be made to minimize risks by following RMP BMP guidance on campsite location and providing restroom facilities when needed, based on site usage. Human use may also have indirect impacts to aquatic resources due to firewood collection, reducing riparian CWD and thus indirectly affecting recruitment of CWD to stream channels.

Construction of a raft launch facility at J.C. Boyle dam would be expected to impact aquatic systems by disrupting the natural connectivity of aquatic habitat to the riparian community, limiting development of riparian vegetation, and creating routes for sediment to reach the river (see Map 16).

Construction/hardening of new parking areas along the bypass canal road are proposed under this alternative in order to provide public access to the bypass reach channel for fishing. Indirect impacts to aquatic resources from impacts to riparian reserves would not be expected to occur as parking locations are proposed on previously disturbed sidecast and fill slopes of the road, no riparian vegetation would be affected. Potential increases in sediment reaching the stream channel may occur as a result of increased use of road surfaces (Chamberlin et al 1991).

Several interpretive sites (J.C. Boyle Dam fish ladder, J.C. Boyle Powerhouse, Spring Island, and Frain Ranch) are proposed within the riparian reserves under this alternative. J.C. Boyle Powerhouse has massively altered the riparian habitat and reduced quality of aquatic habitats. No additional impacts to aquatic species or habitats would be expected from the interpretive site.

Construction of interpretive facilities at J.C. Boyle dam may affect the recovering of the vegetative community at the site. A non-hardened (native surface) parking area is adjacent to the dam access road. Use of this area for parking and creating a trail on the existing native surface road leading to the base of the dam would be expected to have the least impact on the riparian community and thus minimal impact to aquatic habitat.

Additions of interpretive sites at Spring Island and Frain Ranch are not anticipated to have additive impacts to aquatic resources over the existing condition and other proposed actions at these locations.

Three miles of existing designated trails would be maintained under this alternative. In addition, just under three miles of existing road would be converted to trails. Within the planning area most trail lengths are located in the riparian reserves of the Klamath River. The existing Turtle Camp Trail is not directly adjacent to stream edges and has only limited impacts to the aquatic resources. In locations where the trail crosses drainages, use and maintenance of the trail may locally increase sediment reaching stream channels (Furniss et al 1991). Implementation of best management practices pertaining to trail maintenance would be expected to limit impacts to aquatic habitats.

Over 18 miles of new trails would be constructed within the riparian reserves of the planning area under this alternative (see Map 16 and Table 5-9). Five of those miles of new trails are proposed to be constructed on and immediately adjacent to recently exposed flood prone areas within Segment 1 under this alternative. Exposed surfaces (non-vegetated and/or hardened) associated with trails would be at risk to erosion during the wet season (Furniss et al 1991). In addition, these exposed surfaces would be at greater risk to substantial degradation under channel forming flows that reach trail surfaces. Any sidecast from trail construction within the bypass reach that falls to the river may directly affect aquatic habitat. Efforts should be made to minimize debris reaching river channels. The proposed bypass reach trail when located adjacent to the river channel or on the flood area would be anticipated to affect riparian vegetation and potentially aquatic habitats. Implementation of PDF's, including locating trails properly, and enhancement of riparian and uplands vegetation between the trail and river edge would limit the impacts to aquatic habitats.

Trail construction and maintenance typically includes cutting/bucking downed woody debris in order to provide unobstructed routes for human use. Bucking of logs that may reach to the river channel would be expected to reduce the value of these as CWD in for creating and improving aquatic habitats. Larger wood would be expected to resist high flows and alter local channel morphology by creating scour pool and sediment depositional areas. Both these channel features are beneficial to aquatic habitat. Implementing trial maintenance PDF's would protect riparian and aquatic CWD source material.

Flows that enhance recreational rafting and recreational fishing would be pursued under this alternative. See Watershed Process discussion for impacts of varying flows on aquatic resources.

Minimal impacts to the aquatic ecosystem would be anticipated as a result of the proposed upland recreation project under this alternative. Some impact to canyon drainages may result from upland OHV trails running through ephemeral channels, meadows, seeps and springs. This type of disturbance may result in development of source areas for sediment transmission to aquatic habitats, particularly during wet periods (Furniss et al 1991).

Road Management - *Road treatments within riparian reserves (improvement/ decommissioning/closure):* Approximately 11 miles of road would be affected within the riparian reserves under this alternative (Tables 5-10a and b and 5-11a and b). Actions would be conducted in order to maintain or enhance existing road networks or to maintain and enhance ACS objectives (see Map 20a). The majority of road miles treated in the riparian reserves would be contiguous treatments, decommissioning or seasonal closures (see road treatment table). Some roads proposed for obliteration would be converted from the vehicular access roads to non-motorized hiking trails.

Short term impacts from road decommissioning could include increased erosion during the first wet season from loosened soils (Furniss et al 1991). Erosion of exposed and ripped road surfaces potentially could reach stream channels. Fine sediment particles in the river and fish bearing streams of the Canyon would impair aquatic habitat recovery, increasing sediment embeddedness, reducing subsurface percolating flows. Surface erosion would be expected to abate over time through natural revegetation.

Reduction in road densities in the riparian corridors of the planning area and improvement of drainage features for the remaining road lengths potentially could provide indirect long-term benefits to the aquatic resources. Road networks can accelerate peak flows in small watersheds due to road network increasing the effective drainage network of a watershed (Marcus et al 1990). Reductions in road density through decommissioning would reduce exposed surface area for potential surface erosion, improve surface drainage of roads outside of draws, and increase infiltration of water to subsurface layers, thus reducing ditchline runoff and the potential transport of sediment to riparian and aquatic habitat (Furniss et al 1991, Chamberlin et al 1991). Overall road densities in the riparian areas would be expected to decrease somewhat under this alternative, thus positively affecting peak flow patterns and sediment patterns in the river and fish bearing tributaries.

The proposed installation of administrative and seasonal use closures (see Map 20b) of unsurfaced and low use roads within the planning area would protect these road surfaces from use during the wet season thus reducing the potential and extent of surface erosion reaching stream channels (Furniss et al 1991).

The proposed improvement of planning area roads would be expected to reduce sediment production from these road surfaces (Furniss et al 1991). This would in turn improve local water quality in tributary streams that may be affected by these treatments. Localized benefits to aquatic species would occur by reducing sediment loads to aquatic habitats. Mainstem water quality is not likely to be substantively affected due the small percentage of road treatment proposed under this alternative and the extent of watershed upstream of the planning area.

Stream crossing upgrades within riparian reserves: The proposed stream crossing upgrades under this alternative would be expected to have short-term negative indirect impacts to aquatic habitat and aquatic species. Actions would be limited to dry season operations so no aquatic species would be present during construction. Construction actions within the streambed would disturb stream substrate, and potentially increase erosion by loosening riparian soils and stream banks (Furniss et al 1991). Increased sediment potentially would reduce habitat quality during the first wet season after construction. Long-term enhancement of aquatic habitat would be expected as stream substrate, banks, and riparian habitats re-vegetate and stabilize. Improved stream crossings would provide enhanced aquatic species access to upstream habitats and would be expected to reduce road surface erosion from reaching stream channels.

Bridge treatments and upgrades (Rock Creek, Upper Frain, Lower Frain, Stateline): Upper Frain Ranch and Stateline bridge sites have created flow constrictions, increasing water velocities and subsequently altering channel features, such as width to depth ratio and sediment transport (Rosgen 1996). The downstream channels have higher width to depth ratios (reduced water surface depths), which negatively affect the local aquatic habitat. Structural enhancement of the banks and adding bank full benches within the bridges influence of the river channel will improve channel function locally. Increasing span length, or designing bridge abutments to be isolated during high flows would aid in hydrologic function at the site. Increases in flood plain connectivity to the river channel would reduce channel stress from concentration of flow during peak flow events.

Peaking operations make edge habitat only available for short periods of time during low flow periods. Overhead cover including undercut banks, overhanging vegetation, logs, and debris jams are typically important fish habitat in streams (Bjornn and Reiser 1991). Fish within the degraded reaches are limited in accessing these overhead cover habitat types. Efforts to design bridge sites with lowered width to depth ratios and flood plain function would reduce impacts of peaking flows on aquatic species by increasing accessibility of overhead cover habitats.

Improving the lower Frain Ranch Bridge site would aid in narrowing the active channel width both above and below the site. Reducing the width to depth ratio at this location would increase water depth and provide more available habitat during low flow periods.

Redesign of Rock Creek bridge and the stream channel would occur under this alternative. Fish species do not occupy Rock Creek reaches affected by the proposed bridge and channel enhancements. Proposed improvements to route water through the bridge, rather than down the road bed, would be expected to improve aquatic habitat downstream by reducing sediment transmissions. However, short-term (first wet season) negative effects to aquatic habitat downstream of the bridge site may occur from sediment transport, as a result of in stream work.

J.C. Boyle Dam Bridge would be replaced with a modern vehicle load bearing bridge. The existing bridge currently is condemned for vehicular use. Reconstruction of this bridge would likely increase fine sediment production during construction and first wet season after (Furniss et al 1991), particularly due to footing excavation and installation. The bridge additionally constricts channel width, locally creating a pool downstream of the bridge. The withdrawal of water from the site, for power production, has reduced the extent of potential impacts of the bridge location. Changes of instream flow in segment 1, as a result of fisheries flows, may have additional impacts without design accounting for potential flow ranges. Design of a new bridge at this site should account for changes in instream flow. The log stringer bridge is made up of asphalt treated wood members that may impact water quality if material is not moved away from the channel after construction. Removal of these timbers from the river is recommended to prevent wood preservatives from contaminating aquatic habitats.

Road treatments upland (decommissioning/closure/upgrade): Extensive improvements of the upland road network are proposed under this alternative (see Appendix H Roads and Access Alternative 4). Most actions are identified as a means of improving watershed processes, to maintain the existing road network, and meet identified objectives within the RMP. These proposed projects are not anticipated to directly affect the aquatic resources of the canyon (see Map 20a). Road networks can accelerate peak flows in small watersheds due to road network increasing the effective drainage network of a watershed (Marcus et al 1990). Reductions road density through decommissioning would reduce exposed surface area for potential surface erosion, improve surface drainage of roads outside of draws, and increase infiltration of water to subsurface layers, thus reducing ditchline runoff and the potential transport of sediment to riparian and aquatic habitat (Furniss et al 1991, Chamberlin et al 1991).

Cultural and Historical Resources and Traditional Use Areas - *Interpretive sites:* Interpretive sites are proposed for the cultural and historic resources of the canyon along Topsy Grade, and Beswick. See Recreation Resources section for impacts of interpretive site construction for impacts to aquatic resources.

Site protection actions: Actions to protect prehistoric cultural resource sites within the riparian reserves of the canyon include capping of sites with surfacing materials such as crushed gravel, boulders, and/or dirt fill. Placement of these materials near or adjacent to the river channel could result in a short term increase in fine particulates reaching aquatic habitat. As vegetative recovery takes place and the initial washing of surface sediment occurs the extent of this impact would be minimal.

Proposed fencing actions would not be expected to directly affect aquatic habitat. Fencing actions proposed to protect cultural sites may have an indirect beneficial affect on riparian resources and aquatic habitat by reducing human use impacts within these protected areas.

Vegetative Management - (Includes actions for fuels, wildlife habitat, silviculture and weed control.)

Riparian vegetative treatments: Proposed vegetation treatments that would increase the vegetative diversity, reduce fuel loading to reduce risk of catastrophic fire, and enhance riparian stands to accelerate CWD recruitment to stream channels, would have the greatest value to aquatic resources (see Map 24). A range of actions would occur under this alternative in the riparian reserves from mechanical and hand thinning, mechanical and hand piling, pile burning, and broadcast burning. In riparian reserves the individual proposed treatments would be designed to meet the Aquatic Conservation Strategy Objectives and would be reviewed for consistency with River Plan objectives and resource goals by the KFRA riparian team and the KFRA ID team.

Indirect impacts to aquatic habitats from riparian vegetation manipulation could result from actions proposed within this alternative. Removal or reduction in the riparian canopy could produce an increase in summer temperatures and a decrease in winter temperatures (Marcus et al 1990). Cumulative impacts to fishery resources of increased stream temperatures can include chronic stress and reduce fishery productivity from exposure to elevated sub-lethal temperatures. Larger streams, such as the mainstem river reaches in the planning area, would be more affected by removal of the taller vegetation within the riparian areas and less affected by understory treatments. In addition, reduced canopy cover can reduce inputs of organic debris and invertebrates from overhanging branches thereby reducing forage available to aquatic species.

Indirect effects of vegetative management may also occur as a result of using mechanical equipment in the riparian reserves. Road surfaces, landings, skid trails, ditches and disturbed areas can alter pathways water takes to stream channels, alter peak flows, and contribute sediment to stream channels (Chamberlin et al 1991). Changes in flow patterns and increased sediment transport would cause negative impacts to aquatic habitat and aquatic species.

Minimal harvesting and non-commercial treatments within the riparian reserves where CWD needs are met, and actions that maintain or contribute to moving streams toward a functional condition are not expected to have short-term negative impacts to the aquatic resources. Locating mechanical treatments outside the no-entry buffers, and following recommended PDF's, are anticipated to minimize compaction, soil displacement, and reduce surface erosion reaching the stream channel. Application of manual non-commercial treatments located within the no-entry buffer designed to control stocking, reestablish and manage stands and acquire desired vegetation characteristics to meet ACS objectives, are not expected to negatively affect the aquatic resource in the short-term. In the long-term restored and/or maintained riparian forest stand health would be anticipated to maintain, protect and restore aquatic resources. Proposed treatments would be expected to improve riparian habitat over existing conditions and reduce risk of catastrophic fire similar to actions proposed under Alternative 2, however the extent of protection would be less than Alternative 3.

Upland vegetative treatments: Proposed upland actions would primarily revolve around thinning and fuel reduction treatments. Upland vegetation treatments would not be expected to directly impact the aquatic resources (see Map 24). Indirect negative impacts from heavy use of the planning area road network may occur, resulting in elevated sediment production (Chamberlin et al 1991). Increased sediment transmission from road surfaces to stream drainages may occur during the first wet season after treatments, and would reduce as vegetative recovery occurs (Furniss et al 1991). Implementation of this alternative with the application of the identified mitigation and appropriate KFRA RMP BMP's and the described PDF's are expected to minimize short-term impacts to aquatic resources.

Terrestrial Species/Habitat Management - See consequences discussion of vegetation management for proposed wildlife projects addressing the canyons vegetative community.

No negative impacts to aquatic resources from proposed non-vegetation based wildlife projects would be anticipated under this alternative. Some beneficial impacts to aquatic resources may be realized by maintaining wildlife based road closures. See road management sections for impacts to aquatic resources of proposed and ongoing road management for Alternative 4.

Watershed Management - *Water quality/beneficial uses:* Daily fluctuation in water temperature of up to 12 degrees Fahrenheit may continue, assuming the river flows are peaked to benefit summer rafting opportunities. The impact to the aquatic resources from such temperature shifts would also be expected to continue. Some beneficial impacts to aquatic habitat may occur as a result of increased base flows in the bypass reach, including reduced thermal gradient at the springs and at the confluence with the full flow reach

River flows and water rights: Alterations to instream flow would be pursued in order to enhance recreational resources (rafting and fishing). Enhancement of flows under this alternative would assume an increase in base flow during critical summer months both in the bypass reach and below the powerhouse. Stream flows that increase accessibility to overhead cover including undercut banks, overhanging vegetation, logs, and wood jams would enhance fish habitat (Bjorn and Riser 1991).

Continuation of ramping/peaking operations below the powerhouse and diversion of high percentages of the river from Segment 1 would maintain much of the existing degraded aquatic conditions and species distributions. Diurnal fluctuation in water temperature would continue, but the overall gradient would be reduced as a result of increased base flow in the bypass reach. The negative long-term impact to the aquatic resources from such temperature shifts would be reduced in extent. However, impacts to fisheries may include elevation of temperatures beyond the range preferred for rearing, inhibition of upstream migration of adults, increased susceptibility to disease, reduced metabolic efficiency, and shifts in competitive advantage (Hicks et al 1991).

Conflicts exist between optimal flows for recreational rafting and aquatic resources. Efforts to maintain suitable of daily/seasonal rafting opportunities may come into direct conflict with beneficial flow for aquatic species. The proposed peak flows, for rafting opportunities in Segment 2 and 3, would limited recovery and enhancement of riparian vegetative and maintain widened channels (Marcus et al 1990). The lack of available riparian vegetation would continue to affect the aquatic species in the planning area. Risk of fish stranding on point bars and side channels that are currently being dewatered during peaking operations would also continue.

Riparian function: See discussion of riparian vegetation treatments for affects to aquatic resources.

Aquatic Species/Habitat Management - *Fisheries flows (including temperature):* Alteration in flow regimes will be pursued under this option to optimize flow for recreation values. See Watershed Process discussion for impacts of varying flows in aquatic resources.

Sediment management: Spot sediment enhancement would be implemented to replace sediment that has been captured by the project facilities (Link River dam to J.C. Boyle Dam) and are no longer available to the river channel. Treatment sites would be located to enhance/ stabilize instream projects and provide additional spawning habitat for native species (trout). The deposition/distribution pattern of additional gravel would largely be based on stream gradient and morphology (Rosgen 1996). In steeper gradient stretches little gravel deposition would be expected to occur, where channel velocities are high. In lower gradient stretches such as the Frain Ranch area and below the State line substantial changes in point bar deposition patterns could occur with sufficient sediment augmentation. Sediment enhancements would aid in recovery of riparian vegetation by providing rooting areas for riparian species such as willow, alder, cottonwood, sedges, reeds and rushes.

Enhanced and recovered riparian vegetation would increase bank strength due to deeper/ higher strength root masses and potentially result in bank building (Platts 1991, Marcus et al 1990). Increased riparian vegetation along the river edge would trap fine sediments and contribute to reductions of embeddedness of the larger sediment particles in channel. Bank building may result in narrowing the river channel and improving the width to depth ratio. Bank vegetation and discharge from bank water storage, and hyporheic flows, would enhance water quality (Poole and Berman 2002), thus providing additional edge aquatic habitats along much of the length of the river during temperature limiting periods in the summer. The nature of sediment enhancements, associated with the proposed instream projects, would be expected to provide limited instream aquatic habitats when compared to Alternatives 2 and 3 as the sediment supplies, instream flow, and channel processes necessary for recovery would limited in availability.

Instream structures (wood/rock, side channel/chute cutoff treatments, bridge sites, and width treatments): Proposed treatment locations with extreme channel widths and shallow depths would be anticipated to improve local aquatic habitat (see Map 28). Narrow single thread channels would enhance instream cover to aquatic species and reduce risks of stranding. Cross sectional morphology of stream channels influences the likelihood of stranding (Stillwater 1999). Channels with an abundance of shallow habitat are more likely to have larger areas exposed during down ramping where fish could become separated from the main river flow due to declines in stage.

Proposed channel structures include one or multiple, wing deflectors, “j”-hook type structures, or “w” type channel structures (Rosgen 2001). These structures would aid in formation of mid-channel pools by increasing local shear stress to the existing riverbed and would act as sediment storage areas upstream of the structure. Combined with sediment enhancement, at these structures would also potentially create spawning habitat for native fish species.

Some treatments in the mainstem channel could incorporate coarse woody debris. Most treatment with wood in the mainstem would be placement of the wood along the riparian bank edge. In larger stream types, increases in coarse woody debris would “cap” side channels, and cause scour pools (Murphy and Meehan 1991). Increases in CWD that contribute to logjams in the planning area would enhance secondary channels and off channel sloughs and marshes, effectively increasing habitat complexity and total rearing area. Assuming a sediment augmentation program is implemented, sediment deposition potentially may occur upstream or downstream of the log depending on it’s angle of repose in the channel.

The proposed tributary CWD enhancements would be expected to enhance channel morphology, increase retention of organic matter and provide essential aquatic habitat (Murphy and Meehan 1991). Sediment deposition associated with CWD can lead to formation of terraces, thus increasing the size of riparian areas (O’Connel et al 2000). Increased habitat complexity and enhanced riparian vegetative cover would be expected to improve water quality in tributaries such as Hayden Creek or the mouth of Edge Creek, and improve aquatic habitat of resident fish in these systems. Due to conflicts with recreational rafting goals (wood material in the mainstem river channel should not obstruct safe passage) the dynamic function of large wood in the system would be reduced. Wood that obstructs safe rafting passage would be bucked or in some other fashion removed in the mainstem of the river. To prevent CWD transport to mainstem water, tributary structural enhancements would be designed to retain wood at or near original placement locations. Installation potentially would cause short-term disturbance to stream banks. Bank edges and flood prone areas may be disturbed (by anchoring the log ends), in order to increase retention of wood at project sites.

Treatment of side channel/chute cutoffs to limit high flows in these secondary channels would reduce the risk of fish stranding, particularly during hydropower peaking operations. Limiting flow in these cutoffs would concentrate main channel flow, resulting in increased channel velocities in the primary channel. The desired channel response would include increased channel depth and reduced width to depth ratios. The total area of aquatic habitat available for occupancy would be reduced, however the quality and diversity of habitat would be increased.

The proposed treatment of side channels and rerouting the stream channel without a thorough understanding of the site-specific process that formed the channel features may result in negative impact on channel function (Rosgen 1988). Potential site-specific processes would need addressing including meander geometry related to stream size, stream features such as riffle/pool sequences, and hydraulic geometry relationships in order to protect the channel function. Taking into account channel functions and implementing the proposed river width adjustments, proposed augmentation of sediment (gravel), and proposed instream flows with the treatment of these side channels would be expected to protect and enhance the channel and result in enhanced aquatic habitat diversity.

Some long-term beneficial impacts to aquatic resources would be expected from the proposed instream structures, which would enhance channel function, increase hyporheic connectivity, and increase instream habitat complexity. This alternative provides fewer beneficial effects to aquatic resources, when compared to instream treatments in Alternatives 2 and 3.

Bypass canal sidecast actions: Sidecast material in the bypass reach (Segment 1) that is limiting to fish passage during low flows would be removed. Implementation of this action would increase accessibility to the upper mile of the bypass reach during base flow conditions (see Map 28). Direct and indirect impacts to aquatic resources would be expected during the instream working period due to the use of heavy equipment. Some degree on passage recovery would be expected.

Irrigation diversion treatments (mainstem and tributary): Structural enhancements recommended for irrigation diversions with high width to depth ratios would occur under this alternative. Treatments would improve the width to depth ratios to enhance channel function and would be expected to improve aquatic habitat. Proper design of diversions can lead to development of pools downstream of the diversion, which also function as aquatic habitat (Rosgen 2001). This action combined with sediment enhancement would also be expected to enhance spawning habitat, the structures would function as catchments for gravel-sized bedload.

Livestock Grazing - The proposed grazing actions on BLM, and those recommended on PacifiCorp lands would be expected to maintain or slightly improve conditions on riparian and aquatic habitats. Application of range management recommendations on PacifiCorp lands would result in reducing AUM's from existing levels. Increased monitoring of grazing utilization and application of adaptive management would be expected to reduce to extent of impacts.

Fire and Fuels Management - Extensive use of prescribed fire would occur within the planning area to reduce fuel loads, and to improve plant and wildlife diversity. Most fuel management actions would occur in tandem with proposed vegetation enhancement or constitute a Vegetation Management treatment. Impacts from these types of actions on aquatic resources are described in the vegetation management sections. Prescribed fires ignited outside the riparian reserves that are allowed to back into the riparian reserves are not expected to directly negatively affect the aquatic resources.

Contamination of riparian and aquatic habitat from use of volatile chemicals such as gasoline, kerosene, or diesel fuel may occur (as a result of leakage, spill, etc) during fuel management actions within riparian areas. These ignition chemicals have great potential for indirectly negatively affecting aquatic communities and salmonid habitats (Norris et al 1991). The risk to aquatic habitat from use of ignition fuels can be greatly reduced with the proper buffer distances from streams. Implementation of the proposed actions with the application of the identified mitigation and appropriate KFRA RMP BMP's and the described PDF's are expected to the minimize short-term risk of exposure to aquatic resources.

Land Tenure - Implementation of cooperative management agreements, land acquisition, and or land conservation easements would enable the BLM (and cooperators) to administer the lands within the Klamath River planning area to achieve landscape level resource objectives and maintain and enhance resource values. The ability of the BLM to improve aquatic habitats in the planning area would be expected to improve if ownership of the lands was consistent. BLM management would allow a greater range of projects to be implemented with less administrative coordination.. Potential land tenure adjustments would limit the extent of residential development of riparian lands within Segment 3. Management of PacifiCorp lands consistent with BLM goals and objectives would be anticipated to enhance and recover aquatic habitat though changes in land use and restoration of riparian habitats.

Hydropower Facilities - *Power production facilities:* Enhancement of flow releases from facilities associated with J.C. Boyle Dam would be pursued under this alternative. The proposed alteration in flow regimes at the powerhouse and changes in spill at the dam would reduce thermal gradients between the Segments 1 and 2, and reduce temperature fluctuations in Segment 2 and 3.

Alteration of fish passage facilities and augmentation of unscreened spill at the J.C. Boyle dam would also be pursued, and would be expected to improve fisheries connectivity between the planning area and upstream habitats. The configuration of the ladder, including gradient and fishway entrance, is not ideal, and attraction to the ladder is impaired (FishPro 2000).

The proposed enhancement of the fish ladder and attraction flow at J.C. Boyle Dam would be expected to increase upstream movement of adult fish. The fish currently occupying habitat in planning area reaches of the Klamath River, could migrate to important spawning, rearing, foraging areas in the upper river, and tributaries including Spencer Creek. The proposed increase of unscreened spill from J.C. Boyle dam would enhance unobstructed downstream movement of juvenile salmonids and prey fish into the planning area.

Stabilization of the emergency spillway and implementation of structural controls would likely prevent further degradation of the upper bench and hill slope leading to the river channel. Actions to improve the riparian and channel function impaired spillway, including installation of bankfull benches in the boulder debris on the historic flood plain and removal of boulder debris in channel, would improve aquatic habitats. Channel function and riparian development would be expected to experience some degree of recovery under this alternative.

Transmission line rights-of-way: Alterations to the power lines within the canyon proposed to enhance the wildlife resources, would require minimal ground disturbing actions. The power line system within the canyon is having minimal to no impact to the aquatic system. Indirect impacts may be occurring as a result of the power company's efforts to maintain the power lines and the interrelated/interdependent impacts to maintain the road network to service the lines. Surface erosion from roadbed surfaces, drainage ditches, and cut and fill surfaces can increase movement of fine sediment to streams below the right of way (Furniss et al 1991).

Maintaining this additional road network in the canyon could result in long-term negative effects on aquatic resources. Erosion of fine sediment to the river channel can result in increased substrate embeddedness and a reduction in aquatic habitat quality for incubation, rearing and forage.

Cumulative Effects - Minimal changes to the Klamath River geomorphology would be expected to occur under this alternative. Due to the limited extent of proposed alteration of flow patterns, augmentation of sediment in the system, and implementation of instream projects the river bank development would not be expected to change. Reductions in fish stranding risks may occur in targeted side channels, chute cutoffs and point bars but the limited nature of proposed instream projects would not reduce the risk across the planning area.

Depending of future operations of hydropower facilities with this alternative, proposed actions would reduce the unbalanced longitudinal connectivity, and the rates of downstream movement would be similar to upstream movement of fish. In general both migratory rates would be higher than under current regimes.

Enhanced thermal gradients, improvement base flow, and enhanced connectivity between the Keno Reach and the Planning area would beneficially affect the native species. The proposed enhancement of the tributaries and to a lesser extent the mainstem channels would be expected to improve habitat quality for fry, juvenile, adult trout.

As habitat conditions improve and connectivity improves longitudinally and laterally, the potential would exist for beneficially altering the relative abundance and size class distribution for native species. However, the continuation of ramping/peaking in the planning area would be expected to continue to limit lateral connectivity, thus, reducing the duration of access, to cover habitats for forage species and fish in the fry and juvenile life stages.

This alternative would have the fewest beneficial effects on aquatic species and habitats than the other action Alternatives, 2 and 3, primarily due to continued peaking for rafting, and the limited nature of flow regime, sediment regime, and structural enhancements proposed. This alternative would still provide increased aquatic benefits over the no-action alternative.

Irretrievable, Irreversible, and Unavoidable Adverse Impacts

No known Irretrievable, Irreversible are expected to occur to aquatic habitats. Short-term unavoidable adverse impacts such as the release of fine sediments and increased turbidity would occur during and shortly after construction of in stream structures and with restoration activities near the shoreline.

Range Resources

Assumptions/Impacts Common to All Alternatives

Effects on or to livestock grazing under this plan would result primarily from changes in the amount of forage available and/or allocated to livestock grazing and the exclusion of areas from grazing due to other higher resource priorities. Aside from the current situation (Alternative 1), the grazing use proposed in this plan is predicated on the management objectives and restoration projects generated by the other resource programs; impacts to livestock grazing are directly related to these other resource objectives and projects. Consult these other sections for specifics, including the impacts of grazing on these other resources.

The four Alternatives could be lumped into two functionally distinct options: those that essentially prohibit grazing (Alternative 3); and those that call for only slight variations from the current grazing use (Alternatives 2 & 4). Alternative 1 would not change current operations or direction. The differences between Alternatives 1,2, and 4, are significantly less than the difference between these Alternatives and Alternative 3. In general, the primary impacts to livestock grazing are that under Alternatives 2 & 4 the grazing use will be at levels the same as to slightly less than that currently made; in Alternative 3, regular grazing use would be eliminated. Management actions that exclude livestock (e.g. fencing) from range that is currently available would have a negative effect roughly proportional to the amount of land excluded. The exclusion of high production areas (e.g. riparian) would, of course, have a disproportionately negative effect in reducing forage quantity and/or quality. Conversely, vegetation treatments or enhancements (e.g. fuels reduction, oak thinning, road revegetation, etc.) that increase the amounts of herbaceous plants available and/or improve overall ecological conditions, could conceivably benefit livestock by providing better quantity and/or quality of forage resources.

One potential range improvement project is common to all of the alternatives. It is the construction of up to 2 miles of additional fencing along the north Klamath River Canyon rim to inhibit livestock movement into and out of the canyon. Currently, there is approximately 2 miles of fencing along the rim, which inhibits but does not totally restrict livestock movement. As additional cattle trailing "holes" are found, they may be fenced as necessary - a process that has already been going on for some years. The result of the additional fencing will be less need for grazing use supervision due to less unauthorized use - a positive impact. And finally, the impacts from cultural resource related projects is minor to nonexistent under all the Alternatives, except where areas may be exclusion fenced (similar to the riparian areas noted above).

Impacts of Specific Alternatives

(Refer to Map 8, and Appendix H)

Alternative 1

Under this alternative, there would be no significant change in the levels of grazing use on public or private lands. Thus, there would be no significant additional impacts or effects beyond those analyzed in the September 1994 Klamath Falls RMP/EIS for livestock grazing (pages 4-135 through 4-137), or in the case of the Laubacher Lease allotment (see Map 8) in California, as described in the Redding R.A. RMP/EIS. The continuation of the present levels of livestock grazing would be a direct and variably positive economic effect to the planning area, as compared to the reductions envisioned under the other three alternatives.

Cumulative Impacts - Same as that comprehensively analyzed in the above plans; consult for details.

Alternative 2

The primary direct impact under this alternative is the significant reduction in livestock grazing by deferring all or part of the grazing use on the private lands for some years until certain resource objectives are achieved (as discussed in other sections). The grazing use deferrals would be dependent on the specific project work being performed at a given time and the project specific requirements for grazing deferral. The loss of up to several thousand AUMs of grazing capacity/use off the private lands is a relatively significant loss to the planning areas overall grazing utility and in the short-term (up to 5-10 years), to the agricultural portion of the areas economy. Even with the potential for restoring some/most of the private land grazing use in the future, the capacity of the livestock operation that has been in the canyon for many years, will still likely be substantially diminished. (However, since these are private lands, the actual scope and duration of the reductions in livestock use cannot be precisely ascertained and are not directly within BLM control.)

There will be some minor reductions in the total grazing area available on the public lands under this alternative, dependent on the actual amount of land exclusion fenced to accomplish resource objectives noted in other sections. These losses are not expected to be significant since only small portions of the public lands in the canyon are grazed currently. Additionally, the Edge Creek allotment (see Map 8) includes grazing areas above the rim (Ward Pasture - which is outside this area of analysis) that provide enough forage to still allow for the full leased grazing use to take place, making the in-canyon impacts negligible (though this area is not preferred by the current grazing lessee due to rough terrain and access problems). The proposed reduction in the roads available in the analysis area may slightly inhibit the ability of the grazing user(s) to access livestock, though this likely a minor concern. An indirect effect of the road reductions would be an increased possibility of unauthorized use (i.e. grazing outside the season of use) if the grazing user is less able to find and gather animals.

Cumulative Impacts - The potential reductions in grazing use in the analysis area (public and private) may add to the reductions that are likely due to the recent designation of the Cascade-Siskiyou National Monument, which lies directly to the north and west of the analysis area. The grazing lessee in this planning area is also partially dependent on grazing lands in the Monument. The cumulative effect of two special designations - and related reductions in grazing use over time - would in combination be a significant impact to the operator's economic viability. Though it is not possible to precisely quantify this impact at this time, it is likely that the livestock operations would not be commercially viable and may cease.

Alternative 3

The primary direct impact under this alternative is the significant reduction in livestock grazing occurring within the planning area by permanently eliminating all use - public and private. The permanent loss of several thousand AUMs of grazing capacity/use on the private (and some public) lands is a significant reduction in the areas grazing utility and agricultural economy. Enhanced environmental conditions due to grazing exclusion - including better water quality - may lead to increased recreation opportunities and use, which could make up all or a portion of the economic loss. (Note: As noted earlier, the actual scope and duration of the reductions in livestock use on the private lands can not be precisely determined and is not directly within BLM control.)

Though no grazing use would be authorized on the public lands in the analysis area, the grazing areas above the rim (and outside the planning area) have ample enough forage to still allow for the full leased grazing use to take place on the Edge Creek allotment (see Map 8). Prohibiting grazing in the planning area would slightly decrease the overall administrative workload for the BLM, though this could be offset by the need for additional field checks to ensure that unauthorized use does not occur. Additional forage for wildlife - particularly elk that have a high dietary overlap with cattle - would potentially be available under this alternative, though forage is not known to be currently limiting to any of the wild herbivores. Conversely, an indirect impact of no livestock grazing could be an increased danger of wildfire due to a build up of additional fine fuels.

Cumulative Impacts - See Alternative 2, since the cumulative impacts under this Alternative would be similar, though more amplified due to the total prohibition of livestock. In fact, impacts under this Alternative may be enough to render the current livestock operation uneconomical. However, the removal of all livestock from the analysis area, in hand with the restoration activities proposed in other resource sections, could lead to the better ecological condition of some of the degraded vegetation communities - particularly in the riparian/ meadow areas and upland areas with a high amount of undesirable exotic plant species. This could lead to a higher esthetic profile for the area, which may attract more visitors and offset some of the economic losses (see other sections, particularly recreation and fisheries).

Alternative 4

Implementation of this alternative would result in direct impacts that would be a mix between Alternatives 1 & 2. Fencing of new or existing recreation areas would directly limit livestock access and forage, as described previously. Recreation facilities or environmental enhancements that draw additional people to the analysis area, may disturb (harass) livestock grazing activities slightly, though this would probably not be significant. Similarly, increased livestock presence related complaints (noise, smell, dung) would be inevitable with more people visiting the area and would result in more BLM administrative attention. The possible increase in the roads available in the analysis area may slightly increase the ability of the grazing lessee to access his livestock, though this is very minor (though potentially positive) effect.

Cumulative Impacts - Same as the cumulative impacts listed for Alternative 2.

Irretrievable, Irreversible, and Unavoidable Impacts

The continuance of high grazing levels on the private lands could result in irretrievable (though unquantifiable) soil loss and commensurate deterioration in the ecological conditions/ potential of the riparian/meadow vegetation communities. (See other resource sections of this chapter for more information.) The permanent exclusion of important areas from livestock grazing for resource protection reasons - which is already currently allowable under the above two RMP/EIS's and the "Northwest Forest Plan" - would result in the permanent loss of forage for livestock and possibly small economic losses to the area.

For Alternative 3, the impacts to the livestock operation from the grazing elimination on private lands may be enough to unavoidably put the current lessee out of business. The loss of several thousand AUMs of grazing use may be an irreversible economic impact to the analysis area, though could be replaced in whole/part by increased recreation expenditures. The small loss of grazing on the public lands under this Alternative would be a minor impact, which in itself would not be enough to significantly impact the current operation.

Wild Horses

Assumptions/Impacts Common to All Alternatives

A very small percentage (<5%) of the Pokegama Herd Management Area (HMA) is located within the planning area (see Map 8). Therefore, impacts to the HMA, habitat, and overall herd management will be very limited or negligible under all the alternatives. (There is no impact on the Gavin Peak Herd Management Area, which is immediately adjacent to, but outside of the planning area; hence, it will be considered no further.) The wild horses only sporadically use the portions of the HMA that are inside the planning area. For example, they may occasionally be found on the south facing slopes of the canyon during the early spring when the green-up of the plentiful annual grasses is a highly attractive forage source. Also, the horses may be found in the bottom of the canyon during either high snowfall years (too much snow on top of the rim for easy access) or during significant drought years (like 2001) when water and green feed is restricted outside the canyon itself.

Although a mix of impacts/effects are noted in the following narrative, none of them could be considered anything more than insignificant impacts to the wild horse herd. One direct impact that is common to all the alternatives is that with the continued presence of wild horses in the area, domestic/wild horse interaction conflicts will invariably continue. These interactions are typically wild stud horses desiring to add domestic mares to their harem bands (or start a band), which results in damage to fences and other private property and occasionally, even the loss of a domestic horse.

Impacts of Specific Alternatives

(Refer to Map 8 and Appendix H)

Alternative 1

Impacts would be largely as analyzed in the September 1994 Klamath Falls RMP/EIS for wild horses (pages 4-137 through 4-139). One direct impact could be that a continuation of full livestock grazing in the planning area could conceivably reduce the amount of forage available for wild horses, compared to the other alternatives, since the forage preference overlap between cattle and horses is almost complete. However, forage quantity is not known to be an issue currently in the planning area portion of the HMA, with the possible exception of drought years. Even then, wild horses have a high capacity to range far in search of forage and water if pressed to do so. The current moderate levels of fencing in the area probably inhibit wild horse movement to a small amount, but not significantly. Continued cattle grazing on the public and particularly private lands, may lead to deteriorated ecological conditions of riparian and/or upland vegetation communities, leading to somewhat poorer habitat for wild horses.

Cumulative Impacts - No cumulative effects beyond that analyzed in the KFRA RMP/EIS are expected.

Alternative 2

Impacts to wild horses would be largely similar to that in Alternative 1, though the more that livestock are limited for other resource reasons, the more potential forage could potentially be available for horses. Exclusionary fencing would limit the habitat/forage and water available for wild horses like it would for livestock. Habitat improvements for wildlife species could improve the same for wild horses by improving ecological conditions and forage quantity. A reduction in the number of roads in the area could be a positive impact to the wild horses by lessening human disturbance. Improved riparian/wetland conditions could provide enhanced wild horse habitat characteristics, though if fenced the benefits may not be realized.

Cumulative Impacts - Insignificant cumulative impacts would occur to the wild horse herd since the planning area is an insignificant portion of the HMA.

Alternative 3

As this is the only alternative that totally precludes cattle use, it would provide the potential maximum amount of additional forage for wild horses. However, since the planning area does not comprise a significant portion of the HMA, this alternative still has an insignificant effect on the wild horse herd. Without livestock grazing in the planning area, much of the fencing in the canyon may be removed. This would enhance the potential for the wild horses to expand their available habitat somewhat - possibly into the private meadow lands along the river that they are largely excluded from now. Less fencing would mean more water available for the wild horses to use. Improved riparian/wetland conditions could provide enhanced wild horse habitat characteristics, though if these were to be fenced, horses would be excluded from the benefits. A higher level of road density reductions would be a positive effect by limiting the potential for detrimental human disturbance.

Cumulative Impacts - Insignificant cumulative impacts would occur to the wild horse herd since the planning area is an insignificant portion of the HMA.

Alternative 4

Additional recreational facilities, and the added human disturbances this would entail, could be a slight negative impact to the wild horses, though the Pokegama horses have not shown a tendency to be particularly shy of humans. Fencing around the additional facilities could limit wild horse access somewhat and possibly restrict some watering areas. Decreases in livestock numbers for recreation enhancement reasons would have impacts similar to those discussed for the other 3 alternatives. However, like with the other alternatives, the overall potential impacts to the horse herd are insignificant.

Cumulative Impacts - Insignificant cumulative impacts would occur to the wild horse herd since the planning area is an insignificant portion of the HMA.

Irretrievable, Irreversible, and Unavoidable Impacts

The permanent exclusion of areas via fencing could have the irreversible effect of reducing the available forage base for horses. This type of protection is currently allowable under the KFRA RMP/ROD.

Also see Range Resources section.

Fire and Fuels

Impacts Common to All Alternatives

Prescribed fire, and wildfire, short of catastrophic levels, would generally improve habitat conditions by diversifying habitat structure, providing short-term improvement in forage palatability, and increasing the availability of herbaceous forage plants. Some habitat changes would result in adverse impacts to species reliant on large homogeneous blocks of vegetation types. Most vegetation types are dependent on fire return intervals that have been modified over the last century. Returning these habitats to historic fire interval levels, or management close to these levels, would generally increase the quality of habitat. Extreme wildfire that causes mortality in existing plants and soil sterilization can lead to noxious weed infestation, and may demand immediate attention for rehabilitation efforts.

Impacts of Specific Alternatives

(Refer to Maps 5, 21-24, and Appendix H)

Alternatives 1 through 4

Each alternative will reduce fuel loading within the project area. Specific acreages of treatment can be found under the Vegetation management section. In general Alternative 3 treats more area so it reduces the fuel loading more and moves the area toward historic fire interval levels more quickly.

Air Quality

Impacts Common to All Alternatives

All the alternatives propose to use prescribed fire so consequently all alternatives would emit varying amounts of particulate matter. Because of the ability to manage emissions from prescribed fire (through timing burns with projected weather patterns), the air quality goal should be met. Wildland fire is a random event and smoke and particular matter cannot be managed. The alternatives with larger amounts of fuel treatments in the short-term, should have lesser impact on air resources from wildfires in the long-term. Due to the relative isolation of the area and the predominant wind patterns for smoke dispersion, the probability is low to degrade any key airsheds. These local impacts would be transitory in nature and no long-term smoke impacts are expected.

The Clean Air Act requires each state to develop and implement a State Implementation Plan (SIP) to ensure that National Ambient Air Quality Standards are attained and maintained for particulate matter (PM10). The focus of the analysis of effects on air quality from prescribed burning is on the production of PM10 (Particulate Matter smaller than 10 microns). To obtain some indication of how future burning within the river corridor may impact emission reduction goals, the estimated emissions of each alternative will be estimated in the final EIS. It is expected that prescribed burning proposed for the river corridor would not compromise the ability to reach and maintain prescribed burning reduction goals under any of the proposed alternatives. Under all proposed alternatives, prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. Prescribed burning under all alternatives is not expected to affect visibility within nearby smoke sensitive Class I areas (Mountain Lakes) during the visibility protection period (July 1 to September 15). Prescribed burning is not routinely conducted during this period primarily due to the risk of an escape wildfire.

Prescribed burning emissions, under all alternatives, are not expected to adversely effect annual PM10 attainment within Klamath Falls, or the Medford non-attainment area. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration. Prescribed burning would be scheduled primarily during the period starting in October and ending in June. Handpile burning would also be planned during the fall, winter and spring months to reduce damage to the site from high intensity burning and to facilitate control of the units being burned. Current avoidance strategies for prescribed fire assume that smoke can be lifted from the project site and dispersed and diluted by transport winds. Smoke retained on site could be transported into portions of non-attainment areas if it is not dispersed and diluted by anticipated weather conditions. Localized concentration of smoke in rural areas in northern California may occur.

Impacts of Specific Alternatives

(Refer to Maps 5, 21 thru 24, and Appendix H)

Alternatives 1 through 4

Specific analysis of the effects of alternative will be determined in the smoke management plan. Data is currently unavailable to complete this analysis.

Land Tenure

Assumptions/Impacts Common to All Alternatives

The Klamath Falls Resource Area RMP identifies approximately 2,250 acres of private land within the planning area that is suitable for acquisition. The Record of Decision for the Klamath Falls RMP (June 1995) placed public lands within the planning area in land tenure Zone 1. Public lands in Zone 1 have important resource values and will remain in public ownership. Zone 1 lands are not available for disposal by sale, exchange, or any other disposal method.

The private landowner is under no obligation to sell his/her privately owned lands to the BLM. This plan cannot and does not require a private landowner to sell his/her private lands to the BLM. The impacts described in this section will occur if and only if private land is sold to BLM.

Resource values on PacifiCorp lands were considered in all alternatives in this River Plan. PacifiCorp requested that approximately 6,000 acres of their private lands located within the planning area be considered in the plan for possible land tenure adjustments. PacifiCorp is considering several management options for these lands that are surplus to their needs for power production. PacifiCorp requested the BLM to consider their lands for exchange for other BLM lands, or purchase, or that BLM and PacifiCorp enter into a mutually beneficial land management arrangement of these lands.

If BLM acquired all of the private Oregon lands (2,249 acres of which 1,030 acres belongs to PacifiCorp) in the planning area, then Klamath County would lose approximately $2,000.00

annually in property tax revenues and the State of Oregon would lose approximately $59.00 in fire protection payments. These losses would be off set by money paid by BLM to Klamath County for deferred farm use taxes, if any, from the Payments in Lieu of Taxes Act (PILT) (32 U.S.C. 6901-6907) and money paid to the State of Oregon for fire protection. The amount paid under the PILT program will not equal the tax receipts. The BLM pays the State of Oregon approximately 56 cents per acre for fire protection on BLM administered lands located west of Highway 97. The State of Oregon, through Klamath County, collects $0.985/ acre for timberland and $0.397/ acre for grazing land for fire protection.

If acquired by BLM, important cultural, wildlife, recreational, visual and other resource values found on the private lands in Oregon would be protected and managed subject to staffing and funding limitations. If the mineral estate were acquired, mineral development would be prohibited, unless it could be made compatible with the protection and enhancement of the Outstandingly Remarkable Values of the Klamath River.

The BLM has acquired 1,657 acres since the 1993 Redding RMP was approved, and disposed of 16,928 acres during the same time period. This is more than a 10 to 1 ratio of increase of private lands due to BLM's actions. In addition, at least some of the lands proposed for acquisition within the Klamath River corridor were already considered in our cumulative analysis of impact to Siskiyou County in Appendix H of the 1993 RMP. In that document, a net increase of private land of 13,070 acres if BLM fully implemented the land tenure decisions of the RMP was predicted. The past disposal of nearly 17,000 acres within Siskiyou County by BLM far outweighs any potential expansion of the acquisition boundary being considered in the different alternatives (Berg 2002, Personal communication).

The land tenure impacts for Alternatives 2, 3, and 4 vary only in the amount of private land that is included within the proposed extended boundary of the Upper Klamath River Management Area (Redding RMP). The consideration to acquire land within this extended boundary of the Upper Klamath River Management Area in California (acreage depends on each alternative) applies only to PacifiCorp land.

Impacts of Specific Alternatives

(Refer to Maps 3, 9-12, and Appendix H)

Alternative 1

Land acquisition as described in the Redding RMP would be implemented under this alternative. In California, 2,290 acres of private land appear to be suitable for acquisition subject to the assumptions and limitations common to all alternatives. Administration of approximately 250 acres of Klamath National Forest land would eventually be transferred to the BLM (see Map 9).

If BLM acquired all the private lands within the existing project area boundary, grazing, motorized vehicle use and development would be managed or restricted on the acquired lands. Native vegetation would eventually return to the site and the overall condition of the site would improve. The cultural sites, wildlife, fisheries, scenery and the other outstandingly remarkable values within the project area boundary would be protected until the California River segment Congressional decision to designate to as a component of the Wild and Scenic River system.

Shovel creek and its clean cold waters, and the 4,379 acres of private land that forms part of the foreground and all of the background lands visible from the river would not be protected under this alternative and would be available for purchase by other individuals. Only State and local laws and regulations would restrict use and development of the land.

This alternative proposes the least amount of land acquisition and land tenure adjustments.

Cumulative Impacts - In addition to Oregon tax revenue losses, Siskiyou County would lose up to $4,200 in tax revenue. These losses would be off set by money paid by BLM to Siskiyou County from the Payments in Lieu of Taxes Act (PILT) (32 U.S.C. 6901-6907. The amount paid under the PILT program will not equal the tax receipts. The BLM pays the State of California for fire suppression costs but does not pay for fire protection.

Acquisition of the PacifiCorp land surrounding the Topsy road in California would not have any effect on its designation by Siskiyou County as a pubic road. Existing roads, such as the Hessig Creek road, that connect with the Topsy road and provide access to private lands would remain closed to the public. A right-of-way would be used to approve the year round use of a BLM administered road by an adjoining landowner unless the right of access was reserved by landowner the in the deed that conveyed the property to the United States.

Alternative 2

Under this alternative, proposals for land acquisitions occur in river Segments 1, 2 and 3. In Oregon, the proposed project area boundary would include PacifiCorp lands that would compliment the resource values found in river Segments 1 and 2. The possible acquisition of lands would affect about 900 acres of PacifiCorp lands.

In California, the proposed project area boundary expands to include Shovel creek and its watershed that is located within Township 48 North, Range 3 West, Mount Diablo Meridian . Outside of the Shovel Creek area, the boundary remains within one-quarter mile of the river. In this alternative an additional 2,119 acres could be acquired for a total of 4,409 acres (see Map10).

Shovel Creek and its contribution to the Klamath River of clean cold water and fish spawning habitat would be protected under this alternative. Cultural sites along the river and some of the lands that form the foreground and background visible from the river would also be protected. The lands not acquired would remain available for purchase. Use and development of those lands would only be subject to the limitations imposed by State and local laws and local planning regulations.

Cumulative Impacts - In addition to Oregon tax revenue losses, Siskiyou County would lose up to $7,900 in tax revenue. These loses would be off set by money paid by BLM to Siskiyou County from the Payments in Lieu of Taxes Act (PILT) (32 U.S.C. 6901-6907). The amount paid under the PILT program will not equal the tax receipts. The BLM pays the State of California for fire suppression on BLM administered lands.

Alternative 3

Under this alternative proposal, land acquisitions occur in river Segments 1, 2 and 3. In Oregon, the proposed project area boundary would include PacifiCorp lands that would compliment the resource values found in river Segments 1 and 2. The possible acquisition of lands would affect about 900 acres of PacifiCorp lands. These acquisitions would compliment the resource values found in the adjacent ACEC.

In this alternative the project area boundary is expanded easterly to include all the private land that is visible from any point along the upper Klamath River up stream from the tail waters of Copco Reservoir. This includes an additional 4,304 acres of private land for a total of 8,713 acres. An additional 300 Acres of Klamath National Forest land would be eventually transferred to the BLM for a total of 565 acres or managed for river values by the Klamath National Forest and 1,258 acres of BLM administered land that is identified for disposal would be included for a total of 1,478 acres (see Map11).

In addition to the resources protected under Alternatives 1 and 2, all the private lands that are visible from the portion of the Klamath River in the planning area would be protected from development and unrestricted use. Motorized vehicle use would be restricted to designated roads and trails and seasonal use restrictions to prevent resource damage would be implemented.

The 1,258 acres of public land currently identified for disposal in the Redding RMP would be retained in public ownership and would not be available for sale or exchange.   This alternative proposes the greatest amount of land acquisition and land tenure adjustments. Under this alternative all roads that connect with the Topsy road could be acquired by BLM. Access to other private lands would be allowed with acquisition by BLM.

Cumulative Impacts - In addition to Oregon tax revenue losses, Siskiyou County would lose up to $18,500 in tax revenue. These losses would be off set by money paid by BLM to Siskiyou County from the Payments in Lieu of Taxes Act (PILT) (32 U.S.C. 6901-6907) and money paid to the State of California for fire protection. The amount paid under the PILT program will not equal the tax receipts.

Alternative 4

Under this alternative proposal, land acquisitions occur in river Segments 1, 2 and 3. In Oregon, the proposed project area boundary would include PacifiCorp lands that would compliment the resource values found in river Segments 1 and 2. The possible acquisition of lands would affect about 900 acres of PacifiCorp lands. These acquisitions would compliment the resource values found in the adjacent ACEC.

In California (river segment 3), the proposed project area boundary is mostly restricted to the BLM and PacifiCorp lands within Township 48 North, Range 3 West. Private lands proposed for acquisition comprise approximately 6,664 acres. Administration of approximately 250 acres of Klamath National Forest land would be transferred to the BLM (See map 12).

Impacts both positive and negative are similar to those in Alternatives 1 to 3 but cover slightly less area than Alternative 3. Some of the high background ridgelines, visible from the river, would not be protected under this alternative and would be available for sale and, if feasible, development.

Cumulative Impacts - In addition to Oregon tax revenue losses, Siskiyou County would lose up to $12,180 in tax revenue. These loses would be off set by money paid by BLM to Siskiyou County from the Payments in Lieu of Taxes Act (PILT) (32 U.S.C. 6901-6907). The amount paid under the PILT program will not equal the tax receipts. The BLM pays the State of California for fire suppression on BLM administered lands.

Irretrievable, Irreversible, and Unavoidable Impacts

If cooperative management partnerships or conservation easements or direct purchase with PacifiCorp do not occur in the future, then there is a strong likely hood that contiguous management of the resource values found in the Klamath River Canyon as identified in the ACEC evaluation and analysis would be greatly jeopardized. There is the possibility that PacifiCorp could sell their lands to another party who could possibly subdivide the lands, potentially disturbing the unique natural resources, which the areas possess. Land acquisition of private lands would ensure that these unique natural resources would continued to maintain or enhance through the land management practices proposed by the various alternatives.

Private Land

Assumptions

According to large-scale maps available to the BLM, it appears that the only private land owner that has land within the State Scenic Waterway is PacifiCorp. There may a few acres of other private land on the north side of the river above Big Bend that potentially is within the Waterway. Although it doesn't appear that this land is developable, it is possible that State Administrative Rules could apply to those lands.

Impacts Common to All Alternatives

Private land ownership (except for PacifiCorp land) within the planning area is not expected to change as a direct result of this plan. Private land owners would continue to have access to their lands even though some of the existing user-created or poor-condition roads could be closed or obliterated completely. Private landowners would benefit from decreased risk of wildfires occurring due to fuel reduction treatments proposed on BLM land and recommended on PacifiCorp land. Private landowners have the opportunity to have the BLM assist them with fuels reduction and timber stand health treatments through cooperative agreements. The views from private land may change slightly if treatment sites on BLM (and possibly PacifiCorp) are visible. Other evidence of management activities such as smoke from burning, or an increase in the number of vehicles on the roads may be undesirable to private landowners.

PacifiCorp allows public use of various sites on their lands for recreation purposes and even has agreements with the BLM and State of California for site development and management. Recreational uses are anticipated to increase to some degree under all alternatives. PacifiCorp has identified most all of these lands as "surplus to their needs for power generation", and therefore, could dispose of the lands. Continued use of these lands for recreation should not deter PacifiCorp from proceeding with any changes in land ownership or management of their lands (although changes could affect recreational users).

Impacts of Specific Alternatives

Alternative 1

No other specific impacts.

Alternative 2

The State of Oregon would implement a set of Administrative Rules for lands within the Scenic Waterway (Segment 2 in Oregon). Minimal, if any, impacts to private land within the Scenic Waterway from State Administrative Rule implementation would occur, because most land is owned by PacifiCorp, and is managed for "industrial" use.

Management Actions are proposed for PacifiCorp land but not other private land within the Planning Area. Actions on PacifiCorp lands are only made as recommendations. If recommendations are adopted, PacifiCorp would be affected mostly by recreation site development, road improvements and vegetation treatments.

Alternative 3

The State of Oregon would implement a set of Administrative Rules for lands within the Scenic Waterway (Segment 2 in Oregon). Minimal, if any, impacts to private land within the

Scenic Waterway from State Administrative Rule implementation would occur, because most land is owned by PacifiCorp, and is managed for "industrial" use.

Management Actions are proposed for PacifiCorp land but not other private land within the Planning Area. Actions on PacifiCorp lands are only made as recommendations. If recommendations are adopted, PacifiCorp affected mostly by eliminated grazing, irrigation changes, meadow management, road improvements and road closures, and vegetation treatments.

Alternative 4

The State of Oregon would implement a set of Administrative Rules for lands within the Scenic Waterway (Segment 2 in Oregon). Minimal, if any, impacts to private land within the Scenic Waterway from State Administrative Rule implementation would occur, because most land is owned by PacifiCorp, and is managed for "industrial" use.

Management Actions are proposed for PacifiCorp land but not other private land within the Planning Area. Actions on PacifiCorp lands are only made as recommendations. If recommendations are adopted, PacifiCorp affected mostly by recreation site development, reduced grazing, road improvements and road closures, and vegetation treatments.

Socioeconomics

Assumptions

Underlying trends of population growth, business cycles, and economic growth at the national, regional, and local levels would continue to be the primary determinates of local economic activity. Alternatives considered in this document do not influence national or regional trends. Alternatives considered in this document would have only a limited influence on the local economies of Jackson, Klamath, and Siskiyou Counties.

Impacts Common to All Alternatives

Recreational uses are anticipated to increase to some degree under all alternatives. Population growth in the area and the region is the principle cause of this underlying trend. The alternatives influence the relative attractiveness of the study area for recreation compared to other areas with similar recreational opportunities.

While decisions on this river plan/EIS can not directly affect the existence or operation of PacifiCorp facilities, it is possible that decisions could influence terms and conditions of PacifiCorp's next operating license. As such, there could ultimately be impacts on the economics of operating the facilities for PacifiCorp as a result of proposed management actions. However, the data necessary to make the estimates of financial impacts to PacifiCorp rely on propriety information. PacifiCorp is not in the position at this time to provide that information for the DEIS. The BLM recognizes that this could be valuable information to disclose in the DEIS, but acknowledges that it is not available at this time. We are hopeful that PacifiCorp will be able to provide such information through their comments on the DEIS or in coordination meetings with the BLM as we prepare the Final EIS.

Impacts of Specific Alternatives

Alternative 1

Employment - No changes in the existing local employment trends are anticipated under Alternative 1. Employment opportunities associated with grazing use, recreation and tourism, and federal contracting in the Upper Klamath River Wild and Scenic River and ACEC would continue. This employment is very small relative to the overall local economy. In addition, out of area commercial rafting, a primary commercial activity in the study area, generate employment outside the planning area.

Income - No changes in the existing local personal income trends are anticipated under Alternative 1. Income associated with grazing use, recreation and tourism, and federal contracting in the Upper Klamath River Wild and Scenic River and ACEC would continue. Employees and business owners receive income from these activities. This income is very small relative to the overall local economy. In addition, out of area commercial rafting operators generate income outside the planning area.

Agriculture - No changes in existing local agricultural trends is anticipated under Alternative 1. Existing agricultural uses on private lands (PacifiCorp) and permitted livestock use on public lands in the Upper Klamath River Wild and Scenic River and ACEC would continue. Income and employment would continue to vary annually subject to national and regional economic trends but would not be influenced by changes in federal management direction in the Upper Klamath River Wild and Scenic River or ACEC. The impacts of grazing use on federal lands would continue to be as described by the Klamath Falls Resource Area RMP/EIS and the Redding Resource Area RMP/EIS.

Lumber and Wood Products (1,100 acres of treatment) - This alternative would continue to provide limited opportunities for forest thinnings and commercial wood products. Most of the proposed treatment projects would be accomplished through contracts for fuels treatment and prescribed burning activities and would not result in commercially viable timber sales. These activities would continue to provide limited employment and income opportunities. The geographic distribution of these opportunities would depend the locations of successful contract bidders.

Recreation and Tourism - Recreation uses of all types are expected to increase under Alternative 1 at rates similar to existing trends. No actions would be implemented under this alternative that would increase the relative attractiveness of the area for recreation. Private and commercial whitewater boating opportunities would continue at current levels and existing use limitations accommodate anticipated growth. Motorized boating would not be prohibited so this potential future use would not be precluded.

Cumulative Impacts - No cumulative impacts to the local, regional, or national economies have been identified.

Alternative 2

Employment - No changes in the existing local employment trends are anticipated under Alternative 2. Employment associated with recreation and tourism, and grazing on public lands would continue. Opportunities associated with grazing use on private lands would be reduced in the short term and opportunities associated with federal contracting would increase. This employment is very small relative to the overall local economy. In addition, out of area commercial rafting operations generate employment outside the planning area.

Income - No changes in the existing local personal income trends are anticipated under Alternative 2. Income associated with recreation and tourism on public lands would continue.

Income associated with grazing use on public and private lands would be reduced and income associated with federal contracting would increase. This income is very small relative to the overall local economy. In addition, out of area commercial rafting operations generate income outside the planning area.

Agriculture - Reduction of grazing use on private lands (PacifiCorp) within the Klamath Canyon would negatively impact livestock production and sales for impacted operators during the duration of the deferral. Economically unviable livestock operations may result. The duration of impacts (short term or permanent) would be the result of private business decisions of the livestock operators. Permitted use levels on federal lands are not anticipated to change under this alternative. The impacts of grazing use on federal lands would continue to be as described by the Klamath Falls Resource Area KFRMP/EIS and the Redding Resource Area RMP/EIS.

Lumber and Wood Products (4,500 acres treated) - This alternative would provide expanded opportunities for forest thinnings and commercial wood products. Most of the proposed treatment projects would be accomplished through contracts for fuels treatment and prescribed burning activities and would not result in commercially viable timber sales and. These activities would provide increased employment and income opportunities. The geographic distribution of these opportunities would depend the locations of successful contract bidders.

Recreation and Tourism - Recreation uses of all types are expected to increase under this alternative relative to existing underlying trends. Actions would be taken under this alternative, which would generally increase the relative attractiveness of the area for developed, motorized and non-motorized recreation uses. Selected primitive use areas would be developed or have improved access, thus reducing the attractiveness of these areas for experiencing solitude. Non-motorized boating opportunities would become available in Segment l with increased flows from the J.C. Boyle Dam. Private and commercial boating opportunities would continue at the current level and use limitations accommodate anticipated future use levels. Motorized boating would be prohibited so this potential future use is precluded. Designated tour routes would enhance motorized opportunities.

Cumulative Impacts - Increased vegetation treatment activities would result in expanded contracting opportunities. The BLM and other agencies, including the Forest Service and State Forestry Departments are also increasing the emphasis on vegetative treatments for fuels reduction. This alternative contributes to the local economy by supporting the establishment of a stable, year-round industry to supply ecosystem restoration and vegetative treatment services. Additional cumulative impacts have been discussed under Range Resources.

Alternative 3

Employment - Limited reductions in the existing local employment trends are anticipated under Alternative 3. Employment associated with grazing on public lands and on private lands would be permanently reduced. Opportunities associated with recreation and tourism, especially whitewater rafting, would decrease. This employment is very small relative to the overall local economy. Opportunities associated with federal contracting would increase. In addition, reductions in commercial rafting would impact out of area operations that generate employment outside the planning area.

Income - Limited reductions in the existing local personal income trends are anticipated under Alternative 3. Income associated with grazing on public lands and private lands would be permanently reduced. Income associated with recreation and tourism, especially whitewater rafting, would decrease. Income associated with federal contracting would increase. This income is very small relative to the overall local economy. In addition, reductions in commercial rafting would impact out of area operations that generate income outside the planning area.

Agriculture - Permanent elimination of grazing use on private lands (PacifiCorp) within the Klamath Canyon would negatively impact livestock production and sales for impacted operators. Economically unviable livestock operations may result. The scope and type of impacts would be the result of private business decisions of the livestock operators. Permitted use levels on federal lands are not anticipated to change under this alternative. The impacts of grazing use on federal lands would continue to be as described by the Klamath Falls Resource Area KFRMP/EIS and the Redding Resource Area RMP/EIS.

Lumber and Wood Products (almost 7,000 acres treated) - This alternative provides the greatest opportunities for forest thinnings and commercial wood products. Most of the proposed treatment projects would be accomplished through contracts for fuels treatment and prescribed burning activities and would not result in commercially viable timber sales. These activities provide limited employment and income opportunities. The location of these opportunities would depend the locations of successful contract bidders.

Recreation and Tourism - Recreation uses of all types are expected to decrease under this alternative relative to existing underlying trends. However, an overall upward trend is still anticipated. Actions would be taken under this alternative, which would generally decrease the relative attractiveness of the area for developed, motorized and non-motorized recreation uses. Non-motorized boating opportunities would become available in Segment l with increased flows from the J.C. Boyle Dam. However, reduced peaking flows in the late summer would result in decreased private and commercial use at that time of the year. Reduction of this unique seasonal rafting opportunity would have a negative financial impact on existing commercial rafting permittees, many of whom extend their commercial season by traveling to the Upper Klamath River. Overall, annual use would remain about the same as current levels under this alternative. Motorized boating would be prohibited so this potential future use is precluded.

Cumulative Impacts - Increased vegetation treatment activities would result in expanded contracting opportunities. The BLM and other agencies, including the Forest Service and State Forestry Departments are also increasing the emphasis on vegetative treatments for fuels reduction. This alternative contributes to the local economy by supporting the establishment of a stable, year-round industry to supply ecosystem restoration and vegetative treatment services. Additional cumulative impacts have been discussed under Range Resources. A shorter available rafting season will eliminate a unique regional recreation resource. This will result in greater demand for access during the available season as use is concentrated. This could also alter use patterns on other rivers where commercial permittees on the Upper Klamath also run trips.

Alternative 4

Employment - Limited increases in the existing local employment trends are anticipated under Alternative 4. Employment opportunities associated with grazing use on public an private land (PacifiCorp) in the Klamath Canyon would continue. Employment opportunities associated with recreation and tourism, and federal contracting would increase. This employment is very small relative to the overall local economy. In addition, out of area commercial rafting operations generate employment outside the planning area.

Income - Limited increases in the existing local personal income trends are anticipated under Alternative 4. Income associated with grazing use in the Klamath River area would continue. Income associated with recreation and tourism, and federal contracting would increase. This income is very small relative to the overall local economy. In addition, out of area commercial rafting operations generate income outside the planning area.

Agriculture - No change in existing local trends. Existing agricultural uses on private lands (PacifiCorp) and permitted livestock use on public lands in the Klamath River area would continue. Income and employment would continue to vary annually subject to national and regional economic trends but would not be influenced by changes in federal management direction. The impacts of federal land management would continue to be as described by the Klamath Falls Resource Area KFRMP/EIS and the Redding Resource Area.

Lumber and Wood Products (over 4,500 acres treated) - This alternative would provide expanded opportunities for forest thinnings and commercial wood products. Most of the proposed treatment projects would be accomplished through contracts for fuels treatment and prescribed burning activities and would not result in commercially viable timber sales. These activities would provide expanded employment and income opportunities. The geographic distribution of these opportunities would depend the locations of successful contract bidders.

Recreation and Tourism - Recreation uses of all types are expected to increase under this alternative relative to existing underlying trends. Numerous actions would be taken under this alternative, which would generally increase the relative attractiveness of the area for developed, motorized and non-motorized recreation uses. Selected primitive use areas would be developed or have improved access reducing the attractiveness of these areas to experience solitude. Extension of daily peaking flows and reduced ramp rates in the summer would result in increased private and commercial whitewater boating opportunities in Segments 2 and 3. Enhancement of this unique seasonal rafting opportunity would have a positive financial impact on existing commercial rafting industry as a whole. Existing individual permittees may experience additional competition. Motorized boating would be prohibited so this potential future use is precluded.

Cumulative Impacts - Increased vegetation treatment activities would result in expanded contracting opportunities. The BLM and other agencies, including the Forest Service and State Forestry Departments are also increasing the emphasis on vegetative treatments for fuels reduction. This alternative contributes to the local economy by supporting the establishment of a stable, year-round industry to supply ecosystem restoration and vegetative treatment services.

Irretrievable, Irreversible, and Unavoidable Impacts

No irretrievable, irreversible, or unavoidable impacts to the local, regional, or national economies have been identified.

Critical Elements of the Human Environment

There are no identified significant impacts to any of these elements. The alternatives include actions for varying degrees of resource use and protection. As a result, there are varying degrees of impacts, but none are significant. These critical elements will also be considered, as appropriate, in site-specific project design and implementation.

The critical elements of the human environment to be considered in this analysis include: air quality, floodplains, cultural/paleontological resources, prime or unique farmlands, Native American religious concerns, threatened or endangered species, areas of critical environmental concern, designated or potential wild and scenic rivers, wilderness or wilderness study areas, and whether any actions violate law. Also, based on Executive Branch Orders and US Department of Interior Policy or rulemaking additional factors must be assessed and include: unresolved conflicts, Environmental Justice, Indian Sacred sites, Indian Trust resources, Noxious and invasive weeds, and impacts on energy development.

Air Quality

Air quality is discussed in an earlier section.

Floodplains

Floodplains would potentially be impacted with each alternative. However, the overall impact would be positive due to actions to minimize vehicular traffic off roads and reduction of total road miles on floodplains. In addition, to some degree in Alternatives 2 and 4 and especially in Alternative 3, streambank restoration and changes in flows will help to stabilize and restore functionality of floodplains.

Cultural/Paleontological Resources

These are discussed in an earlier section.

Prime Or Unique Farmlands

No prime or unique farmlands occur on BLM lands in the planning area. Some irrigated pastures occur on PacifiCorp property but those are not mapped as prime or unique farmlands.

Native American Religious Concerns

These are discussed in an earlier section.

Threatened Or Endangered (T&E) Species

These are discussed in an earlier section.

Areas Of Critical Environmental Concern

There are no identified significant negative impacts to this element. However, in Alternatives 2 through 4 actions are proposed to enhance ACEC values that have been identified. In addition, in these same alternatives an expansion to this ACEC is proposed to include River Segment 1.

Designated Or Potential Wild And Scenic Rivers

There are no identified significant negative impacts to this element. In all alternatives Outstandingly Remarkable Values (ORVs) will be maintained. In Alternatives 2 through 4 actions are proposed to enhance the ORVs that have been identified.

Wilderness Or Wilderness Study Areas

There are no impacts to this element.

Do Any Actions Violate Law

Appendix C lists the various laws (legal authorities) that the BLM must adhere to in management of the river canyon. All actions are designed to meet these laws.

Unresolved Conflicts

Do any alternatives involve unresolved conflicts concerning alternative uses of available resources (NEPA section 102(2)(E)) not already decided in an approved land use plan? Some actions necessitate pre-disturbance surveys, or require that specific project design features or mitigation be implemented, but no unresolved conflicts occur with proposed actions. Actions on privately owned lands and on Forest Service or State administered lands are only presented as recommendations.

Environmental Justice

Executive Order 12898 of February 11,1994 as amended by Executive Order 12948 provides that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations." Environmental Justice "is achieved when everyone, regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and equal access to a healthy environment in which to live, work, and play " (Whorton and Sohocki 1996). Native Americans are a minority population of concern within the planning area because of historic and current uses of public lands for traditional cultural practices. The alternatives in this River Plan do not preclude collection of vegetative or natural products for personal use. No other ethnic groups or low income population have been identified as being disproportionately adversely impacted. The management actions in this proposed River Plan comply with Executive Order 12898 as amended and there will be no disproportionately high effects on minority, low-income populations or Indian Tribes as a result of the proposed management alternatives.

Alternative 1 maintains current levels of economic uses of the public lands. This includes economic activity associated with Federal grazing use, recreation, vegetation treatments and restoration.

Alternative 2 includes several actions to enhance visitor services and access on public lands. Economic activity associated with visitors to public lands would increase. Opportunities for both small firms and larger companies to bid on contracts for facility construction, vegetation treatments, and restoration projects would be increased.

Alternative 3 potentially decreases current levels of economic uses of the public lands but provides more opportunities for business contracting. This alternative includes several proposals to enhance visitor services and access on public lands, but changes in water delivery from PacifiCorp facilities may make whitewater rafting (especially with larger rafts) in late summer and fall infeasible. Economic activity associated with visitors to public lands could increase slightly because of general population increases, but BLM would not provide new facilities or opportunities to attract additional recreational users to the area. Alternative 3 decreases the level of economic opportunity due to decreased livestock use authorizations, and limited availability of special use permits. Opportunities for both small firms and larger companies to bid on contracts for vegetation treatments, and restoration projects would be increased substantially.

Alternative 4 includes numerous actions to enhance visitor services and access on public lands. Economic activity associated with visitors to public lands would increase including use by commercial rafting businesses. Opportunities for both small firms and larger companies to bid on contracts for facility construction would increase substantially, although, opportunities for contracts for vegetation treatments, and restoration projects would only increase marginally.

Use Of Indian Sacred Sites

Based on Executive Order 13007, there is a need to determine if there are impacts to use of Indian Sacred Sites. In general, actions proposed in alternatives do not restrict access to, or ceremonial use of, Indian sacred sites by Indian religious practitioners. However, some actions to reduce damage to cultural, watershed and aquatic resources include closure and decommissioning of some roads. Most of these roads are in areas where duplicate roads would remain for public use. While no actions would preclude access to and use of any sites, the closure of roads could make it more difficult for some individuals to reach certain sites. In addition, there are no actions that would adversely affect the physical integrity of any known sacred sites and some actions are even proposed to stop ongoing degradation of sites. As mentioned above, the alternatives in this River Plan do not preclude collection of vegetative or natural products for personal use.

Indian Trust Resources

No Indian Trust Resources are identified in the planning area.

Noxious Weeds And Invasive Plant Species

No actions proposed would contribute directly to the introduction, existence, or spread of: Federally listed noxious weeds (Federal Noxious Weed Control Act); or invasive non-native species; Executive Order 13112 (Invasive Species). However, ground-disturbing activities could indirectly facilitate the introduction or spread of undesirable species. While this would not be a significant impact, specific actions to treat undesirable plant populations and project design features are proposed.

Adverse Energy Development Impacts

Do the alternatives have a direct or indirect adverse impact on energy development, production, supply, and/or distribution — Executive Order 13212 (actions to expedite energy-related projects)? Mineral energy sources are limited in the planning area, and opportunities to develop energy sources such as wind and solar are restricted due to topography. If sources were developable, road closures and decommissioning could lower, but would not restrict access.

Compliance with Existing Management Direction

Actions proposed in this EIS should comply with existing management direction. In some cases an action/effect would not comply unless some sort of mitigation was applied. In other cases, where mitigation would not solve the conflict, a specific Resource Management Plan amendment would be necessary. While a decision on the final EIS will in general, amend both Klamath Falls and Redding RMPs, it is important to identify potential changes here.

Recreation – With an increase in recreation developments and an accompanying increase in use with Alternative 4, it is unlikely that the semi-primitive motorized recreation opportunity spectrum (ROS) class would be achievable. Facility design standards are higher, and the potential number of daily visitor contacts would increase to where a "rural" ROS class would result. An amendment of the ROS class would be necessary if Alternative 4 was selected.

In Alternative 3, there is a possibility that changes in river flows would result in not being able to raft the river throughout the summer season. This may mean that the wild and scenic river recreational ORV (whitewater rafting) may not be maintained in as many as 50% of years. Instream channel restoration is proposed to reduce the width/depth ratio of the river (narrow and deepen the river channel) which could lead to more raftable flows in the mainstem of the river even during lower flows. If these treatments do not resolve the potential problem, then other mitigation would be needed to assure maintenance of the ORV.

Livestock Grazing - Removal of grazing from allotments in the Canyon under Alternative 3, would not be in compliance with the 1995 KFRA RMP/EIS...which authorized or reaffirmed existing levels of grazing (also acknowledged in the Topsy Pokegama Landscape Analysis).

An amendment of the authorized permitted grazing use would be necessary if Alternative 3 was selected.

Expansion of ACEC – Expansion of the Upper Klamath River ACEC from Segment 2 to Segment 1 in Oregon is proposed in Alternatives 2, 3, and 4. An ACEC evaluation identified important values in Segment 1 (see Map 2). In order to extend protection of values on this section of the Klamath River an amendment to the Klamath Falls Resource Area RMP would be needed.

Expansion of the Special Recreation Management Area – Based on the Redding RMP, land retention and disposal of land in Segment 3 is consistent between the Upper Klamath River Management Area and Alternative 1 (see Appendix D). For Alternatives 2, 3, and 4, land tenure adjustments (such as land acquisition and retention of BLM parcels identified to be disposed) are proposed outside the existing Upper Klamath River Management Area. An RMP amendment is proposed to expand the Upper Klamath River Management Area so that land tenure direction would be consistent throughout the entire project area for each alternative. The potential expansion would match the project area under each of the three alternatives.

Chapter 6 - Coordination and Consultation

Chapter 6 – Klamath River Rafters

Chapter 6 - Coordination and Consultation

Introduction

The Draft Upper Klamath River Management Plan/EIS (henceforth called the River Plan) was prepared by an interdisciplinary team of resource specialists from the BLM, Lakeview District, Klamath Falls Resource Area Office with cooperation from the BLM, Redding Field Office and the Oregon Parks and Recreation Department. The official start of the preparation of the River Plan was initiated with the publishing of a "Notice of Intent" to prepare a Draft Environmental Impact Statement in the Federal Register on November 27, 2000. This notice also included an invitation to the public to suggest issues to be addressed in the River Plan and to provide comments concerning the management of the public lands. The planning process began in earnest in early 2001 with scoping meetings with the public, local governments, and organizations.

The River Plan is quite complex and requires extra coordination due to the fact that the planning area covers portions of two states. Multiple federal, state, and local government agencies were coordinated with to ensure that regulations would be adhered to during the preparation of this plan. In addition, PacifiCorp coordinated with the BLM in sharing natural resource information on their lands that are considered in the River Plan.

Coordination

Federal Agencies

The BLM is involved with the U.S. Fish and Wildlife Service, U.S. Forest Service, Environmental Protection Agency, U.S. Geological Survey, Bureau of Reclamation, and National Resource Conservation Service on projects such as watershed analysis, water quality improvement projects, in addition to this plan. In addition, personnel from these agencies have been involved in planning, conflict resolution, and Section 7 consultation under the Endangered Species Act.

The Regional Interagency Executive Committee, Klamath Provincial Advisory Committee, Klamath Basin Ecosystem Restoration Office, and the Regional Ecosystem Office, established under the Northwest Forest Plan, have increased BLM's interagency role as well.

Klamath Basin Ecosystem Restoration Office

The Ecosystem Restoration Office (ERO) is an interagency office, which is operated cooperatively by the U.S. Fish and Wildlife Service, Bureau of Reclamation, U.S. Forest Service and the BLM. This interagency office provides funding, technical assistance, and monitoring for watershed restoration projects which are proposed by private landowners, private and public organizations and agencies, and the Upper Klamath Basin Working Group. The ERO works closely with the Klamath Provincial Advisory Committee and watershed councils within the Klamath Basin. BLM has helped support this office since 1997. Proposed projects in this plan were discussed with ERO staff.

State Agencies

The Klamath Falls Resource Area has a long term working relationship with Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Oregon Department of Agriculture, Oregon Parks and Recreation Department, State Historic Preservation Office, and the Oregon Department of Environmental Quality. BLM is involved with these agencies in diverse activities such as recreation and timber sale planning, fish habitat inventory, water quality monitoring and TMDL development, noxious weed management, hazardous material cleanup, air quality maintenance, and wildfire suppression.

A presentation was made to the California Resources Agency on public issues and proposed alternatives. Preliminary information on the proposed plan was shared with California Water Resources Control Board, California Department of Fish and Game, and California Department of Forestry.

Oregon Parks and Recreation Department - The Oregon Scenic Waterways Program is administered under the authority of the Oregon State Parks and Recreation Commission (ORS 390.805 to 390.925). Administrative rules (OAR 736-040-005 to 736-040-0095) have been adopted to govern the program. In addition to the general rules governing the program, specific rules are created through the management of each river segment in the system. These rules are created through the management planning process, and tailored to the actions necessary to maintain the existing character of the designated river corridor.

The Act and Commission's rules require the evaluation of proposed land use changes within one-quarter mile from each side of the river for their potential impacts on aesthetic and scenic values, as viewed from the river. Property owners wanting to build road or houses, develop mines, harvest timber, or other similar projects, must provide written notification to the Oregon Parks and Recreation Department. The OPRD evaluation of the project will be coordinated with other natural resource agencies (federal and state) having regulatory responsibility and with the local jurisdiction. OPRD relies on its river classification and administrative rules for each segment of the scenic waterway to determine whether the proposed project is incompatible or inconsistent with the designated classification. State Parks will work with the landowner to reach a mutually satisfactory resolution of any conflicts. Where such a resolution cannot be reached, the Commission must decide, within one year of the original notification, whether to pay the property owner for the land or the development rights, or allow the landowner to proceed in accordance with the original written notification.

By virtue of the Scenic Waterways Act or other laws applying to the use of lands/waters along Oregon's rivers, OPRD has several management partners. Each of the following agencies has regulatory authority affecting a scenic waterway, and each provides technical information to help enhance and protect the natural and scenic values of private property:

Oregon Water Resources Department - The Oregon Water Resources Department issues water rights an all waters in the state and enforces the exclusion of dams, impoundments and certain types of placer mining in scenic waterways and on tributary streams within scenic waterway boundaries. In addition, the Scenic Waterways Act requires the Water Resources Commission to review proposed land condemnations and to review scenic waterway additions proposed by OPRD for designation by the Governor. The Commission must also assure no adverse effects occur to fish, wildlife and recreation by the issuance of any new water right in or above scenic waterways.

Oregon Division of State Lands - The Division of State Lands is the staff agency for the State Land Board (the Governor, Secretary of State and State Treasurer). It is responsible for protecting and conserving the beds and banks of scenic waterways. Any riverbank alteration, such as filling or removing material from the river, requires Land Board approval and a permit from the Division of State Lands. In addition, the Division of State Lands owns the beds and banks of many navigable rivers and lakes throughout the state. The Division of State Lands works closely with OPRD to insure that any changes made to the beds and banks of scenic waterways are consistent with the scenic waterway management plan.

Oregon State Marine Board - The Oregon State Marine Board regulates the use of boats on Oregon waters and registers motorized craft. Fishing, hunting and rafting guides who operate in Oregon are also required to register with the Marine Board. The Marine Board has the authority to adopt rules governing the operation of recreational watercraft. State boating laws and operating rules are enforced by county sheriffs and State Police. The Marine Board contracts for local enforcement services and provides the necessary funding for staff, equipment and training for marine programs in various counties. In addition to law enforcement, marine patrols conduct safety inspections, place and maintain uniform waterway markers and navigational aides, and provide search and rescue services.

Oregon Department of Fish and Wildlife - The Department of Fish and Wildlife manages fish and wildlife resources in the state, regulates all commercial and recreational harvests, and is responsible for habitat preservation. The department is authorized to request in-stream water rights to protect fish and wildlife resources. Agency technicians and biologists provide technical assistance for riparian habitat protection and maintenance, riverbed or riverbank alteration, water withdrawal, or any use of the water's surface.

California Department of Fish and Game - The California Department of Fish and Game manages fish and wildlife resources in the state, regulates all commercial and recreational harvests, and is responsible for habitat preservation. Meetings and field trips have been held with California Department of Fish and Game employees throughout the development of the proposed River Plan.

Oregon Department of Environmental Quality - As the regulator of air and water quality in the state, the Department of Environmental Quality guards against the degradation of air and water quality in Oregon and along scenic waterways. The department is authorized to request in-stream water rights for the purpose of pollution abatement as well as to set water quality standards to protect scenic waterway values. The Department of Environmental Quality is the best resource for information about the water quality of a river or stream.

Oregon and California Departments of Forestry - Besides managing certain state-owned forests, the Oregon and California Departments of Forestry enforces the Forest Practices Act (in each state), which is designed to protect water quality and fish and wildlife from the adverse impacts of forestry activities such as logging and road construction. A forest operations permit from the department is required for logging and other forestry activities. The department also provides advice to private timber landowners and other state agencies in working to protect waterways.

California Water Resources Control Board - The State Water Resources Control Board (SWRCB) was created in 1967 by combining the Water Rights and Water Pollution Control Boards into a single body. The mission of the Board is to protect the quality of the State's surface, ground, and coastal waters, and to allocate water rights by issuing water right permits for appropriative surface water rights. Both the State and Regional Boards are backed by the Dickey Water Pollution Act of 1949, the Porter-Cologne Water Quality Act of 1969, and the Federal Clean Water Act of 1972, and the Clean Water Enforcement and Pollution Prevention Act of 1999. Meetings were held with SWRCB employees to review the proposed River Plan.

Counties

The Klamath Falls Resource Area (KFRA) is located within Klamath County, Oregon. The Redding Resource Area is located in Siskiyou County, California. There has been periodic communication between the KFRA and Klamath county commissioners, Siskiyou County Supervisors, and other county staff. The commissioners and supervisors and their staff are also on the Upper Basin subcommittee of the Klamath Provincial Advisory Committee or the Interagency Task Force (see Appendix A) or both.

PacifiCorp

PacifiCorp is the major private landowner in the planning area. PacifiCorp has requested, in writing, that BLM explore the possibility of land tenure adjustments during the development of the EIS. PacifiCorp has provided resource information on their lands to be used in the River Plan.

PacifiCorp has submitted a map to the BLM that identifies parcels of their land to be considered for possible land trade, acquisition, or a mutually beneficial land management arrangement

Consultation

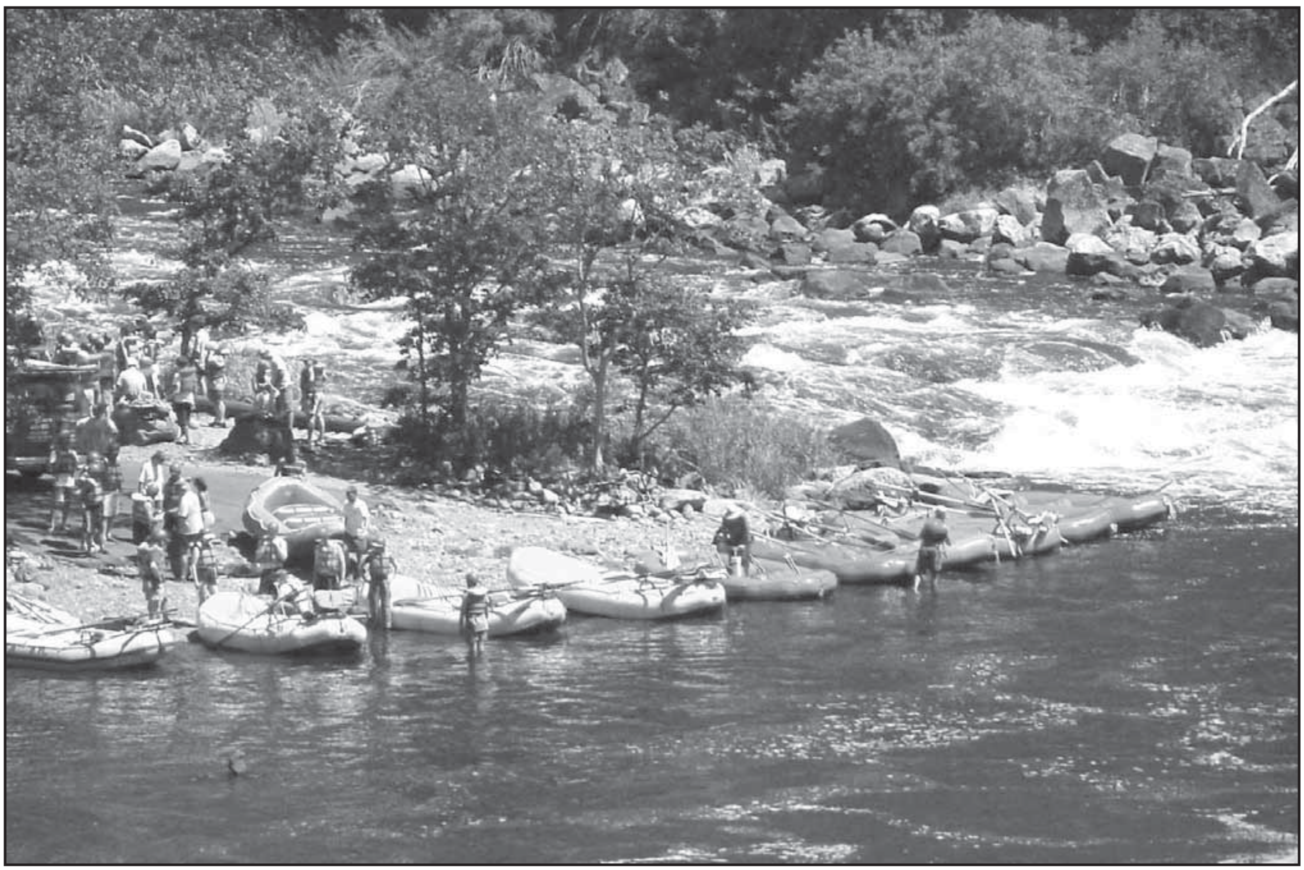
US Fish and Wildlife Service – The 1973 Endangered Species Act identified on a National List, any plant, animal or fish that is in danger of extinction throughout all or a significant portion of its range. Species that are threatened, proposed and candidate status have a consultation process for projects with the USFWS, which administers the National List. A Biological Opinion (BO) will be prepared on the final preferred alternative that will make a determination on endangered fish or wildlife species and habitat. This opinion evaluates the potential impacts to species from a specific project and provides recommendations for protection of the viability of the species. To date, consultation with the USFWS has been informal through discussions with BLM staff.

Tribes - The Lakeview District is in the process of developing a Memorandum of Understanding (MOU) between the BLM and the Klamath Tribes. It is anticipated the MOU will be finalized in FY 2003. The KFRA has consulted with the Klamath Tribes on the Klamath River Management Plan/EIS. Government-to- government meetings have been held that have included presentations to the Tribal Council. Regular updates have been given to the Tribes Cultural and Heritage Resource specialists during bi-monthly meetings.

Government-to-government consultation meetings were also held with various Tribes in California. The KFRA had consulted with the Shasta Nation (both Oregon and California groups), Hupa, Karuk, and Yurok Tribes regarding the proposed River Plan.

State Historic Preservation Officer - Because the sites would potentially be affected by activities in the canyon, consultation will be necessary. To date no formal consultation has occurred although the Oregon and California SHPO officer has been contacted. An "effects determination" will be made on the final preferred alternative in consultation with the State Historic Preservation Officers in both Oregon and California.

Chapter 7 – Implementation and Monitoring



Chapter 7 – Raft Launch below J.C. Boyle Powerhouse

Chapter 7 – Implementation and Monitoring

The objectives of the implementation and monitoring plans are based on the assumption that annual budget allocations will support full implementation of the Klamath River Management Plan. If actual budgets were significantly different from those projected, project implementation, desired restoration and enhancement activities would necessarily be reduced, along with the monitoring actions that are associated with them. However, project implementation, monitoring and evaluation would continue at a level commensurate with the management actions that are implemented, and to ensure that the outstandingly remarkable values of the Klamath River are protected.

Implementation

A detailed implementation time schedule will be developed in the FEIS. For the River Plan/DEIS, it was assumed that actions identified in Appendix H would be implemented in ten years with annual maintenance needed there after. The life span of this plan is estimated to be twenty years.

The total cost estimates for implementing the specific actions for each alternative are displayed in Table 7-1. BLM has prepared cost estimates for the recommended actions that occur on PacifiCorp lands. This was done to abide by PacifiCorp's written request to consider their lands in this River Plan/DEIS.

There were common assumptions made when developing the cost estimates for implementing each alternative.

Cost estimates were based on contracting all work to complete the specific actions.

No cost estimates were made for land tenure acquisitions.

Maintenance costs were determined to be critical after the ten-year implementation period. Maintenance costs were determined by estimating 10% of the total cost per alternative per year. Maintenance costs are for recreation facilities, roads, and vegetation follow-up treatments or new treatments.

Monitoring

BLM is required to monitor land use plan decisions (43 CFR 1610.4-9) and to adopt a monitoring program for any mitigation incorporated into decisions based on environmental impact statements (40 CFR 1505.2[c]). In addition, protection and enhancement of outstandingly remarkable river values is a mandate of the Wild and Scenic Rivers Act. In order to verify the trend of river resource conditions and to guide future management decisions, it is desirable to systematically sample public land, file the data in an organized fashion, and provide for periodic evaluation of the information obtained.

The area included in this monitoring plan consists of all public land administered by the BLM from rim to rim along the Klamath River mainstem (see Maps 9 thru 12). For this River Plan/DEIS a monitoring program was developed to determine monitoring actions, what type of monitoring would be necessary and how much would it cost. The specific costs and levels of monitoring are compared to each alternative in a detailed monitoring plan found in Appendix M. Table 7-2 reviews the total costs associated with monitoring by each alternative.
The monitoring plan identifies 3 levels of monitoring that could be conducted. These

Table 7-1.–Implementation Costs for the Upper Klamath River Management Plan

Management Actions	Alternative 1*		Alternative 2*		Alternative 3*		Alternative 4*	
	BLM	PC	BLM	PC	BLM	PC	BLM	PC
Scenery	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment
Recreation	$ 352	$ 118	719	1,953	255	729	2,239	2,648
Road Treatments	55	42	150	152	115	130	612	189
Cultural Resources	267	19	64	89	87	159	117	155
Vegetation Treatments	416	36	905	1,469	1,273	1,928	939	562
Wildlife Species Habitat Treatments	3	52	27	88	39	195	75	126
Water Quality/ ACS Objectives	Included in Road & Veg Treatment	Included in Road & Veg Treatment	Included in Road & Veg Treatment	Included in Road & Veg Treatment	Included in Road & Veg Treatment	Included in Road & Veg Treatment	Included in Road & Veg Treatment	Included in Road & Veg Treatment
Aquatic Species Habitat	0	0	1,100	780	2,280	7,889	331	392
Grazing	13	0	13	0	13	0	13	0
Fire/Fuels	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment	Included in veg treatment
Total Cost/Decade	$ 1,106	$ 267	$2,978	$4,531	$4,062	$11,030	$4,326	$4,072
Annual Maintenance after first decade (the implementation period)	105	27	298	453	400	400**	433	407

**All cost totals are in $1,000 and displayed for a ten year time period*
*** Annual maintenance costs based on less than 10% factor*

monitoring levels are compared to each monitoring action and alternative (see Appendix M). The following reviews the 3 levels of monitoring that could be completed after projects implementation.

Implementation Monitoring — When determining whether a course of action is having the desired effects, the first step to take is implementation monitoring. This type of monitoring answers the question: "Were the actions detailed in the Record of Decision accomplished as designed?" Implementation monitoring will be conducted on each mitigation measure incorporated into the Klamath River Management Plan, and disclosure of accomplished actions will be documented in achievement reports. For many mitigation measures, such as standard Best Management Practices, the only monitoring necessary would be implementation monitoring.

Effectiveness Monitoring — If more monitoring information is desired, the second phase of monitoring is to determine whether the actions documented in the implementation phase of monitoring are having any effect. This phase answers the question: "Did the actions accomplished meet the objectives in the Record of Decision?" Thus, effectiveness monitoring includes obtaining field observations that meet approved protocol, and evaluating the data gathered to determine whether conditions remain within the bounds and intent of Plan direction.

Validation Monitoring — The validation phase of monitoring seeks to resolve whether the course of action is having the desired effects. Validation answers the question: "Were the initial assumptions used to develop the Klamath River Management Plan correct?" The validation phase also forms the background for adaptive management, and would become the initial data set for the next round of decision making.

Table 7-2.–Monitoring costs for the Upper Klamath River Management Plan

Monitoring Activities	Alternative 1*	Alternative 2*	Alternative 3*	Alternative 4*
Scenic Qualities	$ 70	$ 70	$ 70	$ 70
Recreation	80	130	95	130
Cultural Resources	14	24	16	24
Vegetation/special status plants & noxious weeds	50	92	111	42
Soils	10	20	30	20
Wildlife	66	118	153	125
Watershed/water quality	57	126	126	108
Aquatic Species Habitat	30	270	160	270
Grazing	6	6	3	6
Wild Horses	1	1	1	1
Fire and Fuels	Included in Vegetation	Included in Vegetation	Included in Vegetation	Included in Vegetation
Total Cost/Decade	$384	$857	$765	$796

*All cost totals are in $1,000 and displayed for a ten year time period

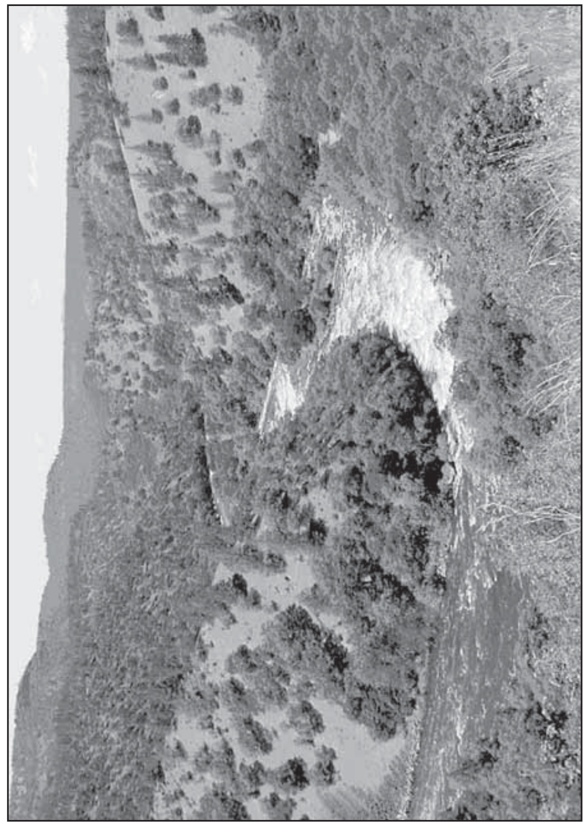
U.S. Department of the Interior
Bureau of Land Management

Lakeview District Office
HC10 Box 337, 301 South G. Street
Lakeview, Oregon 97630

April 2003

Draft-Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments

Volume 2 - Appendices



Draft-Upper Klamath River Management Plan/Environmental Impact Statement and Resource Management Plan Amendments — *Volume 2 - Appendices*

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DEPARTMENT OF THE INTERIOR
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BLM/OR/WA/PL-02/038+1792

Cover Photo: Klamath River Canyon at Hells Corner

List of Abbreviations and Acronyms

ACEC - Area of Critical Environmental Concern
ACS - Aquatic Conservation Strategy
AUM - Animal Unit Month
BLM - Bureau of Land Management
BMP - Best management practice
CA - Conservation Agreement
CAA - *Clean Air Act*
CDFG - California Department of Fish and Game
CEQ - Council on Environmental Quality
CFR - Code of Federal Regulations
CFS - Cubic Feet per Second
COE - Corps of Engineers (Corps)
CSWRCB - California State Water Resources Control Board
CWA - *Clean Water Act*
CWD - Coarse Woody Debris
DEQ - Department of Environmental Quality
DSL - Division of State Lands
EA - Environmental Assessment
EIS - Environmental Impact Statement
EPA - Environmental Protection Agency
ESA - *Endangered Species Act*
ESU - Evolutionary Significant Unit
FACA - *Federal Advisory Committee Act*
FERC - Federal Energy Regulatory Commission
FLPMA - *Federal Land Policy and Management Act*
FONSI - Finding of No Significant Impact
FTZ - Fuel Treatment Zones
GIS - Geographic Information System
HABS/HAER - Historic American Buildings Survey/ Historic American Engineering Record
HCP - Habitat Conservation Plan
IAC - Intergovernmental Advisory Committee
IBLA - Interior Board of Land Appeals
ICBEMP - Interior Columbia Basin Ecosystem Management Project
JITW - Jobs in the Woods
KFRA - Klamath Falls Resource Area
KFRMP - Klamath Falls (Resource Area) Resource Management Plan
KPAC - Klamath Provincial Advisory Committee
LAC - Limits of Acceptable Change
LCDC - Land Conservation and Development Commission
LSR - Late-Successional Reserve
LUP - Land Use Plan
MOA - Memorandum of Agreement
MOU - Memorandum of Understanding
NCA - National Conservation Area
NEPA - *National Environmental Protection Act*
NFMA - *National Forest Management Act*
NFP - Northwest Forest Plan
NHPA - *National Historic Preservation Act*
NMFS - National Marine Fisheries Service
NOA - Notice of Availability
NOAA - National Oceanic Atmospheric Administration
NOI - Notice of Intent
NPS - National Park Service
NRCS - Natural Resources Conservation Service
NRHP - National Register of Historic Places
NRI - Natural Resources Inventory
O&C - *Oregon & California Lands Act*
ODA - Oregon Department of Agriculture
ODEQ - Oregon Department of Environmental Quality
ODF - Oregon Department of Forestry
ODFW - Oregon Department of Fish and Wildlife
ODOT - Oregon Department of Transportation
ODSL - Oregon Division of State Lands
OHV - Off-Highway Vehicle (also known as Off-Road Vehicle)
ONHP - Oregon Natural Heritage Program
OPRD - Oregon Parks and Recreation Department
ORV - Outstandingly Remarkable Value
OWRD - Oregon Water Resources Department
PAC - Provincial Advisory Council
PDF - Project Design Feature
PFC - Proper Functioning Condition
PFW - Partners for Wildlife
PRIA - *Public Rangelands Improvement Act*
RC&D - Resource Conservation and Development
RIEC - Regional Interagency Executive Committee
REO - Regional Ecosystem Office
RMP - Resource Management Plan
RM - River Mile
ROD - Record of Decision
ROS - Recreation Opportunity Spectrum
RRMP - Redding Resource Management Plan
SONCC - Southern Oregon/Northern California Coastal
SHPO - State Historic Preservation Office
SMA - Special Management Area
SRMA - Special Recreation Management Area
SWCD - Soil and Water Conservation District
T&E - Threatened and Endangered
TES - Threatened, Endangered, and Sensitive (Species)
TMDL - Total Maximum Daily Load
TNC - The Nature Conservancy
USBR - U.S. Bureau of Reclamation
USDA - United States Department of Agriculture
USDI - United States Department of Interior
USFS - United States Forest Service
USFWS - United States Fish and Wildlife Service
USGS - United States Geological Survey
VRM - Visual Resource Management
WQS - Water Quality Standards
WSR - Wild and Scenic River
WSRA - *Wild and Scenic Rivers Act*
WQRP - Water Quality Restoration Plan

Appendices

Appendix A – Glossary of Terms

Following are definitions for terms used in this document.

-A-

Active preference: That portion of the total grazing preference for which grazing use may be authorized.

Activity plan: See "Implementation Plan."

Adaptive management**:** Adaptive management is a process that allows the development of a plan when some degree of biological and socioeconomic uncertainty exists. It requires a continual learning process, a reiterative evaluation of goals and approaches, and redirection based on an increased information base and changing public expectations (Baskerville 1985).

Adjustments: Changes in animal numbers, periods of use, kinds or class of animals or management practices as warranted by specific conditions.

Allotment: An area of land where one or more livestock operators graze their livestock. Allotments generally consist of BLM lands but may also include other federally managed, state owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Alluvium (or alluvial deposits): Sediment ranging in size from silt to cobbles transported and deposited by rivers and streams.

Amendment: The process for considering or making changes in the terms, conditions, and decisions of approved RMPs or MFPs using the prescribed provisions for resource management planning appropriate to the proposed action or circumstances. Usually only one or two issues are considered that involve only a portion of the planning area.

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

Animal unit month (AUM): A standardized measurement of the amount of forage necessary for the sustenance of one cow unit or its equivalent for 1 month (approximately 800 pounds of dry forage).

Aquatic habitat: Habitat that occurs in free water.

Area of Critical Environmental Concern (ACEC)**:** Type of special land use designation specified within the "Federal Land Policy and Management Act" (FLPMA). Used to manage areas with important resource values in need of special management.

Assessment: The act of evaluating and interpreting data and information for a defined purpose.

-B-

Bank (or streambank)**:** The area below the ordinary high water mark in a river or stream. The ordinary high water mark is defined by the U.S. Army Corps of Engineers as that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Bankfull discharge: Associated with the flow of water that just fills the channel to the top of its banks to a point where water begins to overflow onto a floodplain.

(BLM) Backcountry byways: Vehicle routes that traverse scenic corridors utilizing secondary or back country road systems. National backcountry byways are differ from other scenic byways based on the type of road and vehicle needed to travel the byway.

Baseflow: Water that percolates to groundwater and reaches the stream slowly over long periods of time.

Base property: Private lands owned or controlled by a livestock operator (permittee/lessee) which meet the regulatory definition of base property (43 CFR 4110.2-1a) and to which the grazing permit/lease is legally attached.

Benthic invertebrates: Aquatic invertebrates that use the river bottom and shoreline.

Best management practices (BMPs)**:** Effective, feasible (including technological, economic, and institutional considerations) conservation practices and land- and water-management measures that avoid or minimize adverse impacts to natural and cultural resources. Best management practices may include schedules for activities, prohibitions, maintenance guidelines, and other management practices.

Boundaries**:** The areas that receive protection under the Wild and Scenic Rivers Act. Boundaries include an average of not more than 320 acres of land per mile, measured from the ordinary high water mark on both sides of the river. This equates to an average width of one-quarter mile on each side of the river.

Bureau sensitive species: Species eligible for federal listed or candidate, state listed, or state candidate status, and on List 1 in the Oregon Natural Heritage Program, or otherwise approved for this category by the State Director.

-C-

Candidate species: Any species included in the *Federal Register* notice of review that are being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act (ESA).

Carrying capacity: The maximum amount of recreational use that can be sustained while maintaining the quality of the recreational experience and natural resource conditions.

Channel: An open conduit either naturally or artificially created which periodically or continuously contains moving water or forms a connecting link between two bodies of water.

Channel stability: A relative term describing erosion or movement of the channel walls or bottom due to waterflow.

(BLM) Class I cultural inventory: An inventory of the existing literature and a profile of the current data base for cultural resources; frequently utilized to guide field inventories.

(BLM) Class II cultural inventory: A sample-oriented field inventory which is representative of the range of cultural resources within a finite study area.

(BLM) Class Ill cultural inventory: An intensive field inventory designed to locate and record, from surface and exposed profile, all cultural resources within a specified area.

Classification: The status of rivers or river segments under the Wild and Scenic Rivers Act ("wild," "scenic," or "recreational"). Classification is based on the existing level of access and human alteration of the site.

Climax: (See also Potential Natural Community.) The culminating stage in plant succession for a given site where vegetation has reached a highly stable condition.

Coarse woody debris (CWD): Pieces of wood with length greater than 10 feet and diameter greater than 6 inches.

Closed: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 sets forth the specific meaning of "closed" as it relates to OHV use, and 43 CFR 8364 defines "closed" as it relates to closure and restriction orders.

Collaboration: A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. This may or may not involve an agency as a cooperating agency.

Commercial (productive) forest land: Forest land which is producing, or has a site capable of producing, at least 20 cubic feet/acre/year of a commercial tree species.

Commercial tree species: Tree species whose yields are reflected in the allowable cut, which includes pines, firs, spruce, and Douglas fir.

Commission: The Oregon Parks and Recreation Commission.

Comprehensive management plan**:** A plan to protect and enhance a Wild and Scenic River.

Conditional suppression: Actions are based on predetermined, stringent conditions, i.e., fire location, weather condition, forces available, and fire size. Monitoring must be done throughout the fire's duration and direct suppression will be taken if any one condition is exceeded.

Conformance: Means that a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

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 fish and wildlife species associated with these late-successional/old-growth forest areas.

Conservation Agreement (CA): A formal signed agreement between the U.S. Fish and Wildlife Service or National Marine Fisheries Service and other parties that implements specific actions, activities, or programs designed to eliminate or reduce threats or otherwise improve the status of a species. CA's can be developed at a State, regional, or national level and generally include multiple agencies at both the State and Federal level, as well as tribes. Depending on the types of commitments the BLM makes in a CA and the level of signatory authority, plan revisions or amendments may be required prior to signing the CA, or subsequently in order to implement the CA.

Consistency: Means that the proposed land use plan does not conflict with officially approved plans, programs, and policies of tribes, other Federal agencies, and State and local governments to the extent practical within Federal law, regulation, and policy.

Cooperating agency: Assists the lead Federal agency in developing an EA or EIS. The Council on Environmental Quality regulations for implementing NEPA define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Cover: Vegetation used by wildlife for protection from predators (escape cover) or to mitigate weather conditions (thermal cover). Also refers to: protection of the soil by plants (vegetative cover), protection of smaller plants by larger plants, and suitable protective habitat for aquatic organisms.

Critical habitat: The area of land, water, and airspace required for the normal needs and survival of a federally listed threatened or endangered species.

Cubic feet per second (cfs): A measure of stream discharge. One cfs equals about 10,000 gallons per day.

Cultural plants: Plants traditionally used by Native Americans for subsistence, economic, or ceremonial purposes.

Cultural resources: Fragile and nonrenewable elements of the physical and human environment including archaeological remains (evidence of prehistoric or historic human activities) and socio-cultural values traditionally held by ethnic groups (sacred places, traditionally utilized raw materials, etc.).

Cultural site: Any location that includes prehistoric and/or historic evidence of human use, or that has important socio-cultural value.

-D-

Deferred grazing: Discontinuance of livestock grazing on an area for specified period of time during the growing season to promote plant reproduction, establishment of new plants, or restoration of the vigor by old plants.

Discharge: (See also Streamflow.) The rate at which water flows, expressed in units of volume per time, such as cubic feet per second (cfs).

Dispersed/extensive recreation: Recreation activities of an unstructured type that are not confined to specific locations such as recreation sites. Example of these activities may be hunting, fishing, off-highway vehicle use, hiking, and sightseeing. Minimal management actions related to the Bylaws' stewardship responsibilities are considered adequate in the areas where extensive recreation takes place and explicit recreation management is not required.

Distribution: The uniformity of livestock grazing over a range area. Distribution is affected by the availability of water, topography, and type and palatability of vegetation as well as other factors.

Drainage (internal soil): The property of a soil that permits the downward flow of excess water. Drainage is reflected in the number of times and in the length of time water stays in the soil.

Drift (livestock drift): Roaming of livestock to areas outside of their authorized area of use.

Drive-to campground**:** A campground with associated parking adjacent to individual campsites.

-E-

Ecological status: Ecological status (also referred to as ecological condition) is the present state of vegetation of a range site in relation to the potential natural community for that site. It is an expression of the relative degree to which the kinds, proportions and amounts of plants in a plant community resemble that of the potential natural plant community for the site. Four classes are used to express the degree to which the production or composition of the present plant community reflects that of the potential natural community (climax). Departures from climax can enhance or depreciate the value of the resultant plant community for various uses.

Ecological status (seral stage): Percentage of present plant community that is climax for the range site:

Potential natural community	76–100
Late seral	51–75
Mid seral	26–50
Early seral	0–25

Ecosystem: A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

Ecosystem management: The use of a “whole-landscape” approach to achieve multiple use management of public lands by blending the needs of people and environmental values in such a way that these lands represent diverse, healthy, productive, and sustainable ecosystems.

Endangered species: A plant or animal species which is in danger of extinction throughout all or a significant portion of its range, as designated by the Secretary of the Interior, and as is further defined by the “Endangered Species Act.”

Environmental Impact Statement (EIS)**:** A public document required under the National Environmental Policy Act (NEPA) that identifies and analyzes activities that might affect the human and natural environment.

Ephemeral stream: A stream that flows only after rains or during snowmelt.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geological agents.

Evaluation (Plan Evaluation): The process of reviewing the land use plan and the periodic plan monitoring reports to determine whether the land use plan decisions and NEPA analysis are still valid and whether the plan is being implemented.

Existing use: Means the use to which related adjacent land was being put on the date a river segment or lake was designated as a scenic waterway; or any subsequent change in use authorized under the Act or these rules.

-F-

Facilities**:** Buildings and the associated infrastructure such as roads, trails, and utilities.

Federal Land Policy and Management Act of 1976 (FLPMA*)*: Public Law 94-579. October 21, 1976, often referred to as the BLM’ s “Organic Act,” which provides the majority of the BLM’s legislated authority, direction, policy, and basic management guidance.

Federally reserved water rights: Water rights that arise from and are governed by federal, rather than state, law. These water rights are “reserved” to meet the purpose(s) of reserved lands (i.e., Wild and Scenic Rivers).

Fire management plan: A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program in the approved land use plan; the plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Floodplain**:** The relatively flat area or lowlands adjoining a body of standing or flowing water which has been or might be covered by floodwater.

Flow exceedance: The percent of time that a given flow is equaled or exceeded during a given time period.

Forest land: Land that is now, or has the potential of being, at least 10 percent stocked by forest trees (based on crown closure) or 16.7 percent stocked (based on tree stocking).

Forward looking infrared radiometry (FLIR): Remotely sensed thermal imagery that measures the temperature of objects (such as water) by recording emitted radiation. This information is used to assess temperature patterns over large areas.

Free-flowing river: Existing or flowing in natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway (as defined in the Wild and Scenic Rivers Act - 16 USC 1286 [b]).

Fuel treatment zone: A pre-designed and value-weighted area considered for any form of fire/fuels treatment. Pre-designation referring to the division of the Resource Area into blocks or areas for evaluation of current condition versus historic or naturally occurring seral stage in the presence of fire.

-G-

Genetic diversity: The variety within populations of a species.

Geographic Information System (GIS): A computer system capable of storing, analyzing, and displaying data and describing places on the earth's surface.

Goal: A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established time frames for achievement.

Grazing lease: See Permit/Lease

Grazing system: The manipulation of livestock grazing to accomplish a desired result.

Grazing use supervision**:** On the ground inspections of public lands to ensure compliance with BLM grazing permits, leases, and/or yearly grazing authorizations.

Groundwater: Water contained in pore spaces of consolidated and unconsolidated surface material.

Guidelines: Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as best management practices. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.

-H-

Habitat: A specific set of physical and biological conditions that surround a species, group of species, or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover, and living space.

Habitat diversity: The number of different types of habitat within a given area.

Herd area: The geographic area identified as having been used by wild horse or burro herds as their habitat in 1971.

Herd management area (HMA): Public land under the jurisdiction of the BLM that has been designated for special management emphasizing the maintenance of an established wild horse herd.

Herptiles/Herptofauna: Reptilian and amphibious vertebrates (snakes, lizards, frogs, etc.).

Historic: Refers to period wherein nonnative cultural activities took place, based primarily upon European roots, having no origin in the traditional Native American culture(s).

Historic American Building Survey/Historic American Engineering Record (HABS/HAER) – A national documentation standard promoted by the National Park Service.

Hydrograph: A graph of the rate of discharge plotted against time (usually hours or days) for a point in a stream channel

Hyporheic flow: Water that enters pore space within streambed alluvial deposits, travels along localized subsurface flow paths and re-emerges into the stream channel downstream.

Hyporheic zone: The area under the stream channel and floodplain that contributes to the stream.

-I-

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

Implementation Decisions: Decisions that take action to implement land use plan decisions. They are generally appealable to IBLA under 43 CFR 4.40.

Implementation Plan: A site-specific plan written to implement decisions made in a land use plan. An implementation plans usually selects and applies best management practices to meet land use plan objectives. Implementation plans are synonymous with “activity” plans. Examples of implementation plans include interdisciplinary management plans, habitat management plans, and allotment management plans.

Impoundment**:** A dam or other structure to obstruct the flow of water in a river or stream.

Improvement: Means the placing on related adjacent land of any building or structure or modification of existing buildings or structures or the clearing, leveling, filling or excavating of related adjacent land.

Indian tribe (or tribe): Any Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status.

Interior Columbia River Basin Ecosystem Management Project (ICBEMP): An ongoing project examining the effects (on a large, regional scale) of past and present land use activities on the Interior Columbia River Basin ecosystem and a small part of the Great Basin ecosystem.

Intermittent stream: A stream that flows most of the time but occasionally is dry or reduced to pool stage.

Invasive juniper: Juniper stands less than 130 years old, which have expanded to vegetative sites not normally occupied by juniper due mainly to human-induced exclusion of natural fire.

Invasive Species: Species introduced into an environment in which they did not evolve and thus have no natural enemies to limit their reproduction and spread. The most successful invasive species have a number of characteristics in common, including fast growth and high reproductive rates, which allow them to "invade" new habitats and successfully compete with native species.

-L-

Lacustrine: Pertaining to, formed in, growing in, or inhabiting lakes.

Land Use Allocation: The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

Land Use Plan (LUP): A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land-use-plan-level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed.

Land use plan level decision: Decisions involving land allocation or proposed use of the land. Does not include specific on-the-ground activity decisions. Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to IBLA.

Limits of Acceptable Change (LAC): A framework for establishing acceptable and appropriate resource and social conditions in recreation settings. LAC represents a reformation of the carrying capacity concept, with the primary emphasis on the conditions desired in the area rather than on the amount of use an area can tolerate.

-M-

Main stem: The primary channel of the Klamath River where water flows at even the lowest levels.

Management decision: A decision made by the BLM to manage public lands. Management decisions include both land use plan level decisions and implementation (activity level) decisions.

Management zone**:** A geographical area for which management directions or prescriptions have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities or development, and park operations.

-N-

National Environmental Policy Act (NEPA): The federal act that requires the development of an environmental impact statement (EIS) for federal actions that might have substantial environmental, social, or other impacts.

National Historic Preservation Act (NHPA): Law establishing a program for the preservation of historic properties throughout the nation. It provides for the President's Advisory Council on Historic Preservation, formalizes the National Register, establishes federal grants for historic preservation and requires federal agencies to consult with the Advisory Council before affecting historical properties.

National Historic Trail (NHT): The National Trail System Act (NTSA) authorized creation of a national system of trails comprised of National Recreation Trails, National Scenic Trails, and National Historic Trails. National Historic Trails may only be designated by an act on Congress.

National Register of Historic Places: A register of districts, sites, buildings, structures, and objects, significant in American history, architecture, archaeology and culture, established by the "National Historic Preservation Act" of 1966 and maintained by the Secretary of the Interior.

Natural processes: All processes, such as hydrological, geological, or ecological, that are not the result of human manipulation.

Nonattainment: Locations where measured pollutant concentrations exceed National Ambient Air Quality Standards for a particular pollutant twice in one year.

Non-motorized watercraft: A class of boats that includes rafts, kayaks, inner tubes, and inflatable air mattresses.

Noxious weed: Noxious weeds are plants species designated under federal, state or local laws and ordinances to cause economic loss and/or harm the environment. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, parasitic, toxic, a carrier or host of destructive insects or plant and animal diseases, and are non-native, new, or not common to the United States.

-O-

Objective: A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

Open: Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines the specific meaning of "open" as it relates to OHV use.

Ordinary high water**:** The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Outstandingly Remarkable Value (ORV)**:** Those resources in the corridor of a Wild and Scenic River that are of special value and warrant protection. Outstandingly Remarkable Values are the "scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values…that shall be protected for the benefit and enjoyment of present and future generations" (16 USC 1272).

-P-

Peak flow: Annual high streamflows, typically generated by snow melt, not to be confused with peaking, which is associated with powerhouse operation.

Peaking: The act of altering powerhouse operations on a frequent (often daily) basis to meet electricity demands. Peaking causes discharge in the river to fluctuate widely.

Perennial (permanent) stream: A stream that has running water on a year-round basis under normal climatic conditions.

Permitted use: The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease; expressed in Animal Unit Months (AUMs) (43 CFR 4100.0-5).

Planning analysis: A process using appropriate resource data and NEPA analysis to provide a basis for decisions in areas not yet covered by an RMP.

Planning criteria: The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamline and simplify the resource management planning actions.

Pool/Riffle ratio: The ratio of surface area or length of pools, to the surface area or length of riffles, in a given stream reach, frequently expressed as the relative percentage of each category. Used to describe quality of fish habitat.

Potential natural community: The biotic community (living organisms) that would become established if all successional sequences were completed without interferences by man under the present environmental conditions.

Prescription**:** A guideline that directs the management of a specific area by describing the type and intensity of activities, facilities, and park operations that can and cannot occur. See "management zone."

Pristine**:** Unaltered, unpolluted by humans.

Provincial Advisory Committee: (PAC): A team consisting of representatives of federal agencies, states, American Indian tribes, and others providing/coordinating analyses at the province level to provide the basis for amendments to Forest and District Plans.

Public land: Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos.

-R-

Ramping: The act of increasing or decreasing river flows to allow peaking

Ramp rate: The maximum allowable rate of change in outflow from a powerhouse

Random Selection: The process whereby the weighted values of each Fuel Treatment Zone are compared to a randomly generated list of numbers to determine selection for treatment. A pseudo-natural selection to mimic natural processes. (Described in EA# OR-014-94-09 and the Klamath Falls RMP/EIS/ROD.)

Rangeland Health Standards Assessment: A process that analyzes existing monitoring and resource condition information to characterize the general health of a grazing allotment within the framework of the five standards for rangeland health (i.e., Bureau-wide resource condition objectives).

Rearing habitat: Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

Record of Decision (ROD): The public document describing the decision made on selecting the "preferred alternative" in an environmental impact statement. See "environmental impact statement.

Recreation Experience Opportunity (REO): The opportunity for a person to realize predictable psychological and physiological outcomes from engaging in a specific recreation activity within a specific setting.

Recreation Opportunity Spectrum (ROS): A continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. The spectrum is comprised of six classes.

Refugia: Areas where conditions have enabled a species or a community of species to survive.

Related adjacent land: Means all land within one-fourth of one mile (measured horizontally or level, as in usual surveying practice) of the bank on each side of a river within a scenic waterway, except land that, in the Commission's judgment, does not affect the view from the waters within a scenic waterway.

Resident trout: Non-anadromous form of red-band trout. Trout remaining in freshwater through its full life cycle.

Riparian corridor: Areas adjacent to streams and wetlands on non-Federal land, mapped for analytical purposes.

Riparian habitat: (also referred to as Riparian Areas) Defined as a specialized form of wetland restricted to areas along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams; also, periodically, flooded lake and reservoir shore areas, as well as lakes with stable water levels with characteristic vegetation.

Riparian reserves: Buffers designated along all streams, lakes, ponds, wetlands, unstable areas and potentially unstable areas which are subject to standards and guidelines designed to conserve aquatic and riparian-dependant species. Riparian reserves apply only to Federal land.

Riprap**:** A layer of large, durable fragments of broken rocks specially selected and graded, thrown together irregularly or fitted together to prevent erosion by waves or currents.

River bank: The banks of a river are the boundaries that confine the water to its channel throughout its entire width when the stream is carrying high water at the elevation to which it ordinarily rises annually in season. Generally this will be the line at which the land becomes dominantly influenced by the river and takes on the characteristics of a riverbed and is thereby set apart from the uplands.

River corridor**:** The area within the boundaries of a Wild and Scenic River (e.g., the Klamath River corridor).

Riverine: Of or relating to a river. A riverine system includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5%. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

River left/River right: Terms used by whitewater boaters to differentiate river channels and banks. Refers to the side of the river, left or right, when looking downstream.

River mile: Distance measured from the mouth of a river to its headwaters.

River protection overlay**:** A buffer area within and adjacent to the river that allows for the protection and restoration of natural and aquatic ecosystem processes

Road: Means any roads, public or private.

Rosgen stream classification: A stream classification system developed by D. Rosgen to stratify streams based on valley form, channel form, and sediment distribution patterns.

-S-

Scale: Refers to the geographic area and data resolution under examination in an assessment or planning effort.

Scenic easement: Means the acquired right to control the use of related adjacent land, including airspace above such land, for the purpose of protecting the scenic view from waters within a scenic waterway.

Scenic waterway: Means a river, lake or segment thereof, including related adjacent land and the airspace above that has been so designated by or in accordance with the Act.

Seen from the water: See Visible from the River.

Short-term: The period of time during which the River Plan will be implemented.

Silviculture: The science and art of manipulating a forest to meet landowner objectives.

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.

Spawning habitat: Typically refers to habitat suitable for fish reproduction.

Special status species: Includes proposed species, listed species, and candidate species under the ESA; State-listed species; and BLM sensitive, assessment, and tracking species, and Survey and Manage species under the Northwest Forest Plan within the range of the Northern Spotted Owl (see BLM Manual 6840 - Special Status Species Policy and OR/WA 6840 policy IM OR-91-57).

Species diversity: The number, different kinds, and relative abundance of species.

Stage: The elevation of the water surface

Standard: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards).

State Implementation Plan (SIP): A strategic document, prepared by a State (or other authorized air quality regulatory agency) and approved by the U.S. Environmental Protection Agency, that thoroughly describes how requirements of the Clean Air Act will be implemented (including standards to be achieved, control measures to be applied, enforcement actions in case of violation, etc.).

Strategic Plan (BLM Strategic Plan): A plan that establishes the overall direction for the BLM. This plan is guided by the requirements of the Government Performance and Results Act of 1993, covers a 5-year period, and is updated every 3 years. It is consistent with FLPMA and other laws affecting the public lands.

Stream order: A hydrologic system of stream classification based on stream branching. Each small unbranched tributary is a first order stream. Two first order streams join to make a second order stream. Two second order streams join to form a third order stream, and so forth.

Suspended sediment: Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

-T-

The Nature Conservancy (TNC): Private national and international organization dedicated to the preservation of biological diversity.

Thriving natural ecological balance: The condition of the public range that exists when management objectives have been achieved that will: (1) sustain healthy populations of wild horses and burros, wildlife, and livestock on public land, and (2) protect the desired plant community from deterioration.

Total Maximum Daily Load (TMDL): An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

Turbidity: An interference to the passage of light through water due to insoluble particles of soil, organics, microorganisms and other materials.

-U-

User capacity**:** As it applies to parks, user capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions based on the purpose and objectives of a park unit.

U-Shaped valley**:** A glacially carved valley having a pronounced parabolic cross-sectional profile suggesting the form of a broad letter "U" and characterized by steep sides and a nearly flat bottom.

-V-

Visible from the River: Means not entirely concealed from view from the river within a scenic waterway by topography. Land beyond the boundaries of "related adjacent land," whether or not visible from the river, is not within the jurisdiction of this Act.

Visitor experience**:** The perceptions, feelings, and reactions a park visitor has in relationship with the surrounding environment.

Visitor Experience and Resource Protection (VERP): A process developed for the National Park Service to help manage the impacts of visitor use on the visitor experiences and resource conditions in national parks.

V-Shaped valley**:** A valley having a pronounced cross-profile suggesting the letter "V", characterized by steep sides and short tributaries. Specifically, a young narrow valley resulting from downcutting by a stream.

-W-

Walk-in campground: A campground with consolidated parking areas separated from the individual campsites. Campers walk a short distance from the parking area to their campsites.

Water resources projects**:** Any dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the Federal Power Act, or other construction of developments that would affect the free-flowing characteristics of a wild and scenic or congressionally authorized study river. In addition to projects licensed by the Federal Energy Regulatory Commission, water resources projects may also include: dams; water diversion projects; fisheries habitat and watershed restoration/ enhancement projects; bridges and other roadway construction/reconstruction projects; bank stabilization projects; channelization projects; levee construction; recreation facilities such as boat ramps and fishing piers; and, activities that require a 404 permit from the U.S. Army Corps of Engineers (IWSRCC 1999).

Watershed**:** The region drained by, or contributing water to, a stream, lake, or other body of water. Synonym: basin or drainage basin.

Water quality: The chemical, physical, and biological characteristics of water.

Wetland: Wetlands are defined by the U.S. Army Corps of Engineers (CFR Section 328.3[b], 1986) as 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.

Width-to-depth ratio: The water surface width measurement at bankfull discharge divided by the average channel depth.

Withdrawal: Withholding of an area of Federal land from settlement, sale, location, or entry under some or all of the general land laws, for the purpose of limiting those laws in order to maintain other public values in the area or reserving the area for a particular public purpose or program; or transferring jurisdiction over an area of Federal land from one department, bureau, or agency to another.

100-year floodplain**:** The area along the river corridor that would receive floodwaters during a 100-year flood event. A 100-year flood event has the probability of occurring 1% of the time during any given year. If a 100-year flood event occurs, the following year will still have the same probability for occurrence of a 100-year event. For the purposes of this plan, the 100-year floodplain also includes wetlands and meadows associated with the hydrologic and ecological processes of the river.

Appendix B - List of Preparers and Plan Development Team

The following list of individuals are involved with development of the River Plan and EIS (see Table B-1). The collaborative planning process illustrated in Figure B-1 below is designed to allow for inter-governmental and general public interaction to identify issues and complete the planning process. The interdisciplinary team of resource specialists assists with public involvement and uses input to develop and analyze alternatives. The interagency advisory Committee provides input relevant to their respective agency to the ID Team through the Klamath Falls Field Manager. Similarly, the Upper Basin Subcommittee of the Klamath Provincial Advisory Committee (that oversees the implementation of the Northwest Forest Plan) provides input to the Field Manager. The Klamath Falls Field Manager provides information and recommendations through the Lakeview District Manager and the Redding Field Manager to the State Directors of Oregon and California. The State Directors will ultimately make decisions based on the proposed River Plan and analysis.

Table B-1. List of Preparers

Individuals Involved With Development Of The River Plan And EIS

Management

Name	Responsibilities/Position	Qualifications
Steven A. Ellis	Management Guidance/ Lakeview District Manager	B.S. Forestry, Southern Illinois University, Carbondale; M.S. Soils and Atmospheric Science, Northern Illinois University, DeKalb. BLM, 23 years.
Teresa A. Raml	Management Guidance/ Klamath Falls Resource Area Field Manager	B.S. Wildlife Biology, Colorado State University. USFS, 22 years; BLM, 3 years.
Chuck Schultz	Management Guidance/ Redding BLM Field Manager	B.S. Wildlife Management, University of Nevada, Reno, NV. BLM 29 years

Interdisciplinary Team

Name	Responsibilities/Position	Qualifications
Leslie Brown	Data Processing/Information Receptionist	Education in Progress at Oregon Institute of Technology. Private Industry, 10 years; BLM, 6 months.
Patty Buettner	Bats, Non-Game Birds/Wildlife Biologist	B.S. Fishery Biology, Humboldt State University. CDFG, 1 year; USFWS, 7.5 years; USFS, 5.5 years; BLM, 7 years.
Tom Cottingham	Land Tenure, Rights-of-Way, Easements/Realty Specialist	B.S. Wildlife Management and Post Graduate Work at Humboldt State University. USFWS, 6 months; BLM, 23 years.
Michael L. Cutler	Soils/Botanist	B.S. Forest Biology, Utah State University. USFS, 2 years; BLM, 9 years.

Interdisciplinary Team

Name	Responsibilities/Position	Qualifications
Michelle Durant	Cultural Resources/ Archaeologist B.S. Anthropology, MA	Anthropology, Central Washington University. BLM 8 years
Joe Foran	Fire Management/Fuels Management Specialist	A.A. Wood Industries, Southwestern Oregon Community College. USFS, 1 year; BLM, 30 years.
Larry Frazier	Team Leader/ Supervisory Natural Resource Specialist	B.S. Forest Resource Management, Humboldt State University. USFS, 2 years; BLM, 24 years.
Leslie Frewing-Runyon	Economics/ Planning and Environmental Coordinator	B.A. Economics, Willamette University. BLM, 13 years.
Don Hoffheins	Planning/Environmental Coordination	B.S. Agronomy, New Mexico State University. USFS, 26 years; BLM, 1 year.
Jan E. Houck	State Scenic Waterway Coordinator/ Natural Resource Specialist	B.S. Leisure Studies, Arizona State University. Oregon Parks and Recreation Department, 22 years.
Bill Johnson	Upland Forests, Vegetation/ Silviculturist	B.S. Forestry, University of Montana. USFS, 3 years; BLM, 32 years.
Trisha Roninger	Spotted Owl, Mountain Quail/ Wildlife Technician	B.S. Wildlife Biology, University of California, Davis. BLM, 5 years.
Michael Limb	Spatial Database Creation, Management/ GIS Coordinator	B.S. Forestry/Range Management, M.S. Natural Resource Mgmt/Landscape Ecology, University of Nevada, Reno. University, 3 years; BLM, 3 years.
Bill Lindsey	Grazing/ Rangeland Management Specialist	B.S. Rangeland Resource Management, Oregon State University. BLM, 24 years.
Kathy Lindsey	Technical Writer/Editor	B.S. Wildlife/Range Management, University of Nevada, Reno. BLM, 12 years.
Brian McCarty	Road Management/Civil Engineering Technician	A.A.S. Natural Resources, Vermilion Community College, Minnesota. USFS, 1 year; BLM, 21 years.
Robert Roninger	Herptiles, Aquatic Mollusks, Wildlife and Fisheries/Biological Technician	B.S. Natural Resource Management, California State University, Chico. BLM, 5 years.
V. Scott Senter	Recreation, Wild and Scenic River, Visual Resources/ Outdoor Recreation Planner	B.S. Forest Management, University of Washington. BIA, 1 year; BLM, 22 years.
Gayle Sitter	Wildlife, Riparian, Old Growth Ecosystems/ Wildlife Biologist	B.S. Wildlife Management, University of Minnesota; M.S. Wildlife Resources, University of Idaho. Minnesota Dept. of Natural Resources, 5 years; USFS, 2 years; USGS, 6 months; BLM, 23 years.
Scott Snedaker	Fisheries Biology, Aquatic Threatened - Endangered Species Mgmt/ Fisheries Biologist	B.S. Fisheries Science, Oregon State University. Washington Dept. of Fish & Wildlife, 6 months; ODFW, 2 years; BLM, 5 years.

Interdisciplinary Team

Name	Responsibilities/Position	Qualifications
Maple A. Taylor	Writer/Editor	B.S. Wildlife Science, New Mexico State University; M.S. Range and Wildlife Mgmt, Texas Tech University. BLM, 6 years.
Michael Turaski	Water Resources, Riparian, Road Management	B.S. Geology, University of Oregon, M.S. Physical Geography, M.S. Water Resources Management, University of Wisconsin, Madison. BLM, 2 years.
Grant Weidenbach	Visual Resources, Recreation/River Ranger	B.A. Psychology, Augsburg College. BLM, 13 years.
Louis Whiteaker	Special Status Plants, Biological Diversity/ Botanist	B.S. Finance, University of S. California; M.S. Botanical Sciences, University of Hawaii. Univ. of Hawaii, 5 years; Stanford Univ., 2 years; NPS, 3 years; BLM, 11 years.

Other BLM Reviewers

Name	Office Represented and Expertise
Francis Berg	Redding Field Office – Chief, Lands and Resources
Bill Kuntz	Redding Field Office – Lead Outdoor Recreation Planner
Glen R. Miller	Redding Field Office – Planning & Environmental Coordinator.
Joe Molter	Redding Field Office – Botanist, Range Management Specialist
Eric Ritter	Redding Field Office – Archeologist
Ron Rogers	Redding Field Office – Geologist
Mike Truden	Redding Field Office – Lead Realty Specialist
George Buckner	Oregon State Office – Wildlife Ecologist
Al Dolker	Oregon State Office - Fisheries Biologist
Louisa Evers	Oregon State Office - Fire Ecologist
Leslie Frewing-Runyon	Oregon State Office - Planner
Richard Hanes	Oregon State Office - Archeologist
Dave Harmon	Oregon State Office - Forester
Jerry Magee	Oregon State Office - NEPA Specialist
Rosie Mazaika	Oregon State Office - Water Policy Specialist
Craig McKinnon	Oregon State Office – Range Management Specialist
Allison O'Brian	Oregon State Office - Land Law Examiner
Joan Seevers	Oregon State Office - Botanist
John Styduhar	Oregon State Office - Realty Specialist
Margaret Wolf	Oregon State Office - Recreation Planner
Christina Caswell McElroy	Oregon State Office - Socioeconomics

Interagency Advisory Committee

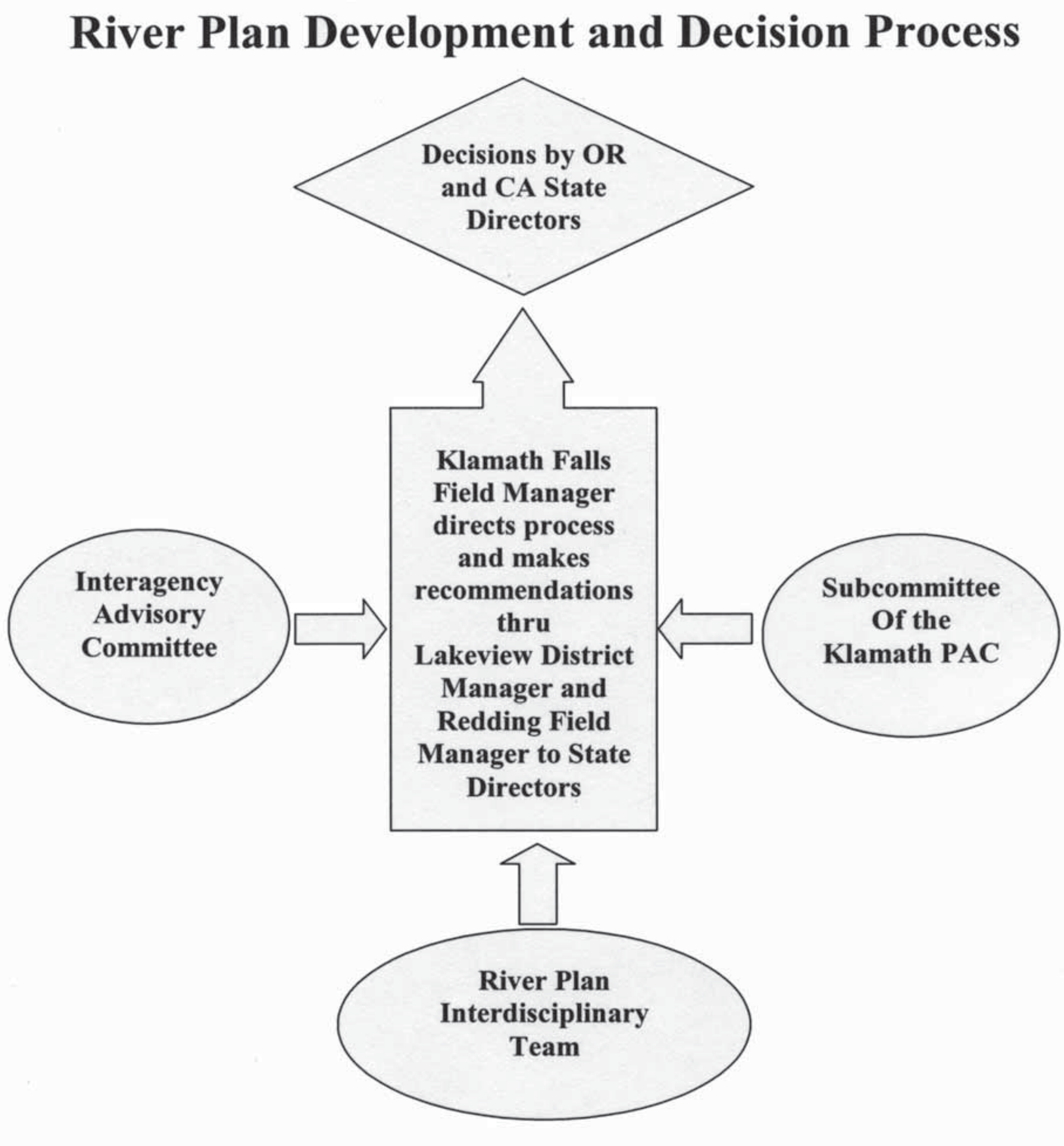
Name	Agency Represented or Role
Phil Detrich	US Fish and Wildlife Service
Randy Brown	US Fish and Wildlife Service
Robbie Vanderwater	USFS-Klamath & Six Rivers NF
Lynda Carnes	USFS-Klamath & Six Rivers NF
Peg Bolan	USFS-Klamath & Six Rivers NF
Jim Kilgore	USFS-Klamath & Six Rivers NF
Donald Reck	National Marine Fisheries Services
Shanna W. Draheim	US Environmental Protection Agency
Chuck Shultz	Bureau of Land Management
Russ Kanz	California Water Resources Control Board
Annie Manji	California Department of Fish and Game

Mike Rode	California Department of Fish and Game
Melissa Miller-Henson	Resources Agency
Denis Maria	California Department of Fish and Game
Joan Smith	Siskiyou County Commissioner
Jim DePree	Siskiyou County Natural Resource Specialist
Dan Fritz	US Bureau of Reclamation
Mark Buettner	US Bureau of Reclamation
Steve Lewis	US Fish and Wildlife Service
Ron Larson	US Fish and Wildlife Service
Doug Laye	US Fish and Wildlife Service
Paul DeVito	Oregon Department of Environmental Quality
Roger Smith	Oregon Department of Fish and Wildlife
Amy Stuart	Oregon Department of Fish and Wildlife
Del Sparks	Oregon Water Resources Department
Kyle Gorman	Oregon Water Resources Department
Bill Fujii	Oregon Water Resources Department
Dick Nichols	Oregon Department of Environmental Quality
Bill Hunt	Oregon Department of Forestry
Paul Donheffner	Oregon Marine Board
Steve West	Klamath County Commissioner
Tim Evinger	Klamath County Sheriff

Upper Basin Subcommittee of the Klamath Provincial Advisory Committee

Name	**Agency Represented or PAC Role**
Steve Lewis	U.S. Fish And Wildlife Service
Chuck Graham	U.S. Forest Service
Teri Raml	Bureau Of Land Management
Chuck Lundy	National Park Service
Bob Davis	Bureau of Reclamation
Bill Hunt	State Government Representative, Oregon Department of Forestry
Steve West	County Government, Klamath County Commissioner
Joan Smith	County Government, Siskiyou County Supervisor
Don Gentry	Tribal Representative, Klamath Tribes
Sally Wells	Environmental Interests
Pat McMillan	Recreation/Tourism
Louis Randall	Other Interests
Alice Kilham	Other Interests

Figure B-1. River Plan and Development Process



Note: This diagram is for BLM's planning process to comply with the NEPA and FLPMA (see glossary). There is a separate but inter-related process to develop Oregon Administrative Rules for the State Scenic Waterway portion of the planning area (refer to Chapter 3 of the River Plan EIS). The Oregon State Parks and Recreation Department provides input to this process to assure consistency between the River Plan and the Administrative Rules.

Appendix C – Legal Authorities

A number of Federal laws have been enacted over time to establish and define the authority of BLM to make decisions on the management and use of re-sources on public land. Following is a list of major legal authorities relevant to BLM land use planning.

FLPMA ("Federal Land Policy and Management Act") of 1976, as amended, 43 U.S.C. 1701 et seq., provides the authority for BLM land use planning. Sec. 102 (a) (7) and (8) sets forth the policy of the United States concerning the management of BLM lands. Section 201 requires the Secretary of the Interior to prepare and maintain an inventory of all BLM lands and their resource and other values, giving priority to ACEC's; and, as funding and workforce are available, to deter-mine the boundaries of the public lands, provide signs and maps to the public, and provide inventory data to state and local governments. Section 202 (a) requires the Secretary, with public involvement, to develop, maintain, and when appropriate, revise land use plans that provide by tracts or areas for the use of the BLM lands. Section 202 (c) (9) requires that land use plans for BLM lands be consistent with Tribal plans and, to the maximum extent consistent with applicable Federal laws, with state and local plans. Section 202 (d) provides that all public lands, regardless of classification, are subject to inclusion in land use plans, and that the Secretary may modify or terminate classifications consistent with land use plans. Section 202 (f) and 309 (e) provide that Federal, state, and local governments and the public be given adequate notice and an opportunity to comment on the formulation of standards and criteria for, and to participate in, the preparation and execution of plans and programs for the management of the public lands. Section 302 (a) requires the Secretary to manage the BLM lands under the principles of multiple use and sustained yield, in accordance with, when available, land use plans developed under section 202 of FLPMA, except that where a tract of BLM lands has been dedicated to specific uses according to any other provisions of law, it shall be managed in accordance with such laws. Section 302 (b) recognizes the entry and development rights of mining claimants, while directing the Secretary to prevent unnecessary or undue degradation of the public lands.

NEPA ("National Environment Policy Act") of 1969, as amended, 42 U.S.C. 4321 et seq., requires the consideration and public availability of information regarding the environmental impacts of major Federal actions significantly affecting the quality of the human environment. This includes the consideration of alternatives and mitigation of impacts.

The "Clean Air Act" (CAA) of 1990, as amended, 42 U.S.C. 7418, requires Federal agencies to comply with all Federal, state, and local requirements regarding the control and abatement of air pollution.

Enforcement of the *Clean Air Act* in Oregon has been delegated, by the U.S. Environmental Protection Agency (EPA), to the Oregon Department of Environmental Quality (ODEQ) - Air Quality Division. The state, in turn, is required to develop and administer air pollution prevention and control programs approved by EPA. State ambient air standards must either be the same as or more stringent than the federal NAAQS. The State of Oregon has established its own ambient air quality standards (Division 31, Oregon Administrative Rules).

California's Smoke Management Program addresses potentially harmful smoke impacts from agricultural, forest and rangeland management burning operations. The legal basis of the program is found in the *Smoke Management Guidelines for Agricultural and Prescribed Burning* (California, 2001) adopted by the California Air Resources Board at its meeting on March 23, 2000. These Guidelines were filed with the Secretary of State and became effective on March 14, 2001. The California Air Resources Board and the State's 35 air districts are responsible for administration of the program.

The "Clean Water Act" (CWA) of 1987, as amended, 33 U.S.C. 1251, establishes objectives to restore and maintain the chemical, physical, and biological integrity of the Nation's water.

The entire Klamath River is listed as "water quality-limited" in accordance with Section 303(d) of the Clean Water Act. It has been listed due to the impacts of nutrients and elevated stream temperatures on beneficial uses such as threatened and endangered fisheries. For each of the waterbodies listed as "water quality-limited" the appropriate State agency (Oregon Department of Environmental Quality and California Regional Water Quality Control Board) or in some specific cases the Environmental Protection Agency (EPA), will develop Total Maximum Daily Loads (TMDLs). TMDLs are quantitative assessments of the sources of pollutants and allocations of those pollutants which are established in order to reduce pollution to levels that achieve water quality standards.

The "Federal Water Pollution Control Act," 33 U.S.C. 1323, requires the Federal land manager to comply with all Federal, state, and local requirements, administrative authority, process, and sanctions regarding the control and abatement of water pollution in the same manner and to the same extent as any nongovernmental entity.

The "Safe Drinking Water Act," 42 U.S.C. 201, is designed to make the Nation's waters "drinkable" as well as "swimmable." Amendments in 1996 establish a direct connection between safe drinking water and watershed protection and management.

The "Endangered Species Act" of 1973, as amended, 16 U.S.C. 1531 et seq.: Provides a means whereby the ecosystems upon which T&E species depend may be conserved and to provide a program for the conservation of such T&E species (section 1531 (b), Purposes). Requires all Federal agencies to seek to conserve T&E species and utilize applicable authorities in furtherance of the purposes of the "Endangered Species Act" (Sec. 1531 (c) (1), Policy). Requires all Federal agencies to avoid jeopardizing the continued existence of any species that is listed or proposed for listing as T&E or destroying or adversely modifying its designated or proposed critical habitat (Sec. 1536 (a), Interagency Cooperation). Requires all Federal agencies to consult (or confer) in accordance with section 7 of the "Endangered Species Act" with the Secretary of the Interior, through the USFWS and/or the National Marine Fisheries Service, to ensure that any Federal action (including land use plans) or activity is not likely to jeopardize the continued existence of any species listed or proposed to be listed under the provisions of the "Endangered Species Act," or result in the destruction or adverse modification of designated or proposed critical habitat (Sec. 1536 (a), Interagency Cooperation, and 50 CFR 402).

The "Wild and Scenic Rivers Act," as amended, 16 U.S.C. 1271 et seq., requires the Federal land management agencies to identify potential river systems and then study them for potential designation as wild, scenic, or recreational rivers.

The "Wilderness Act," as amended, 16 U.S.C. 1131 et seq., authorizes the President to make recommendations to the Congress for Federal lands to be set aside for preservation as wilderness.

The "Antiquities Act" of 1906, 16 U.S.C. 431-433, protects cultural resources on Federal lands and authorizes the President to designate national monuments on Federal lands.

The "National Historic Preservation Act," as amended, 16 U.S.C. 470, expands protection of historic and archaeological properties to include those of national, state, and local significance and directs Federal agencies to consider the effects of proposed actions on properties eligible for or included in the "National Register of Historic Places" (NRHP).

The "American Indian Religious Freedom Act" of 1978, 42 U.S.C. 1996, establishes a national policy to protect and preserve the right of American Indians to exercise traditional Indian religious beliefs or practices.

The "Recreation and Public Purposes Act" of 1926, as amended, 43 U.S.C. 869 et seq., authorizes the Secretary of the Interior to lease or convey BLM lands for recreational and public purposes under specified conditions.

The "Surface Mining Control and Reclamation Act" of 1977, 30 U.S.C. 1201 et seq., requires application of unsuitability criteria prior to coal leasing and also to proposed mining operations for minerals or mineral materials other than coal.

The "Mineral Leasing Act" of 1920, as amended, 30 U.S.C.181 et seq., authorizes the development and conservation of oil and gas resources.

The "Onshore Oil and Gas Leasing Reform Act" of 1987, 30 U.S.C. 181 et seq., provides: Potential oil and gas resources be adequately addressed in planning documents; The social, economic, and environmental consequences of exploration and development of oil and gas resources be determined; and Any stipulations to be applied to oil and gas leases be clearly identified.

The "General Mining Law" of 1872, as amended, 30 U.S.C. 21 et seq., allows the location, use, and patenting of mining claims on sites on public domain lands of the United States.

The Mining and Mineral Policy Act of 1970, 30 U.S.C. 21a, establishes a policy of fostering development of economically stable mining and minerals industries, their orderly and economic development, and studying methods for disposal of waste and reclamation.

The "Taylor Grazing Act" of 1934, 43 U.S.C. 315, "[T]he Secretary of the Interior is authorized, in his discretion, by order to establish grazing districts or additions thereto... of vacant unappropriated and unreserved lands from any part of the public domain...which in his opinion are chiefly valuable for grazing and raising forage crops[.]..." The Act also provides for the classification of lands for particular uses.

The "Public Rangelands Improvement Act"(PRIA) of 1978, 43 U.S.C. 1901, provides that the public rangelands be managed so that they become as productive as feasible in accordance with management objectives and the land use planning process established pursuant to 43 U.S.C. 1712.

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), 49 *Federal Register* 7629 (1994), requires that each Federal agency consider the impacts of its programs on minority populations and low income populations.

Executive Order 13007 (Indian Sacred Sites), 61 Fed. Reg. 26771 (1996), requires Federal agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions to: Accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners; and avoid adversely affecting the physical integrity of such sacred sites.

Executive Order 13084 (Consultation and Coordination with Indian Tribal Governments) provides, in part, that each Federal agency shall establish regular and meaningful consultation and collaboration with Indian Tribal governments in the development of regulatory practices on Federal matters that significantly or uniquely affects their communities.

Executive Order 13112 (Invasive Species) provides that no Federal agency shall authorize, fund or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk or harm will be taken in conjunction with the actions.

Executive Order 13212 provides that all decisions made by the Bureau of Land Management (BLM) will take into consideration adverse impacts on the President's National Energy Policy. This directive provides interim supplemental guidance and a delegation of authority regarding all applicable BLM decision-making documents in Oregon and Washington.

Secretarial Order 3175 (incorporated into the Departmental Manual at 512 DM 2) requires that if Department of the Interior (DOI) agency actions might impact Indian trust resources, the agency explicitly address those potential impacts in planning and decision documents, and the agency consult with the Tribal government whose trust resources are potentially affected by the Federal action.

Secretarial Order 3206 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the "Endangered Species Act") requires DOI agencies to consult with Indian Tribes when agency actions to protect a listed species, as a result of compliance with "Endangered Species Act," affect or may affect of Indian lands, Tribal trust resources, or the exercise of American Indian Tribal rights.

Appendix D – Existing Resource Management Plan Direction

The river corridor is located within portions of two Bureau of Land Management (BLM) resource areas. Land north of the California-Oregon border is administered by the Klamath Falls Resource Area, and land south of the California-Oregon border is administered by the Redding Resource Area. Management direction for each of the applicable resource management plans will apply to specific portions of the planning area. For a detailed review of these management documents, refer to:

- Klamath Falls Resource Area Record of Decision and Resource Management Plan (1995)
- Redding Resource Management Plan and Record of Decision (1993)

The 1994 "Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl" (also known as the ROD — for the Northwest Forest Plan [NFP]) amended the 1993 Redding plan to include new land allocations. The Klamath Falls resource area plan was written after the ROD was issued and therefore incorporates direction from the NFP.
In addition, the State of Oregon has management responsibility within the river corridor on both BLM administered land and private land. A discussion of management responsibilities is also provided in this section.

Klamath Falls Resource Area Resource Management Plan (1995)

The Klamath Falls Resource Area Resource Management Plan provides:

- Management direction applicable to all land use allocations and resource programs,
- Management direction for specific land use allocations, and
- Management direction specific to resource programs.

Management Direction Applicable To All Land Use Allocations And Resource Programs
Activities planned within the western part of the resource area must implement direction spelled out in the "*Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD)" and the "*Record of Decision for Amendment to the Survey and Manage, Protection Buffer, and Other Mitigating Measures Standards and Guidelines*" (S/M ROD). Specifically, proponents need to implement survey and manage provisions, and provide protection buffers for specific species.

Management Direction For Specific Land Use Allocations
Riparian Reserves
A significant role of the Amendments in the ROD was implementation of the Aquatic Conservation Strategy (ACS). Included in the ACS are four key elements: 1) managing riparian reserves, 2) managing key watersheds, 3) completing watershed analysis and 4) performing watershed restoration.

Riparian reserves were identified in the Klamath Falls RMP as a major land use allocation. Riparian reserves are defined as lands along streams and unstable and potentially unstable areas where specific standards and guidelines apply to most all potential land uses. This can further be described as covering the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing water bodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. The objectives of riparian reserves are to maintain or enhance riparian areas, wildlife and fisheries habitat, and water quality by emphasizing streamside and wetland management. The width of the riparian reserve along the river is approximately 300 feet each side of the high water mark.

Key Watersheds
An important component of the ACS is management of Key watersheds. This is a management tool, not a land allocation. Spencer Creek, which drains into J.C. Boyle Reservoir, was identified as a Tier 1 watershed. Tier 1 watersheds were selected for directly contributing to at-risk anadromous salmonid, bull trout and resident fish conservation. Specific recommendations from the Spencer Creek Watershed Analysis, may affect the conditioning of

the FERC license. Jenny Creek is also identified as a Tier 1 Key watershed but is mostly included in the Medford and Redding Resource area so is discussed under management direction for those areas.

Late-Successional/District Designated Reserves (DDR)
Within the Klamath Falls Resource Area there are no specific late-Successional Reserves (LSRs), however, through direction in the NFP a number of Late-Successional/District Designated Reserves, have been identified. The Topsy DDR is directly adjacent to the river drainage within Segment two. Operation and relicensing of PacifiCorp's facilities could affect this DDR depending on plans for managing roads (Topsy Road) and powerlines.

Matrix Lands (General Forest Management Areas)
Those lands within the ROD that are not in one of the other six categories are called Matrix lands. These are the areas where most of the timber harvest occurs, although Matrix lands also include non-forest areas, and forest areas unsuitable for timber production. In the relicensing project, Matrix lands could be affected by road use and powerline management. The Klamath River canyon is managed as Matrix, but it has been identified as an Area of Critical Environmental Concern. (See Special Areas).

Matrix (Late-Successional/District Designated Reserve Buffers)
Some areas in the west side Matrix that surround Late-Successional/District Designated Reserves, are designated as buffers. Most of these special restriction areas are in existing old growth stands. These buffers could be affected similarly to the DDRs mentioned above.

Management Direction Specific To Resource Programs
The Klamath Falls Resource Management Plan (KFRMP) provides direction for 26 resource programs and activities. Only that direction potentially applicable to FERC relicensing will be mentioned here.

Water and Soils (KFRMP p. 28-31).
1. See management direction for riparian reserves and Key watersheds
2. Comply with state water quality requirements.
3. Comply with state laws and regulations pertaining to the beneficial uses identified by the states and any applicable water quality standards that have been established.
4. Design management practices to comply with Oregon's Antidegradation Policy.
5. Ensure consistency of management activities with the Oregon Water Management Program (Oregon Administrative Rule 340-41).
6. Perform a watershed analysis to provide the mechanism for consideration, incorporation and implementation of the above into land and water resource management planning.
7. Permit no degradation of water quality if it will interfere with or become injurious to the established beneficial uses of water within those segments of a river designated under the National Wild and Scenic Rivers Act.
8. Protect Floodplains and wetlands in accordance with Executive Orders 11988 and 11990.
9. Follow a four-tier approach for land and resource management: regional, physiographic or river basin, watershed and project level. Under this approach, analysis starts at the watershed level.
10. Evaluate proposed projects for their cumulative effects on water quality, runoff, and stream channel conditions.
11. Manage riparian-wetland areas to protect, maintain, or improve riparian habitat for wildlife and native plant diversity.
12. Achieve riparian-wetland improvement and maintenance objectives through the management of existing uses, wherever feasible.
13. Prescribe management or riparian-wetland values based on site-specific characteristics and settings.
14. Include corrective measures, such as construction of erosion control structures, and control or mitigate activities that may contribute to soil erosion and degradation of watershed condition.

Wildlife (KFRMP p. 31-34)
1. Buffer special habitats from surface disturbance if necessary to protect primary values.
2. Provide a buffer around known and future nest sites of protected species.

Fish Habitat (KFRMP p. 35-36)
1. Develop a coordinated recreation management plan to include tributaries of the Jenny Creek watershed.
2. Block up ownership when possible on lands with fish bearing streams.
3. Meet Aquatic Conservation Strategy objectives.

4. Maintain or enhance the fisheries potential of streams and other waters consistent with BLM's Fish and Wildlife 2000 Plan, the Bring Back the Natives initiative, and other nationwide initiatives.
5. Promote the rehabilitation and protection of fish stocks at risk and their habitat.
6. Propose fish habitat enhancement projects for Rainbow and Redband Trout.
7. Use the watershed analysis process to address at-risk fish species and stocks and their habitat or individual watersheds. Where appropriate, fish habitat enhancement opportunities will be identified through this process or through coordinated resource management plans.
8. Rehabilitate streams and other waters to enhance natural populations of resident fish.
9. Cooperate with federal, tribal and state wildlife management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands.
10. Identify instream flows needed to maintain riparian resources, channel conditions, and fish passage.
11. Protect, manage, and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and Bureau special status species policies.
12. Manage for the conservation of federal candidate and Bureau sensitive species and their habitats so as not to contribute to the need to list and recover the species.
13. Manage for the conservation of state listed species and their habitats so as not to contribute to the need to list and recover the species.

Special Status Species (KFRMP P. 36-40)
1. Consult/conference with the U.S. Fish and Wildlife Service or National Marine Fisheries Service for any proposed action, which may effect federally listed or proposed species or their critical or essential habitat. Based on the results of consultation/conferencing, modify, relocate, or abandon the proposed action.
2. Coordinate with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and other appropriate agencies and organizations and jointly endeavor to recover federal listed and proposed plant and animal species and their habitats.
3. Where appropriate opportunities exist, acquire land to contribute to recovery, reduce the need to list, or enhance special status species habitat.
4. Monitor and manage habitats of federally listed or proposed threatened or endangered species as required by law. Prior to any vegetation or ground manipulation, or any disposal of BLM-administered land, conduct a review of the affected site(s) for such plants or animals.
5. For bald eagles - Restrict new roads and other management activities within 1/2 mile of existing and potential nest sites. Protect potential habitat in cliff areas of upper Klamath River Canyon.
6. For Peregrine Falcon - Provide a buffer of up to 30 acres around known and future sites; survey for presence in potential nesting habitat and cooperate with the Oregon Department of Fish and Wildlife to reintroduce peregrines into the Klamath River Canyon.
7. For Townsend's Big-eared Bat (Federal Candidate Category 2)
   - When available, obtain through exchange or other mutual agreement private lands that support bat populations or contain potential habitat. Continue the Salt Caves seasonal habitat closure from May 1 to September 15.
   - Buffer current and future use sites up to 20 acres. Restrict management activities within 1/4 mile of occupied sites.
   - Conduct an inventory of Townsend's big-eared bat populations, minimize detrimental human disturbance in habitat used by the bat. As opportunities arise, obtain through exchange or other mutual agreement, private lands with habitat hat support big-eared bat populations or have the potential for use by the bat.

Special Areas (KFRMP p. 31-42)
1. Develop site-specific management plans for new special areas as needed. Protect resource values in new areas pending completion of management plans. Management plans will address other possible action such as land acquisitions, use of prescribed fire, and interpretation.
2. Provide the following management for the Upper Klamath River — 4,690 acres, 11 miles of the Klamath River canyon from rim to rim extending from J.C. Boyle powerhouse to the Oregon-California State line:
   - Maintain, protect, or restore historic, cultural, scenic, fisheries, wildlife populations and habitat. Not available for planned timber harvest;
   - limit off-highway vehicle use to designated roads;
   - no developments allowed to enhance the potential for grazing;
   - mineral leasing subject to no surface occupancy,

- not available for hydroelectric development.
- Manage area for semi-primitive motorized recreation opportunities.

Cultural Resources Including American Indian Values (KFRMP p. 43)

1. Identify cultural resource localities and manage them for public, scientific, and cultural heritage purposes.
2. Conserve and protect designated cultural resources for future generations.
3. Identify and evaluate Native American traditional use areas requiring protection and management during watershed analysis or site-specific planning.
4. Evaluate cultural resource sites to determine their potential for contributing to public, cultural heritage, and/or scientific purposes. Evaluate the Klamath River Canyon and lands on Bryant Mountain for nomination to the National Register of Historic Places as Archeological Districts.
5. Address the management of cultural resources through watershed analyses and project plans.
6. Develop partnerships with local American Indian tribes and other interested parties to accomplish cultural resource objectives.
7. Take appropriate law enforcement or other actions when necessary to protect cultural resources. (Such actions may include physical protection measures such as riprapping and barrier installations to reduce deterioration.)
8. Consider acquiring significant cultural resource properties for public, cultural heritage, and scientific purposes.

Visual Resources (KFRMP p. 43-44)

1. Manage all BLM-administered land to meet the following visual objectives for Visual Resource Management Class A areas: retain the existing character of landscapes.
   - Visual Resource Management Class A: All BLM lands within 1/4 mile of Topsy, Surveyor, and Gerber developed recreation sites, the Pacific Crest National Scenic Trail, and Spencer Creek. Also, the Klamath River Complex special recreation management area, Miller Creek Canyon, the upper Klamath Lake viewshed, state scenic waterways and rivers designated Scenic under the National Wild and Scenic Rivers Act will be managed as Visual Resource Management Class A.
2. Manage Visual Resource Management Class A lands for low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

Wild and Scenic Rivers (KFRMP p. 45)

1. Manage designated and suitable segments of the National Wild and Scenic Rivers System by protecting their outstandingly remarkable values. Maintain and enhance the natural integrity of river-related values in designated and suitable river areas.
2. Provide the following types of interim protection from the John C. Boyle Powerhouse to the Oregon-California state line on the upper Klamath River until a river management plan has been completed; exclude timber harvest in the Riparian Reserve, provide Visual Resource Management Class A management in the corridor, and protect the free-flowing values and identified outstandingly remarkable values (recreation, scenic, fish, wildlife, prehistoric, and historic resources, and its value as a Native American traditional use area.).

Socioeconomic Conditions (KFRMP p. 46-47)

1. Contribute to local, state, national, and international economies through sustainable use of BLM-administrative lands and resources and use of innovative contracting and other implementation strategies.
2. Provide amenities (for example, recreation facilities, protected special areas, and high quality fisheries) that enhance communities as places to live, work, and visit.
3. Improve viewing opportunities for watchable wildlife in the Gerber block area, Klamath River Canyon, Topsy recreation site, and other sites as they arise.

Recreation (KFRMP p. 47-52)

1. Provide a wide range of developed and dispersed recreation opportunities that contribute to meeting projected recreation demand within the planning area.
2. Manage scenic, natural and cultural resources to enhance visitor recreation experience expectations and satisfy public land users.
3. Support locally-sponsored tourism initiatives and community economic strategies by providing recreation projects and programs that benefit both short- and long-term implementation. Continue participation in multi-agency recreation program (public and private) to coordinate and promote recreational development and tourism.

4. Manage off-highway vehicle use on BLM-administered land to protect natural resources, provide visitor safety, and minimize conflicts among various users.
5. Enhance recreation opportunities provided by existing and proposed watchable wildlife areas and national backcountry byways.
6. Continue to provide non-motorized recreation opportunities and create additional opportunities where consistent with other management objectives.
7. Manage special and extensive recreation management area in a manner consistent with the BLM's Recreation 2000 Implementation Plan and Oregon-Washington Public Lands Recreation initiative.
8. Provide additional informational, educational and recreational opportunities to enhance visitors' experiences, and increase their knowledge of the use and protection of natural resources, the BLM's land management role, and the responsibility of visitors to public lands. Examples of opportunities could include development of natural multipurpose trails in the Klamath River Complex Special Recreation Management Area.
9. Continue to operate and maintain developed and semi-developed recreation sites and developed trail as listed below:
   - Klamath River BLM campgrounds
   - Klamath River edge trail
10. Designated developed recreation sites a fire suppression areas (intensive) and fire fuels management areas. These designations will reduce fire hazards and protect investments. Restriction on fire suppression equipment and activities or minimum impact methods will be required in the following recreation sites and areas: Klamath River Canyon.
11. Manage timber within developed recreation sites for purposes of removing pr topping Hazard tress, providing space for additional facilities and activity areas and providing desired regeneration of the forest canopy.
12. In addition to the 15 developed and semi-developed sites, maintain potential for recreation development in the 35 other sites and 18 other trail locations. Develop potential sites and trails as finding and/or recreation partnerships become available and if development is constant with other land use objectives and allocations. Maintain or protect the recreation objectives for development of potential sites and trails by using and/or modifying the silvicultural treatments and harvest designs discussed in the Timber Section. Identify site and trial objectives and issues during watershed analysis or other activity level planning.
13. Pursue mineral withdrawals for existing developed recreation sites and for proposed recreation sites when development is approved.
14. Continue to manage and maintain the following existing special recreation management areas:
   - Klamath River Complex Special Recreation Management Area - 7,460 acres will continue to be managed for semi-primitive motorized recreation objectives. Manage the special recreation management area to emphasize whitewater boating, fishing, and camping along the upper Klamath River. Improve scouting trails for the Caldera and Hell's Corner rapids. Manage and maintain Topsy recreation site with camping units for overnight and day use visitors; boat ramp; the rafting put0in, and several primitive camping sites along Klamath River. Continue to follow the cooperative management agreement with the Pacific Power and Light Company for coordinated recreation trail and facility development. Nominated for designation Topsy Road to the National Back Country Byway System. Maintain the Klamath River edge trail for non-motorized use.
   - Evaluate and update the Klamath River Complex Special Recreation Management Area recreation area management plan. Provide for safe, approved, and developed group campsites. Improve and provide barrier-free access at the Topsy recreation site and BLM campground in the Klamath River Canyon. Pursue development of a cooperative management agreement with Klamath and Siskiyou counties to provide minimum annual maintenance on the Topsy Road. Pursue the development of additional nature or multipurpose trails and an interpretive facility at the powerhouse site.
15. Designate the majority of BLM-administrated land limited to off-highway vehicle use.
16. Off- highway vehicle use will be limited to designated roads and trails in the following sires/areas:
   - Klamath River Canyon area of critical environmental concern.
17. Off-highway vehicle use will be limited to existing roads and trails in the following sites/areas:
   - Lands south of Highway 66, outside of the Klamath River Canon area of critical environmental concern;
   - Topsy recreation site
18. Nominate for designation and facilitate the use of the Topsy Road for a new National Back Country Byways. Develop interpretive signs, vehicle parking areas, interpretive brochures, etc. for the Topsy Road Back Country Byway.
19. Design new recreational facilities within Riparian reserves, including trails and dispersed sites, so as not to prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future

attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impacts to ensure that these fo not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.

20. Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy Objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific sire closures are not effective, eliminate the practice or occupancy.

Special Products (in Late-Successional/District Designated Reserves) (KFRMP p. 57)

1. Permit fuelwood gathering only in existing cull decks, in areas where green trees are marked by silviculturists for thinning, in areas where blowdown is blocking roads, and in recently harvested timber sale units where down material will impede scheduled post-sale activities or pose an unacceptable risk of future large scale disturbances. In all cases, these activities will comply with management actions/directions for Late-Successional/District Designated Reserves.

Land Tenure Adjustments (KFRMP p. 64-65)

1. Meet the following objectives for Zone1: generally, retain these lands under BLM administration.
2. Manage newly acquired lands for the purpose for which they are acquired of consistent with the management objectives for adjacent BLM administered lands. If lands with unique or fragile resources values are acquired, protect those values until the next plan revision.
3. Maintain or increase public land holdings in Zone 1 by retaining public lands and acquiring non-federal lands with high public resource values. The primary mode if acquisition will be through exchange of BLM-administered lands in Zones 2 and 3. Utilize purchases and donations if exchange is not feasible.
4. Consult with county governments prior to any land exchange.
5. Minimize impact on local tax base by emphasizing exchanges rather that fee purchase.
6. Make exchanges ti enhance public resource values and/or improve land patterns and management capabilities of both private and BLM-administered land within the planning area by consolidation ownership and reducing the potential for land use conflict.
7. Use land acquisition, exchange, and conservation easements to meet Aquatic Conservation Strategy objectives and facilitate restoration of fish stocks and others species at risk of extinction.

Rights-of-way (KFRMP p. 66-67)

1. Continue to make BLM-administered lands available for needed right-of-way where consistent with local comprehensive plans, Oregon statewide planning goals and rules, and the Exclusion and avoidance areas identified in this Resource Management Plan.
2. Ensure that all right-of-way for hydroelectric development are consistent with the Northwest Power Planning Council guidance, which recommends prohibiting future hydroelectric development on certain rivers and streams with significant fisheries and wildlife values.
3. Where consistent with local comprehensive plans and Oregon's statewide planning goals and rules, BLM-administered land will continue to be available for needed right-of-way. Utility/transportation routes (for electric transmission, as distinguished from electricity distribution or facilities; pipelines 10 inches in diameter or larger; significant canals, ditches and conduits; railroad; communication lines for interstate use; federal and state highways; and major county roads) will be confined to existing and other previously designated corridor.
4. With the exceptions of buried lines in rights-of-way of existing roads, avoid locating rights-of-way in:
   - Recreation Sites (existing and proposed
   - Areas of Critical Environmental Concern (Except research natural areas)
   - Scenic and Recreational Rivers (suitable)
   - Sensitive Species Habitat
   - Visual Resource Management Class II Areas
   - Late-Successional/District Designated Reserves
   - Late-Successional/District Designated Reserves Buffers
5. Remove hazard trees along utility rights-of-way and in other developed areas.
6. Encourage location of major new right-of-way projects in existing transportation routes and other previously designated corridors.

Access (KFRMP p. 68)

1. Acquire access to Zone 1 and large blocks of Zone 2 lands when appropriate to manage the resources found there, by obtaining easements, entering into new reciprocal right-of-way agreements. Condemnation for access will be pursued when necessary.

Roads (KFRMP p. 71-72)

1. Follow best management practices (see Appendix D) for water quality and soil productivity to mitigate adverse effects on soils, water quality, fish, and riparian-wetland habitat during road construction and maintenance.
2. Specifically address, either in the road management plan or in a watershed analysis, stabilizing existing roads located in drainages, watersheds with water quality limited streams, and or other parts of the resource area where soil/water quality problems are known to exist.

Noxious Weeds (KFRMP p. 74)

1. Use control methods which do not retard or prevent attainment of Aquatic Conservation Strategy Objectives.

Fire/Fuels Management (KFRMP p. 75)

1. Provide appropriate fire suppression responses to wildfires that will help meet resource management objectives and minimize the risk of large-scale, high intensity wildfires.
2. Respond to all wildfires by taking appropriate suppression actions. In most cases, responses will consist of aggressive initial attack to extinguish fires at the smallest size possible.

Redding Resource Management Plan (1993)

The Redding Resource Management Plan provides “Management Guidance” beginning on page 13. This guidance consists of discretionary and non-discretionary procedures followed by the BLM. This information is provided for the entire resource area. Resource Area management direction is provided in two parts, “Management Area Direction” and “Resource Specific Direction”. Management Area Direction covers the Klamath Management Area, which includes most of the northern portion of the Redding Resource Area. There is also Management Area Direction for the smaller Upper Klamath River “special management area”.

Resource Specific Direction is intended to apply where specific resources or activities are present

Lastly, direction related to land allocations from the Northwest Forest Plan Amendment is included at the end of this section.

Management Area Direction for the Klamath Management Area

The California portion of the planning area is within an area designated as the “Klamath Management Area ”. This general management area encompasses all of the Klamath River drainage within the Redding Resource Area and approximately 25% of the total land base within the entire Redding Resource Area.

I. *Resource Condition Objectives*
   1) Enhance the ability to acquire high value resource lands within the Redding Resource Area by disposal of scattered public land interests within the Klamath Management area (RRMP p. 34).
   2) Enhance the resource management efficiency and public service mission of local, state, and Federal agencies via transfer of specific public lands from BLM (RRMP p. 34).

II. *Land-Use Allocations*
   1) Transfer jurisdiction of nineteen parcels of public land encompassing approximately 3650 acres to the Shasta and Klamath National Forests. There parcels include: agricultural inspection station (T. 39N., R 1W. NW1/4 of NW1/4, Section 4), Dry Lake (T. 44 N., R. 1W., SE1/4 of SE1/4, Section 31), Goosenest (T.45 N., R.4 W., Sections 36), Willow Creek to include in spotted owl habitat conservation area(T. 43 N., R. 4 W., NE14 Section 36), Pluto Cave to enhance recreation and protect natural / cultural values (T. 43 N., R. 4 W., Section 22), Iron Dyke Mine Owl Habitat Area (t. 48 N., R. 8 W., S1/2 of SE1/4, Section 22), McGavin Peak (T. 47 N., R. 2W., Sections 4,6,8,18,0 and T. 48 N., R. 2W., Section32), and Butte Valley Land Use Project (T. 4 N., R 1 W., Sections 14 and 22).

2) Transfer via exchange, the Recreation and Public Purposes Act (R&PP) or cooperative agreement administrative responsibility of 80 acres within the Butte Valley Wildlife Area (T 47 N., R. 2 W., Section 28) to the California Department of Fish and Game.
3) Transfer via exchange, R&PP or sale to the County of Siskiyou the Handbook refuse transfer site (T. 47 N, R. 6 W., Sections 29, N1/2 of SE1/4 of NE1/4).
4) Transfer via R&PP or exchange to the City of Yreka, the County of Siskiyou or other qualified local agency the Humbug Gulch parcel encompassing approximately 140 acres (T. 45 N., R. 7W., Section 21). Offer for exchange to any party after two years from the approval of the Final RMP.
5) 1025 acres near Hawkinsville (T. 24 N., R. 7 W., Sections 2, 3, 10 and 11) are suitable for the community development purpose aw a reservation for Federally recognizes Indian tribes(s). If congressional sponsorship is unavailable, offer for exchange to any party after five years from the approval of the Final RPM.
6) All public land interests not noted above in II A-H (1-5) are available for exchange.
7) The majority of the available commercial forestland would be managed as restricted.

III. *Management Actions*

- Amend the existing river management plan for the Klamath River above Copco to reflect the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study and the recommendations or the Klamath Falls Resource [Area Resource] Management Plan (RRMP p. 36).
- Contact County of Siskiyou, City of Yreka and other qualified public agencies to acquire management responsibility of parcels noted above (RRMP p. 37).
- The upper Klamath River (above Copco) has been determined suitable for inclusion in the National Wild and Scenic Rivers System. The California segment of this corridor possesses characteristics considered appropriate for a classification as "Scenic". If the Oregon segments of the study corridor are included within the National Wild and Scenic Rivers System through the conclusive action of the U.S. Congress, then the relatively short California segment of this same river will be recommended for inclusion. This action will enhance protection of the overall corridor and provide resource management continuity by BLM in both states (RRMP p. 37).

Management Area Direction for the Upper Klamath River Management Area

More specific, special management areas have been delineated for portions of the Klamath Management Area. Those related to the Klamath River include:

- Upper Klamath River – The portion of the Klamath River corridor from the California-Oregon state line to Copco Reservoir that has been determined to be suitable for "Scenic" designation within the National Wild and Scenic River System.
- Jenny Creek ACEC – This Area of Critical Environmental Concern surrounds Jenny Creek from the California-Oregon state line to Iron Gate Reservoir.
- Mid Klamath River – Along the Klamath River from Iron Gate dam to the confluence with Cottonwood Creek.
- Shasta and Klamath River Canyon – The portion of the Klamath River canyon from the confluence with Cottonwood Creek to 1.5 miles downriver of the confluence with the Shasta River.

The Upper Klamath River management area was established in order to protect the resources for which the river had been found suitable and eligible for inclusion in the Wild and Scenic Rivers system. Resource Condition Objectives and Land-Use Allocations found on pages 33 to 36 of the Redding RMP are listed below for this area.

Resource Condition Objectives

1) Maintain the Scenic quality of the river corridor,
2) Improve the condition of riparian vegetation to Class II or better,
3) Protect the cultural resources of the river corridor, and
4) Improve semi-primitive non-motorized recreation opportunities.

Land-Use Allocations

1) This portion of the Klamath River is considered eligible and suitable for inclusion in the National Wild and Scenic Rivers System. All public land in the corridor bounded by the northern canyon rim and within ° mile of the normal high water along the southern bank will be managed in a manner which will not impair the outstandingly remarkable values and consistent with a preliminary classification as "Scenic".
2) Manage Area as Semi-Primitive Motorized.
3) Vehicle use is limited to designated roads and trails.

4) Manage area as VRM (Visual Resource Management) class II.
5) The river corridor is closed to livestock grazing.
6) Offer public lands with the river corridor for mineral leasing with no surface occupancy.
7) Mineral material disposals are not allowed within the river corridor.
8) Seek administrative transfer of four parcels totaling 520 acres from the Klamath National Forest.
9) Retain existing land (per Map 1 – Scott Valley and Klamath Management Areas) and acquire available unimproved lands within the area and/or develop cooperative management agreements with Pacific Power and Light or their successor(s).

Resource Specific Direction

Resource Area-wide direction is applied to all lands where the specific resources or activities are present. Only the direction that appears applicable to this planning effort is provided here. Refer to the Redding Resource Management Plan (RRMP) for a more complete understanding of direction for Bureau of Land Management administered lands.

Cultural Resources (RRMP p. 14)

1. Comply with the National Historic Preservation Act. Section 106 of the Act (as implemented under 36 CFR 800 and a programmatic Memorandum of Agreement among the California Office of Historic Preservation, the President's Advisory Council on Historic Preservation and the BLM) requires identification and full consideration of any historic or archaeological sites located within a project area or on lands identified to transfer to any non-Federal entity.

Fire Management (RRMP p. 15)

1. Areas of Critical Environmental Concern, Special Recreation management Areas, Wilderness Areas, Wilderness Study Areas, Wild and Scenic River Corridors (study and designated), and certain other public lands will require modified suppression techniques to protect the known values.
2. Forest management activities within designated or study corridors of the National Wild and Scenic Rivers System would not be allowed to detract from the outstandingly remarkable values which led to their designation or determination of eligibility.

Hydroelectric and Water Storage (RRMP p. 17)

1. Potential waterpower/storage reservoir sites under a land withdrawal will continue to be managed for waterpower values. Exceptions include withdrawal for waterpower or storage on streams which become components of the National Wild and Scenic Rivers System or if public lands are transferred from Federal jurisdiction. In these instances and existing withdrawals will be recommended for revocation.

Lands and Realty (RRMP p. 17-18)

1. All land acquisitions will be through exchange, purchase or donation. Acquisitions will be from willing sellers for available unimproved property. Available unimproved property is defined in this plan as lands which are willingly offered to the BLM for acquisition and which contain improvements which represent less than 2- percent of the total value of the land.
2. If only a part of a property is identified for acquisition and the remaining part would leave the owner with an uneconomic remnant, then the BLM will acquire the entire property as required by the Uniform Relocation Assistance and Land Acquisition Policies Act of 1970 (PL 91-646, 84 Stat. 1904 Sec 301 (9)).
3. In all acquisitions the BLM will strive to gain the local support and understanding for the action, especially the support of the Board of Supervisors in the affected county.
4. All BLM administered public land not specifically identified for retention is available for other lands with higher public values (per Map 1 – Scott Valley and Klamath Management Areas).

Minerals (RRMP p. 22)

1. BLM interim management of rivers determined eligible for inclusion in the National Wild and Scenic Rivers System will necessitate that a no surface occupancy stipulation be placed on any mineral lease offered within º mile of these rivers. The purposes of this stipulation are to protect the outstandingly remarkable values and maintain the river classification.

Recreation (RRMP p. 23)

1. ROS prescriptions will be assigned to all pubic lands within special recreation management areas (SRMA) and other areas where recreation is a specific resource condition objective (e.g., Upper Klamath and Middle Klamath).

Wild and Scenic Rivers (RRMP p. 26-27)

1. Forested areas on public land within designated corridors or within º mile of streams determined to be eligible for inclusion in the National Wild and Scenic Rivers System will be managed in a manner that will not detract from the outstandingly remarkable values which led to their designation or determination of eligibility. These forested areas will be managed under the classification of "enhancement of other resources.
2. The following synopsis provides the preliminary classification(s) for each study stream determined as eligible for inclusion in the National Wild and Scenic Rivers System.
   - Klamath River – The Klamath River above Copco Reservoir has been determined to be eligible and suitable for inclusion in the National Wild and Scenic Rivers System as SCENIC.

Northwest Forest Plan Amendment to the Redding Resource Management Plan

Besides the direction for the above management areas, the April 1994 "Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl" (ROD or Northwest Forest Plan) created new land allocations. Only three of those allocations (Riparian Reserves, and Matrix) are applicable in the project vicinity. The ROD provides stringent standards and guidelines that comprise a comprehensive ecosystem management strategy for the old growth resources covered in these land allocations.

Riparian Reserves

A significant role of the Amendments in the ROD was implementation of the Aquatic Conservation Strategy (ACS). Included in the ACS are four key elements: 1) managing riparian reserves, 2) managing key watersheds, 3) completing watershed analysis and 4) performing watershed restoration. All four of these may be necessary for FERC relicensing. Riparian reserves were identified in the Klamath Falls RMP as a major land use allocation.

Riparian Reserves are defined as lands along streams and unstable and potentially unstable areas where specific standards and guidelines apply to most all potential land uses. This can further be described as covering the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing water bodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. The objectives of riparian reserves are to maintain or enhance riparian areas, wildlife and fisheries habitat, and water quality by emphasizing streamside and wetland management. The width of the riparian reserve along the river is approximately 300 feet each side of the high water mark.

Matrix Lands (General Forest Management Areas)

Those lands within the ROD that are not in one of the other six categories are called Matrix lands. These are the areas where most of the timber harvest occurs, although Matrix lands also include non-forest areas, and forest areas unsuitable for timber production. In the relicensing project, Matrix lands could be affected by road use and powerline management.

Appendix E - Agreements

Three agreements (memorandums of understanding — MOU) provide for cooperative management of the upper Klamath River area. They are as follows:

- Management of the California section is by memorandum of understanding with the BLM Redding Field Office. The KFRA manages several recreation sites and issues and monitors special recreation permits for commercial whitewater rafting along this section of the river.

- The Oregon Parks and Recreation Department is a cooperative agency in management of the river and preparation of this river management plan. A cooperative management agreement (1997) was created to help guide and support the writing of this plan, and to manage the Klamath River until a final EIS is completed.

- An additional memorandum of understanding, affirming a policy of cooperation and coordination among the BLM, landowners, and other public agencies is currently in place. This memorandum involves PacifiCorp, Oregon Department of Fish and Wildlife (ODFW), California Department of Fish and Game, Weyerhaeuser Company (as assigned to U.S. Timberlands Services Company, LLC) and the BLM, and establishes a mechanism for coordinating land management programs and planning among cooperating parties.

MEMORANDUM OF UNDERSTANDING

BETWEEN

USDI - BUREAU OF LAND MANAGEMENT, UKIAH DISTRICT, REDDING RESOURCE AREA

USDI - BUREAU OF LAND MANAGEMENT, LAKEVIEW DISTRICT, KLAMATH FALLS RESOURCE AREA

I. PURPOSE AND JUSTIFICATION

A. Purpose

This memorandum is designed to formalize and establish a working agreement for the recreation management of the Upper Klamath River Corridor because the river is located in the BLM Klamath Falls and Redding Resource Areas.

B. Justification

1. Improve public service to commercial recreation permittees and to recreation visitors.
2. Establish a single BLM office contact for the administration, management, and monitoring of recreational activities within the river corridor.
3. Reduce costs to the commercial recreation permittees and the federal government.

II. RESPONSIBILITY

The Lakeview District, Klamath Falls Resource Area will be designated the BLM office contact for the administration of special use permits, management, and monitoring of all recreational activities within the river corridor below John Boyle Dam (in Oregon) to the slack waters of Copco Reservoir (in California). The river corridor boundaries are the same as identified as the BLM river study boundary on Map 1-2 in the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (March 1990). See attached map for the river corridor boundaries.

The Klamath Falls Resource Area will compile and report all visitor use statistics in the river corridor for the BLM Recreation Management Information System.

All maintenance of the existing facilities (excluding roads) within the river corridor will be the responsibility of the Klamath Falls Resource Area.

The Ukiah District, Redding Resource Area will continue to be the BLM office responsible for the administration of public land management actions not covered by this or other agreements (ie. land exchanges, etc.). However, the Klamath Falls Resource will be contacted to provide input on all actions that will impact recreation management in the river corridor.

This agreement will in no way supersede prior individual Resource Area management commitments, but may be used in support of their completion.

The participants will review this MOU at least every 5 years to determine its adequacy, effectiveness, and continuing need.

III. COORDINATION AND COMMUNICATION

The success of the agreement is dependent on effective and timely coordination and communication between the parties. To accomplish this, the Area Managers, or their designated representatives, shall meet on a regular basis as determined by needs and circumstances. This agreement may be amended at any time upon written concurrence by both parties.

A. Barron Bail
Area Manager
Klamath Falls Resource Area

10/3/94
Date

Kelly F. Williams
Area Manager (Acting),
Redding Resource Area

10-5-94
Date

Attachment:
Klamath River Corridor Boundary Map

COOPERATIVE MANAGEMENT AGREEMENT
FOR THE UPPER KLAMATH RIVER
BETWEEN
STATE OF OREGON, PARKS AND RECREATION DEPARTMENT;
AND
UNITED STATES DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT,
LAKEVIEW DISTRICT, KLAMATH FALLS RESOURCE AREA

8370 (014)

RELATIVE TO: Joint State and Federal management of the upper Klamath River in Oregon.

I. Purpose

This Cooperative Management Agreement provides guidance for coordination and cooperation between the Bureau of Land Management (BLM) and the State of Oregon, Parks and Recreation Department (OPRD), on joint management of the upper Klamath Wild and Scenic River. This agreement covers the segment of the upper Klamath River from Pacific Power's J. C. Boyle powerhouse to the Oregon - California border. This eleven mile segment of the Klamath River was designated as a State-administered component of the National Wild and Scenic River system pursuant to Section 2 (a)(ii) of the National Wild and Scenic River Act on September 22, 1994.

The same eleven mile segment of the upper Klamath River was designated a state scenic waterway in November 1988. Under Oregon law, OPRD has primary administrative responsibility for state scenic waterways.

The Klamath Falls Resource Area (KFRA) BLM administers Federally owned lands within the Klamath River canyon from J. C. Boyle Dam to Copco Lake, California. Management of the California section (an additional 5 miles) is by a Memorandum of Understanding (MOU) with the Redding Resource Area BLM (dated 10/05/94). An additional MOU, affirming a policy of cooperation and coordination among the BLM, landowners and other public agencies is currently in place (dated 04/25/91). The agreement is with Pacific Power and Light, Oregon Department of Fish and Wildlife, California Department of Fish and Game, Weyerhaeuser Company (as assigned to U. S. Timberlands Services Co. LLC) and the BLM. It establishes a mechanism for coordinating land management programs and planning among cooperating parties. The KFRA, BLM manages several recreation sites and issues and monitors special recreation permits for commercial whitewater rafting along this section of the river. User fees from commercial whitewater rafting companies are currently collected by the KFRA, BLM.

The Federal lands along upper Klamath River are currently managed under the KFRA Resource Management Plan (RMP) and Environmental Impact Statement (EIS) (1995). Additional guidance for management of recreation resources is contained in the Recreation Area Management Plan for the Klamath River Special Recreation Management Area (1983).

OPRD has primary administrative responsibility for Oregon Scenic Waterways and explicit authority to regulate land use. OPRD has adopted general rules of land management applicable to all scenic waterways. Specific rules are adopted for individual scenic waterways. There are currently no specific rules or guidelines set forth for the upper Klamath Scenic Waterway.

These existing management plans, rules and guidelines will continue to provide management direction for the Wild and Scenic upper Klamath River until an updated or new river management plan or set of specific rules is developed to address specific resource concerns.

- 1 -

I. Objectives

The objectives of this agreement are to:

A. Establish the basis for cooperation between Oregon Parks and Recreation Department (OPRD) and Bureau of Land Management (BLM), Klamath Falls Resource Area (KFRA) in jointly managing the Klamath State Scenic Waterway and the upper Klamath Wild and Scenic River.

B. Define management roles for State OPRD and BLM.

C. Identify commitments of State OPRD and BLM in abiding by this agreement.

II. Authority to enter into the Agreement

A. The Oregon Parks and Recreation Department enters into this agreement pursuant to ORS 190.110, 390.140 and 390.805 through 390.925.

B. The Bureau of Land Management enters into this agreement pursuant to P.L. 97-258, September 13, 1982, 96 stat. 1004, 6305, Using Cooperative Agreements. Additional authorities include: the Wild and Scenic Rivers Act of 1968 as amended, P.L. 90-542 & P.L. 99-590; Federal Land Policy and Management Act 1976 P.L. 94-579, and Public Land Administration Act P.L. 86-644, Interior and Related Agencies Appropriations Act P.L. 102-154, Economy Act of June 30, 1932.

C. Memorandum of Understanding for River Management Between Bureau of Land Management, USDA Forest Service and Oregon Parks and Recreation Department dated 15 July 1991.

/. General Obligations

The parties commit to:

A. Working together in developing any plan(s), rules or regulations for the management of the Klamath Wild and Scenic River and state scenic waterway. Nothing in this agreement shall prevent the parties from developing plans or rules that further define the management roles, responsibilities, or necessary and desired actions of the parties in managing the river.

B. Advise and consult with each other before making decisions or taking management actions that will result in facility development, land use changes or user regulations.

C. Exchange and share information, along with public contacts, relating to the management of the upper Klamath River.

D. Meet on an annual basis to review and discuss proposed management actions, developing issues, user trends and problems, and administration/operational strategies.

E. Seek management efficiencies by sharing or contributing specialized knowledge and skills, staff resources and equipment, and administrative or procedural mechanisms whenever appropriate and possible to accomplish agreed upon management tasks, goals and objectives.

F. Jointly explore and implement, where feasible, innovative and cooperative fee structures, collection arrangements and expenditure priorities designed to optimize benefits to the users and outstandingly remarkable values of the Klamath Wild and Scenic River.

- 2 -

V. Roles of the Parties

A. The Oregon Parks and Recreation Department shall:

1. Have primary administrative authority for private lands within the upper Klamath Wild and Scenic River corridor as provided under Section 2 (a)(ii) of the Act. Administrative responsibilities would include private land issues, river planning, and development of administrative rules.
   Note: The language in the Secretary of the Interior's designation notice specifies the upper Klamath River be a "State administered component of the National Wild and Scenic River system". The language also states that the river "shall be managed by the State of Oregon at no cost to the Federal Government except for those lands currently managed by the Bureau of Land Management (BLM)".

2. Be responsible for managing the Klamath River in accordance with the requirements of the State Scenic Waterways Act and the Wild and Scenic Rivers Act, and act as the contact point for issues regarding private lands along the river.

3. Exercise its jurisdiction under the Scenic Waterways Act to discourage development on private land that conflicts with the goals and objective of the Scenic Waterways Act and the general (Oregon Administrative Rules, Ch. 736, Div. 40 SPRD) and specific land use rules for the Klamath River.

4. Coordinate with and seek the cooperation of other state agencies with special jurisdiction under the State Scenic Waterways Act or other state acts as it applies to water quality, free-flowing character, outstandingly remarkable values and other special attributes. Assist in identifying partnerships for gaining monitoring information.

5. Seek additional law enforcement funding and capabilities and assist in developing law enforcement recommendations.

B. The Bureau of Land Management, Klamath Falls Resource Area shall:

1. Manage public lands within the upper Klamath River corridor consistent with National Wild and Scenic River and State Scenic Waterway designations and in a manner designed to protect and enhance the outstandingly remarkable resource values and special attributes in the corridor.

2. Continue to be responsible for the on-the-ground management of recreation facilities, visitors and the issuance, monitoring and fee collection for special recreation (commercial whitewater) permits.

3. Continue to address fire protection through an existing agreement with Oregon Department of Forestry. Changes to the existing policies regarding campfires and the fire closure season would be coordinated with OPRD.

4. Continue to act as the contact point for issues regarding the public lands in the canyon.

VI. Disclaimer s

Nothing in this agreement shall:

A. Affect the jurisdiction of the parties over their own lands.

B. Require the parties to expend funds in violation of federal or state law or legislatively approved budgets, or contrary to commonly accepted standards of prudent fiscal management.

- 3 -

C. Obligate the parties to management responsibilities not described in this agreement or specified in the Wild and Scenic Rivers Act, as amended.

/II. Approval

This agreement is approved by the parties this ____ day of ____________, 1997. It shall remain in effect until terminated.

The Oregon Parks and Recreation Department

By ______________________________
Robert L. Meinen, Director

The Bureau of Land Management, Klamath Falls Resource Area

By ______________________________
A. Barron Bail, Area Manager

- 4 -

MEMORANDUM OF UNDERSTANDING

among

PACIFIC POWER & LIGHT COMPANY
OREGON DEPARTMENT OF FISH & WILDLIFE
CALIFORNIA DEPARTMENT OF FISH & GAME
WEYERHAUSER COMPANY
and the
BUREAU OF LAND MANAGEMENT

This memorandum of understanding (MOU) is entered into this 18th day of April, 1991, by and among the Pacific Power & Light Company, hereinafter referred to as Pacific; the Oregon Department of Fish & Wildlife, hereinafter referred to as Oregon Department; California Department of Fish & Game, hereinafter referred to as California Department; Weyerhauser Company, hereinafter referred to as WeyCo; and the Bureau of Land Management, hereinafter referred to as the BLM.

I. STATEMENT OF JOINT OBJECTIVES

A. Purpose

Private, state and Federal land ownership is intermingled in the vicinity of the upper Klamath River. Many of the land owners have mutual resource management concerns and responsibilities in this area. A coordinated land management process that encourages a high level of cooperation between various land owners could improve resource benefits through cost-effective actions and policies.

This MOU affirms a policy of cooperation and coordination among the cooperators concerning management of their lands along the upper Klamath River. It establishes a mechanism for coordinating land management programs and planning among the cooperating parties. It serves as a master agreement for the Cooperators that can be used to develop separately negotiated and approved amendments (task orders) to this MOU for specific management projects or actions.

B. Objectives

Objectives of the agreement are as follows:

- Manage rangelands to maintain or improve range conditions.

. Manage deer winter range to maintain or improve habitat.

. Manage riparian habitats to maintain or improve fish, wildlife and scenic resources.

. Maintain and enhance species of special concern and their habitats.

. Maintain a wild horse population in the Pokegama Herd Use Area (HUA).

. Maintain and enhance recreation and scenic resource values;

. Protect and interpret archaeological resources and cultural values.

C. Authority

. ORS 496.138 (11) authorizes Oregon Department to enter into agreements for the development and encouragement of wildlife research and management programs and projects.

. Federal regulation 36 CFR 219.19 for public land states that "wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species".

. BLM - Wild Horse and Burro Act, Redding Land Use Plan, Redding Resource Management Plan, Klamath Recreation Area Management Plan, Federal Land Policy and Management Act, Wild and Scenic Rivers Act.

. Pacific's environmental policy (dated June 1990) states it's dedication to maintaining it's position as a responsible cooperative member of the community it serves, and continuing to comply with all applicable Federal and state laws enacted to protect and enhance the environment.

. California Fish and Game policy and Section 1801 of California Fish and Game Code.

D. Benefits

Benefits of the agreement are as follows:

. To establish a process that facilitates cooperation and coordination of resource management in the upper Klamath River watershed.

. To identify and develop specific resource management projects through amendments (task orders) to the MOU.

. To provide a process for transfer of funds and exchange of services through amendments (task orders) to the MOU.

. Document current cooperation and facilities application/reporting for outside funding (challenge grant, GWEB).

E. Responsibilities

The Cooperators agree that:

1. Under the terms of separately negotiated and approved amendments to this MOU, tasks (amendments) shall be undertaken for coordinating and enhancing land management programs.

2. This MOU provides the framework for the initiation and implementation of future agreements among the cooperators. Such agreements will refer to this MOU which shall be the primary agreement document.

3. Coordination and enhancement of land management programs among the cooperators will be undertaken under terms of separately negotiated and approved amendments to this MOU.

4. Cooperators will work cooperatively in identification, evaluation, and management (including monitoring) of grazing lands and other owned lands with high natural and cultural values.

5. The development of automated databases related to land management, including geographical information systems, will be coordinated, where practical.

6. Consistent with authorities, access will be provided to Cooperators lands for studies and analysis for land management in mutually agreed to areas.

7. The implementation of this MOU is subject to required funds being available to appropriate parties of the MOU.

8. Nothing herein contained shall be construed as limiting or affecting an any way the delegated authority or responsibilities of the Cooperators.

9. This MOU may be modified or amended upon request of any party and the concurrence of the others. A Cooperator may terminate their participation with 60 days written notice.

10. An annual meeting will be held to discuss progress of programs under the MOU, future activities, and funding.

11. This MOU becomes effective when signed by all parties, and shall remain in effect until terminated.

AGREEMENT:
US Dept. of the Interior
Bureau of Land Management

Dated: FEB 11 1991

Pacific Power & Light Co.

Dated: 4/10/91

California Dept. of Fish and Game

Dated: Feb 75, 1991

Oregon Dept. of Fish and Wildlife

Stephen L. Lewis

Dated: 4/2/91

Weyerhauser Company

Dated: 4/18/91

US Dept. of the Interior
Bureau of Land Management

Dated: 4/25/91

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Appendix F – Public Involvement Plan

This public involvement plan displays public participation and consultation activities to provide opportunities for the public to meaningfully participate in and comment on the proposed Upper Klamath River Management Plan (CFR 43, Chapter II, 1610.2) and associated environmental impact statement. Meetings have been held to share information throughout each major step of the analysis process, including the initial scoping phase, which included identification of planning issues and alternatives, and defining the scope of analysis for alternatives to be disclosed in a draft environmental impact statement. In addition, information has been provided on a public access web site and through a public mailing. This plan would adhere to the CEQ 40 CFR, BLM Manual 1614, and Wild and Scenic River manual requirements for public participation and outreach. The list below also includes planned or proposed contacts to be made following the release of the DEIS.

Consultation Meetings
Klamath Tribes Executive Committee, Chiloquin, OR (Numerous meetings and communications)
Shasta Nation, Quartz Valley, CA (Numerous meetings and communications)
Shasta Nation, Yreka, CA* (Numerous meetings and communications)
Shasta Nation, MacDoel, CA* (Numerous meetings and communications)
Hupa Tribe, Karuk Tribe, and Yurok Tribe
Fish and Wildlife Service consultation, Klamath Falls, OR (Numerous meetings and communications)

Public Meetings/Open Houses
Open House, Klamath Falls, OR
Open House, Yreka, CA
Public Meeting, Copco, CA

Federal Agency Coordination Meetings
Department of the Interior, Washington, D.C.
Klamath Provisional Advisory Committee (PAC)
Upper Basin subcommittee of the PAC (Numerous meetings)
Interagency Advisory Committee – Federal and State agencies (Numerous meetings)
Redding Resource Area BLM
Medford District BLM
Lakeview District BLM
Oregon State Office, BLM (Formal Briefings)
California State Office, BLM (Informal Briefing)
BLM State Cultural Protocol Meetings
Klamath National Forest
Bureau of Reclamation, Klamath Project Office

Governmental Meetings/Briefings
Klamath County Commissioners (presentation)
Siskiyou County Board of Supervisors (presentation)
Oregon Congressional Delegation (presentation)
California Congressional Delegation (presentation)
Oregon State Natural Resource Advisor (presentation)
Oregon Department of Environmental Quality (Maybe this should be under IAC above)
California Resources Agency (presentation)

Informational Meetings and Communications
Klamath/Lake/Modoc/Siskiyou Recreation Working Group (presentation)
Klamath River Working Group of the Klamath Watershed Council (presentation)
Southeast Oregon Resource Advisory Council (presentation)
Northwest California Resource Advisory Council (presentation)
Oregon Natural Desert Association

Audubon Society - Klamath Chapter, Klamath Falls, OR (presentation)
Upper Klamath Outfitters Association, Medford, OR (presentation)
Klamath Four Runners, Klamath Falls, OR (Informal meeting and communications)
Service Clubs

- Klamath Basin Sunrise Rotary, Klamath Falls, OR (presentation)
- Kiwanis Club, Klamath Falls, OR (presentation)

Sierra Club - Klamath Chapter, Klamath Falls, OR (Potential)
Oregon Natural Resources Council (Potential)
PacifiCorp (presentation)
U.S. Timberlands
California Fruitgrowers Association (presentation)
Boise Cascade (Phone Discussion)
State of Jefferson Archaeological Meeting
Pedaling Through the Past Public Outreach Event
Adjacent Private Landowners (mostly phone calls)
Various members of the public (phone calls and in BLM office)

Federal Register Notices and Media Contacts
Notice of Intent
Notice of Availability for DEIS and public meeting dates
Notice of Availability for FEIS and public meeting dates (Planned)

Media Contacts
Yreka Siskiyou Daily News (Newspaper)
Klamath Falls Herald and News (Newspaper)
Redding Searchlight (Newspaper) (Potential)
Eureka, California (Newspaper) (Potential)
Eureka Television Stations (Potential)
Klamath Falls Television Stations (Potential)
Medford Television Stations (Potential)
Redding Television Stations (Potential)
Yreka Television Stations (Potential)
Klamath Falls Radio Stations
Medford Radio Stations (Potential)
Yreka Radio Stations (Potential)
Eureka Radio Stations (Potential)

Other Sources of Public Information
Lakeview District, KFRA Web Site
River Plan Update (information letter sent to over 400 people on mailing list)

* These groups are not part of a Federally Recognized Tribe, but have requested to be involved with the process so they have received similar information as the existing recognized tribes.

Appendix G – Public Issue Statement Tracking

The list of scoping issues below is based upon public and agency comments received during the scoping period that closed on January 31, 2001, and other input received up until June 1, 2002. Each issue statement was reviewed to determine if it is addressed in the analysis. Other issues not listed below were previously evaluated and determined to be "beyond the scope of this analysis". The issues below can be addressed in the analysis in one or more of the following ways:

1. Discussed under Purpose and Need or Management Direction portions of the EIS,
2. Described in the Affected Environment section of the EIS,
3. Included as an action (opportunity) to be analyzed in one or more alternative,
4. Effects described in Environmental Consequences.

KLAMATH RIVER MANAGEMENT PLAN PUBLIC ISSUE STATEMENTS	HOW / WHERE ADDRESSED
WILD AND SCENIC RIVER SYSTEM AND AREA OF CRITICAL ENVIRONMENTAL CONCERN VALUES	
How will the designated Scenic River Outstandingly Remarkable Values be maintained or enhanced?	Alternative design & Effects discussion
How will the designated area of critical environmental concern values be maintained or enhanced?	Alternative design & Effects discussion
RECREATION FACILITIES	
What are the types and numbers of existing or new recreational sites needed in the canyon?	Alternatives 1-4
No further development should occur in the canyon.	Alternative 1 (No Action)
More restrooms and campgrounds are needed.	Alternatives 2,4
A real bathroom is needed at the Freedom Site (Stateline) and Frain Ranch.	Alternatives 2,4
At Frain Ranch, a simpler vault toilet could be less costly to build and repair.	Alternatives 2,4
Keep low maintenance (semi-primitive) facilities and don't substantially upgrade facilities.	Alternatives 1,3
A parking lot at the old PPL housing site needs to be developed with a path to the put-in.	Alternatives 2,4
Don't expand recreation facilities if you can't keep existing facilities going.	Alternatives 1,3
Designated camping areas would preserve the area's ecosystem.	Alternative 3

Development should focus on adding and improving campsites. I support a minimum 100 foot non-development corridor (buffer), measured from the high-water line, for facility development.	Alternatives 2,3
The fewer facilities the better. If any other facilities are needed, limit them to porta-potties and concrete and steel barbeque pits.	Alternatives 1,3
Allow river users to utilize Access #6 as a take-out and put-in option.	Alternatives 1-4
There is a need for toilet facilities at Frain Ranch, on one side of the river or both.	Alternatives 1-4
There is room for additional campsites at the BLM Campground; those additional sites are probably needed and appropriate.	Alternatives 2,4
Toilet facilities should be maintained at the BLM CG and the Frain Ranch area in addition to the BLM “put-in and take-out.”	Alternatives 1-4
To facilitate recreational use for visitors not in a “boat”, new trails to and along the river in appropriate locations would be assets to the area. Such trails would be most useful in the canyon between the Frain Ranch area and the state line where it is largely inaccessible except via water.	Alternatives 2,4
A trail along each side of the river between Copco and HWY 66 at the Klamath River encouraging backpacking would be desirable.	Alternatives 2,4
Provide new trails for fishing access, especially in the “Bypass Reach”.	Alternatives 2,4
Don’t build new trails or roads.	Alternatives 1,3
Can plans for a Stateline boat ramp be implemented?	Alternatives 2,3,4
There may be a need for group size campsites?	Alternatives 2,4
Determine the proper management of dispersed primitive campsites.	Alternatives 1-4
Any new trail building needs consultation with Tribes.	Alternatives 1-4
Is there a need for additional signs and interpretive facilities in the canyon?	Alternatives 1-4
Determine what the appropriate level of regulatory signage is for the canyon.	Alternatives 1-4
BLM should provide an interpretive sign at the beginning and end of Topsy Road and at popular sites.	
Topsy Road and adjacent historic sites (stage stops) should be acknowledged with the appropriate signs and interpretation, including the Frain Ranch and school.	Alternatives 1-4
How will facilities (on public and private land) be maintained?	Alternatives 1-4
Recreational facilities need to be maintained.	Alternatives 1-4
The restrooms at Frain Ranch should not be locked.	Alternatives 2,3,4
Close campgrounds around old Frain Ranch (Assumed this is for dispersed camp sites)	Alternatives 2,3,4
Explain why the toilet at Frain Ranch is closed.	Affected Environment
Outfitters should pay to help maintain facilities for their customers along the river.	Affected Environment
RECREATION ACTIVITIES	
What is the appropriate carrying capacity for recreational uses within the river canyon?	Alternatives 1-4
Recreation use, besides whitewater rafting, needs to be monitored more closely.	Alternatives 2-4
There is more recreational use in the canyon than documented.	Alternatives 1-4
Maintain current level of commercial rafting use.	Alternative 1
Plans need to consider the needs of private boaters as well as commercial outfitters.	Alternatives 1-4
Need to assign limits with Tribal, State and other agency input.	Alternatives 1-4
There should be no restrictions on whitewater rafting.	Alternative 4

A crowded put-in doesn't necessarily mean that there is a carrying capacity problem on the river.	Alternatives 1-4
River use should be reduced or eliminated if there are not sufficient maintained toilet facilities for visitors.	Alternative 3
What recreational uses are desired and how will they be impacted by management actions?	Environmental Consequences
Fishing, Hunting, Hiking and OHV use should be allowed.	Alternatives 1-4
Minimal impact, non-consumptive recreation should be given priority over consumptive or high impact OHV or commercial uses.	Alternative 3
Foam and concentrated algae in the river degrade the recreational experience.	Affected Environment
Some recreational uses may not be compatible with this Wild and Scenic River system setting.	Alternatives 1-4
How can existing use, and potential increases in use, be managed to protect the values in the river corridor?	Alternatives 1-4
With increasing recreational use of the river, nearby recreation site use may increase as well.	Alternatives 1,2,4
Recreation use is booming, people are wanting to experience the great outdoors whether it is camping, fishing, rafting, or etc.	Alternatives 1,2,4
Rafting of the river must remain a strictly controlled activity.	Alternatives 1-4
From State Line to Copco, rafters are starting to take out at other areas on private land. This should be stopped.	Alternatives 1-4
Put-in and take-out should only be allowed at designated locations, and these can include private lands if there is an agreement and the site is maintained.	Alternative 3
Any conflicts between river-runners and other recreationists is more likely to be competition for camp sites. Adequate opportunities for dispersed camping along the river and within the canyon should minimize that problem.	Alternatives 1-4
Day trips have less impact than overnight trips.	Alternative 3
Camping is great and I would hate to see a limitation on two-day (overnight) raft trips.	Alternatives 1,2,4
Camping by non-natives should be restricted to BLM designated campsites (Protect Native American Traditional Use Areas).	Alternatives 1-4
Camping should be restricted to designated sites to reduce impacts to cultural sites.	Alternative 3
Outfitter-guides (rafters) should be required to provide toilet facilities for their customers?	Alternatives 1-4
Litter from recreational use must be tightly monitored.	Alternatives 1-4
Need to implement a *Pack-It-In/Pack-It-Out* policy for litter.	Alternatives 1-4
Need to emphasize the use of *Leave No Trace* techniques with both commercial outfitters and the general recreating public.	Alternatives 1-4
Specifically, how will OHV use be managed?	Alternatives 1-4
No OHV use should be allowed off-roads.	Alternatives 1-4
OHV (off-highway vehicle) use should not be eliminated.	Alternatives 1-4
OHV use should be strictly banned within the canyon area due to its destructive nature and abuse to house pits and ceremonial areas.	Action Eliminated
No OHV recreation should be allowed in the canyon, or maybe allow OHV recreation if a permit process to restrict use was established.	Action Eliminated
Use of ATV's and ORV's, indeed all vehicles, should be confined to maintained roads or trails to avoid damage to soil and vegetative resources and reduce harassment to wildlife and recreational users.	Alternatives 1-4
Continue to deny access to the Salt Caves area.	Alternatives 1-4

What level of patrols or BLM presence is needed to protect the resources and provide for safety of users?	Alternatives 1-4
More vigilant patrols in canyon during peak usage period, May through September.	Alternatives 2,3,4
Have law enforcement phone numbers posted.	Alternatives 1-4
The river from J.C. Boyle Powerhouse to Copco Reservoir should be kept open to the public for recreation and tourism.	Alternatives 1-4
Law enforcement personnel are to be allowed to patrol in all areas to protect the canyon and its values, and consultation with tribal patrols should be maintained for assistance in protecting cultural sites.	Alternatives 1-4
BLM needs to have a plan that encourages and facilitates enforcement, rather than a plan which inherently eludes enforcement.	Alternatives 2,3,4
The plan should stipulate that when funding is unavailable, vehicle access to these sensitive or otherwise improperly regulated areas will have to be closed.	Alternative 3
Possibly provide a joint use law enforcement officer residence.	Alternatives 2,3,4
BLM presence needs to be consistent with the objectives of the Semi-primitive Motorized Recreational Opportunity Spectrum designation in the canyon.	Alternatives 1-4
How will use of firearms be managed within the river corridor?	Alternatives 2,3,4
Restrict Firearm use.	Alternatives 2,3,4
Firearm use in the vicinity of other recreation uses in the canyon may not be compatible.	Alternatives 1-4
Do not restrict firearms.	Alternative 1
No firearm use during rafting season - May through September.	Alternatives 2,3,4
More law enforcement is needed.	Alternatives 2,3,4
Not opposed to legal hunting, but discharge of firearms seems to be random and indiscriminate and surely ruins ones enjoyment of the area.	Alternatives 2,3,4
Wildlife hunting opportunities should be maintained, but no hunting in the canyon in the summer months.	Outside Scope of Analysis
Recreational hunting can be allowed but the Shasta Council must be involved in the setting of seasons, bag limits, etc.	Outside Scope of Analysis
Eliminate and ban use of OHV, 4-wheelers, motorcycles, etc. in all areas within one mile of the canyon rim edge on both sides of the river.	Outside Scope of Analysis
People should only be permitted to carry and use firearms if they have completed Gun Safety Classes.	Outside Scope of Analysis
ROADS AND ACCESS	
What is the appropriate transportation system for the river corridor including roads, bridges and trails?	Alternative design
Transportation management must be directed to benefit the ecological, social and economic values in the area in a way that integrates or balances all values.	Alternatives 1-4
Consider helicopter logging and other low impact options with minimal road development to perform projects to reduce fuel loading.	Alternatives 1-4 as specified in BMPs and mitigation measures
Do not develop any more roads or make the existing roads better.	Alternative 1
No new roads are to be built.	Alternatives 2,3
New, unobtrusive roads may be appropriate to access the river, campsites or other resources.	Alternative 4

Provision of a new bridge at the old "Burned Bridge" site would be an asset to the area that would provide better seasonal access to the Frain Ranch area and provide for a loop road through the canyon facilitating the enjoyment of its scenic and historical attributes.	Alternative 4
Opportunities for other bridge replacements (i.e., J.C. Boyle dam and Stateline) should be considered.	Alternative 4
There are open and closed roads that may provide opportunities for non-motorized use.	Alternatives 1-4
The Topsy Grade should be left open for those to hike, bike, or provide access by motor vehicles.	Alternatives 1-4
Access for existing wildlife hunting opportunities should not be affected.	Alternatives 1,4
Maintain access to cultural resource gathering areas for tribal gatherers. The Tribe(s) should be contacted prior to closing roads to see if they have any concerns about road blockage.	Alternatives 1-4
Are road closures necessary to protect resource values?	Alternative design
Inappropriate and unnecessary roads should be closed and restored to natural conditions.	Alternatives 1,2,3
Using boulders and tank traps to close roads really does not work very well.	Alternatives 1,2,3
Work with user groups if plans are made to close roads.	Alternatives 1-4
In considering any road closures, please consider the impacts to PacifiCorp's ability to access and maintain hydroelectric project facilities and transmission lines that are in place.	Alternatives 1-4
Limited closure of roads that do not provide access for recreation should occur.	Alternatives 1,2,3
Support judicious road closures along with an active program to restore old and abandoned roads to their natural state.	Alternatives 1,2,3
What road system improvements or maintenance will be needed to accommodate existing, or potential traffic increases, and to ensure safety?	Alternatives 1-4
Improve the access road to Take-out #6.	Alternatives 2,4
The two main access roads should be maintained in passable condition. Appropriate spur roads should be maintained similarly where they are useful for accessing the river or campsites.	Alternatives 2,4
Maybe slightly improve the roads to Frain Ranch and the raft launch site. Leave most of the rest of the roads in their existing conditions with little to no maintenance.	Alternatives 1,3
Extensive road improvements and on-going maintenance is needed for Topsy Road and North side river access road.	Alternatives 1-4
No paving of the existing roads.	Alternatives 1-4
The Topsy Road should be improved to stop resource damage that is presently occurring.	Alternatives 1-4
Road maintenance agreements need to be developed for roads (e.g., Topsy) that have multiple ownership or administration.	Alternatives 1-4
Topsy road, Stateline access road, and North side river road need maintained.	Alternatives 1-4
At a minimum the Topsy road should be gated and closed in winter and during wet weather.	Action Eliminated
To stop excessive soil erosion and resource damage on Topsy Road, include possible road closures during the hunting season.	Alternatives 1-4
With the improvement of existing roads in the area, response time to a fire situation could be greatly enhanced.	Effects discussion
Improve stream crossings in the Stateline and Frain Ranch areas?	Alternatives 1-4
How will access to the river's edge be managed?	Alternatives 1-4

Access to the river should be maintained.	Alternatives 1-4
Fishing access should be maintained.	Alternatives 1-4
Fishing access should be expanded, especially on private land.	Alternatives 2,4
Access should be limited to the existing roads.	Alternatives 2,3
Adequate access and camping opportunities should be provided and maintained to support enjoyment of these resources.	Alternatives 1-4
Determine which roads should be opened for access to the river shoreline.	Alternatives 1-4
The road to Frain Ranch should be blocked at Robbers Rock.	Possibly Alternative 3
Use of roads by tribal members for cultural, religious, and ceremonial purposes must remain unrestricted. Keys to the locked gates for access to the lower river areas [private land in Segment 3] must be provided to the Shasta Nation tribal council at the earliest convenient date.	Outside Scope of Analysis
CULTURAL RESOURCES/PREHISTORIC SITES	
Will archaeological resources in the area be directly or indirectly affected by existing, or increased, access and use?	Effects discussion
Conflicts are occurring where recreation use is affecting cultural sites.	Alternatives 1-4
There are hundreds of Native American cultural sites, and a fair number of historical sites, along the Klamath River that should be protected.	Alternatives 1-4
There are over 115 Shasta Cultural sites within the study area. Many of the sites such as those at Frain Ranch and the State Line Takeout, are being impacted to the point of destruction.	Alternatives 1-4
The Klamath River Canyon is part of the Klamath Tribes aboriginal territory and they are concerned that sites not be impacted.	Affected Environment
Cultural sites exist in Segment 1 that should be considered in the plan.	Alternatives 1-4
Cultural sites are affected by fluctuating river flows.	Alternatives 1-4 (In Monitoring Plan)
Road access to, and camping in areas with cultural sites accelerates damage to the sites.	Alternatives 1-4
How will cultural sites be managed and protected?	Alternatives 1-4
Sites should be managed cooperatively with interested Native American Tribes.	Alternatives 1-4
There is disagreement on how different Tribes want the sites managed.	Affected Environment
There is disagreement on which Tribes currently and historically used the sites.	Affected Environment
The Klamath Tribes are only interested in protection and stabilization of sites in place.	Alternatives 1,2,4
There may be direct conflict between the Shasta and Klamath Tribes over management of cultural resources in the canyon.	Affected Environment
The Klamath Tribes are not in favor of public tours of prehistoric cultural sites in the canyon.	Alternatives 1-4 (Although No Tours are proposed)
Suggest that the Shasta and Klamath Tribes meet on cultural management issues in the canyon.	Alternatives 2,3,4
Locations of sensitive sites should be on a need-to-know basis.	Management Direction
A complete inventory of all sites on both public and private or corporate ownership land must be done (including the east side of the river between Frain Ranch and the put-in).	Alternatives 3,4
Heavily damaged sites may be strongly considered for detailed archeological study and excavation to recover what information that may yet remain to provide a more complete historical picture of past use.	Alternative 4

Cultural site protection should be higher priority than recreation use. All prehistoric sites must be protected at all costs regardless of ownership.	Alternatives 2,3
It is vital to protect and even improve cultural sites.	Alternatives 2,3,4
Protect cultural sites at all cost – purchase land where sites exist on private land.	Alternatives 2,3
The BLM should propose solutions to the private landowners and work with them to stop the destruction of cultural sites.	Alternatives 2,3,4
Plant poison oak around the Rain Rock to help prevent vandalism.	Alternative 3 (Although not proposed)
Include cultural site interpretation in the management plan.	Alternatives 2,4
Discuss the role that outfitters should or should not have in interpretation of, or "pointing out", cultural and historic sites to their clients.	Alternatives 2,3,4
Signs should be used to educate and warn people about taking artifacts and destroying cultural sites. They need to describe the Antiquities Act and reference "penalty of law" for disturbance.	Alternatives 2,4
Place signs on fences around sites to warn people of the need to protect the sites.	Alternatives 2,4
Sites can be marked with warnings posted of the religious values to the native cultures with notices of fines for desecration.	Alternatives 2,4
On-site monitor(s) or manager(s) would be effective in protecting sites.	Alternatives 2,4
Cover sites with cloth and soil and then plant vegetation or turn into a parking lot so their presence is not obvious.	Alternatives 2,3,4
Do not publish information on cultural sites that may increase the likelihood of the general public finding the sites.	Alternatives 1-4
Create an educational program to teach respect for the sites; include lessons in grade school, local history course at Klamath Community College.	Alternatives 2,4
Not sure education will foster respect unless it is geared toward younger generations.	Alternative 3
Have a meeting between the Shasta Nation and the off-road vehicle group would help educate the guides so that they can pass on the correct information to their guests and also avoid sensitive locations.	Alternatives 2,3,4
Help protect sensitive sites. Maybe a course in local culture would be a good idea for rafting companies and other groups who use the area. Cultural resource information should be shared through a brochure, supplemented by a web page, to foster respect for the sites.	Alternatives 2,4
Tours would increase public appreciation and may lead to protection.	Alternatives 2,4
The Shasta Tribes should be amenable to sharing knowledge of some of their sites and ceremonies to selected groups.	Outside Scope of Analysis
Collecting of artifacts by rafters and other members of the public must stop.	Alternatives 1-4
There are several cultural sites within the river's corridor from the Keno dam downstream to the Put-In for the rafters. This stretch of the river corridor is not included in your scoping plan (Segment 1 should be expanded).	Outside Scope of Analysis
The boundary of River Segment 3 should be expanded to include rim to rim (like Segment 2) for cultural resource issues.	Alternatives 2,3,4 depending on values
The site at Fishing Access #6 needs to be tested to determine their significance. This area may serve to relieve impacts on other upstream cultural sites.	Alternative 4
Cultural sites are being impacted by flooding caused by spills from the dams.	Alternatives 1-4
TRADITIONAL USES	

How will traditional cultural uses of the upper Klamath River management area be affected by the proposed activities?	Alternatives 1-4
Keep open to Native Americans.	Alternatives 1-4
Allowance of subsistence hunting and gathering by tribal members is imperative.	Outside Scope of Analysis
We have long practiced our traditional hunting, fishing and gathering activities utilizing the methods of our ancestors and we fully intend on continuing this practice.	Affected Environment
The canyon should be open to traditional uses but other uses should not be curtailed or eliminated.	Alternatives 1,2,4
Native Americans can post the time when they hold their ceremonies and alert public users to the fact and either redirect use or limit it so that the ceremonies would not be disturbed.	Outside Scope of Analysis
Allow uses to continue: religion, hunt, fish, gather/teach. (Religion/Gathering)	Alternatives 1-4
Areas of traditional tribal use for cultural and ceremonial activities should be identified and have limited or reduced access to non-tribal members.	Alternatives 1-4 (reduced access in Alt 3)
Access to the prehistoric hunting areas must be limited to foot travel only: no horses, bikes, ATV's, OHV's, etc.	Alternative 3 (or Outside Scope of Analysis)
The Shasta Nation is interested in a modest expansion of the traditional subsistence used by the tribal members to provide food and materials for traditional cultural use.	Outside Scope of Analysis
Use of wildlife resources by tribal members shall be tightly controlled and strictly enforced. Anti-poaching patrols will be added.	Outside Scope of Analysis
Expand traditional tribal cultural activities to educate and improve communication and cooperation for joint management of the Klamath River system between the Shasta Nation and BLM.	Alternatives 1-4
The boundary of river Segment 2 should be expanded to include the lithisol meadows in Section 1 on USGS map. These were traditional root gathering areas.	Outside Scope of Analysis
Basketry materials in riparian areas along the river are affected by upstream management.	Outside Scope of Analysis
Flood releases are also impacting other resources such as riparian areas containing basketry materials.	Outside Scope of Analysis
Fish harvest is adversely affected by water flows.	Outside Scope of Analysis
The cultural section needs to be broadened to include all traditional lifeways. For example, fish are central to ceremonies, so if the fish are affected, tribal ceremonies are affected.	Affected Environment
Allow the expanded use of wildlife and fish by Tribal members.	Outside Scope of Analysis
The published interest and historic use of the Klamath River is overstated and exaggerated by the Klamath Tribes.	Outside Scope of Analysis
May necessitate a small reduction in the late archery and controlled limited entry seasons by the general public. Proposed tribal use will exceed current season lengths but not the overall harvest levels to insure healthy populations.	Outside Scope of Analysis
HISTORIC SITES	
How will historic sites/structures be managed?	Alternatives 1-4
The historic sites in the canyon were important to the settlement of Klamath County and should be interpreted.	Alternatives 2,4
Maintain and keep up historic sites.	Alternatives 2,4
I would like to see some of the old cabins and the sites like the schoolhouse at Frain Ranch and the Way Ranch at least stabilized. You would not suffer from a lack of manpower if you asked various organizations for help in doing these tasks.	Alternatives 2,4

Historic landmarks should be kept open to the public as a source of heritage and beauty.	Alternatives 1-4
It is probably not necessary, nor practical, to restore or maintain the remains of structures but to try to avoid vandalism of these resources.	Alternatives 1-4
Bullet-proof interpretive signs should be provided at historic sites.	Alternatives 2,4
If we can't have signs in the canyon because of vandals, then use brochures, self-guided tours or guided tours for groups when requested.	Alternatives 2,4
How can sites be protected from vandalism?	Alternatives 1-4
More law enforcement is needed.	Alternative 4
More presence by people – not necessarily law enforcement -- is needed.	Alternatives 2,3,4
Sites should be protected but not at the expense of those who enjoy other sites along the Topsy Grade.	Alternatives 1-4
Sites can be marked with warnings posted of the historic values with notices of fines for desecration.	Alternatives 2,4
Historic sites previously located by the Klamath County Historic Landmark Commission should be relocated and mapped.	Alternatives 2,4
WATERSHED VALUES	
What will be the effect of proposed activities on water quality?	Alternatives 1-4
Induced residential, commercial and industrial growth can adversely affect water quality.	General Effects Discussion
Baseline water quality and trends should be studied in the planning process.	Affected Environment
Use volunteer groups to do stewardship projects.	Alternatives 1-4
Can water quality (natural condition) be improved?	Alternative design
The entire Klamath River has been listed as "water quality limited".	Existing Condition / Affected Environment
Water requirements and habitat protection to meet water quality standards and protect beneficial uses must be a priority.	Alternatives 2,3,4
Water quality needs improved most of all.	Affected Environment
Poor water quality led to a major outbreak of *Columnaris* that resulted in hundreds of thousands of fish and aquatic organisms dying in the river.	Affected Environment
Foam is also at nuisance levels and it impairs the visitor's water contact experience, whether as a boater, fisher, or swimmer.	Affected Environment
Restoration or reconstruction of PacifiCorp's canal emergency spillway could reduce excessive erosion and sedimentation.	Alternatives 1-4
Floods bring sedimentation from logging practices. Big sediment loads clog the mouths of downstream creeks where fish try to retreat during bad river water conditions.	Outside Scope of Analysis. Affected Environment
Will the proposed action conform to management direction for Riparian Reserves and Aquatic Conservation Strategy objectives?	Effects discussion
Consider the feasibility of adding large woody debris to the riparian and shoreline area to improve channel stability and function.	Alternatives 2,3,4
Reestablishment of a healthy and diverse riparian community is important to meet Aquatic Conservation Strategy objectives.	Alternatives 2,3,4
Improve riparian habitat by streamside willow planting and bank stability improvement projects.	Alternatives 2,3,4

What are the impacts of proposed management actions on water quantity and river flows?	Effects discussion
The management plan must address the issue of water flows necessary to meet not only WSRA objectives but those of the Endangered Species Act.	Affected Environment/ Alternative Recommendations
The plan must address what water is needed to fulfill the purpose of outstanding and remarkable value protection.	Alternatives 1-4 & Effects discussion
Higher and more uniform flows will better achieve the outstanding and remarkable characteristics of the river both for the fish as well as improving the whitewater rafting experience with the Scenic River designation.	Effects discussion
Pursue river flows that optimize river rafting opportunities.	Alternatives 2,4
WILDLIFE AND FISHERIES	
How will wildlife, including threatened and endangered species, sensitive species, other species of concern, and the habitats of these species be affected by proposed management activities and recreation use?	Effects discussion
Protect T, E, and S species including bald eagles, peregrine falcons, shortnose and Lost River suckers, redband trout, Townsend's big-eared bat, and other State or Federally listed species and their habitat.	Alternatives 1-4
The impact of any developmental project and consumptive recreational use should be assessed as to its impacts on bird migration in the canyon.	Effects discussion
Studies should also be conducted to assess other species-specific connectivity functions and needs.	Alternative 3
As humans move in, wildlife moves out, so don't let any more humans move in.	Alternative 3
Poaching occurs in the canyon.	Alternative 4
How does existing management of the area affect fish, and how will the trout fishery be managed?	Effects discussion
The excellent trout fishery should be maintained.	Alternatives 1-4
Things should not be restored to conditions prior to 1850 just to benefit the fisheries.	Alternatives 1-4
Although fisheries are a resource, so is power and recreation. One should not take precedence over the other. The fish have survived many years of the powerhouses releases and will continue to survive.	Alternatives 1-4
If the flows are less haphazard and more planned the recreational users of the water can co-exist with the fisheries.	Alternatives 2,3,4 (Flow Study needed)
A more stable, natural flow regime would provide for increased, but manageable, angler use and provide for improved conditions for the trout population.	Alternatives 2,3,4
Wherever and whenever fish ladders/screens can be employed to project fish species, they should be implemented.	Alternative 3
With more stable, seasonal flows, the stream's productivity would improve and I would expect the redband trout population to increase in both fish number and average size.	Alternatives 2,3
Irregular ramping creates fish "stranding ponds" which has a negative effect on the brood stock.	Affected Environment
Fish size – It appears that native trout do not grow to similar sizes as they do in comparable size and type streams especially at sites downstream of the J.C. Boyle Powerhouse). There are larger fish in the Bypass reach (River Segment 1).	Affected Environment Alternatives 1-4
Although the planning area is within the historical range of coho and steelhead, these fish were not in the area at the time of Scenic River designation.	Affected Environment Alternatives 2,3,4

What are the affects of hatchery fish on wild stock?	Outside Scope of Analysis
The Pacific Lamprey should be able to survive above the dams.	Effects discussion
Suggest that the BLM do a study on possible genetic relations between the Red Band and Steelhead, as well as the Pacific and Brook Lamprey.	Outside Scope of Analysis
How will wildlife habitat management affect other resource values?	Effects discussion
Limit wildlife enhancement projects so they don't restrict other uses.	Alternatives 1-4
Predatory animal control will be aggressively pursued on cougar, bears, and coyotes within our ancestral lands to aid the wildlife populations. Traditional methods of predator control do include baiting and the use of dogs.	Outside Scope of Analysis
Recreational catch and release of the fishery should be terminated permanently as the 10-30% mortality loss associated with this wanton waste type of recreational fishery is not acceptable to the Shasta people.	Outside Scope of Analysis
Restrictions on the use of bait must be ended as this method is both a recreational and traditional use.	Outside Scope of Analysis
Increase base minimum fish flows from Topsy dam.	Alternatives 2,3
Will reintroduction of salmon be proposed and how will it be accomplished?	Alternative 3
Restore anadromous fish passage.	Alternative 3
Restoration of the river ecosystem to its former productivity through fish passage is also a non-negotiable point. Technology exists to restore fish passage by the dams or the dams must be removed.	Outside Scope of Analysis
FIRE AND FUELS	
What is the current fire suppression strategy?	Current management discussion
Wildfire needs to be quickly controlled to prevent loss of the scenic value of the canyon.	Alternatives 1-4
What type and level of fuel treatments are necessary to protect resource values?	Alternatives 1-4
Use prescribed fire and low impact logging to reduce fuel loads.	Alternatives 1-4
Selective, careful, and thoughtful use of fire is a positive way to restore the former riparian seral stage to that of the pre-contact period.	Alternative 3
There is a need for fuel reduction treatments in the river canyon area.	Alternatives 1-4
The CDF (California Department of Forestry) would be a willing partner in fuels treatment proposals with BLM and USFS.	Alternatives 1-4
Control the fuel load through selective logging, controlled burns and control of slash on both public and private lands.	Alternatives 1-4
Management should allow for activities that will reduce the risk of fire to a natural range of variability.	Alternatives 1-4
Fuels treatment should incorporate all landowners in the canyon, with both public and private parties in agreement and collaborating.	Alternatives 1-4
VEGETATION AND BIOLOGICAL DIVERSITY	
How will vegetation be managed in the short and long-terms, including removal or control of exotic or noxious weed species?	Alternatives 1-4
Emphasis should be placed on maintaining the canyon's black and white oak woodland habitats which occur here at the eastern extent range.	Alternatives 1-4

"Restoration" projects should be geared to restoring and maintaining these habitats, but without logging larger diameter juniper and conifers that have survived in the canyon for over a century.	Alternatives 1-4
There are invasive weeds (like star thistle) that are existing within the river corridors that compete with native vegetation and habitat for animals and plants.	Alternatives 1-4
Remove all noxious weeds.	(Perhaps Infeasible) Alternatives 1-4
Non-native noxious weeds are to be eliminated by intensive management practices, native noxious species may require control measures as well.	Alternatives 1-4
No chemicals should be used to control noxious weeds.	Alternatives 1-4 (Possible for some species - See Programmatic Weed EA)
If foreign insects are used to control noxious weeds, then ensure that studies have been done to understand what effects those releases will have on the environment and that the insects will not get out of control.	Affected Environment - See Programmatic Weed EA)
While there is no discussion of the possibility for pesticide or other herbicide use, Oregon Natural Resources Council and the Klamath Forest Alliance would be highly critical of any such future plans.	Alternatives 1-4
BLM needs to first evaluate before recommending any particular controls, how cattle and other ground disturbing activities can be eliminated to minimize the chance of further noxious weed species' reestablishment or spread.	Alternatives 1-4
Firewood cutting should be allowed in the canyon.	Alternative 4
What are the effects on rare or special habitats, such as springs, seeps, wallows, meadows, talus, and old-growth?	Effects Discussion
Guidelines need to be developed to protect this unique geological area.	Alternatives 1-4 (esp. Alt. 3)
How will the Unmapped LSR (District Designated Reserve) in the Topsy area be affected by proposed management activities within the canyon?	Effects Discussion
BLM needs to assess the impact of any planned development activities or ongoing human disturbances on the key connectivity functions of the Siskiyou Crest, Klamath River Canyon and Southern Cascades Landscape Corridors.	Alternatives 1-4
SCENIC QUALITY	
How will the visual quality to/from critical viewpoints within and outside of the river corridor be affected by management activities and use of the river and roads?	Alternatives 1-4
Because of the unique features in the area, it should remain as is.	Alternative 1
Preserve, enhance, restore where possible.	Alternatives 2,3
Include severe restrictions and limitations on all logging activities within view of the canyon rim when viewed in all directions from the highest points along the canyon rim.	Alternative 3
Scenic resources could be enhanced by removal of derelict wrecked autos off the upper end of Topsy Road.	Alternatives 1-4
Restore the road leading to the "Salt Caves Dam site".	Alternative 3
Stabilization of river flows to a more natural regime which would allow for establishment of riparian vegetation in the unsightly "intertidal zone" that currently affronts visitors at all but high flow periods.	Outside Scope of Analysis
Foam and concentrated algae in the river degrade the scenic quality.	Outside Scope of Analysis
Restoration of the canal emergency spillway will improve scenic conditions.	Alternatives 1-4

AIR QUALITY	
What effects will proposed management, including fuel treatment, have on air quality?	Effects discussion
From prescribed fires, smoke will degrade air quality. Smoke contains multiple chemical compounds and particulate matter. Describe the impacts of the planned prescribe fires on air quality and visibility.	Effects discussion
Wildland and prescribed fires need to be conducted consistent with the Federal Clean Air Act.	Current management discussion
A smoke management program must be presented.	Alternatives 1-4
Class I airsheds and Wild and Scenic Rivers should be considered sensitive areas (receptors) that you need to identify and avoid when evaluating environment impacts.	Alternatives 1-4
Air quality monitoring must be completed.	Alternatives 1-4
LAND TENURE/OWNERSHIP	
Will land tenure (ownership) be altered in the area?	Alternatives 1-4
There are opportunities to develop new/different recreational sites if private lands are acquired in the canyon.	Alternatives 1-4
Acquire additional private lands within the river corridor in exchange for BLM lands elsewhere.	Alternatives 1-4
The BLM or Forest Service need to purchase the Frain Ranch private land section. PacifiCorp potentially has lands that they are interested in disposing.	Alternatives 1-4
PacifiCorp may want to acquire public land where they are permitted to operate existing facilities.	Alternatives 1-4
Acquire land through purchase/condemnation to distribute recreation use.	Alternatives 1-4
Acquire land to prevent housing near Canyon rim.	Outside Scope of Analysis
Acquire old Beswick hotel site and hot spring for future recreation development.	Alternatives 1-4
Propose to adjust the power withdrawal at the old housing site below powerhouse so the site can be used for public recreation.	Alternative 4
Given the uncertain future of private lands within the canyon, particularly in the Frain Ranch area, it would be prudent and appropriate to try to get those lands into public ownership to maintain future public use.	Alternatives 1-4
How will Klamath County and Siskiyou County “No Net gain” policies affect potential land tenure adjustments?	Alternatives 1-4
Acquisition of private land in California by BLM is of concern to Siskiyou County.	Alternatives 1-4
There may be interest by certain Tribes in acquiring land in the California portion of the river corridor.	Outside Scope of Analysis
Condemnation procedures should be used to acquire lands within the 1-mile area extending away from each rim to preserve the scenic values for future generations.	Outside Scope of Analysis
Acquire critical lands by purchase, trades, or use of condemnation for the Shasta Nation. This may include land acquired for trust purposes in the joint management efforts of the canyon and restoration of key cultural village sites used for ceremonial and religious purposes.	Outside Scope of Analysis
No housing or construction of any kind should occur near the canyon to prevent development, urban sprawl and subsequent permanent damage to the area – prevention can occur by purchase, litigation, or condemnation procedures to protect the wild and scenic values.	Outside Scope of Analysis

SOCIO-ECONOMICS	
What are the impacts, including induced effects, upon the local and regional economies, from potential changes in Land Tenure/Ownership?	Effects discussion
How will the economic viability and operations of existing permitted outfitters and guides be affected with proposed management?	Effects discussion
The Upper Klamath provides rafting and kayaking. Many commercial outfitters rely on this resource for livelihood. This stimulates commerce in an area with little else to live on.	Affected Environment
Releases from J.C. Boyle Powerhouse make possible boating recreational opportunities for thousands of people each season.	Affected Environment
What will be the socioeconomic impacts from management activities to surrounding landowners, private companies and the local community?	Effects discussion
Socioeconomic analysis should also consider power production, private timber land, grazing, etc.	Effects discussion
Evaluate the impact of the whitewater business on the health of the regional economies within Oregon and California?	Effects discussion
The deleterious water quality effects have caused an economic impact to downstream residents and visitors in the Klamath Basin. Your plan and EIS must discuss the economics of impairment and, conversely, the economics of restoration and meeting CWA objectives.	Affected Environment & Effects discussion
Your plan should include an economic section that determines the economic benefits that would come if water quality were improved to meet Clean Water Act required standards.	Effects discussion
Improved trout population and riparian condition would support much more angler use that would contribute to the local economies.	Alternatives 3,4
Rafting has few benefits to the local (Klamath Falls) economy.	Affected Environment
What will be the effects on Indian tribes, and minority and low-income populations?	Effects discussion
Identify tribal assets (i.e., procured rights and the fiduciary responsibility that the federal government has for tribes).	Affected Environment
Discuss environmental justice issues, proposals that disproportionately affect minorities and those who are economically disadvantage. (Executive Order 12898 (*Federal Actions to Address Environmental Justice In Minority Populations and Low-Income Populations*) issued on February 11, 1994.)	Effects discussion
PACIFICORP'S POWER GENERATING FACILITIES	
How does existing or future operation of power generation facilities affect recreation management of the area?	Affected Environment & Effects discussion
Releases from J.C. Boyle Powerhouse should be consistent and predictable for increased enjoyment of the natural resources that flourish in the river canyon.	Affected Environment
To what extent will the plan address water releases from the J.C. Boyle powerhouse to meet recreation demand?	Existing Condition / Affected Environment
Minimum flows (1500 cfs or greater) need to be maintained to sustain the 20 year old rafting industry.	Affected Environment
Daily and timely releases are crucial for rafting, such as 10am releases Friday through Monday, and 11am releases Tuesday through Thursday.	Affected Environment
Disruptive peaking flows largely restrict trout habitat.	Affected Environment

Flow ramping affects fish habitat.	Affected Environment/ Alternative Recommendations
Determine the optimum level of water releases for fishing.	Affected Environment
Determine the optimum level of water releases for rafting.	Affected Environment
How does PacifiCorp's operation of power generating facilities affect the river ecosystem?	Existing Condition / Affected Environment
PacifiCorp's operation negatively affects water quality and quantity?	Existing Condition / Affected Environment
Erosion of river banks from the raising and lowering of the river (from the power plant operation is a concern.	Existing Condition / Affected Environment
Dumping of water from the emergency spillway at the J.C. Boyle's canal tunnel entrance is causing excessive erosion and sedimentation.	Affected Environment
What are PacifiCorp's plans for maintaining, upgrading, or expanding their facilities within the plan area?	Existing Condition / Affected Environment
No new power lines or other obtrusive developments should be allowed within the river management corridor.	Affected Environment
Describe the level of maintenance of roads, recreation sites, power lines and bridges that PacifiCorp proposes.	Affected Environment
PacifiCorp stated that they are not planning to expand power generation to Keno dam.	Affected Environment
It is rumored that PacifiCorp is planning to add another generating unit to J.C. Boyle dam, and retrofitting Keno dam and other dams.	Affected Environment
How will this plan affect PacifiCorp's Operations in the planning area?	Effects discussion
The plan should not affect PacifiCorp's ability to operate and maintain existing transmission right-of-ways.	Effects discussion
The plan should recognize right-of-ways as utility corridors in accordance with Section 503 of the Federal Land Management and Policy Act.	Outside Scope of Analysis - Affected Environment (Exclusion Area in RMP)
It is not clear to ODEQ how and if the new KRMP and EIS may direct or motivate PacifiCorp to modify management and/or operation of it's hydroelectric facilities or lands such that water quality may be affected.	Management Situation
How will this plan affect the FERC relicensing process for PacifiCorp's facilities?	Affected Environment
BLM should advocate first and foremost that PacifiCorp's relicensing results in the operation of the hydro facilities in a way that assures optimum salmonid fish passage and survival in Klamath River.	Outside Scope of Analysis
Can the dams be removed from the river?	Outside Scope of Analysis
PRIVATE LAND	
What are the effects on private land within the canyon from management of BLM land?	Existing situation & Effects discussion
Risks to PacifiCorp due to injury, harm or damages to persons or property are greatly increased when the public is encouraged to recreate on our property.	Existing situation & Effects discussion
PacifiCorp has incurred substantial costs as a result of damages caused by the public's use of PacifiCorp property, it's recreation sites and trespass along the river.	Existing situation & Effects discussion
What role does the State of Oregon have in management of private lands within the River canyon?	Existing Condition / Affected Environment

How can the Federal government ensure adequate recreational access to the river if it doesn't own the land?	Existing Condition / Affected Environment / Effects
How can the Federal government allow recreational use (for example boater take-out at Frain ranch) if it doesn't own the land?	Existing Condition / Affected Environment / Effects
What is the liability to the government or the private land owner if use originating on public land is allowed to continue on private land.	Outside Scope of Analysis
What are the effects on private property owners within the canyon?	Effects discussion
Discuss the effects of proposed management direction on private property rights.	Effects discussion
Will management restrict private landowners ability to develop their private land?	Effects discussion
Describe why and how private lands would be acquired within the planning area boundaries.	Alternative design & Effects discussion
What are PacifiCorp's plans for managing land not associated with power generation within the planning area?	Affected Environment & Alternative design
PacifiCorp is concerned that the recreation planning for the area take into account the potential recreation development resources and values associated with PacifiCorp property and not limit their potential for development or sale.	Effects discussion
Water rights add considerable value to private property in the river corridor and should be recognized and protected.	Affected Environment
Impacts of plan objectives or recommended actions to the value of PacifiCorp's land holdings or the Company's continued ability to manage these lands, including financial implications, need to be addressed in the proposed management plan.	Effects discussion
What are the options to "trade-off" management of different lands in the canyon, for example, PacifiCorp owns Frain Ranch, but BLM spends more time there?	Alternatives 1-4
CUMULATIVE IMPACTS	
What are the cumulative effects that could occur with implementing the proposed management plan?	Effects discussion
Adverse effects that may result downstream as a result of implementing this management plan need to be analyzed.	Effects discussion
Cumulative effects need to be considered; including issuing permits for federal land use, that results in negative impacts occurring on private land.	Effects discussion
Fuels management can have negative cumulative effects on air quality.	Effects discussion
Cumulative effects to cultural resources result from recreational use in the canyon.	Alternative design & Effects discussion
OHV use can cause impacts to many other resources and these cumulative effects need to be addressed.	Alternative design & Effects discussion
Discuss any effects to land above J.C. Boyle dam.	Effects discussion
OTHER ISSUES	
What is the process for determining management of the River corridor?	EIS process discussion
Involve public and private organizations in development of the plan.	EIS process discussion
It is possible that beneficial actions for one ORV (Outstandingly Remarkable Value) could be in conflict with another.	Effects discussion

Expand the scope of your analysis to be sure that activities proposed are consistent with both the requirement of Section 10 and 12 of the federal Wild Scenic Rivers Act (i.e., protect and enhance the values).	Alternative design & Effects discussion
The planning area boundary needs to be expanded to include rim-to-rim management throughout the length of the planning area.	Alternative design
Include the river between the Keno dam and the J.C. Boyle dam (the Shasta Nation requests the inclusion of this short but pristine section for protection of resources).	Alternative Considered but Eliminated
Clarify the role the State of Oregon has in management of public and private lands within the River canyon?	Existing management situation discussion
What "baseline" condition will be considered for the analysis?	Affected Environment
Baseline should assume hydroelectric power generation since 1958 and ranching activities since the late 1800s.	Affected Environment
The Klamath River Plan Process needs strong representation on the subcommittee of the Klamath PAC from the outfitter, recreation and visitor bureau communities.	EIS process discussion
How does this process relate to other planning activities in the basin?	EIS process discussion
Describe the potential implications of the proposed action on the Bureau of Reclamation (BOR) Klamath River Anadromous Fish Restoration and Operation Plan (an attempt to address flow, water quality, and Endangered Species Act issues); FERC relicensing; and total Maximum Daily Load (TMDL) development.	Effects discussion
State how all four actions (i.e., BLM/River Management, FERC relicensing, BOR Operations; EPA/State TMDLs) would or could interact to maximize the environmental benefits for the River while addressing the purpose and need of the Federal action.	EIS process and Effects discussion
As a partner in the Klamath TMDL process, BLM will be expected to develop and implement a Water Quality Management Plan for lands under it's jurisdiction including those lands being considered under the KRMP and EIS.	Affected Environment
Describe the effects of increasing Upper Klamath Lake storage capacity.	Affected Environment
BLM should identify problems in the upper Klamath basin that adversely affect downstream (Lower Klamath River) Wild and Scenic River values.	Affected Environment
What effect does grazing have on management of the river corridor?	Effects discussion
Grazing must be restrictive and tightly controlled.	Alternatives 2,3,4
Analyze how many AUMs are allowed on both public and private land and what impact that has on other resources?	Alternatives 1-4
Grazing and potential control of invasive weeds is contributing to non-attainment of water quality standards.	Alternatives 1-4
The Klamath Forest Alliance and Oregon Natural Resources Council do not believe grazing on BLM lands which are the subject of this plan are compatible with maintenance of the Klamath River's outstanding and remarkable values.	Alternatives 2,3
Livestock grazing has no place in maintaining the natural environmental conditions that support the native species.	Alternatives 1-4
The Pokegama wild horse herd needs to be considered in your planning.	Alternatives 1-4
What management is proposed for Salt Caves?	Existing Condition / Affected Environment
If revived, the Salt Caves Project will affect river management.	Existing management situation discussion
Describe how the Cave management plan relates to this proposed river plan.	Existing management situation discussion
Will the current planning process revisit the status of other segments of the river.	Outside Scope of Analysis

Include a recommendation and action steps to gain Congressional approval for Wild and Scenic designation in California.	Outside Scope of Analysis
Segments 1 and 3 should be designated as a Wild and Scenic River.	Outside Scope of Analysis
BLM's upcoming plan should not defer to independent TMDLs that are being developed for each state but should recommend the development of an interstate TMDL.	Outside Scope of Analysis
PacifiCorp (for FERC relicensing) is currently only analyzing the effects of their permitted facilities and not the surrounding environment.	Outside Scope of Analysis
Pacific Power's West Side and East Side Projects (above Section 1) need to be analyzed because there are no fish screens. BLM could bring influence to bear on FERC relicensing of either of these facilities.	Outside Scope of Analysis
Although the Jenny Creek dam is outside of the immediate purview of this proposed management plan, the Klamath Falls Resource Area BLM should take the initiative in accomplishing removal of the diversion dam in cooperation with the landowners and the Redding BLM.	Outside Scope of Analysis
Although the Karuk territory is down stream, the dams still greatly effect their lands.	Outside Scope of Analysis

Appendix H – Proposed Management Actions

The table on the following pages provides a detailed list of projects that are included under the four proposed alternatives.

Appendix H - Proposed Management Actions by Alternative

RESOURCE/PROGRAM Action/location	Alternative 1— **No action (continue existing management)**	Alternative 2— **Enhancement/improvement of opportunities and resources**	Alternative 3— **Natural resource enhancement/ restoration**	Alternative 4— **Expand human use opportunities (enhance recreation/values)**
SCENERY MANAGEMENT				
Sightseeing: visual resource management and enhancement	• No restrictions on sightseeing • Manage projects and activities to maintain VRM Class II objectives • Enhance landscaping and visual screening at camping/day use sites • Design vegetation treatment projects to reduce risk of opportunities for catastrophic wildfire (long term) while allowing acceptable short-term visual resource impacts (9% percent of project area/decade) • Improve scenic quality and scenic views through priority targeted vegetation treatments and plantings around recreation sites and by creation of scenic overlooks	• No restrictions on sightseeing • Manage projects and activities to maintain VRM Class II objectives • Require vegetative screening and other measures to mitigate for hydroelectric project facilities scenic degradation • Enhance landscaping and visual screening at camping/day use sites • Design vegetation treatment projects to reduce risk of catastrophic wildfire (long term) while allowing acceptable short-term visual resource impacts (17% percent of project area/decade • Improve scenic quality and scenic views through priority targeted vegetation treatments and plantings around recreation sites and by creation of scenic overlooks	• No restrictions on sightseeing, except where motorized access is limited • Manage projects and activities to maintain VRM Class II objectives • Require vegetative screening and other measures to mitigate for hydroelectric project facilities scenic degradation • Enhance landscaping and visual screening at camping/day use sites • Design vegetation treatment projects to reduce risk of catastrophic wildfire (long term) while allowing acceptable short-term visual resource impacts (27% percent of project area/decade) • Improve scenic quality and scenic views through priority targeted vegetation treatments and plantings around recreation sites and by creation of scenic overlooks	• No restrictions on sightseeing • Manage projects and activities to maintain VRM Class II objectives • Require vegetative screening and other measures to mitigate for hydroelectric project facilities scenic degradation • Enhance landscaping and visual screening at camping/day use sites • Design vegetation treatment projects to reduce risk of catastrophic wildfire (long term) while allowing acceptable short-term visual resource impacts (24% percent of project area/decade) • Enhance views through targeted vegetative manipulation (thinning and plantings) • Improve scenic quality and scenic views through priority targeted vegetation treatments and plantings around recreation sites and by creation of scenic overlooks
RECREATION				
Segment 1				
Developed campgrounds	1 campground	1 campground	1 campground	1 campground
(fee sites)	(15 campsites)	(15 campsites)	(15 campsites)	(15 campsites)

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Designated dispersed camps (picnic table, fire grate, and possible toilet)	0 camps	0 camps	0 camps	1 camp
	(0 campsites)	(0 campsites)	(0 campsites)	(3–5 campsites)
				• Big Bend Park: construct access road, camp loop, and campsites. Install toilet, tables and fire grate. Construct trailhead parking area.
Developed day use sites	0 sites	7 sites	2 sites	7 sites
	• No recommended	• J.C. Boyle fish ladder and dam history overlook (PacifiCorp)	• Powerhouse shed/fishing access site (PacifiCorp)	• J.C. Boyle fish ladder and dam history overlook; enhanced fish viewing opportunity and improved parking (PacifiCorp)
		• Big Bend Trailhead; parking area and restroom (BLM)	• Develop fishing access at bridge site below J.C. Boyle dam; parking area (PacifiCorp)	• Big Bend Trailhead; parking area and restroom (BLM)
		• Improve three existing user-established trailheads along canal access road (designate and sign); maintain and improve parking (PacifiCorp and BLM)		• Improve 3 existing user-established trailheads along canal access road (designate and sign); maintain and improve parking (PacifiCorp and BLM)
		• Powerhouse shed/fishing access site; improve and maintain existing parking area (designate and sign, handicap access for fishing) (PacifiCorp)		• Powerhouse shed/fishing access site; improve and maintain existing parking area (designate and sign, handicap access for fishing) (PacifiCorp)
Trails				
Nonmotorized Trails	0 miles	5 miles	2 miles	8 miles
		• Construct Big Bend Fishing Access Trail (2 miles); extend this trail to Topsy Campground (3 miles); install warning system at emergency bypass	• Convert Canal access road (2 miles) nonmotorized/administrative access route only	• Construct Big Bend Fishing Access Trail (2 miles); extend this trail to Topsy Campground (3 miles) and extend Klamath River edge trail upstream from Segment 2 (about 3 miles)

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Motorized Tour Routes	5 miles (outside planning area boundary) • Nominate Topsy Road for national back country byway; sign and designate motorized tour route on existing roads (5 miles) • OHV use limited to designated roads	5 miles (outside planning area boundary) • Nominate Topsy Road for national back country byway and national historic trail; sign and designate motorized tour routes on existing roads (5 miles) • OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources	5 miles (outside planning area boundary) • Nominate Topsy Road for national back country byway and national historic trail; sign and designate motorized tour routes on existing roads (5 miles) • OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources	5 miles (outside planning area boundary) • Nominate Topsy Road for national back country byway and national historic trail; sign and designate motorized tour routes on existing roads (5 miles) • OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources
Bridges		Replace or repair motorized access bridge below J.C. Boyle Dam; provide primitive float boater launch, parking area, and restroom (assuming increased flows) (PacifiCorp)		Replace or repair motorized access bridge below J.C. Boyle Dam; provide primitive float boater launch, parking area, and restroom (assuming increased flows) (PacifiCorp)
Interpretation/environmental education	1 sites • Topsy Road Back Country Byway portal sign at Topsy Campground	3 sites • Provide interpretive panels on Bypass Reach at J.C. Boyle fish ladder and Powerhouse shed fishing site • Topsy Road Back Country Byway portal sign at Topsy Campground	0 sites	3 sites • Provide interpretive panels on Bypass reach at J.C. Boyle fish ladder and Powerhouse shed fishing site • Topsy Road Back Country Byway portal sign at Topsy Campground

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Segment 2				
Developed campgrounds	0 campground	0 campground	0 campground	3 campgrounds
(fee sites with water)	(0 campsites)	(0 campsites)	(0 campsites)	(16–22 campsites)
				• Klamath River Campground (BLM); rebuild designated dispersed camp with 10–15 campsites, new toilets, trash service, drinking water, electricity/lights, and develop drift boat launch • Turtle Camp (BLM); relocate designated dispersed camp from conifer to oak grove area upstream; install shared toilet; define and harden parking areas and fire ring areas; install barriers; develop 3rd site for large group; install picnic tables; develop drinking water at site (3 sites) • Lower Frain, river left (PacifiCorp); Recommend reduced motorized access through road obliteration; improve boater access with hardened boat launch and construct vandal-resistant vault toilet; add camp host site (with full hookups), and add potable water to facilities; reduce/eliminate nondesignated camps (3–4 campsites)

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Designated dispersed camps (picnic table, fire grate, and possible toilet)	3 camps (8 -campsites) • Existing Klamath River Camp (BLM); 3 campsites • Existing Turtle Camp (BLM dispersed group campsites); maintain site, install barriers and small information signboards; 2 campsites • Lower Frain Ranch Camps, river left (PacifiCorp); no management (coordinate with PacifiCorp on management of their lands); 3 campsites	4 camps (12–14 campsites) • Existing Klamath River Camp (BLM); maintain site, install barriers to better define campsites, hazard tree removal; relocate campsite near willow stand to upland; replace toilet; close road upstream; 3 campsites • Old Bridge Camp (east side of river BLM and other); install fire rings and toilets near most popular sites, shared between sites where possible, construct new spur access road; obliterate one campsite; two improved campsites • Turtle Camp (BLM); relocate Site 1 from conifer to oak grove area upstream of Site 2; install shared toilet; define and harden parking areas and fire ring areas; install barriers; two campsites • Frain Ranch Camps, northwest side of river (PacifiCorp/BLM); allow dispersed camping on upland in 2–3 sites; construct 0.1 mile access road to sites • Lower Frain Ranch camps, river left (PacifiCorp); define and harden parking and fire grate areas, reduce/eliminate nondesignated campsites, improve boater access with hardened boat launch, and construct vandal-resistant vault toilet; 3–4 campsites	3 camps (7 campsites) • Relocate Klamath River Camp (BLM) to uplands, minimum of 100 feet from river; relocate road to above camp; consider converting camp to nonmotorized access, short walk from parking area; 3 campsites • Old Bridge Camp (east side of river BLM and other); obliterate duplicate road and close camp to motorized access north of old bridge site; rehabilitate camp; 0 sites • Existing Turtle Camp (BLM); remove permanent fire rings, area is subject to fire closures; nonmotorized access only; 2 campsites • Lower Frain Ranch Camps, river left (PacifiCorp); close area to motorized traffic; 2 sites	4 camps (11–13 -campsites) • Powerhouse Camp (former PacifiCorp housing site); 5 campsites, tree screening, restroom, and host site with septic and water • Old Bridge Camp (east side of river BLM and other) install shared toilets, table, and fire ring; 2–3 campsites • Frain Ranch Camps, northwest side of river (PacifiCorp/BLM); install shared toilets; develop 2–3 sites with hardened surface, table, and fire ring; construct 0.1 mile access road to sites • Tom Creek Substation/Hoover Ranch Camp (BLM); define and harden road and parking area near river; improve main road leading to site; develop site with boat/vehicle launch area, toilet, and 2 campsites

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Developed day use sites	2 sites developed 1 site monitored	4 sites developed 1 site monitored	1 site developed 2 sites obliterated 2 sites monitored	4–7 sites developed
	• Powerhouse site (former PacifiCorp housing site); continue to allow large vehicle parking and turn-around (KFRMP/FEIS) • Existing Spring Island launch site/Klamath River boaters access (BLM); maintain site and improve information signs • River Gorge lunch/stop areas (BLM); (not developed); monitor, close to commercial use if necessary	• Powerhouse site (former PacifiCorp housing site); develop interpretive display, tour gathering area, day use/ picnic area • Spring Island launch site/Klamath River boaters access (BLM); replace/upgrade toilets and changing rooms • River Gorge lunch/stop areas (BLM); (not developed; monitor, close to commercial use if necessary • Hoover Ranch (PacifiCorp); nonmotorized access; install interpretive signs • Develop Tom Creek Substation/Hoover Ranch river access (BLM); define and harden road and parking area near river	• Powerhouse site (former PacifiCorp housing site); remove existing structures, rehabilitate, and revegetate the site • Spring Island launch site/Klamath River boaters access (BLM); maintain site and improve information signs • River Gorge lunch/stop areas (BLM); (not developed) monitor, close to commercial use if necessary • Hoover Ranch (PacifiCorp); (not developed) encourage nonmotorized access into area, implement regulated seasonal closure of roads, and monitor. • Obliterate and rehabilitate Tom Creek Substation/Hoover Ranch river access (BLM)	• Powerhouse site (former PacifiCorp housing site); develop interpretive display, tour gathering area, day use/ picnic area • Spring Island launch site/Klamath River boaters access (BLM); improve information signs; replace/upgrade toilets and changing rooms; develop overflow area; improve day use areas with tables and benches • River Gorge lunch/stop areas (BLM); monitor, install fire rings and tables (1–4 sites) • Hoover Ranch (PacifiCorp); encourage motorized access into area; install interpretive signs
Trails				
Nonmotorized trails	18 miles	15 miles	8 miles	15 miles
	• Klamath River Edge Trail (BLM); reestablish roadblocks, maintain the trail for nonmotorized use, 1 mile; • Klamath Rim trail (BLM and private); obtain easements and construct trail, south rim from Big Bend to Stateline Recreation Site, 14 miles • Caldera to Hell's Corner Trail (BLM and PacifiCorp); construct trail north side of river, 3.3 miles • Old motorized bridge site (BLM -west side of river); continue to allow use of old bridge site, allow for dispersed camping/recreation activities at site	• Klamath River Edge Trail (BLM and PacifiCorp); construct new trail from Stateline to Powerhouse site (includes 6 miles old road converted to nonmotorized trail) 12.5 miles • One mile of road converted to trail at Construct foot bridge at old motorized bridge site below Klamath River campground; construct aesthetically blending, nonmotorized accessible bridge (all-terrain vehicle access for administrative purposes), • Caldera Rapid Trail (PacifiCorp); construct scouting trail, 0.25 mile • Salt Caves Overlook Trail; obliterate and rehabilitate access road and convert to nonmotorized trail, 0.5 miles • Hell's Corner Rapid Trail (BLM); Construct scouting trail on river left, 0.5 miles	• Klamath River Edge Trail; convert old road to nonmotorized trail from Frain Ranch to Spring Island boat launch, 5.5 miles • Caldera Rapid Trail (PacifiCorp); construct scouting trail, 0.25 mile • Salt Caves Overlook Trail (BLM); obliterate and rehabilitate access road and convert to nonmotorized trail, 0.5 miles • Tom Creek substation to Hoover Ranch trail (BLM and PacifiCorp); construct 0.5 miles new trail	• Klamath River Edge Trail (BLM and PacifiCorp); construct new trail from Stateline to Powerhouse site, (includes 6 miles old road converted to nonmotorized trail), 12.5 miles • Bridge site below campground, east side (BLM); convert road to trail, one mile • Caldera Rapid Trail (PacifiCorp); construct scouting trail and improve boat landing areas and connecting trails, 0.25 miles • Salt Caves Overlook Trail; obliterate and rehabilitate access road and convert to nonmotorized trail, 0.5 miles • Hell's Corner Rapid Trail (BLM); Construct scouting trail on river left, 0.5 miles

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Motorized tour routes	11 miles (4 miles outside planning area boundary) • Nominate Topsy Road for national back country byway; sign and designate motorized tour route on existing road (11 miles) • OHV use limited to designated roads	30 miles (4 miles outside planning area boundary) • Highway 66/J.C. Boyle Powerhouse/ Tom Creek Substation Road (lower section from Frain Ranch to Tom Creek Substation); maintain for a 4-wheel drive tour route (19 miles) • Nominate Topsy Road for national back country byway and national historic trail; sign and designate motorized tour route on existing road (11 miles) • OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources	11 miles (4 miles outside planning area boundary) • Nominate Topsy Road for National Back Country Byway and National Historic Trail; Sign and designate motorized tour route on existing road (11 miles) • Greatly restrict OHV use through extensive road closures and road rehabilitation; OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources	36 miles (4 miles outside planning area boundary) • Nominate Topsy Road for national back country byway and national historic trail; sign and designate motorized tour routes on existing road (11 miles) • OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources • Connect Topsy Road with J.C. Boyle Powerhouse Road (4 miles) • J.C. Boyle Powerhouse/Tom Creek Substation Road (lower section from Frain Ranch to Tom Creek Substation); maintain for a 4-wheel drive tour route (21 miles)
Bridges		• Construct aesthetically blending, nonmotorized accessible bridge (all-terrain vehicle access for administrative purposes) at old motorized bridge site below Klamath River campground.		• Construct aesthetically blending, motorized accessible bridge (all-terrain vehicle access for administrative purposes) at old motorized bridge site below Klamath River campground.

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Interpretation/environmental education	1 site	7 sites	3 sites	8 sites
	• Develop interpretive displays at Powerhouse site (PacifiCorp); • Develop interpretive brochure for Topsy Road and OHV tour opportunities (BLM)	• Develop interpretive display at Powerhouse site (PacifiCorp) • Develop interpretive display at Spring Island (BLM) • Construct Topsy Road portal signs (BLM) • Develop interpretive panel at Section 35 overlook on Topsy Road (BLM) • Develop interpretive brochure and assurance signing for Topsy Road and OHV tour opportunities (BLM) • Develop interpretive panel at Frain Main Cabin (Beak Field No. 21) (PacifiCorp) • Develop interpretive panel at Topsy School House (BLM) • Develop outreach program between the river outfitters and Tribes (BLM) • Partner with OHV groups to educate users and maintain resources (BLM)	• Develop interpretive display at Spring Island (BLM) • Develop interpretive display at Frain Ranch (PacifiCorp) • Construct Topsy Road portal signs (BLM) • Develop interpretive brochure for Topsy Road and OHV tour opportunities (BLM)	• Develop interpretive display at Powerhouse site (PacifiCorp) • Develop interpretive display at Spring Island (BLM) • Construct Topsy Road portal signs (BLM) • Develop interpretive panel at Section 35 overlook on Topsy Road about the prehistory of area and other subjects (BLM) • Develop interpretive panel at Frain Main Cabin (Beak Field No. 21) (PacifiCorp) • Develop interpretive panel at Topsy School House (BLM) • Develop interpretive display at Hoover Ranch (PacifiCorp) • Develop interpretive brochure for Topsy Road and OHV tour opportunities (BLM) • Develop outreach program between the river outfitters and Tribes (BLM) • Partner with OHV groups to educate users and maintain resources (BLM)
Segment 3				
Developed campgrounds (fee sites with water)	0 campgrounds	1 campground	0 campground	1 campground
	(0 campsites)	(5–10 campsites)	(0 campsites)	(10–15 campsites)
		• Construct Shovel Creek Campground (PacifiCorp) and boat ramp, 5–10 campsites, including 2-3 large group sites		• Construct Shovel Creek Campground (PacifiCorp) and boat ramp, 10–15 campsites, including 2–3 large group sites

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Designated dispersed camps (picnic table, fire grate, and possible toilet)	1 camp	3 camps	2 camps	4 camps
	(3–6 campsites)	(5-8 campsites - 2 camps with no facilities)	(4–6 campsites)	(8–14 campsites)
	• Stateline Recreation Site (PacifiCorp lands); below canal bench closed to camping, coordinate management of PacifiCorp property; • Stateline Recreation Site (BLM portion); continue to allow primitive camping above canal bench and upper flat; replace toilets on upper flat, allow for improvements and expansion of campsites per KFRMP/FEIS, 3–6 campsites	• Stateline Recreation Site (PacifiCorp lands); below canal bench closed to camping improve (rocked) parking and boat ramp, construct permanent restroom and changing facilities, coordinate management of PacifiCorp property; • Stateline Recreation Site (BLM portion); allow for improving and expanding group and individual campsites with hardened parking; continue to allow camping above canal bench and upper flat; replace toilets on upper flat, 3–6 campsites • Panther Canyon (PacifiCorp); allow primitive camping • Shovel Creek Canyon (PacifiCorp); allow primitive camping	• Close and rehabilitate Stateline Recreation Site lower bench (PacifiCorp and BLM); contingent upon relocating take-out to Fishing Access #6, 0 campsites • Maintain primitive camping on upper flat at Stateline Camp (BLM); replace existing toilets; 2 campsites • Develop Fishing Access #6 Camp (PacifiCorp) for rafting take-out; better define road and improve parking, and construct changing rooms; work with PacifiCorp and outfitters to cooperatively manage site; 2–4 campsites	• Stateline Recreation Site (PacifiCorp lands); allow for improving and expanding group and individual campsites; improve (paved) parking and boat ramp, construct permanent restroom and changing facilities; improve take-out with paved access road, parking, and boat ramp, 2–4 campsites; • Stateline Recreation Site (BLM portion); continue to allow camping above canal bench and upper flat; replace toilets on upper flat, allow for improvements and expansion of campsites per KFRMP/FEIS, 2–4 additional campsites • Panther Canyon (PacifiCorp); allow primitive camping, recommend developing 2–3 sites • Shovel Creek Canyon (PacifiCorp); allow primitive camping, recommend developing 2–3 sites

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Developed day use sites **(These numbers include Access # 1 which is outside the project boundary)**	7 sites	7 sites	5 sites	8 sites
	• Stateline Rec. Site (PacifiCorp); below canal bench closed to camping, coordinate management of PacifiCorp property for day use only • Existing Fishing Access #6 (PacifiCorp); work with PacifiCorp and outfitters to cooperatively manage site • Existing Fishing Access #5 (PacifiCorp); parking, toilet, garbage and access trail • Existing Fishing Access #4 (PacifiCorp); parking, toilet, garbage and access trail • Existing Fishing Access #3 (PacifiCorp); parking, toilet, garbage and access trail • Existing Fishing Access #2 (PacifiCorp); parking, toilet, garbage and access trail • Existing Fishing Access #1 (PacifiCorp, adjacent to planning area boundary); parking, raft take-out, garbage and portable toilets; work with PacifiCorp and outfitters to cooperatively manage site	• Consider developing Shovel Creek Hot Springs for day use (PacifiCorp) • Develop Fishing Access #6 (PacifiCorp) for rafting take-out; better define road and improve parking, and construct changing rooms; work with PacifiCorp and outfitters to cooperatively manage site • Upgrade Fishing Access #5 (PacifiCorp); parking, toilet, and trail for accessibility • Upgrade Fishing Access #4 (PacifiCorp); parking, toilet, and trail for accessibility • Upgrade Fishing Access #3 (PacifiCorp); parking, toilet, and trail for accessibility • Upgrade Fishing Access #2 (PacifiCorp); parking, toilet, and trail for accessibility • Existing Fishing Access #1 (PacifiCorp, adjacent to planning area boundary); work with PacifiCorp and outfitters to cooperatively manage site, improve parking, raft take-out, toilets for accessibility, provide changing rooms with permanent vault toilets	• Stateline Recreation Site lower bench (PacifiCorp and BLM); area open to nonmotorized day use only, no developments • Existing Fishing Access #4 (PacifiCorp); maintain parking, toilet, garbage and access trail • Existing Fishing Access #2 (PacifiCorp); maintain parking, toilet, garbage and access trail • Construct Shovel Creek Hot Springs day use area (PacifiCorp) • Close and rehabilitate Fishing Access #5 • Close and rehabilitate Fishing Access #3 • Existing Fishing Access #1 (PacifiCorp, adjacent to planning area boundary); parking, raft take-out, garbage and portable toilets work with PacifiCorp and outfitters to cooperatively manage site	• Develop Fishing Access #6 (PacifiCorp) for rafting take-out; better define road and improve parking, and construct changing rooms; work with PacifiCorp and outfitters to cooperatively manage site • Upgrade Fishing Access #5 (PacifiCorp); parking, toilet, and trail for accessibility • Consider developing Shovel Creek Hot Springs day use area and large group pavilion (PacifiCorp) • Construct Shovel Creek Canyon trailhead day use area (PacifiCorp) • Upgrade Fishing Access #4 (PacifiCorp); parking, toilet, and trail for accessibility • Upgrade Fishing Access #3 (PacifiCorp); parking, toilet, and trail for accessibility • Upgrade Fishing Access #2 (PacifiCorp); parking, toilet, and trail for accessibility • Existing Fishing Access #1 (PacifiCorp, adjacent to planning area boundary); work with PacifiCorp and outfitters to cooperatively manage site, implement site development plan as proposed by PacifiCorp in 1988, improving parking, raft take-out, toilets for accessibility, provide changing rooms with permanent vault toilets

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Trails				
Nonmotorized trails	0.2 miles	9.5 miles	6.4 miles	8.2 miles
	• Fishing access #2–6 (PacifiCorp) river access trails only, 0.2 mile	• Fishing access #2–6 (PacifiCorp) river access trails, 0.2 mile • Klamath River Edge Trail (BLM and PacifiCorp); construct trail from Stateline to Copco community (includes 3 miles road converted to trail), 6 miles • Panther Canyon Overlook Trail (PacifiCorp); 2 miles (regulated access) • Shovel Creek trail (PacifiCorp); 1.3 miles road converted to trail and regulated access	• Fishing access #2 and 4 (PacifiCorp) river access trails, 0.1 mile • Klamath River Edge Trail (BLM and PacifiCorp); 3 miles road converted to trail from Stateline to Beswick Hotel site • Panther Canyon Overlook Trail (PacifiCorp); 2 miles (regulated access) • Shovel Creek trail (PacifiCorp); 1.3 miles road converted to trail	• Fishing access #2–6 (PacifiCorp) river access trails, 0.2 mile • Klamath River Edge Trail (BLM and PacifiCorp); construct trail from Stateline to Copco community (includes 3 miles road converted to trail), 6 miles • Shovel Creek Trail (PacifiCorp); (includes 0.3 miles road converted to trail) 2 miles
Motorized tour routes	6 miles	9 miles	6 miles	9 miles
	• OHV use limited to designated roads • Nominate Topsy Road for National Back Country Byway, 6 miles	• Sign and designate tour routes on existing roads; OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources • Nominate Topsy Road for National Back Country Byway and National Historic Trail, 6 miles • Panther Canyon Overlook Route (PacifiCorp); 2 miles permitted access • Shovel Creek Route (PacifiCorp); 0.8 miles permitted access	• Greatly restrict OHV use through extensive road closures and road rehabilitation • Nominate Topsy Road for National Back Country Byway and National Historic Trail, 6 miles; sign and designate motorized tour route on existing roads;	• Develop new OHV trail routes, primarily in California (PacifiCorp); sign and designate OHV tour routes on existing roads; OHV use limited to designated roads; partner with OHV groups to educate users and maintain resources • Nominate Topsy Road for National Back Country Byway and National Historic Trail, 6 miles • Panther Canyon Overlook Route (PacifiCorp); 2 miles • Shovel Creek Route (PacifiCorp); 0.8 miles

RESOURCE/PROGRAM Action/location	**Alternative 1— No action (continue existing management)**	**Alternative 2— Enhancement/improvement of opportunities and resources**	**Alternative 3— Natural resource enhancement/ restoration**	**Alternative 4— Expand human use opportunities (enhance recreation/values)**
Interpretation/environmental education	1 site	2 sites	1 site	3 sites
	• Topsy Road Back Country Byway portal sign at Stateline Recreation Site • Develop pamphlets on history of the area • Existing Fishing Access #1 interpretive panel (PacifiCorp, adjacent to planning area boundary)	• Develop interpretive panels on Topsy Road between Fishing Access #1 and #2 (Siskiyou County and PacifiCorp) • Develop interpretive panels at Old Beswick Hotel site (PacifiCorp) • Develop pamphlets on history of the area • Develop outreach program between the river outfitters and Tribes (BLM) • Partner with OHV groups to educate users and maintain resources (BLM)	• Develop interpretive panels on Topsy Road between Fishing Access #1 and #2 (Siskiyou County and PacifiCorp) • Develop pamphlets on history of the area • Develop outreach program between the river outfitters and Tribes (BLM)	• Develop interpretive panels on Topsy Road between Fishing Access #1 and #2 (Siskiyou County and PacifiCorp) • Develop interpretive signs at Old Beswick Hotel (PacifiCorp) • Consider converting the Community Hall into an interpretive center (PacifiCorp) • Develop pamphlets on history of the area • Develop outreach program between the river outfitters and Tribes (BLM) • Partner with OHV groups to educate users and maintain resources (BLM)
Firearm use/restrictions	• No restrictions on target shooting/ varmint hunting except posted No Shooting signs around Klamath River Campground	• Restrict shooting from mid-May to mid-September from Frain Ranch to J.C. Boyle Dam; post No Shooting signs around all camping sites and visitor use areas, all segments	• Restrict target shooting/varmint hunting from mid-May to mid-September from Frain Ranch to J.C. Boyle Dam; post No Shooting signs around all camping sites and visitor use areas, all segments	• Restrict target shooting/varmint hunting from mid-May to mid-September from Frain Ranch to J.C. Boyle Dam; post No Shooting signs around all camping sites and visitor use areas, all segments • Increase law enforcement patrols to manage increased visitor numbers
Private/self outfitted whitewater boating use limits	• No limit on number of users • Voluntary self registration	• Private trips limited to 50 boaters/day • Voluntary self registration	• Private trips limited to 50 boaters/day • Voluntary self registration	• Allow up to 100 private users/day • Voluntary self registration
Commercial rafting use limits				
Special Recreation Permit (SRP) Allocation	• Moratorium on new SRP's since 1996, 22 SRP's currently (2001)	• Allow a maximum of 22 SRP's	• Manage to reduce the number of SRP's to 18 through voluntary surrender, cancellation for nonuse, etc.	• No upper limit on the number of SRP's
Maximum number of trips per SRP holder per day	• 2 trips/day/SRP	• 2 trips/day/SRP	• 1 trip/day/SRP • Second trip/day allocated to outfitters based on historical use during the peak period (July – August) • 2 trips/day/SRP outside of the July–August peak period	• 3 trips/day/SRP
Maximum trip size limit	• 30 passengers/trip	• 30 passengers/trip	• 30 passengers/trip	• 45 passengers/trip

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Total commercial rafting daily use limits (thresholds for allocating use)	• 10 trips or 200 passengers total	• 10 trips or 200 passengers	• 10 trips or 200 passengers total on weekend days • 8 trips, 160 passengers total on weekdays	• 20 trips or 400 passengers total
Controls on commercial launch times		• Scheduled launch times during peak use periods if necessary and feasible	• Scheduled launch times during peak use periods if necessary and feasible	• Scheduled launch times during peak use periods if necessary and feasible
Monitoring		• Monitor use levels with BLM LAC or similar technique to determine if/when allocation is necessary	• Monitor use levels with BLM LAC or similar technique to determine if/when allocation is necessary	• Monitor use levels with BLM LAC or similar technique to determine if/when allocation is necessary
Motorized boating/other technological advances	• Motorized watercraft not prohibited (except personal watercraft)	• Motorized watercraft prohibited except by special use authorization (Oregon Marine Board)	• Motorized watercraft prohibited except by special use authorization (Oregon Marine Board)	• Motorized watercraft prohibited except by special use authorization in Segments 1 and 2; allow motorized boating in Segment 3 (River Access 1 boat launch to Stateline site)
Visitor contact and management	• Regular law enforcement, ODF fire and river patrols; current weekly river (raft) patrols and low frequency of vehicle patrols (BLM)	• Increase law enforcement and river patrols to enhance visibility, reduce vandalism, and enforce No Shooting zones; PacifiCorp assist with funding	• Decrease visitor contact and continue minimum patrols to enhance solitude and for those necessary to protect property and life	• Greatly increase law enforcement and river patrols; utilize onsite caretakers at Powerhouse site, Hoover Ranch and lower Frain Ranch; PacifiCorp assist with funding
River flows: Bypass Reach (Segment 1)	• None recommended; base flow insufficient for kayaking, except during spring high flow period.	• Recommend increased flow releases for fish migration (see Watershed Values section) would enhance whitewater kayaking (tie into FERC relicensing flow study)	• Recommended flows more closely resemble natural flows for fish, etc.; no specific recreation flow recommendation; recreation would adapt to increased base flows, enhancing whitewater kayaking opportunities	• Recommended increased flow releases for fisheries and kayaking would enhance kayaking opportunities (no peaking); disseminate flow information to boaters and fisherman (tie into FERC relicensing flow study)

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
River flows: Segments 2 and 3	• Secure water rights claim for Segment 2 (1,500 cfs flow from Memorial Day to September 30) for recreation and scenic values; dialogue w/PacifiCorp on desired flow release schedule; and secure water rights for 625 cfs flow from April 1 through June 15 and 525 cfs for fisheries instream flow from June 16 through March 31 • Secure water rights to maintain both whitewater rafting and fishing recreational use, similar to the flow occurring at the time of wild and scenic river designation	• Recommended modified run-of-the-river (stabilized) raftable and fishing flows below J.C. Boyle Powerhouse (Segments 2 and 3) (tie into FERC relicensing flow study); secure water rights for 1,500 cfs instream flow for recreation/scenic values from Memorial Day to September that provide for mid-morning launches to enhance whitewater rafting and provide flows that are less damaging to streamside vegetation and habitat to enhance fishing opportunities; secure water rights for 625 cfs for fisheries instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31	• Pursue river flows for recreation use to favor flows that are more conducive to fish habitat improvement and restoration of the river channel (no peaking—run of river operation); secure water rights for 1,500 cfs instream flow for recreation/scenic values from Memorial Day to September • Secure water rights for 625 cfs for fisheries instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31	• Request PacifiCorp provide optimum (stabilized) raftable and fishing flows below J.C. Boyle Powerhouse (Segments 2 and 3) (tie into FERC relicensing flow study); pursue water flow releases to optimize whitewater rafting opportunities • Secure water rights for 1,500 cfs instream flow for recreation/scenic values from Memorial Day to September • Secure water rights for 625 cfs for fisheries instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31 • Consistent flow levels allow for motorized boating opportunities in Segment 3 (tie into FERC relicensing flow study)
ROADS AND ACCESS				
Segment 1				
Topsy Road T39S-R7E-Sections 31and 32; T40-R7E-Sections 6,7, and 18; BLM/PC)	• Spot improvements	• Spot improvements	• Spot improvements	• Contiguous improvements
Miscellaneous roads in Sections 1, 6, and 12, downstream from J.C. Boyle Dam (T40-R6E-Sections 6 and 12; BLM/PC)		• Administrative use; 2.2 miles; wildlife	• Administrative use; 2.2 miles; wildlife	
J.C. Boyle Dam Bridge (Klamath River crossing) (T40S-R6E-Section 6; PC)		• Recommend replacing bridge to allow motorized vehicle use	• Recommend continuing to allow only nonmotorized use	• Recommend replacing bridge to allow motorized vehicle use
Powerhouse Road (Highway 66 to J.C. Boyle Powerhouse) (T40S-R6E-Sections 1,12,13 and 14; BLM/PC)	• PacifiCorp maintenance responsibility	• Monthly summer maintenance • Spot improvements	• Monthly summer maintenance • Spot improvements	• Monthly summer maintenance • Contiguous improvements

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Canal Access Road (T40E-R6E-Sections 1, 6, and 12; BLM/PC)			• Administrative use; 2.2 miles	
Big Bend recreation site access road (T40S-R6E-Section 13; BLM)		• Construct new road (<0.1 miles) to access proposed recreation site		• Construct new road (<0.1 miles) to access proposed recreation site
Segment 2 (NW of River)				
Powerhouse Road (from J.C. Boyle Powerhouse to Klamath River Campground) (T40S-R6E- Sections 14,23,26,27; BLM)	• Minimum maintenance; hazard tree removal, rock slide removal	• Spot improvements (3.2 miles), including some resurfacing • Hazard tree removal, rock slide removal	• Install seasonal closure at Spring Island turn-around (3.2 miles, November 20–April 1) • Minimum maintenance; hazard tree removal, rock slide removal	• Road improvements (3.2 miles) to allow access in low clearance vehicles • Hazard tree removal, rock slide removal
Powerhouse Road (from Klamath River Campground to Caldera Rapid) T40S-R6E-Section 34; T41S-R6E-Sections 3 and 10; BLM/PC)	• Minimum maintenance; hazard tree removal, rock slide removal	• Spot improvements	• Seasonal closure (2.5 miles, November 20–April 1)	• Contiguous improvements (2.5 miles) to allow access in low clearance vehicles
Powerhouse Road (from Caldera Rapid to Hells Corner Overlook) (T41S-R6E-Sections 8, 9, and 10; BLM/PC)	• Minimum maintenance; hazard tree removal, rock slide removal	• Spot improvements	• Seasonal closure (1 mile, November 20–April 1)	• Spot improvements
Powerhouse Road (from Hells Corner Overlook to Chert Creek Meadow) (T41S-R6E-Sections 7 and 8; BLM/PC)	• Seasonal closure (within the existing Pokegama Cooperative Closure)	• Seasonal closure (within the existing Pokegama Cooperative Closure)	• Seasonal closure (within the existing Pokegama Cooperative Closure)	• Seasonal closure (within the existing Pokegama Cooperative Closure)
Spring Island put-in access road and loop (T40S-R6E-Section 14; BLM)			• Seasonal closure 0.2 miles; wildlife; new seasonal/administrative closure	
Klamath Campground spur road (T40S-R6E-Section 26; BLM)		• Obliterate; north end of spur road (0.2 miles); restore riparian	• Decommission entire length of existing spur road (0.4 miles) • Construct approximately 0.2 miles of road outside of riparian reserve	• Contiguous improvements
Powerline access roads (T40S-R6E-Sections 27 and 34; T41S-R6E – Sections 3 and 9; BLM/PC)	• Administrative use; 2.7 miles; wildlife	• Administrative use; 2.7 miles; wildlife	• Administrative use; 2.7 miles; wildlife	
Klamath River Edge Road (T40S-R6E-Section 34; T41S-R6E-Section 3; BLM/PC)	• Obliterate; 1.3 miles, including about 0.8 miles of recontouring	• Obliterate; 1.3 miles, including about 0.8 miles of recontouring	• Obliterate; 1.3 miles, including about 0.8 miles of recontouring	• Spot improvements; reduce damage to wet meadows

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Klamath River Edge Road, north end connection to Powerhouse Road (T40S-R6E-Section 34; BLM)			• Obliterate; 0.3 miles; restore riparian	
Turtle Camp access roads T41S-R6E-Section 3; BLM)		• Construct approximately 0.2 miles of access roads to replace existing access (Klamath River Edge Road)		• Construct approximately 0.2 miles of access roads to replace existing access (Klamath River Edge Road)
Frain Ranch Area (northwest side) (T41S-R6E-Section 3; PC)	• Obliterate; 0.1 miles; restore riparian area impacted by user-created road	• Obliterate; 0.5 miles; restore riparian area impacted by user-created road	• Obliterate; 0.5 miles; restore riparian and protect cultural; all roads in vicinity	• Obliterate; 0.25 miles; restore riparian area impacted by user-created road
Caldera Rapid (west side) (T41S-R6E-Sections 3 and 10; PC/BLM)	• Obliterate; 0.1 miles; restore riparian; 250 feet of recontouring; conversion to trail	• Obliterate; 0.1 miles; restore riparian; 250 feet of recontouring; conversion to trail • Close remaining 0.3 miles of spur roads	• Obliterate; 0.1 miles; restore riparian; 250 feet of recontouring; conversion to trail • Close remaining 0.3 miles of spur roads	• Obliterate; 0.1 miles; restore riparian; 250 feet of recontouring; possible conversion to trail • Close remaining 0.3 miles of spur roads
Pokegama Cooperative road closure (includes multiple roads) (T41S-R5E-Sections 1,12, and 13; T41S-R6E-Sections 5,6,7,8, and 9; BLM/PC)	• Seasonal closure 11.1 miles; wildlife and road surface maintenance	• Seasonal closure 11.1 miles; wildlife and road surface maintenance	• Seasonal closure 11.1 miles; wildlife and road surface maintenance	• Seasonal closure 11.1 miles; wildlife and road surface maintenance
Salt Caves site access road (T41S-R6E-Sections 7 and 8; BLM)	• Obliterate; 0.9 miles; wildlife and hydrologic processes	• Obliterate; 0.9 miles; wildlife and hydrologic processes	• Obliterate; 0.9 miles; wildlife and hydrologic processes	• Obliterate; 0.9 miles; wildlife and hydrologic processes
Chert Creek southeast riparian parallel (NE of SW of Section 7) (T41S-R6E-Section 7; PC)		• Obliterate; 0.1 miles; wildlife and hydrologic processes	• Obliterate; 0.1 miles; wildlife and hydrologic processes	
Chert Creek Road (T41S-R5E-Section 12; T41S-R6E-Section 7; PC/BLM)	• Relocation; 0.9 miles; restore channel processes and riparian	• Obliterate; 1.2 miles; restore channel processes and riparian; includes 0.5 miles of recontouring	• Obliterate; 1.2 miles; restore channel processes and riparian; includes 0.5 miles of recontouring	• Relocation; 0.9 miles; restore channel processes and riparian;
Chert Creek east end alternate (T41S-R6E-Section 7; BLM)		• Obliterate; <0.1 miles; restore meadow; BLM and PacifiCorp, removal necessitates resurfacing of adjacent roads	• Obliterate; <0.1 miles; restore meadow; BLM and PacifiCorp, removal necessitates resurfacing of adjacent roads	• Obliterate; <0.1 miles; restore meadow; BLM and PacifiCorp, removal necessitates resurfacing of adjacent roads
NW of SW of Section 7, north/south road (T41S-R6E-Section 7; BLM)	• Obliterate; 0.25 miles	• Obliterate; 0.25 miles	• Obliterate; 0.25 miles	

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
SW and SE of NW of Section 7, east/west road (east end only) (T41S-R6E-Section 7; BLM)		• Contiguous Improvements; <0.1 miles; necessitated by removal of Chert Creek east end alternative	• Contiguous Improvements; <0.1 miles; necessitated by removal of Chert Creek east end alternative	• Contiguous Improvements; <0.1 miles; necessitated by removal of Chert Creek east end alternative
SW and SE of NW of Section 7, east/west road (remainder of length) (T41S-R6E-Section 7; BLM)				• Spot Improvements; 0.4 miles; access, sediment reduction; spot improvements on steep, rocky road
Tom Creek substation river access T41-R5E-Sections 12 and 13 BLM)		• Road Improvements; 0.5 miles; reduce runoff and gullying; rafting takeout	• Obliterate; 0.5 miles; riparian restoration	• Road Improvements; 0.5 miles; reduce runoff and gullying; rafting takeout
Section 1, spur road along west side of Hayden Creek (T41S-R5E-Section 1; BLM)		• Obliterate; 0.5 miles	• Obliterate; 0.5 miles	
Miscellaneous roads, Hayden subwatershed (T41-R5E-Section 1 and T41S-R6E-Section 6; BLM)	• Spot improvements to reduce runoff and gullying	• Spot improvements to reduce runoff and gullying	• Spot improvements to reduce runoff and gullying	• Spot improvements to reduce runoff and gullying
Hayden subwatershed, Section 12 north/south hookup road (T41S-R5E-Section 12; BLM/PC)		• Contiguous Improvements; 0.25 miles; access to Hoover Ranch and Tom Creek Substation if Chert Road is removed	• Contiguous Improvements; 0.25 miles; access to Hoover Ranch and Tom Creek Substation if Chert Road is removed	
Hoover Ranch to CA/OR state line (T41S-R5E-Section 12 and 13; BLM/PC)	• Administrative use; 0.3 miles	• Administrative use; 0.3 miles	• Administrative use	• Seasonal closure; 0.3 miles
Miscellaneous roads on northwest side of river in Segment 2 (T41S-R6E-Sections 6,7,8,and 9; BLM/PC)			• Decommission; 0.5 miles; wildlife; spur roads along Powerhouse Road	
Segment 2 (SE of River)				
Topsy Road (including portions outside of planning area) (T41S-R6E-Sections 2,3,7,8,9, and 18; BLM/PC)	• Road improvements; spot improvements, varying extent includes 8.4 miles outside of planning area	• Road improvements; spot improvements, varying extent includes 8.4 miles outside of planning area	• Road improvements; spot improvements, varying extent includes 8.4 miles outside of planning area	• Road improvements; 16.6 miles; includes 8.4 miles outside of planning area
Picard Road (outside of planning area; BLM)	• Recommend Klamath County assume jurisdiction and maintenance responsibility	• Recommend Klamath County assume jurisdiction and maintenance responsibility		• Recommend Klamath County assume jurisdiction and maintenance responsibility

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Frain Ranch Bridge (Klamath River crossing) (T40S-R6E-Section 35; BLM)			• Decommission access road to bridge site (150 feet)	• Construct bridge across river for administrative and motorized recreation access
Frain Ranch area (T41S-R6E-Sections 3 and 10; BLM/PC)			• Seasonal closure (November 20–April 1) at Robber's Rock	
Section 35 Old Homestead Road (north of Frain Ranch) (T40S-R6E-Section 35; BLM)	• Obliterate; 1.0 miles; restore riparian and tributary channel processes; redundant road	• Obliterate; 1.0 miles; restore riparian and tributary channel processes; redundant road	• Obliterate; 1.0 miles; restore riparian and tributary channel processes; redundant road	• Obliterate; 1.0 miles; restore riparian and tributary channel processes; redundant road
Section 35 Road (T40S-R6E-Section 35; T41S-R6E-Section 3; BLM)			• Administrative use; 1.0 miles;	
Campground access points along Old Homestead Road (T40S-R6E-Section 35; BLM)	• Road construction; 0.1 miles; access to replace obliterated road; riparian area	• Road construction; 0.1 miles; access to replace obliterated road; riparian area		• Road construction; 0.1 miles; access to replace obliterated road; riparian area
North end of Frain Ranch (T41S-R6E-Section 3; PC/BLM)		• Decommission 0.75 miles of duplicate roads • Construct approximately 0.2 miles of road to maintain motorized access through area	• Decommission 0.75 miles of duplicate roads • Construct approximately 0.2 miles of road to maintain motorized access through area	
Lower Frain Ranch excess roads T41S-R6E-Section 3 and 10; PC/BLM)		• Obliterate; 1.45 miles; restore meadow, riparian	• Obliterate; 1.45 miles; restore meadow, riparian	• Obliterate; 0.35 miles; restore meadow, riparian
Caldera Rapid (east side) T41S-R6E-Section 10; PC)	• Obliterate; 0.15 miles; restore meadow, riparian; south end of Frain Ranch	• Obliterate; 0.15 miles; restore meadow, riparian; south end of Frain Ranch	• Obliterate; 0.15 miles; restore meadow, riparian; south end of Frain Ranch	• Obliterate; 0.15 miles; restore meadow, riparian; south end of Frain Ranch
Rock Creek spur road (T41S-R6E-Sections 9 and 10; BLM/-State of Oregon)	• Administrative use; 0.65 miles; wildlife; address gullying and road surface runoff • Road improvements; spot improvements; reduce runoff and gullying	• Obliterate; 0.65 miles; reduce runoff and gullying	• Obliterate; 0.65 miles; reduce runoff and gullying	• Road improvements; spot improvements; reduce runoff and gullying
Rock Creek spur road (T41S-R6E-Section 10; State of Oregon)		• Administrative use; 0.9 miles; wildlife	• Administrative use; 0.9 miles; wildlife	

RESOURCE/PROGRAM Action/location	**Alternative 1— No action (continue existing management)**	**Alternative 2— Enhancement/improvement of opportunities and resources**	**Alternative 3— Natural resource enhancement/ restoration**	**Alternative 4— Expand human use opportunities (enhance recreation/values)**
Topsy Road at Rock Creek meadow (T41S-R6E-Section 9; BLM)	• Spot improvements; 0.1 miles; meadow restoration and obliteration of braided roads	• Spot improvements; 0.1 miles; meadow restoration and obliteration of braided roads	• Spot improvements; 0.1 miles; meadow restoration and obliteration of braided roads	• Contiguous improvements; 0.1 miles; meadow restoration and obliteration of braided roads
Rock Creek meadow braided roads (T41S-R6E-Section 9; BLM)	• Obliterate; 0.1 miles; restore meadow	• Obliterate; 0.1 miles; restore meadow	• Obliterate; 0.2 miles; restore meadow (includes more road length on private land)	• Obliterate; 0.1 miles; restore meadow
Spur roads (T41S-R6E-Sections 8 and17; BLM)		• Decommission; 1.7 miles; wildlife and hydrologic processes; maintain access to private land in California via other roads	• Obliterate; 1.7 miles; wildlife and hydrologic processes; maintain access to private land in California via other roads	• Administrative use; 1.0 miles; wildlife
Wells Fargo diversion access (T41S-R5E- Sections 12 and 13; BLM)	• Administrative use; 0.15 miles	• Administrative use; 0.15 miles	• Administrative use; 0.15 miles	• Administrative use; 0.15 miles
Segment 3				
Segment 3 westside road (CA/OR state line to about 0.5 miles into Segment 3) (T48N-R3W-Section 15; PC)	• Administrative use, 0.5 miles; riparian and stream channel restoration; currently restricted access	• Administrative use; 0.5 miles; restore riparian and stream channel; (PacifiCorp)	• Administrative use; 0.5 miles; restore riparian and stream channel; (PacifiCorp)	• Seasonal closure; 0.5 miles
Segment 3 westside road (from Beswick Bridge to 0.5 miles south of OR/CA state line) (T48N-R3W-Sections 15, 22, 27; PC)	• Administrative use; 2.5 miles; (PacifiCorp), currently restricted access	• Administrative use; 2.5 miles; restore riparian/meadow; protect from OHV use; (PacifiCorp), currently restricted access	• Administrative use; 2.5 miles; restore riparian/meadow; protect from OHV use; (PacifiCorp), currently restricted access	• Administrative use; 2.5 miles; (PacifiCorp), currently restricted access
Access 6 access road (T48N-R3W-Section 22; PC)		• Contiguous improvements; 0.1 miles; recreation access	• Contiguous improvements; 0.1 miles; recreation access	• Contiguous improvements; 0.1 miles; recreation access
Hessig Ranch Road (T48N-R3W-Sections 22,23, and 24; PC/BLM)	• Administrative Use	• Administrative Use	• Decommission; wildlife and road surface maintenance; (PacifiCorp and BLM), currently restricted access	• Administrative Use
Panther Canyon Overlook Road (T48N-R3W-Sections 26 and 27; PC)	• Administrative use; 1.7 miles; wildlife and road surface maintenance; currently restricted access	• Administrative use; 1.7 miles; wildlife and road surface maintenance; currently restricted access • Spot improvements; 1.7 miles; road surface maintenance and erosion control; install drainage features according to best management practices	• Administrative use; 1.7 miles; wildlife and road surface maintenance; currently restricted access • Spot improvements; 1.7 miles; road surface maintenance and erosion control; install drainage features according to best management practices	• Spot improvements; 1.7 miles; road surface maintenance and erosion control; install drainage features according to best management practices

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Shovel Creek Road (and spurs) T48N-R3W-Sections 27,34,35; PC)	• Administrative use	• Administrative use; relocate road away from riparian area; maintain access to diversions and powerline; obliterate unnecessary roads	• Administrative use; relocate road away from riparian area; maintain access to powerline; obliterate unnecessary roads	• Spot improvements; downstream from Negro Creek confluence; may be some realignment to move road away from stream; administrative use v/s from Negro Creek
Beswick Bridge (Klamath River crossing) (T48N-R3W-Sections 27; PC)	• Administrative use	• Administrative use	• Administrative use	• Administrative use
Shovel Creek Campground Access Road (T48N-R3W-Sections 27; PC)		• Road construction; approximately 0.5 miles to access campground		• Road construction; approximately 0.5 miles to access campground
Stream crossing improvement				
Powerhouse road springs (R40S-R6E-Section 23; BLM)	• Install culverts at 2 sites where road surface diverts flow paths	• Install culverts at 2 sites where road surface diverts flow paths	• Install culverts at 2 sites where road surface diverts flow paths	• Install culverts at 2 sites where road surface diverts flow paths
NE of NW of Section 8 stream crossing (R41S-R6E-Section 8; BLM)			• Install low water ford to accommodate hydrologic flow paths where stream intersects road	
Exclosure Meadow western stream crossing (R41S-R6E-Section 8; PC)			• 1 site; install low water ford to accommodate hydrologic flow paths downhill from meadow	
Chert Creek road crossings (R41S-R6E-Section 7; PC)		• 1 site; remove unnecessary upper crossing	• 2 sites; remove unnecessary upper crossing; enlarge lower culvert	
Chert Creek stream crossing (R41S-R5E-Section 12; PC)		• 2 sites; install low water crossing; to provide habitat connectivity	• Obliterate Tom Substation river access road to eliminate need for 2 stream crossings	• 2 sites; install low water crossing; to provide habitat connectivity
Hayden Creek (R41S-R5E-Section; BLM)		• Obliterate low water crossing	• Obliterate low water crossing	
Hayden Creek ((R41S-R5E-Section 13; BLM)		• Improve low water crossing	• Improve low water crossing	• Improve low water crossing

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Topsy Road and Frain access seep crossings (R41S-R6E-Section 10; BLM/PC)	• Install culverts at 3 sites where stream flows across road	• Install culverts at 3 sites where stream flows across road	• Install culverts at 3 sites where stream flows across road	• Install culverts at 3 sites where stream flows across road
Rock Creek Bridge (T41S-R6E-Section 9; BLM)	• Recommend retrofitting bridge to allow passage of 100-year floods and restore channel processes.	• Recommend retrofitting bridge to allow passage of 100-year floods and restore channel processes.	• Recommend retrofitting bridge to allow passage of 100-year floods and restore channel processes.	• Recommend retrofitting bridge to allow passage of 100-year floods and restore channel processes.
Major Spring meadow stream crossing (T40S-R6E-Section 35; BLM)	• Obliterate 1 stream crossing	• Obliterate 1 stream crossing	• Obliterate 1 stream crossing	• Obliterate 1 stream crossing
Frain Creek (T41S-R6E-Section 3; PC)	• 2 sites; install culverts to improve water quality and restore stream channel	• Obliterate road (0.1 miles) that crosses stream in 2 locations	• Obliterate road (0.1 miles) that crosses stream in 2 locations	• Obliterate road (0.1 miles) that crosses stream in 2 locations
Crayfish Creek (T41S-R6E-Section 10; PC)	• Obliterate 1 stream crossing to improve aquatic habitat connectivity	• Obliterate 1 stream crossing to improve aquatic habitat connectivity	• Obliterate 1 stream crossing to improve aquatic habitat connectivity	• Obliterate 1 stream crossing to improve aquatic habitat connectivity
Stateline take-out ditch seepage (T48N-R3W-Section 14; PC)		• 1 site; install culvert or divert to address cultural and access concerns	• 1 site; install culvert or divert to address cultural and access concerns	
Shovel/Negro Creek stream crossings (T48N-R3W-Section 34; PC)		• Improve 2 low water crossings along road parallel to Shovel Creek	• Improve 2 low water crossings along road parallel to Shovel Creek	• Improve 2 low water crossings along road parallel to Shovel Creek
Shovel Creek tributaries (T48N-R3W-Section 35; PC)		• Improve or obliterate 4 low water crossings along powerline access road	• Improve or obliterate 4 low water crossings along powerline access road	• Improve or obliterate 4 low water crossings along powerline access road
Bridge across mouth of Shovel Creek (T48N-R3W-Section 27; PC)	• Recommend enlarging bridge to allow passage of 100-year floods and restore channel processes	• Recommend enlarging bridge to allow passage of 100-year floods and restore channel processes	• Recommend enlarging bridge to allow passage of 100-year floods and restore channel processes	• Recommend enlarging bridge to allow passage of 100-year floods

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CULTURAL RESOURCES				
Prehistoric				
Sites capped	1 site • Site #35KL18 (PacifiCorp); preserve and protect site by covering it with soil and vegetation	1 site • Site #35KL18 (PacifiCorp); preserve and protect site by covering it with soil and vegetation	0 sites	2 sites • Site #35KL18 (PacifiCorp); preserve and protect site by covering it with soil and vegetation; and establish caretaker on site • Site #CA-Sis-1721/2646 (PacifiCorp); preserve and protect site by covering it with soil and vegetation
Sites fenced	0 sites	2 sites • Site #CA-Sis-1721/2646 (PacifiCorp); fence off the site and relocate camping area • Site #CA-Sis-2135 (BLM); construct approx. 0.25 mile fence with wings along the roadway (not an enclosure)	0 sites	1 site • Site #CA-Sis-2135 (BLM); construct approx. 0.25 mile fence with wings along the roadway (not an enclosure)
Access controlled sites	0 sites	1 site • Site #35KL20 (PacifiCorp); block off vehicle access to site by either establishing boulders, installing a gate, and/or erecting Area Closed signs	3 sites • Site #35KL18 (PacifiCorp); close area to motorized vehicles site by either establishing boulders, installing a gate, and/or erecting Area Closed signs • Site #CA-Sis-1721/2646 (PacifiCorp); close area o public use site by either establishing boulders, installing a gate, and/or erecting Area Closed signs • Site #35KL20 (PacifiCorp); block off vehicle access to site by either establishing boulders, installing a gate, and/or erecting Area Closed signs	0 sites
Establish caretaker	0 sites	0 sites	0 sites	1 site • Site #35KL18 (PacifiCorp); establish caretaker on site

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Research	1 project • Site #CA-Sis-16 (PacifiCorp); study and report on the excavated materials from the 1953 University of California excavation • Promotion of nonexcavation research	1 project • Site #CA-Sis-16 (PacifiCorp); study and report on the excavated materials from the 1953 University of California excavation • Promotion of nonexcavation research; excavation use only as a mitigation measure	1 project • Site #CA-Sis-16 (PacifiCorp); study and report on the excavated materials from the 1953 University of California excavation • Promotion of nonexcavation research; excavation use only as last resort mitigation measure	1 project • Site #CA-Sis-16 (PacifiCorp); study and report on the excavated materials from the 1953 University of California excavation • Excavation research not prohibited; excavation used as a mitigation tool
Historic				
Sites documented	10 sites • Record the site to meet HABS/ HAER documentation standards. This documentation consists of - measured drawings, large-format photographs, and written history: ~The Hoover 41 Ranch (Beak Field No. 38) (PacifiCorp) ~Beswick Complex (PacifiCorp) ~Hessig Ranch (CA-Sis-1838/H) (PacifiCorp) ~Truitt Saloon (PacifiCorp) ~Topsy School House (ORKL84) (BLM) ~Topsy Road (Beak Field No. 43) ~Frain Ranch (Beak Field No. 21) (PacifiCorp) ~Truitt Ranch (PacifiCorp) ~Slaughter House (PacifiCorp) ~Fred's Cabin (PacifiCorp)	10 sites • Record the site to meet HABS/ HAER documentation standards. This documentation consists of measured drawings, large-format photographs, and written history: • ~The Hoover 41 Ranch (Beak Field No. 38) (PacifiCorp) ~Beswick Complex (PacifiCorp) ~Hessig Ranch (CA-Sis-1838/H) (PacifiCorp) ~Truitt Saloon (PacifiCorp) ~Topsy School House (ORKL84) (BLM) ~Topsy Road (Beak Field No. 43) ~Frain Ranch (Beak Field No. 21) (PacifiCorp) ~Truitt Ranch (PacifiCorp) ~Slaughter House (PacifiCorp) ~Fred's Cabin (PacifiCorp)	10 sites • Record the site to meet HABS/ HAER documentation standards. This documentation consists of measured drawings, large-format photographs, and written history: • ~The Hoover 41 Ranch (Beak Field No. 38) (PacifiCorp) ~Beswick Complex (PacifiCorp) ~Hessig Ranch (CA-Sis-1838/H) (PacifiCorp) ~Truitt Saloon (PacifiCorp) ~Topsy School House (ORKL84) (BLM) ~Topsy Road (Beak Field No. 43) ~Frain Ranch (Beak Field No. 21) (PacifiCorp) ~Truitt Ranch (PacifiCorp) ~Slaughter House (PacifiCorp) ~Fred's Cabin (PacifiCorp)	10 sites • Record the site to meet HABS/ HAER documentation standards. This documentation consists of measured drawings, large-format photographs, and written history: • ~The Hoover 41 Ranch (Beak Field No. 38) (PacifiCorp) ~Beswick Complex (PacifiCorp) ~Hessig Ranch (CA-Sis-1838/H) (PacifiCorp) ~Truitt Saloon (PacifiCorp) ~Topsy School House (ORKL84) (BLM) ~Topsy Road (Beak Field No. 43) ~Frain Ranch (Beak Field No. 21) (PacifiCorp) ~Truitt Ranch (PacifiCorp) ~Slaughter House (PacifiCorp) ~Fred's Cabin (PacifiCorp)

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Sites stabilized	0 sites	3 sites • Stabilize Hoover 41 Ranch House (Beak Field No. 38) (PacifiCorp) by repairing the foundation skirt; replacing exterior steps for liability purposes; replacing the windows and doors; repair ceilings in bedrooms, bathroom and kitchen; patch fireplace holes; replacing the shingle roof with a metal roof; remove metal fence around structure; and hazardous material removal. The roof is the priority. • Stabilize the Community Hall at Beswick Complex (PacifiCorp) by patching the roof and repairing the leak damage in the back room. • Stabilize Truitt Saloon (PacifiCorp) by replacing half of the back wall; fixing the porch; replace south window and front window panels; patch holes on inside walls; replace firring strips on outside walls; clear vegetation and dirt from sides of building.	2 sites • Stabilize the Community Hall at Beswick Complex (PacifiCorp) by patching the roof and repairing the leak damage in the back room. • Stabilize Truitt Saloon (PacifiCorp) by temporarily covering the holes along the back wall with boards and digging out the dirt that has accumulated along the outside of the back wall	3 sites • Stabilize Hoover 41 Ranch House (Beak Field No. 38) (PacifiCorp) by repairing the foundation skirt; replacing exterior steps for liability purposes; replacing the windows and doors; repair ceilings in bedrooms, bathroom and kitchen; patch fireplace holes; replacing the shingle roof with a metal roof; remove metal fence around structure; and hazardous material removal. The roof is the priority. • Stabilize the Community Hall at Beswick Complex (PacifiCorp) by patching the roof and repairing the leak damage in the back room. • Stabilize Truitt Saloon (PacifiCorp) by replacing half of the back wall; fixing the porch; replace south window and front window panels; patch holes on inside walls; replace firring strips on outside walls; clear vegetation and dirt from sides of building.

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Sites rehabilitated	0 sites	2 sites • The Hoover 41 Ranch Root Cellar (Beak Field No. 38) (PacifiCorp); rehabilitate the double-walled cellar by removing lichen off the logs and removing vegetation from between the double walls and around the exterior • Frain Ranch (Beak Field No. 21) (PacifiCorp); rehabilitate the Frain main cabin by spraying the logs with preservatives to protect them from further rodent damage	4 sites • Frain Ranch (Beak Field No. 21) (PacifiCorp); rehabilitate the Frain main cabin by spraying the logs with preservatives to protect them from further rodent damage • The Hoover 41 Ranch Root Cellar (Beak Field No. 38) (PacifiCorp); rehabilitate the double-walled cellar by removing lichen off the logs and removing vegetation from between the double walls and around the exterior • Stabilize Hoover 41 Ranch House (Beak Field No. 38) (PacifiCorp) by repairing the foundation skirt; replacing exterior steps for liability purposes; replacing the windows and doors; repair ceilings in bedrooms, bathroom and kitchen; patch fireplace holes; replacing the shingle roof with a metal roof; remove metal fence around structure; and hazardous material removal. The roof is the priority. • Beswick Complex (PacifiCorp); rehabilitate the Maid Quarters by replacing the shingle roof with a metal roof; replace back siding; replace foundation supports; repair the floors, repair windows and doors, replace exterior steps; divert spring water around building; clear shrubs from around structure • Hessig Ranch (CA-Sis-1838/H) (PacifiCorp); rehabilitate the Ranch Squeeze Stall, Chutes, and Fences by replacing broken elements with modern duplicates of the original element • Hessig Ranch (CA-Sis-1838/H) (PacifiCorp); rehabilitate the Ranch Barn by replacing the broken door panels	4 sites • The Hoover 41 Ranch Root Cellar (Beak Field No. 38) (PacifiCorp); rehabilitate the Double-Walled cellar by removing lichen off the logs and removing vegetation from between the double walls and around the exterior • Beswick Complex (PacifiCorp); rehabilitate the Maid Quarters by replacing the shingle roof with a metal roof; replace back siding; replace foundation supports; repair the floors, repair windows and doors, replace exterior steps; divert spring water around building; clear shrubs from around structure • Hessig Ranch (CA-Sis-1838/H) (PacifiCorp); rehabilitate the Ranch Squeeze Stall, Chutes, and Fences by replacing broken elements with modern duplicates of the original element • Hessig Ranch (CA-Sis-1838/H) (PacifiCorp); rehabilitate the Ranch Barn by replacing the broken door panels • Frain Ranch (Beak Field No. 21) (PacifiCorp); rehabilitate the Frain main cabin by spraying the logs with preservatives to protect them from further rodent damage
Sites signed	1 site	0 sites	0 sites	0 sites

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Research	1 project • Historic overview document from J.C. Boyle to Copco; contract with qualified historian • Promotion of nonexcavation research	1 project • Historic overview document from J.C. Boyle to Copco; contract with qualified historian • Promotion of nonexcavation research; excavation use only as last resort mitigation measure	1 project • Historic overview document from J.C. Boyle to Copco; contract with qualified historian • Promotion of nonexcavation research; excavation use only as last resort mitigation measure	1 project • Historic overview document from J.C. Boyle to Copco; contract with qualified historian • Excavation research not prohibited; excavation used as a mitigation tool
Native American Traditional Use				
Research	1 project • Ethnobotanical study from J.C. Boyle to Copco; contract with qualified ethnobotanist(s)	1 project • Ethnobotanical study from J.C. Boyle to Copco; contract with qualified ethnobotanist(s)	1 project • Ethnobotanical study from J.C. Boyle to Copco; contract with qualified ethnobotanist(s)	1 project • Ethnobotanical study from J.C. Boyle to Copco; contract with qualified ethnobotanist(s)
Miscellaneous	2 projects • Evaluate the canyon as a historical archaeological district or cultural landscape and complete a registration form • Class III inventories (100 percent survey); inventory of all unsurveyed BLM lands not tied to projects	1 project • Evaluate the canyon as a historical archaeological district or cultural landscape and complete a registration form • Class III inventories (100 percent survey); inventory of all unsurveyed BLM lands not tied to projects and resurvey areas that do not meet current Class III survey standards on BLM lands • Nominate Topsy Road (Beak Field No. 43) as national historic trail; work with private landowners in county	1 project • Evaluate the canyon as a historical archaeological district or cultural landscape and complete a registration form • Class III Inventories (100 percent survey); inventory of all unsurveyed BLM Lands not tied to projects and resurvey areas that do not meet current Class III survey standards on BLM lands; survey unsurveyed high probability areas on PacifiCorp lands not tied to projects • Nominate Topsy Road (Beak Field No. 43) as national historic trail; work with private landowners in county	1 project • Evaluate the canyon as a historical archaeological district or cultural landscape and complete a registration form • Class III Inventories (100 percent survey); inventory of all unsurveyed BLM Lands not tied to projects and resurvey areas that do not meet current Class III survey standards on BLM lands; survey unsurveyed high probability areas on PacifiCorp lands not tied to projects • Nominate Topsy Road (Beak Field No. 43) as national historic trail; work with private landowners in county

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
VEGETATION/BIODIVERSITY				
Special Status Plants	• Inventories for special status plants would be conducted before ground-disturbing activities and known sites protected or managed according to appropriate guidelines	• Inventories for special status plants would be conducted before ground-disturbing activities and known sites protected or managed according to appropriate guidelines; systematic inventories of planning area would be conducted	• Inventories for special status plants would be conducted before ground-disturbing activities and known sites protected or managed according to appropriate guidelines; systematic inventories of planning area would be conducted	• Inventories for special status plants would be conducted before ground-disturbing activities and known sites protected or managed according to appropriate guidelines
Noxious Weeds				
Inventory	• Systematic inventory of planning area to support integrated noxious weed management	• Systematic inventory of planning area to support integrated noxious weed management; post project inventory of areas disturbed by vegetation management actions	• Systematic inventory of planning area to support integrated noxious weed management; post project inventory of areas disturbed by vegetation management actions	• Systematic inventory of planning area to support integrated noxious weed management; periodic inventory of high use recreation sites
Education		• Interpretive signs would be placed in high use recreation areas for weed awareness/prevention		• Interpretive signs in high use recreation areas for weed awareness/ prevention; interpretive brochures available in high use recreation areas
Treatment	• Chemical, manual, mechanical, and biological control methods would be used	• Chemical, manual, mechanical, and biological control methods would be used	• Chemical, manual, mechanical, and biological control methods would be used	• Chemical, manual, mechanical, and biological control methods would be used
Vegetation Treatments (acres/decade)	1,171 acres/decade	4,510 acres/decade	6,958 acres/decade	4,580 acres/decade
Conifer forest and woodland	• Treatments limited to fuel reduction, especially in areas with other resource emphasis; prescribed fire used only when unit is randomly selected (BLM, 557 acres)	• Thin stands on lower slopes to sustainable levels to improve forest health; prescribed fire used in random selections as well as priority units (BLM, 1,238 acres; PacifiCorp, 305 acres)	• Thin all stands to sustainable levels, favoring ponderosa pine but maintaining a mix of species and size classes; fuel reduction treatment would be applied to all stands; prescribed fire would be a primary tool, especially on slopes >35 percent (BLM, 1,638 acres; PacifiCorp, 925 acres)	• Thin all stands as under Alternative 2, with priority to areas adjacent to recreation sites, river corridor, trails, and roads; fuel reduction would be the same as under Alternative 2 (BLM, 1,277 acres; PacifiCorp, 429 acres)

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Dense oak woodlands	• Thinning of a few oak stands would increase growth and mast (acorn) production; prescribed fire would be used to reduce fuel loads in thinned stands (BLM, 115 acres)	• Additional oak thinning would increase growth and mast (acorn) production; prescribed fire would be used to reduce fuel loads in thinned stands (BLM, 115 acres; PacifiCorp, 99 acres)	• All oak woodlands would be thinned; all oak woodlands would be burned to reduce fuel loads (BLM, 286 acres; PacifiCorp, 115 acres)	• Oak woodlands would be thinned as under Alternative 2, with priority to areas adjacent to recreation facilities, river corridor, and roads; fuel reduction would be the same as under Alternative 2 (BLM, 115 acres; PacifiCorp, 72 acres)
Open oak woodlands	• Thinning of a few oak stands would increase growth and mast (acorn) production; prescribed fire would be used to reduce fuel loads in thinned stands (BLM, 299 acres)	• Additional oak thinning would increase growth and mast (acorn) production; prescribed fire would be used to reduce fuel loads in thinned stands (BLM, 608 acres, PacifiCorp, 372)	• All oak woodlands would be thinned; all oak woodlands would be burned to reduce fuel loads (BLM, 723; USFS, 20 acres; PacifiCorp, 631 acres)	• Oak woodlands would be thinned as under Alternative 3, with priority to areas adjacent to recreation facilities, river corridor, and roads; fuel reduction would be the same as under Alternative (BLM, 616 acres; PacifiCorp 520 acres)
Juniper woodlands	• Cut young, invasive juniper in priority areas and around springs (BLM, 0 acres)	• Cut invasive juniper as under Alternative 1, plus cut juniper around individual pine trees (BLM, 0 acres)	• Cut all invasive juniper; retain and protect old growth juniper trees (BLM, 0 acres)	• Cut all invasive juniper in areas of recreation sites (BLM, 0 acres)
Mixed shrubfields	• Shrub and browse species would be treated along with oak treatments (BLM, 1,330 acres)	• South and west slopes would be priority to treat to rejuvenate shrubs for browse (BLM, 538 acres; PacifiCorp, 367 acres)	• All shrubfields would be treated to rejuvenate for big game browse; use mechanical or prescribed fire, especially in wedgeleaf ceanothus (BLM, 700 acres; PacifiCorp, 644 acres)	• Same as under Alternative 2 (BLM, 538 acres; PacifiCorp 537 acres)
Rabbitbrush/sagebrush	• Shrub and browse species would be treated along with oak treatments (BLM, 0 acres)	• South and west slopes would be priority to treat to rejuvenate shrubs for browse (BLM, 12 acres; PacifiCorp, 3 acres)	• All shrubfields would be treated to rejuvenate for big game browse; use mechanical or prescribed fire, especially in wedgeleaf ceanothus (BLM, 52 acres; PacifiCorp 203 acres)	• Same as under Alternative 3 (BLM, 114 acres; PacifiCorp, 65 acres)
Dry meadow	(BLM, 63 acres)	(BLM, 215 acres; PacifiCorp 46 acres)	(BLM, 215 acres; USFS, 1 acre; PacifiCorp 103 acres)	(BLM, 215 acres; PacifiCorp 46 acres)
Irrigated meadow		• Manage 370 acres for native habitats; apply principles of adaptive management to achieve vegetation management and wildlife habitat objectives; options include some use of existing irrigation diversions (BLM, 0 acres; PacifiCorp, 370 acres)	• Manage 370 acres for native habitats; apply principles of adaptive management to achieve vegetation management and wildlife habitat objectives; options include some use of existing irrigation diversions (BLM, 0 acres; PacifiCorp, 374 acres)	• Use fencing/obstructions to protect from OHV use (BLM, 0 acres; PacifiCorp, 0 acres)

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Riparian Restoration (proposed and recommended)	• BLM, 7 acres; PacifiCorp 11 acres	• BLM, 30 acres; PacifiCorp, 166 acres	• BLM, 44 acres; PacifiCorp, 245 acres; other private, 5 acres	• BLM, 9 acres; PacifiCorp, 22 acres
Vegetation Treatments				
Hayden Creek riparian restoration		• Vegetation treatments (approximately 3 acres) within the riparian reserve of Hayden Creek will be designed to restore the distribution of riparian vegetation communities	• Vegetation treatments (approximately 8 acres) within the riparian reserve of Hayden Creek will be designed to restore and maintain the distribution and composition of riparian vegetation communities	
Shovel Creek		• Vegetation treatments (approximately 155 acres) within portions of the riparian reserves of Shovel and Negro Creeks will be designed as needed to meet desired future conditions for riparian habitat and large wood recruitment	• Conifer planting on abandoned skid trails to ensure course woody debris recruitment (3 acres); Vegetation treatments (approximately 170 acres) within riparian reserves of Shovel and Negro Creeks will be designed as needed to meet desired future conditions for riparian habitat and large wood recruitment	
Meadow restoration				
Restore riparian habitat by decommissioning roads	About 1.5 acres: Crazy 8 Spring, Big Alder	About 1.5 acres: Crazy 8 Spring, Big Alder	About 4 acres: Crazy 8 Spring, Big Alder, Racer Meadow, and Boulder Spring	About 1.5 acres: Crazy 8 Spring, Big Alder
Restore riparian habitat by constructing exclosures	About 3 acres: Racer Meadow and Boulder Spring	About 3 acres: Racer Meadow and Boulder Spring	About 1 acre: Hoover Springs	About 3 acres: Racer Meadow and Boulder Spring
Restore riparian habitat by decommissioning roads and constructing exclosures	About 10 acres: Rock Creek Meadow, Major Spring, Crayfish Meadow	About 12 acres: Rock Creek Meadow, Major Spring, Crayfish Meadow, and Lower Frain	About 15 acres: Rock Creek Meadow, Major Spring, Crayfish Meadow, and Lower Frain	About 12 acres: Rock Creek Meadow, Major Spring, Crayfish Meadow, and Lower Frain
Restore riparian habitat by decommissioning roads, constructing exclosures, vegetation treatments, and/or stream restoration	No action	About 33 acres: Exclosure Meadow, Hayden Creek Meadow, Hayden Springs, and Frain Ranch	About 42 acres: Exclosure Meadow, Middle Chert Creek, Upper Chert Creek, Hayden Creek Meadow, Hayden Springs, and Frain Ranch	About 2 acres: Frain Ranch

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Revegetation on roads removed from riparian reserves	• About 7 acres/4 miles along Klamath River and Chert Creek	• About 11 acres/6 miles along Klamath River, Chert Creek, and Shovel Creek	• About 14 acres/7 miles along Klamath River, Chert Creek, and Shovel Creek	• About 9 acres/5 miles along Klamath River, Chert Creek, and Shovel Creek
Conifer, willow, and sedge/rush planting in riparian areas				
Revegetation at J.C. Boyle housing site			• Approximately 3 acres	
Revegetation adjacent to J.C. Boyle Powerhouse			• Approximately 0.7 acres at the site of facilities immediately adjacent to the Klamath River	
Revegetation in coordination with channel restoration activities		• See Aquatic Species/Habitat for details on the extent of these actions	• See Aquatic Species/Habitat for details on the extent of these actions	• See Aquatic Species/Habitat for details on the extent of these actions
Riparian restoration adjacent to sidecast in Segment 1		• See Aquatic Species/Habitat for details on the extent of these actions	• See Aquatic Species/Habitat for details on the extent of these actions	
Willow enhancement projects		• Plant cuttings at likely sites along Klamath River	• Plant cuttings at likely sites along Klamath River	
Blackberry/reed canarygrass control		• Shovel Creek and portions of the river in Segment 3; burn, mow, or utilize other nonchemical treatments, possibly followed by planting of native species	• Shovel Creek and portions of the river in Segment 3; burn, mow, or utilize other nonchemical treatments, possibly followed by planting of native species	
SOIL RESOURCES				
Soil Monitoring	• Quantitatively monitor 20% of resource area ground disturbing projects including those within planning area or 1,171 acres/decade	• Quantitatively monitor 20% of resource area ground disturbing projects including those within planning area or 4,510 acres/ decade	• Quantitatively monitor 20% of resource area ground disturbing projects including those within planning area or 6,958 acres/ decade	• Quantitatively monitor 20% of resource area ground disturbing projects including those within planning area or 4,580 acres/decade

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TERRESTRIAL SPECIES/ HABITAT				
Structural work				
Roads				
Closures	• Reduce open roads to 1.5 miles/section through closures that can be implemented during other management activities (currently road density is 3.36+)	• Reduce open roads to 1.5 miles/section through an active closure program not necessarily associated with other activities	• Close all roads except those needed for daily management access	• Road closures only used when needed to reduce disturbance to special status species or under cooperative agreements
Improvements (see Watershed Values section)	• Spot improvements to improve drainage or to direct traffic flow	• Road improvements in meadow areas or to enhance wildlife movements	• Road obliteration; improvements only when needed to improve drainage or management after road closures	• Major improvements to improve traffic flow, speed, and protect wildlife
Buildings	• Add wildlife friendly perches, nest boxes, etc., to existing structures; work on private lands when requested	• Work cooperatively with private landowners to install wildlife habitat on private structures; renovate hydroelectric facilities to improve wildlife movement and habitat • Old buildings and bridges could be modified for nest structures	• Remove recreation structures that pose threats to wildlife (such as Klamath River Campground)	• Design platforms and structures on buildings for birds, bats, and other wildlife
Powerlines	• Raptor proof powerlines when and where problems are documented	• Raptor proof and modify powerpoles; install nesting/perching structures for osprey, goose nests, and blue birds, etc.	• Support burial of all distribution powerlines or removal from the scenic corridor	• Raptor proof and modify powerpoles; install nesting/perching structures for osprey, goose nests, and blue birds, etc.
Species management				
Eagles	• Manage riparian forest communities for existing and potential nest and roost trees; manual thinning and fuels reductions around selected large mature trees (Douglas fir or pine) • Develop potential nest trees by pruning branches to create openings in the canopy and using natural materials	• Manage riparian forest communities for existing and potential nest and roost trees; more aggressive treatments (manual, mechanical, fire, etc.) around the selected trees; more trees and selection of potential future trees • Develop potential nest trees by pruning branches to create openings in the canopy and using natural materials	• Manage riparian forest communities for existing and potential nest and roost trees; more aggressive treatments (manual, mechanical, fire etc) around the selected trees; more trees and selection of potential future trees; use mechanized equipment to remove competing trees to reduce stress on large diameter trees • Manage Forest communities to maintain options for natural creation of nest structures and perch trees	• Manage riparian forest communities for existing and potential nest and roost trees; thinning around large trees when it would not conflict with the recreational activities or visual requirements • Develop potential nest trees by pruning branches and placing artificial structures

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Spotted owls	• Maintain existing nesting/ foraging/roosting and dispersal habitat	• Treat some nesting/foraging/roosting stands to improve health but maintain nesting/foraging/roosting	• Return stands to historic (more natural) conditions; this may result in the loss of some nesting/foraging/roosting but will retain the dispersal habitat	• Treat some nesting/foraging/roosting stands to improve health but maintain nesting/foraging/roosting
Peregrine falcons	• Monitor historic nest site during nest seasons	• Monitor all cliff areas in the canyon periodically throughout the year • Use a hack site to release peregrines and return them to the area	• Conduct stand treatments beneath cliff areas to improve visibility and hunting opportunities for peregrines; (remove selected trees to create a more open stand structure and a more effective hunting area)	• Use a hack site to release peregrines for public visibility
Osprey	• Monitor existing sites, top tree, or create nest sites in unseen areas or visibly acceptable areas using natural materials	• Create nest sites throughout the river canyon by topping/blasting trees and building nests from natural materials (limbs, boughs, etc.)	• Manage timber stands to maintain options for natural creation of nest structures	• Create nest structures through topping of trees, building artificial platforms in trees, and modifying powerpoles
Waterfowl	• Maintain existing duck nest boxes	• Repair and replace existing nest boxes; add new boxes to important waterfowl areas • Improve riparian areas to provide brood-rearing areas that provide forage and cover; meadow areas adjacent to the river should be managed for adequate residual cover for ground nesting waterfowl	• As nest boxes decay, remove them from area; create artificial nest sites by boring cavities in large trees	• Maximize use of duck boxes in all areas; install goose nest structures in meadow habitat • Improve riparian areas to provide brood rearing areas that provide forage and cover; meadow areas adjacent to the river should be managed for adequate residual cover for ground nesting waterfowl
Turkeys	• Improve mast crops through thinning and or burning of oak stands in unseen areas • Meadow restoration through burning and /or seeding	• Improve mast crops in oak stands throughout the canyon area (800 acres in 10 years) 50 percent would be in pine/ juniper vegetation types • Meadow restoration through irrigation of meadows (may involve use of some abandoned irrigation systems) • Develop food plots for winter areas using mainly native species • Manage roost areas through fuel reduction and thinning around roost sites • Use transplanting to disperse the population	• Maximize habitat management in all oak areas in the canyon within the next 10 years (2,000 acres); also thin around large oaks in timber stands • Maintain irrigation systems in meadow areas to retain the wet meadow habitats for brood rearing, passive irrigation preferred • Develop roost areas through thinning and pruning of pine stands	• Improve mast crops in oak stands throughout the canyon area (800 acres in next decade); 50 percent would be in pine/juniper vegetation types • Restore irrigation to Frain Ranch and other old homesteads to improve brood rearing habitat • Develop food plots for winter areas using grains and native species • Develop roost areas through thinning and pruning of pine stands • Conduct transplants to augment populations

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Land birds (general)	• Improve riparian management throughout the canyon • Manage for a minimum of 60% optimal cavity nester populations (same as the KFRMP/FEIS)	• Improve riparian management throughout the canyon; use current and historical irrigation systems to develop more woody riparian vegetation in meadow areas • Manage for a minimum of 60 percent optimal cavity nester populations (same as the KFRMP/FEIS) • Use bird boxes and artificial structures in all campgrounds and day use areas	• Improve riparian management throughout the canyon; use current and historical irrigation systems to develop more woody riparian vegetation in meadow areas • Use passive irrigation to promote woody riparian vegetation • Manage for 100 percent optimum levels for cavity nester populations • No boxes will be installed; will utilize improved habitat to provide the nest sites	• Increase meadow management to develop more wet meadow areas with shrubs along the drainage facilities • Manage for 100 percent optimum levels for cavity nester populations • Bird boxes and artificial structures in all campgrounds and day use areas • Develop a complete Watchable - Wildlife program throughout the canyon; see also recreation plans
Blue birds	• Use of fire and oak management to manage open areas	• Use of fire and oak management to manage open areas • Use of nest boxes to improve utilization of some habitats	• Forest community management to provide for accessible nest trees adjacent to open areas	• Nest boxes throughout the canyon on trees, on power poles, and in campgrounds
Mountain quail		• Burning and mechanical treatment of shrubfields to create a mosaic of field conditions and seral stages	• Maximize shrub-field management; utilize vegetation management to restore natural mosaics	• Burning and mechanical treatment of sshrubfields to create a mosaic of shrub-field conditions and seral stages • Improved meadow management (dry and wet); development of food plots • Fencing of documented quail habitat to protect from grazing animals and OHVs
Woodpeckers	• Current management as in KFRMP/FEIS, 100 percent optimal cavity nester habitat in riparian areas and a minimum of 60 percent optimal cavity nester habitat outside the riparian zone • Improve mast crops for acorn and Lewis woodpeckers by thinning some oak stands • Protect granary trees for acorn storage by acorn woodpeckers	• Current management as in KFRMP/FEIS, 100 percent optimal cavity nester habitat in riparian areas and a minimum of 60 percent optimal cavity nester habitat outside the riparian zone • Improve mast crops for acorn and Lewis woodpeckers by thinning extensive oak stands • Protect granary trees for acorn storage by acorn woodpeckers; manage selected trees for future granary trees	• Manage for 100 percent optimal cavity nester habitat throughout the canyon • Improve mast crops for acorn and Lewis woodpeckers by thinning extensive oak stands; improve riparian zone management for downy woodpeckers; mast crop improvement • Protect granary trees for acorn storage by acorn woodpeckers; manage pine stands to create future granary trees	• Manage for 100 percent optimal cavity nester habitat throughout the canyon • Improve mast crops for acorn and Lewis woodpeckers by thinning extensive oak stands; improve riparian zone management for downy woodpeckers • Mast crop improvement • Install drumming boards in campground to increase visibility of woodpeckers • Protect granary trees for acorn storage by acorn woodpeckers; highlight these trees for public awareness and education

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Bats	• Add roost structures to existing signs • See also "Salt Caves Management Plan" for management direction	• Protect buildings that are used by bats; install bat boxes • See also "Salt Caves Management Plan" for management direction	• Develop natural habitat • See also "Salt Caves Management Plan" for management direction	• Signs, buildings, and bridges would be made bat compatible; develop more artificial bat structures • See also "Salt Caves Management Plan" for management direction
Herptiles				
Terrestrial	• Protect hibernaculums, manage for retention of large woody debris as in KFRMP/FEIS (120 linear feet of logs/acre equal to 16 inch diameter and at least 16 feet long)	• Protect hibernaculums, manage for retention of large woody debris as in KFRMP/FEIS (120 linear feet of logs/ acre equal to 16 inch diameter and at least 16 feet long) • Also protect large woody debris during vegetation management projects	• Protect hibernaculums, manage for retention of large woody debris as in KFRMP/FEIS (120 linear feet of logs/acre equal to 16 inch diameter and at least 16 feet long) • Develop or improve hibernaculum at old power housing site by using the stock pile of large boulders from road clearing activities	• Protect hibernaculums, manage for retention of large woody debris as in KFRMP/FEIS (120 linear feet of logs/ acre equal to 16 inch diameter and at least 16 feet long) • Install herp crossings (culverts) in roads near important habitats to reduce road kills and improve migration
Aquatic		• Fence springs or riparian that are being impacted	• Reconnect Boulder and Crazy 8 spring (Frain Ranch Area) to river by removing roads that intercept flow • Increase accessibility into tributaries from the river to improve Pacific giant salamander breeding/wintering habitat • Close roads that cross Crayfish Creek • Create cobble/gravel bars that will be exposed during different water levels for foothill yellow-legged frog basking areas (historical sighting of frog in canyon area)	• Install culverts in Crayfish Creek road crossings
Pond turtles	• Fuel reductions adjacent to river to improve access to the selected nesting areas	• Fuel reductions adjacent to river to improve access to the selected nesting areas; add large layered woody debris to provide basking habitat during all water levels • Manage potential egg laying areas (gradual gradient, deep soils, good exposure to the sun); this may involve thinning forest communities, fuel reductions, and vegetation management to promote desired conditions	• Fuel reductions adjacent to river to improve access to the selected nesting areas • Manage potential egg laying areas (gradual gradient, deep soils, good exposure to the sun); this may involve thinning forest communities, fuel reductions, and vegetation management to promote desired conditions; remove camping areas in Frain Ranch and BLM river campground	• Fuel reductions adjacent to river to improve access to the selected nesting areas; add large layered woody debris to provide basking habitat during all water levels • Manage potential egg laying areas (gradual gradient, deep soils, good exposure to the sun); this may involve thinning forest communities, fuel reductions, and vegetation management to promote desired conditions

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Big game				
Deer	• Existing road closures • Manage to maintain a 60/40 forage cover ratio • Retain hiding cover adjacent to open roads	• Increase road closures; reduce open roads to 1.5 miles/section through an active closure program not necessarily associated with other activities • Scatter oak thinning and shrub-field management projects throughout the canyon areas to increase food availability • Manage to maintain a 60/40 forage cover ratio • Retain hiding cover adjacent to open roads	• Close all roads except those needed for daily management access • Burn/scarify 25 percent of ceonothus shrubfields every decade • Manage to maintain a 60/40 forage cover ratio • Reduce open roads to the minimum number needed	• Road closures only used when needed to reduce disturbance to special status species or under cooperative agreements • Scatter oak thinning and shrub-field management projects throughout the canyon areas to increase food availability and visibility of deer • Manage to maintain a 60/40 forage cover ratio
Elk	• Maintain existing road closures	• Reduce open roads to 1.5 miles/section through an active closure program not necessarily associated with other activities	• Close all roads except those needed for daily management access • Reduce open roads to the minimum number needed	• Road closures only used when needed to reduce disturbance to special status species or under cooperative agreements
Bears	• Maintain existing road closures	• Reduce open roads to 1.5 miles/section through an active closure program not necessarily associated with other activities • Maintain berry production and improve mast crops	• Close all roads except those needed for daily management access • Modify existing irrigation to provide shrubs and wet meadow habitat	• Road closures only used when needed to reduce disturbance to special status species or under cooperative agreements • Improve berry production
Vegetation treatments				
Oak areas	• Treat selected units in rarely seen areas away from the river or screened from the river by other vegetation (refer to vegetation management prescriptions)	• Treat scattered units along the river that have visual concerns addressed (refer to vegetation management prescriptions)	• All oak areas will be treated (refer to vegetation management prescriptions)	• Treat scattered units along the river that have visual concerns addressed (refer to vegetation management prescriptions)
Mixed conifer	• Fuel reductions in areas that have other resource concerns (i.e., eagle nests) • Prescribed fire used only when unit is randomly selected	• Fuel reductions in areas that have other resource concerns (i.e., eagle nests); fuel reductions in all riparian timber stands; more manual and mechanical thinning around older trees • Use prescribed fire in old burns and selected timber units; also random selections	• All stands treated to reduce density and basal area to carrying capacity; maintain a mix of species and size classes • Extensive use of prescribed fire to maintain vegetative communities especially after initial treatments	• Fuel reduction in all timbered areas adjacent to recreational development • Use of prescribed fire limited to areas well outside of the developed recreation sites

RESOURCE/PROGRAM Action/location	**Alternative 1— No action (continue existing management)**	**Alternative 2— Enhancement/improvement of opportunities and resources**	**Alternative 3— Natural resource enhancement/ restoration**	**Alternative 4— Expand human use opportunities (enhance recreation/values)**
Shrub fields	• Shrub/browse species would be treated in conjunction with the oak treatments	• Prioritize south and west slopes for treatments to rejuvenate browse species	• Treat all shrubfields to rejuvenate the shrub species; create a mosaic of age and species	• Manage shrubfields in areas where the public can view the wildlife
WATERSHED VALUES				
Instream flows				
Segment 1	• Instream flows sufficient for favorable channel conditions and fish passage are emphasized • No flow changes anticipated unless as a result of FERC relicensing process	• During the FERC relicensing process, recommend increased baseflow to support fish migration • During the FERC relicensing process, recommend reduced rates of down-ramping on the receding limb of flood hydrographs	• During the FERC relicensing process, recommend flows in this reach that more closely resemble natural flow regimes and provide fish habitat and fish passage through this segment and adjacent hydroelectric facilities—these flows will include increased baseflows and occasional “pulse” flows • During the FERC relicensing process, recommend the occasional release of geomorphic flows to prevent vegetation encroachment and enhance channel-forming processes • During the FERC relicensing process, recommend reduced rates of ramping on the rising and receding limbs of flood hydrographs	• During the FERC relicensing process, recommend increased flow releases that would enhance whitewater recreation and fish migration • During the FERC relicensing process, recommend reduced rates of down-ramping on the receding limb of flood hydrographs

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Segment 2	• Fisheries baseflow based on FERC Relicensing and other analyses • *Recreation/scenic flows:* secure water claim rights for 1,500 cfs instream flow from Memorial Day to September 30 • *Fisheries flows:* secure water claim rights for 625 cfs instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31 • As new information becomes known, address instream flow needs through the FERC relicensing process	• Fisheries baseflow based on FERC Relicensing and other analyses • During the FERC relicensing process, recommend a "modified run-of-the-river" flow regime, in which J.C. Boyle operations are allowed to alter instantaneous flows within a defined range around the daily average flow—some peaking (within acceptable ramp rates) could occur if necessary to attain recreation flow objectives • During the FERC relicensing process, recommend reductions in the ramp rate at the J.C. Boyle Powerhouse • *Recreation/scenic flows:* secure water claim rights for 1,500 cfs instream flow from Memorial Day to September 30 • Fisheries flows: secure water claim rights for 625 cfs instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31	• Fisheries baseflow based on FERC Relicensing and other analyses • During the FERC relicensing process, recommend a "run-of-the-river" flow regime downstream from the powerhouse that mirrors the volume of water flowing into J.C. Boyle Reservoir (plus the accretions from the springs in Segment 1) and minimizes flow fluctuations associated with peaking • During the FERC relicensing process, recommend reductions in the ramp rate at the J.C. Boyle Powerhouse • *Recreation/scenic flows:* secure water claim rights for 1,500 cfs instream flow from Memorial Day to September 30 • *Fisheries flows:* secure water claim rights for 625 cfs instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31	• Fisheries baseflow based on FERC Relicensing and other analyses • During the FERC relicensing process, recommend reductions in the ramp rate at the J.C. Boyle Powerhouse • During the FERC relicensing process, recommend that releases from the powerhouse be timed to optimize whitewater opportunities • *Recreation/scenic flows:* secure water claim rights for 1,500 cfs instream flow from Memorial Day to September 30 • *Fisheries flows:* Secure water claim rights for 625 cfs instream flow from April 1 through June 15 and 525 cfs from June 16 through March 31 • As new information becomes known, address fisheries instream flow needs through the FERC relicensing process
Segment 3	• Flows in this segment are essentially the same as in Segment 2	• Flows in this segment are essentially the same as in Segment 2	• Flows in this segment are essentially the same as in Segment 2	• Flows in this segment are essentially the same as in Segment 2
Irrigation Diversions				
Segment 1	• No irrigation diversions occur	• No irrigation diversions occur	• No irrigation diversions occur	• No irrigation diversions occur
Segment 2	• Klamath River irrigation diversions; no action regarding irrigation diversions	• Klamath River irrigation diversions; apply adaptive management to adjust the timing and magnitude of flow through these diversion points to achieve vegetation management and wildlife habitat objectives • Consider managing existing irrigation infrastructure at Frain Ranch and Hoover Ranch to benefit wet meadows and wildlife	• Klamath River irrigation diversions; apply adaptive management to adjust the timing and magnitude of flow through these diversion points to achieve vegetation management and wildlife habitat objectives	• Klamath River irrigation diversions; no action regarding irrigation diversions • Consider managing existing irrigation infrastructure at Frain Ranch and Hoover Ranch to benefit wet meadows and wildlife

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Segment 3	• Klamath River irrigation diversions; no action regarding irrigation diversions • Shovel Creek diversions; no action regarding irrigation diversions • Negro Creek diversion; no action regarding irrigation diversions	• Klamath River irrigation diversions; apply adaptive management to adjust the timing and magnitude of flow through these diversion points to achieve vegetation management and wildlife habitat objectives • Shovel Creek diversions; recommend these 2 irrigation diversions to be managed primarily for instream flows and water quality maintenance, as well as for meadow restoration and habitat; diversions will be in use primarily during the high flow season • Negro Creek diversion; recommend eventual removal of 1 diversion structure	• Klamath River irrigation diversions; apply adaptive management to adjust the timing and magnitude of flow through these diversion points to achieve vegetation management and wildlife habitat objectives • Shovel Creek diversions; recommend eventual removal of 2 diversions • Negro Creek diversion; recommend eventual removal of 1 diversion structure	• Klamath River irrigation diversions; no action regarding irrigation diversions • Shovel Creek diversions; recommend these 2 irrigation diversions to be managed primarily for instream flows and water quality maintenance, as well as for meadow restoration and habitat; diversions will be in use primarily during the high flow season • Negro Creek diversion will be managed similar to Shovel Creek
Water quality (temperature)	• No action	• Recommend alterations in hydroelectric facilities and/or operations to reduce exaggerated daily temperature fluctuations in S~~s~~egment 2 caused by flow fluctuations	• Recommend alterations in hydroelectric facilities and/or operations to reduce exaggerated daily temperature fluctuations in S~~s~~egment 2 caused by flow fluctuations	• No action

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
AQUATIC SPECIES/HABITAT				
Ladder attraction flow	• No changes in attraction flows would occur as part of this plan	• Ladder attraction flow points would be redesigned to enhance attraction flows to lead fish to the existing opening of the ladder orifice; treatments would be localized within the area currently affected by the ladder and immediately in front of the ladder; concrete structures may be installed at the outlet and extend up to 50 feet downstream of the current opening within the stream channel	• *Option 1:* Facility operations would occur as run of the river, as such fish migration facilities would be designed to take advantage of that condition; it would be anticipated that a substantial change in the release of water (base flows and peak flow periodicity) from J.C. Boyle Dam would occur as part of this alternative; fish ladder design would direct fish towards ladder inlets based on dominant flow patterns from the spill gates or water release points; demolition of existing facilities and construction of new facilities at J.C. Boyle Dam could occur as a result of this option • *Option 2:* Facilities that impair fish migration are removed; no ladder technology is required for fish to move through the J.C. Boyle area	• Ladder attraction flow points would be redesigned to enhance attraction flows to lead fish to the existing opening of the ladder orifice; treatments would be localized within the area currently affected by the ladder and immediately in front of the ladder; concrete structures may be installed at the outlet and extend up to 50 feet downstream of the current opening within the stream channel
Bypass outfall attraction flow	• No changes in attraction flows would occur as part of this plan	• Bypass outfall would be redesigned in order to minimize fish attraction to bypass flows; facilities may include construction of a manifold system to diffuse the water released from bypass; facilities may also include relocation of the bypass outfall to be incorporated with the fish ladder attraction water	• It would be anticipated that a substantial change in the release of water (base flows and peak flow periodicity) from J.C. Boyle Dam would occur as part of this alternative; bypass outfall flows would have to be assessed based on the new flow release program; outfall design would incorporate the operational constraints for the new release patterns • *Option 1:* The facilities that impair downstream migration of fish would be removed; hence the screens and bypass for fish would no longer be present; outfall would be removed as it would no longer be necessary • *Option 2:* Bypass outfall would be located in concert with fish ladder attraction flows in order to enhance attractions flows to adult fish passage facilities	• Bypass outfall would be redesigned in order to minimize fish attraction to bypass flows; facilities may include construction of a manifold system to diffuse the water released from bypass; facilities may also include relocation of the bypass outfall to be incorporated with the fish ladder attraction water
Temperature differentials	• No changes in temperatures would be pursued as part of this plan	• Flow release patterns would address the impacts of exaggerating the diel temperature fluctuation which affects the full flow reach below the Powerhouse	• Flow regimes which exaggerate diel temperature fluctuations would be eliminated	• Flow release patterns would address the impacts of exaggerating the diel temperature fluctuation which affects the full flow reach below the Powerhouse

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Bypass Reach Canal and road sidecast instream	• No changes in Segment 1 channel morphology would occur as part of this plan	• Removal of sidecast material within the stream channel would occur as well as removal of sidecast along the west bank in areas determined to be impairing channel/riparian recovery; the installation of bankfull benches along reaches of the river impaired by road and canal construction would be designed to promote riparian vegetative recovery	• Full pull back of sidecast material associated with canal and road construction within Segment 1; floodplains would be reestablished in areas impacted by sidecast in order to provide high flow relief areas, resulting in natural hydrologic behavior through the impaired reach; areas on the opposite side of the river may need to be structurally enhanced in order to prevent further degradation of the river left canyon wall	• Enhancement of Segment 1 channels would be intended to improve localized mainstem width/depth channel features to provide a broader range of recreational boating opportunities; instream channel design would encompass enhancement of structure that would additionally benefit fishery resources; sidecast material impairing salmonid migration within Ssegment 1 would be removed
Emergency water release chute (Segment 1)	• Incised gorge would be stabilized; stabilization would constitute hardening the outfalls and shear cliff walls with either concrete and/or fill material; the rejection chute should be redesigned or enhanced so as to avoid future degradation of the hill slope	• Incised gorge would be stabilized and material affecting the river channel would be removed; a bankfull bench along the river edge would be installed in order to establish a vegetative community; redesign of the local canal system would be encouraged in order to reduce or eliminate the need for the load rejection chute; in the event that facility modifications cannot be made which makes the rejection chute unnecessary, then the concrete structure would need to be extended down to the flood prone edge of the river	• Incised gorge would be filled back in to mimic historic elevations of the upper bench, hill slope and flood prone area adjacent to the river; material affecting river morphology would be removed and at a minimum placed back into the hole; facilities would be redesigned such that the load rejection would be unnecessary and then could be removed; design options for the canal could include capping the canal with concrete and installing surge towers; another design option may include the installation of a closed pipe inside the canal and installing surge towers; in the event that facility modifications cannot be made which makes the rejection chute unnecessary, then the concrete structure would need to be extended down to the flood prone edge of the river	• Incised gorge would be stabilized; stabilization would constitute hardening the outfalls and shear cliff walls with either concrete or boulder fill; material within the river channel which impairs boating opportunities would be removed; if possible, a bankfull bench would be installed in order to establish a riparian community

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Channel width treatments	• No changes in channel widths and channel function would occur as part of this plan	• Limited channel treatments would be pursued; approximately 22 sites identified through aerial photographic analysis; these sites were selected based on the premise that the existing channel widths at the site are outside the natural range for the river in the planning area; all channel widths exceeding 200 feet were identified for review and treatment; each site would be further reviewed at the local level for channel condition and reference width/depth ratios; based on cross-section and longitudinal profile information and reference conditions, channel narrowing projects would be instituted at these sites; additional sites may be identified based on site level review of channel conditions that may warrant channel treatment; enhancement of banks and channel profile could occur; installation of rock and/or log wiers including bankfull benches with transplanted riparian vegetation would be designed to protect the channel from additional lateral erosion and lead the stream toward a reference condition channel profile	• Extensive channel treatments would be pursued; at least 69 sites have been identified through aerial photographic analysis and would be further reviewed at the local level for channel condition and true width/depth ratios; all channel widths exceeding the channel width of 150 feet where identified for review and treatment	• Limited channel treatments would be pursued in order to enhance the recreational rafting experience which at the same time would benefit fishery resources; 7 sites were identified where channel widths exceeded an extreme condition, over 250 feet wide; these sites would be reviewed and treated in a manner to reduce the channel width and improve pool habitat at the sites
Sediment (sediment particles captured by JC Boyle Dam)	• No changes in sediment and sediment regimes would occur as part of this plan	• Establish a sediment replenishment program along the length of the Klamath River; sites would be selected where regular placement of clean river sediment would occur, in order to provide supplemental sediment sources for channel/bank development and spawning gravel enhancement; sediments would be allowed to naturally sort in the river channel based on riverine hydraulics	• *Option 1:* Bypass natural sediment from Spencer Creek and upper Klamath River around the J.C. Boyle facility; this may include an offsite diversion of sediment to a stilling area where either a conveyance chute or trap and haul actions would move sediment around the dam. • *Option 2:* J.C. Boyle facilities would be redesigned in order to pass sediments imported to the reservoir through the dam; construction would be localized to the immediate area of the dam; natural sediment regimes would be restored	• Spot enhancement of sediment would occur in locations accessible or visible to the public and/or determined to have the greatest likeliness of enhancing the recreational fishery

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Large wood treatments	• No changes in large woody debris quantities or recruitment would occur as part of this plan	• Large woody debris treatment of the mainstem river channel along the banks would occur so long as material size and use is consistent with recreational boating activities; mainstem large woody debris treatment locations would be consistent with the channel width treatment locations • Limited enhancement of fish-bearing tributaries using large woody debris would occur; installation of large woody debris would include channel structure wood treatments with specific design and installation of large woody debris and potentially some log jams [log jams would include at least 1 or 2 key pieces of large woody debris and various other sizes of wood intended to alter channel hydraulics over differing flow levels at a site; channel structure treatments use wood as a bank stabilizing and width to depth altering structural treatment, typically including burying wood into the stream bank; tributary wood installation would be sufficiently designed to prevent recruitment/movement of installed large woody debris to the mainstem channel]	• Extensive installation of large woody debris along all fish-bearing reaches in the planning area would occur; number of large wood treatments (approximately 30—50 pieces/mile) would be an average of standards for large woody debris (PACFISH/INFISH = >20 pieces/mile of >12 inch diameter and 35 foot length; and USFWS/NMFS for Western Cascades is >60 pieces/mile)	• Enhancement of wood component in the mainstem and tributaries would be locally designed to enhance stream habitats in order to improve localized recreational fishery opportunities; emphasis for wood placement would be designed so as to not conflict with recreational boating in the mainstem and tributary installation would be of sufficient size and structure so as to not be expected to move under substantial flows (50–100 year events); treatment focus would be in areas that would be accessible or visible to the visiting publics

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Chute-cutoffs (lateral side channels of the river; numerous locations, see Maps 25 through 28	• No changes in chute-cutoffs would occur as part of this plan	• Side channels and chute-cutoffs would be reviewed for the impacts of project operations on the fisheries resources; depending on future project operations those channels features that are found to be potential fish-stranding areas would be enhanced so as to minimize stranding risks; channel enhancements weould include improving/creating pool habitat or deepening the channel in order to provide escape routes for fish	• As part of efforts to restore width/ depth ratios along the mainstem river those chute-cutoffs and side channels that contribute to a degradation of the mainstem width/depth ratio will be obstructed from access for all flows below bankfull; rock structures, logs and fill material would be placed in the side channel and installed using methods that would protect the upstream banks; side channels and chute cutoffs that do not contribute to degradation of the width/ depth ratio and or those features found to be prehistoric in nature would be reviewed for the impacts of project operations on the fisheries resources; depending on future project operations those prehistoric channels that are found to be potential stranding areas would be enhanced, similar to Alternative 2 enhancement, to minimize stranding risks	• Closing off chute-cutoff channels would be intended to improve flow within the mainstem channel in order to provide a broader range of recreational rafting opportunities; design of mainstem channel improvements would encompass construction of mainstem channel structures that would reduce width to depth ratios to improve boating opportunities and provide additional fishery resource benefits
Bridge sites	• No changes to old bridge sites would occur as part of this plan	• Treatment of 1 or more old bridge sites that impair channel processes; this could include removal of abutment material allowing restoration of floodplain channel forming processes above and below the site, and removal of road prisms leading to bridge abutments	• All bridge sites within the Klamath River planning area would be treated in order to restore channel and floodplain features and processes; roads leading to bridge abutments, and the bridge abutments, would be removed in order to eliminate channel restrictions; instream treatments and rock weirs would be employed to restore bankfull width/depth ratios to reference conditions	• Actions associated with bridge sites would occur in order to enhance the human use experience and are not intended to directly benefit fishery resources

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
Diversions	• No changes in mainstem or tributary diversions would occur as part of this plan	• The diversions of the Klamath River which have increased the width/depth ratios of the channel adjacent to the diversion would be treated to reduce the ratios to within the reference range of variance for the channel type; structural enhancement would include removal of the existing boulder material and installation of rock weirs designed to centralize base flows, provide deeper pools, and maintain irrigation diversion capabilities, rock and log vains would be installed upstream and downstream of the diversion in order to narrow the channel width; existing screened water diversions in tributaries to the Klamath River would be maintained so long as fisheries access can be maintained though the diversion; where upstream and or downstream movement is limited by water diversions, the tributary diversion should be removed in order to maintain fishery access; based on field review Negro Creek diversion currently impairs fish movement during low flow periods and should be removed; screens would be placed on all maintained diversion points; diversions may be retained in order to maintain or enhance upland/riparian habitats; Hayden Creek intersection with a mainstem diversion canal would be altered such that flows from Hayden would reach the river channel unfettered by the canal; the canal would be either buried or piped over the Hayden Creek channel	• All mainstem and tributary diversions would be targeted for removal, rock and log vains would be installed upstream and downstream of the diversion in order to narrow the channel width to within the reference range of variance for the channel type; some diversions may be retained over the short term in order to maintain or enhance upland/riparian habitats; screens would be placed on all maintained diversion points; Hayden Creek intersection with the mainstem diversion would be restored to natural channel condition	• Screens would be placed on all maintained diversion points to protect fisheries resources; the diversions of the Klamath River which have increased the width/depth ratios of the channel adjacent to the diversion would be enhanced so as to improve the recreational rafting opportunities; structural enhancement of these mainstem diversions would be designed to additionally benefit fishery resources; Hayden Creek intersection with a mainstem diversion canal would be altered such that flows from Hayden would reach the river channel unfettered by the canal; the canal would be either buried or piped over the Hayden Creek channel

RESOURCE/PROGRAM Action/location	Alternative 1—No action (continue existing management)	Alternative 2—Enhancement/improvement of opportunities and resources	Alternative 3—Natural resource enhancement/restoration	Alternative 4—Expand human use opportunities (enhance recreation/values)
LIVESTOCK GRAZING				
Permited Use (AUMS)	BLM, 171; PacifiCorp, 2,500 to 3,000	BLM, 125 to 171; PacifiCorp, 0 to 2,000	BLM, 0; PacifiCorp, 0	BLM, 125 to 171; PacifiCorp, 1,500 to 2,500
	• License livestock grazing use up to the maximum lease amount of 171 animal unit months on BLM lands; PacifiCorp lands would continue to provide approximately 2,500–3,000 animal unit months of use yearly • Rangeland monitoring data collection • Rangeland health standards assessments • Periodic grazing use supervision • Implement/maintain rangeland improvement projects • Grazing management consistent with wildlife habitat maintenance/improvement • Construct up to 2 miles of additional fencing on the north Klamath River canyon rim to control livestock drift	• License livestock grazing use up to 171 animal unit months on BLM lands; PacifiCorp lands would be leased up to about 2,500 animal unit months depending on restoration goals and improvement • Rangeland health standards assessments • Periodic grazing use supervision • Implement/maintain rangeland improvement projects • Grazing management consistent with wildlife habitat maintenance/improvement • Construct up to 2 miles of additional fencing on the north Klamath River canyon rim to control livestock drift	• *Note:* Livestock grazing would only be used as a tool to achieve other resource objectives and may not be used at all; there would be no formal grazing leases for BLM or PacifiCorp lands • Periodic grazing use supervision (unauthorized use detection) • Implement/maintain rangeland improvement projects • Grazing management consistent with wildlife habitat maintenance/improvement • Construct up to 2 miles of additional fencing on the north Klamath River canyon rim to control livestock drift	• License livestock grazing use up to 171 animal unit months on BLM lands; PacifiCorp lands would be leased in the 1,500–2,500 animal unit month range depending on the amount of land devoted to other resource uses • Rangeland monitoring data collection • Rangeland health standards assessments • Periodic grazing use supervision • Implement/maintain rangeland improvement projects • Grazing management consistent with wildlife habitat maintenance/improvement • Construct up to 2 miles of additional fencing on the north Klamath River canyon rim to control livestock drift
WILD HORSES				
	• Monitoring of Pokegama Herd and its habitat • Periodic removals to stay within the appropriate management level • Update "Pokegama Herd Management Area Plan" • Management of the herd management area consistent with BLM Regulations, 43 CFR 4700 and current BLM policy and direction	• Monitoring of Pokegama Herd and its habitat • Periodic removals to stay within the appropriate management level • Update "Pokegama Herd Management Area Plan" • Management of the herd management area consistent with BLM Regulations, 43 CFR 4700 and current BLM policy and direction	• Monitoring of Pokegama Herd and its habitat • Periodic removals to stay within the appropriate management level • Update "Pokegama Herd Management Area Plan" • Management of the herd management area consistent with BLM Regulations, 43 CFR 4700 and current BLM policy and direction	• Monitoring of Pokegama Herd and its habitat • Periodic removals to stay within the appropriate management level • Update "Pokegama Herd Management Area Plan" • Management of the herd management area consistent with BLM Regulations, 43 CFR 4700 and current BLM policy and direction

RESOURCE/PROGRAM Action/location	Alternative 1— No action (continue existing management)	Alternative 2— Enhancement/improvement of opportunities and resources	Alternative 3— Natural resource enhancement/ restoration	Alternative 4— Expand human use opportunities (enhance recreation/values)
FIRE AND FUELS				
	• Provide appropriate management response emphasizing initial attack on all wildland fires • The fuels management program would be implemented with random selections and would include minimal fuel treatment around recreation areas • Fuels treatment would cover 1,171 acres/decade; under this alternative, returning the fire adapted ecosystems to sustainable function and structure to plant communities to desired future conditions would take the longest timeframe • Monitoring would be implemented to determine whether fuels treatments are meeting resource objectives • A smoke management/air quality plan would be completed • Initiate cooperative assistance agreements with private landowners (Wyden Amendment) to meet fuels management objectives across ownership boundaries	• Provide appropriate management response emphasizing initial attack on all wildland fires • The fuels management program would emphasize hand treatments with piling and burning of materials and some random prescribed burn selections to be performed • Fuels treatment would occur on 4,510 acres/decade; treatments would be located to minimize their being seen from the river and other key observation points; fire may be used to enhance species in Native American traditional use areas • Monitoring would be implemented to determine whether fuels treatments are meeting resource objectives • A smoke management/air quality plan would be completed • Initiate cooperative assistance agreements with private landowners (Wyden Amendment) to meet fuels management objectives across ownership boundaries	• Provide appropriate management response emphasizing initial attack on all wildland fires • The fuels management program would emphasize greater use of prescribed fire on all forest/woodland and shrub stands; treatments would exceed the random selection program • Fuels treatments would occur on 6,958 acres/decade; location of treatment sites would be less restrictive and could occur throughout the canyon; under this alternative, returning the fire adapted ecosystems to sustainable function and structure to plant communities to desired future conditions will take the shortest timeframe • Monitoring would be implemented to determine whether fuels treatments are meeting resource objectives • A smoke management/air quality plan would be completed • Initiate cooperative assistance agreements with private landowners (Wyden Amendment) to meet fuels management objectives across ownership boundaries	• Provide appropriate management response emphasizing initial attack on all wildland fires • The fuels program would have greater emphasis on the use of mechanical treatment with large equipment • Fuels treatments would occur on 4,580 acres/decade; treatment emphasis would be to treat areas along roads and near recreation sites, although treatment sites could occur throughout the canyon • Monitoring would be implemented to determine whether fuels treatments are meeting resource objectives • A smoke management/air quality plan would be completed • Initiate cooperative assistance agreements with private landowners (Wyden Amendment) to meet fuels management objectives across ownership boundaries
LAND TENURE ACTIONS				
	• No changes in land tenure would occur as part of this plan	• Land tenure objectives would be to purchase lands or develop management agreements, or pursue conservation easement on lands which encompass the riparian reserves and historic flood plains of the Klamath River, Shovel Creek, and Hayden Creek with the planning area	• Acquisition of lands or management agreements/conservation easements would be pursued within Shovel Creek Watershed boundaries and all nonpublicly-held lands within the riparian reserves and historic floodplains of the Klamath River and Hayden Creek	• Acquisition of lands or develop management agreements or conservation easements in order to establish and/or ensure public access to the Klamath River and lower Shovel Creek

Appendix I – ACEC Evaluation

RELEVANCE AND IMPORTANCE EVALUATION FOR POTENTIAL EXPANSION OF THE KLAMATH CANYON AREA OF CRITICAL ENVIRONMENTAL CONCERN

INTRODUCTION

In 1986 the Klamath River Canyon, from the J.C. Boyle Powerhouse to the California border from rim to rim, was first nominated for consideration as an Area of Critical Environmental Concern (ACEC) by Kelly O'Brian Smith of the Oregon Chapter of the Sierra Club (November 4, 1986). Subsequent to that were nominations by Marc E. Prevost, Rogue Group Sierra Club (June 2, 1987); Liz Frenkel, Oregon Chapter of the Sierra Club (April 17, 1988); and Bruce W. White, Oregon Chapter of the Sierra Club (April 17, 1988). The signing of the Record of Decision for the Klamath Falls Resource Management Plan designated this area as the Klamath Canyon ACEC on June 2, 1995.

A planning process to develop a resource management plan (RMP) and environmental impact statement (EIS) for the Klamath River was initiated in the spring of 2000. The planning area included not only the area previously designated as an ACEC (Segment 2), but also the Klamath River Canyon from rim to rim from the J. C. Boyle Dam to the J. C Boyle Powerhouse (Segment 1), and the Klamath River Canyon from the California/Oregon border to slackwater of the Copco Reservoir (Segment 3). The interdisciplinary team developing the management plan found that Segment 1 supported similar resource values within Oregon as Segment 2. Therefore, after careful consideration, the BLM interdisciplinary team recommended that Segment 1 be evaluated for inclusion into the Klamath Canyon ACEC during the planning process.

An ACEC designation highlights an area where special management attention is needed by the Bureau of Land Management (BLM) to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes; or to protect human life and safety from natural hazards. The ACEC designation indicates to the public that the BLM not only recognizes the area possesses significant values, but has also established special management measures to protect those values. Designation serves as a reminder that the significant values or resources must be accommodated during the BLM's consideration of subsequent management actions and land use proposals near or within an ACEC.

To be considered as a potential ACEC and further analyzed in resource management plan (RMP) alternatives, inventory data must be analyzed to determine whether there are areas containing significant resources, values, systems or processes, or hazards. To be a potential ACEC, an area must meet both relevance and importance criteria, as established and defined in 43 CFR 1610.7-2:

Relevance. There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard.

Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

The analysis used as a basis for designation of the Klamath Canyon ACEC, considered historic, prehistoric cultural, Native American traditional use (cultural value), scenic, fishery, wildlife, special status plant species (natural process or system), and vegetation (natural process or system) values in the Klamath River Canyon during the process which designated the ACEC. After careful consideration, the BLM interdisciplinary team included the same resource values for evaluation of Segment 1 for inclusion into the Klamath Canyon ACEC.

The designated Klamath Canyon ACEC covers 5,390 acres of land managed by the BLM's Klamath Falls Resource Area (KFRA), and 1,903 acres of state and private land. The Klamath State Scenic Waterway is contained within the boundary of the ACEC. Segment 1 contains 947 acres of land managed by KFRA and 463 acres of private land.

Map 1-1 shows the general location of the upper Klamath River and **Map 1-2** shows the ACEC boundary (Segment 2 on the map), State Scenic Waterway boundary, and wild and scenic river study area boundary from the 1990 BLM study.

RELEVANCE

As described in BLM Manual 1613, an area meets the "relevance" criterion if it contains one or more of the following:

1. A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archaeological resources and religious or cultural resources important to Native Americans).

2. A fish and wildlife resource (including but not limited to habitat for endangered, sensitive or threatened species, or habitat essential for maintaining species diversity).

3. A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relic plants or plant communities which are terrestrial, aquatic, or riparian; or rare geologic features).

4. Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the RMP process that it has become part of a natural process.

Historic Values

Segment 1. The Topsy Road, an excellent example of an early stagecoach/freight road, passed through this segment. This road was first constructed in 1873 along the general route of an Indian trail. From 1875 to 1903 the road provided the only year round freight and passenger transportation to the Klamath Basin. Although stage and freight service along the Topsy Road was displaced by the railroad in 1903, the road served as the only automobile route to Klamath Falls until 1922. The road has considerable historic importance to the development of the transportation of the region. Portions of the Topsy Road are eligible for nomination to the National Register of Historic Places.

Conclusion. The historic values in Segment 1 satisfy the criterion for relevance.

Cultural Values

Prehistoric Values

Segment 1. There is one known prehistoric site, which lies above the powerhouse.

Native American Traditional Use Values

The Klamath River Canyon is valued as a cultural landscape, which holds great spiritual and religious significance for the Klamath Tribes and the Shasta Nation. The physical environment of the canyon is the core of tribal spiritualism. It has been and still is used for spiritual activities such as vision quests, curing ceremonies, and spiritual preparation; as well as for cultural activities such as hunting, fishing, gathering, and education.

Both the prehistoric values and the Native American traditional use of the canyon were found to be outstandingly remarkable values in the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (BLM 1990).

Conclusion. The cultural values in Segment 1, both prehistoric resources and Native American traditional use, meet the criterion for relevance.

Scenic Values

The scenic quality rating of the upper Klamath River Canyon (from Topsy campground to Copco Reservoir) has been classified as Scenic Quality A, BLM's highest scenic classification (BLM 1977 and 1988). This rating of outstanding scenic value is due primarily to unique landform, diverse vegetation, water, and a low level of adverse cultural modifications (for the entire canyon's length). All three river segments are to be managed to maintain the existing character of the landscape, using VRM Class II standards (BLM Klamath Falls and Redding RMPs).

The canyon represents a transition from a mountainous to desert landscape as it crosses the Cascade Range, creating unique and varied scenery. The canyon is characterized by steep, layered basalt walls, rising as high as 1,000 feet above the river, providing a strong contrast to the regular rolling topography of the surrounding plateau.

Vegetation in the canyon is diverse due to elevation differences, slope, aspect, and soil diversity. Colors within the canyon are heavily influenced by the vegetation. The prominence of colors is most obvious in the fall when the leaves of the deciduous trees change colors adding reds and yellows to the landscape. During spring and early summer, flowering brush, and wildflowers enhance the color contrast, as does the white of the winter snows.

In 1988 the upper Klamath River, from J.C. Boyle powerhouse to the Oregon/California state line (segment 2), was designated an Oregon State Scenic Waterway. The scenic values of the Klamath River Canyon (segment 2 and 3) were found to be an outstandingly remarkable value in the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (BLM 1990). In 1994, the upper Klamath River, from just below the J.C. Boyle powerhouse, to the Oregon/California state line, was designated a federal Wild and Scenic River.

Segment 1. The scenic values found in segment 1 (Bypass Reach) are relevant in that they are intricately linked and add to the diversity and complexity of landscape variation found in segment 2 (Wild and Scenic River segment). The opportunity to travel down into a semi-primitive canyon on an improved road provides appealing scenic vistas for both first time and repeat recreational visitors. Visitors witness a dramatic change in vegetation, color, textures and landforms as they travel from the Klamath Basin plateau to the bottom of the river canyon in Segment 1. Visitors are in essence able to traverse back in time as they descend into the canyon Visitors pass through multiple, older layers of volcanic lava, ash, cinders and other eruptions from ancient Cascade volcanoes.

The opportunity to provide additional protection and special management attention for the scenic resources found in segment 1 is important. Cultural modifications such as hydroelectric facilities and roads have significantly affected this segment of the river and are disharmonious with the existing scenery. The opportunity to provide significant scenic improvement enhancements to these existing cultural modifications and improve the present landscape is an important consideration for future management.

Conclusion. The presence of significant scenic values in Segment 1meets the criterion for relevance.

Fish

The population of native inland redband trout that inhabits all three segments of the river is a significant resource. This population is very abundant, naturally spawning, and genetically unique in being resistant to high Ph values. Their resistance to a lethal parasite and high summer water temperatures may also be a genetic trait. Non-native strains of rainbow trout historically introduced in the upper Klamath River apparently were not able to reproduce due to their susceptibility to these conditions. The inland redband trout is a Species of Concern for the U.S. Fish and Wildlife Service (USFWS), a state of Oregon vulnerable species, and a Bureau sensitive species.

The fish resources were found to be an outstandingly remarkable value in the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (BLM 1990).

Segment 1. This segment is a cold water refugia for resident trout, a source for downstream populations of wild trout, a designated wild trout river in Oregon, and the springs in the reach provide a source of high quality water to the river. The Klamath largescale sucker, a Species of Concern for the USFWS and a Bureau sensitive species, is also found in this segment.

Conclusion. The presence of the native inland redband trout and Bureau sensitive species in Segment 1 satisfies the relevance criterion for fish.

Wildlife Resources

The rich diversity of wildlife, including threatened and endangered species, found within this relatively small confined geographic area is unique. There are 32 species of herptiles, 67 species of mammals, and 212 species of birds that potentially occur within the canyon area. Of these, there are two federally listed threatened species and 56 special status species on federal or state lists.

A maternity colony of Townsend's big-eared bat, a Bureau sensitive species and Oregon state sensitive (critical) species, is documented within the designated ACEC in Segment 2. There are only five known maternity colonies within the region. These bats likely forage throughout the Klamath Canyon, including Segment 1.

Wildlife habitat within the proposed ACEC addition is of exceptionally high quality and diversity, as evidenced by the numbers and diversity of wildlife living in and migrating through the area. The Klamath River Canyon bisects the Cascade Range and cuts through a variety of plant communities, which creates the wide diversity of habitats available for wildlife.

The most important habitat features in Segment 1 include the riverine habitat that is important to a wide variety of birds and mammals including bald eagles, osprey, ringtails, and river otters; the canyon provides a natural migration corridor for a variety of raptors; the extensive rimrock is important raptor nesting habitat; large live and dead conifers provide nesting and roosting habitat for bald eagles and ospreys; caves provide important nursery and roosting habitat for several species of bats. These habitats are equally important during the winter period.

The wildlife resources (both the animals and the habitat) were found to be an outstandingly remarkable value in the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (BLM 1990).

Conclusion. The presence and significance of both the populations and habitat of many federal and state threatened, endangered, sensitive, and candidate wildlife species that live in or migrate through the upper Klamath River Canyon satisfies the criterion for relevance for Segment 1.

Natural Processes and Systems

Geology

The upper Klamath River is in a transition area between the High Cascades and Basin and Range physiographic provinces. Characteristic geologic features are primarily volcanic flows and volcanic-derived sedimentary rocks. There are some spectacular high basalt and andesite cliffs that contain good examples of columnar jointing. Other interesting geologic features include weathered tuff cliffs, the Salt Caves, localized outcrops of contrasting white diatomaceous earth (diatomite), and landslide features.

Vegetation

The proposed addition to the Klamath Canyon ACEC supplements the wide diversity of plant communities, which occur there due to variations in topography, aspect, elevation, soil type, and microclimate provided by the canyon, which bisects the Cascade Range traversing several distinct vegetation zones. Vegetation community types range from montane conifer forest communities to high desert communities, and from riparian communities to oak savannah communities.

This diversity of plant communities was a major contributing factor in finding both the wildlife habitat and visual resources values in the canyon to be outstandingly remarkable values in the Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (BLM 1990).

Special Status Plant Species

Segment 1. Two populations of red-root yampah (*Perideridia erythrorhiza*), a Bureau sensitive species, are documented within Segment 1. Red-root yampah is also a State of Oregon candidate for listing as threatened or endangered, and is on List 1, taxa threatened or endangered throughout its range, of the Oregon Natural Heritage Program (ONHP).

Conclusion. The relevance criterion for the occurrence of a natural process or system in Segment 1 is met. Although the geologic features are interesting and enhance the visual resources, they are not rare, and therefore do not meet the relevance criterion. The presence of habitat for endangered, sensitive, or threatened plant species meets the criterion for relevance. The vegetation values meet the criterion of relevance by increasing the wide diversity of plant communities, and by providing habitat essential for maintaining wildlife species diversity.

Natural Hazards

Segment 1. Natural hazards in Segment 1 include landslides, rockfalls, and the river itself. Seismic (earthquake) activity is low.

Conclusion. The relevance criterion for natural hazards only requires an area to contain hazards; therefore, the presence of landslides, rockfalls, and the river in this segment meets the criterion for relevance.

IMPORTANCE

The value, resource, system, process, or hazard described under the Relevance Criterion must have substantial significance and value to satisfy the importance criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

1. Has more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.

2. Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.

3. Has been recognized as warranting protection to satisfy national priority concerns or to carry out the mandates of the Federal Land Policy and Management Act.

4. Has qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare.

5. Poses a significant threat to human life and safety or to property.

Historic Values

Segment 1. The Topsy Road was the major route of transportation into the Klamath Basin in the late 1800s to early 1900s. The Topsy Road has been preserved in large part due to its isolation. There are relatively few important 19th century travel routes, which remain in a relatively unaltered state in the region, which gives the Topsy Road more than local significance.

Conclusion. The historic values in Segments 1 have more than local significance, are fragile, irreplaceable, unique, and endangered. For these reasons they meet the importance criterion.

Cultural Values

Prehistoric Values

The prehistoric resources in the Klamath River Canyon have been deemed significant because of the abundance of sites and their regional interpretive value. A wide range of artifacts recovered from sites within the canyon has shown the river corridor was not the exclusive territory of one tribe but was used at various times, perhaps concurrently, by the Shasta, Modoc, Klamath, Takelma, and possibly the Achomawi of northeastern California. This is important because it raises some interesting questions about tribal boundary fluctuation not only within the canyon, but within the region as well. This lends more than local significance to the cultural values.

Archaeological sites are by their nature fragile, sensitive, irreplaceable, and endangered.

Native American Traditional Use

Native American traditional use of the canyon is one of its most unique values. Members of the Shasta Nation and Klamath Tribes state that the canyon is sacred and of immeasurable spiritual significance. The spiritual importance of the canyon is associated with the preservation of the river and the canyon's physical environment, as well as ancestral and current use by tribal members. Significant alteration of the canyon could destroy it as a suitable focus of Native American activity.

Spiritual power is vested in the environment. Encompassed within its boundaries are places and things, such as wildlife, vegetation, springs, rapids, boulders, caves, and cliffs that contribute to the spiritual importance of the canyon. The diversity of resources found within the canyon is rare, and the interrelationship of these same values is fragile. These resources make up the canyon's physical environment and the preservation of these resources as a whole is vital to the Shasta and Klamath people.

Conclusion. The prehistoric values within Segment 1 are rare, fragile, sensitive, irreplaceable, endangered, and have more than local significance. The traditional use of the canyon by Native Americans has more than local significance, which gives it special worth, meaning, and distinctiveness; and has qualities that make it irreplaceable, unique, and vulnerable to adverse change. The prehistoric values and Native American traditional use within Segment 1 meet the criterion for importance.

Scenic Values

Segment 1. The scenic quality rating of the upper Klamath River Canyon has been classified as Scenic Quality A, BLM's highest scenic classification (BLM 1977 and 1988). However, significant negative cultural modifications affect the present scenery found in Segment 1. When taken in context with the scenery found in and connectivity with Segment 2 and 3 and the fact that Segment 1 provides the primary travel corridor for thousands of recreation visitors to the canyon in Segment 2 and 3, the protection and enhancement of scenery in Segment 1 is important.

The steep walled canyon is the predominant visual element in the region. The layered basalt walls rise up to 1,000 feet above the river. Vegetative variety is much more diverse than the surrounding plateau due to the variety of elevations, aspects, and slopes. The Klamath River itself enhances the visual variety in the canyon. As it flows through the deep canyon, it changes from slack, slow-flowing waters in the wider areas to a rushing torrent of cascading whitewater through narrow rocky walls making it a unique sight in the region.

Conclusion. The scenic values in Segment 1 are unique in the region, have more than local significance, and are vulnerable to adverse change. They meet the criterion of importance.

Fish

Segment 1. This segment was designated in 1978 as a wild rainbow trout stream by the Oregon Department of Fish and Wildlife and is one of only six rivers in Oregon managed for wild rainbow trout.

The National Park Service in its Nationwide Rivers Inventory recognized the "excellent trout fishery" of the Klamath River.

The Northwest Power Planning Council designated the upper Klamath River as a Protected Area to protect the resident inland redband trout population.

The Oregon Department of Fish and Wildlife chose the inland redband trout populations of the Klamath Basin, including the upper Klamath River, as among the first in the state to be studied to better understand how stocks of wild trout have adapted to their particular environments.

The Pacific Northwest Rivers Study for Oregon gave their highest resource value rating based on the wild trout population.

The catch rate for wild rainbow trout on the upper Klamath River, is rivaled in Oregon only by that in the Deschutes River. The river's reputation for producing large wild rainbow trout draws anglers from outside the region who come to fish for more than one day.

The Klamath largescale sucker, a Bureau sensitive species, has been found in Segment 1.

Conclusion. The inland redband trout population of the upper Klamath River is unique, fragile, sensitive, and vulnerable to adverse environmental change. The Klamath largescale sucker is a Bureau sensitive species. Fish resources (including both the wild trout and the sucker) in the proposed addition to the ACEC, which are more than locally significant and have been recognized as warranting protection, meet the criterion for importance.

Wildlife Resources

The Klamath River is one of three rivers that cuts through the Cascade Range, which makes it a natural and important migratory route for wildlife. The diversity of habitat and the wide variety of threatened and endangered and other wildlife species present is unique and not found anywhere else in the region.

Within the canyon as a whole, there are two federally listed threatened species; two federal candidate species; nine state listed threatened, endangered, and/or sensitive species; and two Oregon Natural Heritage Program listed species known to occur. An additional six federal and state listed species potentially occur in the Klamath River Canyon.

Conclusion. The wildlife habitat and population values in Segment 1 of the canyon are unique and have more than local significance. Several of the species within the canyon are threatened, endangered, or sensitive, and would be vulnerable to adverse change. They satisfy the importance criterion.

Natural Processes and Systems

Geology

The upper Klamath River is in a transition area between the High Cascades and Basin and Range physiographic provinces. Characteristic geologic features are primarily volcanic flows and volcanic-derived sedimentary rocks. There are some spectacular high basalt and andesite cliffs that contain good examples of columnar jointing. Other geologic features include weathered tuff cliffs, the Salt Caves, localized outcrops of contrasting white diatomaceous earth (diatomite), and landslide features.

Vegetation

The Klamath and Pit rivers are the only rivers to bisect the Cascade Range in the southern Oregon/northern California area. The diversity of plant communities in the Klamath Canyon is not duplicated elsewhere. Only one other river, the Columbia, flows through the Cascades, but crosses a different group of vegetation zones and thus does not duplicate the diversity of species, communities, and habitats found in the Klamath Canyon.

Special Status Plant Species

Segment 1. The status of red-root yampah (*Perideridia erythrorhiza*) as state candidate species indicates that it is vulnerable to threats to its existence throughout Oregon. The inclusion of this species on List 1 of the Oregon Natural Heritage Program indicates that it is threatened or endangered throughout its entire range.

Conclusion. The importance criterion for a natural process or system is met. The geologic features are not more than locally significant, exemplary, or unique to this area; therefore, they do not meet the importance criterion. The presence red-root yampah in Segment 1 is of more than local significance, and thus the special status plant species values meet the criterion for importance. The vegetation in the upper Klamath River Canyon, which provides a wide diversity of plant and animal species, communities, and habitats, is unique and of more than local significance; therefore, it meets the criterion for importance.

Natural Hazards

Natural hazards in the upper Klamath River study area include landslides, rockfalls, and the river itself. Seismic (earthquake) activity is low.

Conclusion. None of the natural hazards in the proposed ACEC pose a significant threat to human life and safety, or to property; therefore, they do not meet the importance criterion.

SUMMARY

It is only necessary to meet the relevance and importance criteria for one value to be designated an ACEC. Segment 1 of the upper Klamath River Canyon has been found to meet the relevance criterion for the presence of historic, cultural (both prehistoric values and Native American traditional use), and scenic values; fish and wildlife (both populations and habitat) resources; a natural process or system (both priority plant species and vegetation); and natural hazards (landslides, rockslides, and the river itself). The Klamath Canyon has been found to meet the importance criterion for substantial significance and value of all the features mentioned above, except natural hazards.

CONCLUSION

Segment 1 of the upper Klamath River Canyon, and from rim to rim, meet the criteria and are identified as a potential addition to an area of critical environmental concern. The described area is recommended for further evaluation as an addition to an area of critical environmental concern in the Upper Klamath River Management Plan. This land use planning process is currently underway.

Under management direction in the existing land use plan (Klamath Falls Resource Area Resources Management Plan), the identified relevant and important values within the proposed addition to the ACEC are adequately protected from degradation. No special temporary management actions will be required until the area is fully evaluated in the Upper Klamath River Management Plan and Environmental Impact Statement. At that time the record of decision for the final management plan will replace management actions in the Klamath Falls Resource Area RMP.

Appendix J – Plant Species List

Working Plant List For The Upper Klamath River Canyon Vicinity
with USGS Quadrangle Map Locations noted (Section from the backwaters of Copco Reservoir, CA, to J.C. Boyle Reservoir, OR)

TREES

BETULACEAE
Alnus rhombifolia (white alder) CH, MH, SS
Betula occidentalis (western birch) CH, MH, SS

CUPRESSACEAE
Calocedrus decurrens (incense cedar) CH, MH, SS
Juniperus occidentalis var. *occidentalis* (western juniper) CH, MH, SS

FAGACEAE
Quercus garryana var. *garryana* (Oregon white oak) CH, MH, SS
Quercus kelloggii (California black oak) CH, MH, SS

OLEACEAE
Fraxinus latifolia (Oregon ash) CH, MH, SS

PINACEAE
Abies concolor var. *lowiniana* (white fir) CH, MH, SS
Pinus contorta ssp. *murrayana* (lodgepole pine) CH, MH
Pinus lambertiana (sugar pine) CH, MH, SS
Pinus ponderosa (ponderosa pine) CH, MH, SS
Pseudotsuga menziesii var. *menziesii* (Douglas-fir) CH, MH, SS

SALICACEAE
Populus balsamifera ssp. *trichocarpa* (black cottonwood) SS
Populus tremuloides (quaking aspen) CH, MH
Salix laevigata (red willow) CH, MH, SS
Salix lucida ssp. *lasiandra* (shining willow) CH, MH, SS
Salix lutea (yellow willow) CH, SS

SHRUBS AND VINES

ANACARDIACEAE
Rhus trilobata (three-leaf sumac) MH, SS
Toxicodendron diversilobum (poison oak) CH, MH, SS

ASTERACEAE
Artemisia arbuscula ssp. *thermopola* (low sagebrush) CH, MH, SS
Artemisia cana ssp. *bolanderi* (silver sagebrush) CH, MH
Artemisia tridentata ssp. *tridentata* (Great Basin sagebrush) CH, MH
Artemisia tridentata ssp. *vaseyana* (big sagebrush) CH
Chrysothamnus nauseosus ssp. *consimilis* (rabbit brush) CH, MH, SS
Chrysothamnus viscidiflorus ssp. *viscidiflorus* (green rabbit brush) CH, MH, SS
Ericameria bloomeri (goldenbush) CH, MH, SS

BERBERIDACEAE
Berberis aquifolium var. *aquifolium* (Oregon grape) CH, MH, SS
Berberis aquifolium var. *repens* (creeping Oregon grape) CH, MH, SS
Berberis nervosa (Oregon grape) MH

BETULACEAE
Alnus incana ssp. *tenuifolia* (mountain alder) CH
Alnus viridis ssp. *sinuata* (thin-leaf alder) MH

CAPRIFOLIACEAE
Lonicera ciliosa (orange honeysuckle) CH, MH, SS
Lonicera interrupta (chaparral honeysuckle) CH, MH, SS
Lonicera sp. (introduced honeysuckle) CH
Sambucus mexicana (blue elderberry) CH, MH, SS
Symphoricarpos albus var. *laevigatus* (snowberry) CH, MH, SS
Symphoricarpos mollis (creeping snowberry) CH, SS
Symphoricarpos rotundifolius var. *rotundifolius* (mountain snowberry) SS

CELASTRACEAE
Paxistima myrsinites (mountain lover, Oregon boxwood) CH, MH, SS

CHENOPODIACEAE
Sarcobatus vermiculatus (greasewood) MH

CORNACEAE
Cornus glabrata (smooth dogwood) CH, SS
Cornus sericea ssp. *sericea* (red-twig dogwood) CH, MH

ERICACEAE
Arctostaphylos nevadensis (pine-mat manzanita) CH, MH
Arctostaphylos patula (greenleaf manzanita) CH, MH, SS
Arctostaphylos viscida ssp. *viscida* (white-leaf manzanita) CH, MH
Chimaphila umbellata (prince's pine) CH, MH

FABACEAE
Cytisus scoparius (scotch broom) CH
Lupinus albifrons var. *douglasii* (lupine) CH, MH

FAGACEAE
Chrysolepis chrysophylla var. *minor* (chinquapin) CH, MH, SS
Quercus garryana var. *breweri* (scrub Oregon white oak) CH, MH

GARRYACEAE
Garrya fremontii (Fremont's silk-tassle) MH, SS

GROSSULARIACEAE
Ribes aureum var. *aureum* (golden currant) CH, MH
Ribes binominatum (Siskiyou gooseberry) MH
Ribes cereum var. *cereum* (wax currant) CH, MH
Ribes divaricatum var. *pubiflorum* (gooseberry) CH, SS
Ribes hudsonianum var. *petiolare* (western black currant) SS
Ribes inerme var. *inerme* (white-stemmed gooseberry) CH, MH, SS
Ribes lobbii (gummy gooseberry) CH, SS
Ribes sanguineum var. *sanguineum* (red-flowering currant) CH, SS
Ribes velutinum (plateau gooseberry) CH, MH, SS

PHILADELPHACEAE
Philadelphus lewisii (Lewis' mockorange) CH, MH, SS

POLYGONACEAE
Eriogonum sphaerocephalum var. *halimioides* (wild buckwheat) CH, MH, SS
Eriogonum umbellatum var. *polyanthum* (sulfur flower) CH, MH

RANUNCULACEAE
Clematis ligusticifolia (clematis) CH, SS

RHAMNACEAE
Ceanothus cuneatus var. *cuneatus* (buckbrush) CH, MH, SS
Ceanothus cuneatus x *prostratus* (hybrid ceanothus) CH, MH
Ceanothus integerrimus (deerbrush) CH, MH, SS
Ceanothus prostratus (mahala mat) CH, IG, K, MH, PM, SN, SS, SoM, SC, SuM
Ceanothus velutinus var. *velutinus* (snowbrush) CH, MH
Rhamnus purshiana (cascara) CH, SS
Rhamnus rubra (sierra coffeeberry) CH

ROSACEAE
Amelanchier utahensis (Utah serviceberry) CH, MH, SS
Cercocarpus betuloides var. *betuloides* (mountain mahogany) CH, MH, SS
Cercocarpus betuloides var. *macrourus* CH, MH, SS
Cercocarpus ledifolius var. *intermontanus* (curl-leaf mountain mahogany) CH
Crataegus douglasii (black hawthorn) CH, SS
Holodiscus discolor (oceanspray) CH, SS
Holodiscus microphyllus var. *glabrescens* (rock spirea) MH
Malus fusca (Oregon crab apple) MH
Physocarpus capitatus (ninebark) SS
Prunus emarginata (bittercherry) CH, MH
Prunus subcordata (Klamath plum) CH, MH, SS
Prunus virginiana var. *demissa* (chokecherry) CH, MH, SS

Purshia tridentata var. *tridentata* (antelope brush) CH, MH, SS
Rosa californica (California rose) CH, MH, SS
Rosa gymnocarpa (bald-hip rose) CH, MH, SS
Rosa woodsii var. *ultramontana* (Woods' rose) CH, MH, SS
Rosa x "harrisonian" (pioneer rose) CH
Rubus discolor (Himalayan blackberry) CH, MH, SS
Rubus laciniatus (cut-leaved blackberry) CH, SS
Rubus leucodermis (black raspberry, blackcap) CH, MH, SS
Rubus parviflorus (thimbleberry) CH, MH, SS
Rubus ursinus (Pacific blackberry) CH, SS
Spiraea douglasii (Douglas' spirea) CH, MH, SS

SALICACEAE
Salix exigua (narrow-leaf willow) CH, SS
Salix scouleriana (Scouler's willow) CH, MH, SS

SOLANACEAE
Lycium barbarum (matrimony vine) CH

VITACEAE
Vitis californica (western wild grape) CH, MH, SS

HERBACEOUS PLANTS

ALISMATACEAE
Alisma plantago-aquatica (water plantain) CH
Sagittaria cuneata (arrowhead, wapato) CH

AMARANTHACEAE
Amaranthus retroflexus (green amaranth) SS

APIACEAE
Angelica arguta (angelica) MH
Angelica hendersonii (angelica) CH
Anthriscus caucalis (bur-chervil, Klingons) CH, MH, SS
Berula erecta (cut-leaf water parsnip) CH, MH
Cicuta douglasii (western water hemlock) MH, SS
Conium maculatum (poison hemlock) CH, MH, SS
Daucus carota (wild carrot, Queen Anne's lace) CH, MH
Heracleum lanatum (cow parsnip) CH
Lomatium bicolor var. *leptocarpum* (lomatium) CH, MH, SS
Lomatium californicum (iknish, California lomatium) CH, MH, SS
Lomatium dissectum var. *mallifidum* (fern-leaf lomatium) CH, MH
Lomatium macrocarpum (large-seeded lomatium) CH, MH, SS
Lomatium nudicaule (pestle lomatium) CH, MH, SS
Lomatium piperi (Piper's lomatium) CH, MH
Lomatium triternatum var. *triternatum* (nine-leafed lomatium) CH, MH, SS
Lomatium vaginatum (lomatium) CH, MH, SS
Osmorhiza occidentalis (western sweet cicely) CH
Osmorhiza purpurea (sweet cicely) CH, MH, SS
Perideridia bolanderi ssp. *bolanderi* (Bolander's yampa) CH, MH, SS
Perideridia erythrorhiza (red-root yampa) CH, MH, SS
Perideridia gairdneri ssp. *borealis* (Gairdner's yampa) CH, MH
Perideridia howellii (Howell's yampa) CH, MH
Perideridia oregana (ipos, yampa) CH, MH, SS
Sanicula graveolens (snakeroot, poison sanicle) CH, MH, SS
Yabea microcarpa CH

APOCYNACEAE
Apocynum androsaemifolium (bitter dogbane) CH, MH, SS
Apocynum cannabinum (Indian hemp) CH, SS

ASCLEPIADACEAE
Asclepias cordifolia (heart-leaf milkweed) MH
Asclepias fascicularis (narrow-leaf milkweed) MH, SS
Asclepias speciosa (common milkweed) CH, MH, SS

ASTERACEAE
Achillea millefolium var. *lanulosa* (common yarrow) CH, MH, SS
Acroptilon repens (Russian knapweed) CH
Adenocaulon bicolor (trail plant) MH
Ageratina occidentalis CH
Anaphalis margaritacea (pearly everlasting) CH, MH
Ancistrocarphus filagineus (wooly fishhooks) MH, PM

Antennaria argentea CH
Antennaria dimorpha CH, MH
Antennaria howellii ssp. *howellii* CH, MH
Antennaria rosea ssp. *rosea* CH, MH
Anthemis cotula (dog-fennel) CH, MH, SS
Arctium minus (burdock) CH, MH, SS
Arnica cordifolia (heart-leafed arnica) CH, SS
Artemisia douglasiana (mugwort) CH, MH, SS
Aster campestris (aster) CH
Aster lanceolatus ssp. *hesperius* CH
Aster ledophyllus CH, MH
Balsamorhiza deltoidea (deltoid balsamroot) CH, MH, SS
Balsamorhiza sagittata (arrow-leaf balsamroot) CH, MH
Bidens cernua var. *cernua* (nodding bur-marigold) SS
Blepharipappus scaber (rough eyelash) CH, MH, SS
Centaurea nigra CH
Centaurea solstitialis (yellow star-thistle) CH, MH, SS
Centaurea squarrosa (knapweed) CH
Chaenactis douglasii var.? (dusty maiden) SS
Chamomilla suaveolens (pineapple weed) MH, SS
Cichorium intybus (chicory) MH, SS
Cirsium cymosum (peregrine thistle) CH
Cirsium occidentale var. *candissimum* (snowy thistle) SS
Cirsium vulgare (bull thistle) CH, MH, SS
Conyza canadensis (horseweed) CH
Crepis occidentalis CH
Crocidium multicaule (spring-gold) CH
Echinops sphaerocephalus (globe thistle) CH, MH, SS
Erigeron strigosus CH
Eriophyllum lanatum var. *integrifolium* (woolly sunflower) CH, MH, SS
Euthamia occidentalis (western goldenrod) CH, MH, SS
Grindelia nana (gumweed) CH
Helenium bigelovii (Bigelow's sneezeweed) CH, MH
Helianthus bolanderi (Bolander's sunflower) MH
Hieracium albiflorum (white flowered hawkweed) CH, MH, SS
Lactuca saligna CH, SS
Lactuca serriola (prickly lettuce) CH, SS
Leucanthemum vulgare (ox-eye daisy) MH, SS
Madia citriodora (lemon-scented tarweed) CH
Madia elegans ssp. *elegans* (elegant tarweed) CH, MH, SS
Madia elegans ssp. *vernalis* (spring-blooming elegant tarweed) CH
Madia exigua (threadstem madia) CH, MH, SS
Madia glomerata (mountain tarweed) CH
Madia gracilis (slender tarweed) MH, SS
Madia minima (small tarweed) CH, MH
Microseris nutans SS
Nothocalais troximoides (false agoseris) MH
Psilocarphus tenellus var. *tenellus* (woolly-heads) MH
Scorzonera hispanica (Spanish salsify, viper's grass) CH
Senecio aronicoides (California butterweed) CH
Senecio integerrimus var. *exaltatus* (ragwort) CH, MH
Solidago californica (California goldernrod) CH, MH

Sonchus asper ssp. *asper* (prickly sow thistle) <u>MH</u>
Stephanomeria tenuifolia (wire lettuce) CH, MH, SS
Taraxacum officinale (dandelion) <u>CH</u>, <u>MH</u>, SS
Tragopogon dubius (yellow salsify) <u>CH</u>, MH, SS
Wyethia angustifolia (narrow-leaf mule's ears) <u>CH</u>, MH, SS

BORAGINACEAE
Amsinckia menziesii var. *intermedia* (fiddleneck) <u>CH</u>, MH, SS
Cryptantha sp. CH
Cynoglossum occidentale (hound's tongue) <u>CH</u>, MH

BRASSICACEAE
Alyssum alyssoides <u>CH</u>, MH
Arabidopsis thaliana (mouse-ear cress, thale cress) <u>MH</u>
Arabis holboellii var. *pinetorum* (Holboell's rockcress) <u>CH</u>
Athysanus pusillus (sandweed) <u>MH</u>, SS
Barbarea orthoceras (American wintercress) <u>CH</u>, MH
Brassica nigra (black mustard) CH, MH
Descurainia incisa ssp. *incisa* (tansy mustard) CH, SS
Descurainia sophia (tansy mustard) <u>CH</u>
Draba verna (Whitlow grass) CH, <u>MH</u>
Idahoa scapigera (flat-pod) CH, MH, <u>SS</u>
Isatis tinctoria (dyer's woad) <u>MH</u>
Lepidium campestre (poorman's peppergrass) <u>CH</u>, MH, SS
Lepidium montanum var. *canescens* CH
Phoenicaulis cheiranthoides (dagger-pod) CH, MH
Rorippa nasturtium-aquaticum (watercress) CH, MH
Sisymbrium altissimum (tumble mustard) <u>CH</u>, SS
Thelypodium howellii ssp. howellii <u>MH</u>

CAMPANULACEAE
Campanula scouleri (Scouler's harebell) <u>MH</u>
Downingia bacigalupii (downingia) <u>CH</u>, MH
Downingia yina <u>MH</u>

CARYOPHYLLACEAE
Arenaria serpyllifolia ssp. *serpyllifolia* (sandwort) <u>SS</u>
Cerastium glomeratum (mouse-ear chickweed) CH, MH, SS
Holosteum umbellatum ssp. *umbellatum* (jagged chickweed) CH, <u>MH</u>
Minuartia douglasii (sandwort) <u>MH</u>
Pseudostellaria jamesiana <u>CH</u>, SS
Scleranthus annuus ssp. *annuus* (knawel) <u>MH</u>, SS
Silene gallica (pioneer flower) <u>SS</u>
Silene lemmonii <u>CH</u>, <u>MH</u>, SS
Stellaria media (common chickweed) <u>CH</u>

CHENOPODIACEAE
Chenopodium album (lamb's quarters) MH, SS
Chenopodium ambrosioides (Mexican tea) <u>CH</u>, MH, SS

CONVOLVULACEAE
Calystegia occidentalis ssp. *occidentalis* CH, MH, SS
Convolvulus arvensis (morning glory) CH, MH, SS

CRASSULACEAE
Sedum stenopetalum (worm-leaf stonecrop) CH, MH, SS

CUSCUTACEAE
Cuscuta californica var. *californica* (dodder) CH

DIPSACACEAE
Dipsacus fullonum (teasel) CH, MH, SS

ERICACEAE
Pterospora andromedea (pine drops) CH, MH
Pyrola picta (white-veined wintergreen) CH, MH

EUPHORBIACEAE
Chamaesyce glyptosperma (spurge) CH, MH, SS
Eremocarpus setigerus (dove weed, turkey mullein) CH, MH, SS

FABACEAE
Astragalus accidens var. *hendersonii* (loco-weed) CH
Astragalus obscurus (loco-weed) MH
Lotus corniculatus (bird's-foot trefoil) MH, SS
Lotus crassifolius var. *crassifolius* CH
Lotus micranthus MH
Lotus purshianus var. *purshianus* (Spanish lotus) CH, MH, SS
Lotus wrangelianus CH, MH
Lupinus argenteus var. *argenteus* CH, MH
Lupinus argenteus var. *heteranthus* CH
Lupinus polyphyllus var. *pallidipes* MH
Lupinus tracyi (Tracy's lupine) CH, MH
Medicago lupulina (black medick) CH, MH, SS
Medicago polymorpha (California bur-clover) SS
Medicago sativa (alfalfa) CH
Melilotus alba (white sweet clover) CH, MH, SS
Melilotus indica (sour clover) MH
Melilotus officinalis (yellow sweet clover) CH, MH
Trifolium bifidium var. *decipiens* CH, MH
Trifolium cyathiferum CH, MH
Trifolium eriocephalum var. *eriocephalum* MH, SS
Trifolium fragiferum (strawberry clover) SS
Trifolium kingii var. *productum* (Shasta clover) SS
Trifolium macrocephalum (large-headed clover) CH, MH, SS
Trifolium pratense MH, SS
Trifolium repens (white clover) CH, MH, SS
Trifolium variegatum phase 1 CH
Vicia americana var. *americana* (American vetch) CH, MH
Vicia benghalensis (purple vetch) CH, MH, SS

GENTIANACEAE
Swertia albicaulis var. nitida CH, MH

GERANIACEAE
Erodium cicutarium (filaree) CH, MH, SS

HYDROPHYLLACEAE
Hydrophyllum capitatum var. *alpinum* (woolen-breeches) MH
Nemophila parviflora var. *austinae* (water-leaf) CH, MH, SS
Phacelia hastata ssp. *hastata* (silverleaf phacelia) CH
Phacelia heterophylla ssp. *virgata* (varileaf phacelia) CH, MH
Phacelia linearis MH
Phacelia racemosa CH

HYPERICACEAE
Hypericum anagalloides (tinker's penny) CH, MH, SS
Hypericum perforatum (Klamath weed) CH, MH, SS

IRIDACEAE
Iris missouriensis (blue flag) CH, MH
Sisyrinchium bellum (blue-eyed grass) CH, SS
Sisyrinchium douglasii var. *douglasii* (grass widows) CH, MH, SS

LAMIACEAE
Agastache urticifolia (nettleleaf horsemint) CH, MH, SS
Lamium purpureum CH
Marrubium vulgare (horehound) CH, MH, SS
Monardella odoratissima ssp. *odoratissima* (coyote mint) CH, MH
Monardella purpurea (Siskiyou monardella) CH, MH
Prunella vulgaris var. *lanceolata* (self-heal, heal-all) CH, MH, SS
Stachys ajugoides var. *rigida* CH
Trichostema lanceolatum (vinegar weed) CH, MH, SS
Trichostema oblongum MH

LEMNACEAE
Lemna minor (duckweed) CH, MH

LILIACEAE
Allium acuminatum MH
Allium amplectens CH, MH
Allium bolanderi var. *bolanderi* (Bolander's onion) SS
Allium membranaceum? MH
Allium peninsulare var. peninsulare CH
Allium siskiyouense (siskiyou onion) CH, SS
Allium tolmiei var. *tolmiei* (Tolmie's onion) CH
Brodiaea coronaria ssp. *coronaria* (harvest brodiaea) CH, MH, SS
Brodiaea elegans ssp. ? (harvest brodiaea) MH
Calochortus greenei (Green's Mariposa lily) MH, SS
Calochortus tolmiei (Tolmie's cat ears) MH, SS
Camassia quamash ssp. *breviflora* (camas) CH, MH
Dichelostemma capitatum ssp. *capitatum* (blue dicks) MH, SS
Dichelostemma congestum (fork-tooth ookow) CH, MH, SS

Dichelostemma multiflorum (wild hyacinth) CH
Fritillaria affinis var. *affinis* (checker lily) CH, MH
Fritillaria pudica (yellow bells) SS
Fritillaria recurva (scarlet fritillary, red bells) MH, SS
Lilium pardalinum ssp. *vollmeri* (Vollmer's lily) MH
Lilium washingtonianum ssp *purpurascens* (Washington lily) CH, MH
Smilacina racemosa (false Solomon's seal) CH, MH, SS
Smilacina stellata (star Solomon's seal) CH, MH
Streptopus amplexifolius var. *americanus* (twisted stalk) CH
Triteleia hyacinthina (white brodiaea) CH, MH, SS
Triteleia laxa (Ithuriel's spear) CH
Zigadenus paniculatus (zigadene lily) CH, MH
Zigadenus venenosus var. *venenosus* (death camas) CH, MH, SS

LINACEAE
Hesperolinon micranthum (dwarf flax) CH

LOASACEAE
Mentzelia dispersa CH, MH, SS

MALVACEAE
Malva neglecta (cheeseweed) CH, MH, SS
Sidalcea oregana ssp. *oregana* (Oregon sidalcea) CH, MH, SS

ONAGRACEAE
Clarkia gracilis ssp. *gracilis* (slender clarkia) CH, MH
Clarkia purpurea ssp. *quadrivulnera* (four-spot) CH
Clarkia rhomboidea CH, MH
Epilobium angustifolium ssp. *circumvagum* (fireweed) MH
Epilobium brachycarpum (willowherb) CH, MH
Epilobium ciliatum ssp. *ciliatum* CH, MH
Epilobium densiflorum MH
Epilobium saximontanum MH
Oenothera elata ssp. *hirsutissima* (evening primrose) CH

ORCHIDACEAE
Calypso bulbosa (fairy slipper) SS
Cephalanthera austiniae (phantom orchid) CH
Corallorhiza maculata (spotted coralroot) CH
Corallorhiza striata (striped coralroot) CH
Cypripedium montanum (mountain lady's slipper) CH
Piperia elegans (crane orchid) CH
Platanthera leucostachys (white-flowered bog-orchid) CH, MH

OROBANCHACEAE
Orobanche uniflora (broom-rape) CH, MH, SS

PAEONIACEAE
Paeonia brownii (peony) CH, MH

PAPAVERACEAE
Eschscholzia californica (California poppy) CH, SS

PLANTAGINACEAE
Plantago lanceolata (English plantain) CH, MH, SS
Plantago major (broadleaf plantain) CH, SS

POLEMONIACEAE
Collomia grandiflora (large-flowered collomia) CH, MH, SS
Gilia capitata ssp. *capitata* (bluefield gilia) CH, MH, SS
Ipomopsis aggregata ssp. *formosissima* (scarlet gilia) CH, MH
Linanthus bolanderi MH, SS
Navarretia divaricata ssp. *vividior* (mountain navarretia) CH
Navarretia intertexta ssp. *propinqua* CH, MH
Phlox gracilis CH, MH
Phlox speciosa ssp. *occidentalis* (phlox) CH, MH

POLYGONACEAE
Eriogonum compositum var. *compositum* (wild buckwheat) MH
Eriogonum elatum var. *elatum* (wild buckwheat) CH
Eriogonum nudum var. *oblongifolium* (naked-stemmed eriogonum) CH, MH, SS
Eriogonum umbellatum var. ? (sulphur flower) CH, MH, SS
Polygonum amphibium var. *emersum* (kelp) SS
Polygonum bistortoides (bistort) CH, MH
Polygonum californicum (California smartweed) CH
Polygonum douglasii ssp. *majus* CH, MH, SS
Polygonum punctatum (water smartweed) MH, SS
Rumex acetosella (sheep sorrel) CH, MH, SS
Rumex crispus (curly dock) CH, MH, SS
Rumex occidentalis (western dock) MH, SS
Rumex salicifolius var. *denticulatus* (California dock) CH, MH
Rumex salicifolius var. *salicifolius* (willow-leaf dock) CH, MH, SS

PORTULACACEAE
Claytonia exigua ssp. *exigua* (springbeauty) MH
Claytonia parviflora ssp. *parviflora* (miner's lettuce) CH, MH
Claytonia perfoliata ssp. *perfoliata* (miner's lettuce) CH, MH
Claytonia rubra ssp. *rubra* (red claytonia) CH, MH
Montia chamissoi (toad lily) CH
Montia linearis CH, MH, SS

POTAMOGETONACEAE
Potamogeton alpinus ssp. *tenuifolius* (pondweed) CH, MH

PRIMULACEAE
Dodecatheon pulchellum (shooting star) CH, MH
Trientalis latifolia (western starflower) CH, MH

RANUNCULACEAE
Actaea rubra (western baneberry) CH
Anemone deltoidea (Columbia windflower) CH, MH
Aquilegia formosa (columbine) CH, MH

Delphinium depauperatum CH, MH
Delphinium nuttallianum (dwarf larkspur) CH, MH, SS
Ranunculus aquatilus var.*capillaceus* (water buttercup) MH
Ranunculus arvensis CH
Ranunculus occidentalis (western buttercup) CH, MH
Ranunculus orthohynchus var. *orthohynchus* (buttercup) MH

ROSACEAE
Fragaria vesca (wild strawberry) CH, MH
Fragaria virginiana (wild strawberry) CH, MH, SS
Geum macrophyllum (bigleaf avens) MH
Geum triflorum (old man's whiskers) CH
Horkelia daucifolia (carrot-leafed horkelia) MH
Potentilla flabellifolia (fanfoil) CH
Potentilla glandulosa ssp. *ashlandica* CH, MH
Potentilla glandulosa ssp. *glandulosa* (sticky cinquefoil) CH, MH, SS
Potentilla gracilis var. *gracilis* (slender cinquefoil) CH, MH, SS
Potentilla millefolia MH, SS
Sanguisorba minor ssp. *muricata* (garden burnet) MH
Sanguisorba occidentalis (western burnet) CH, MH, SS

RUBIACEAE
Galium aparine (catchweed bedstraw) CH, MH, SS
Galium bolanderi (Bolander's bedstraw) MH
Galium boreale ssp. *septentrionale* (northern bedstraw) CH

SAXIFRAGACEAE
Lithophragma heterophyllum (woodland star) CH
Lithophragma parviflorum var. *parviflorum* (woodland star) CH, MH, SS
Saxifraga integrifolia (saxifrage, woodland star) CH, MH
Saxifraga oregana (saxifrage) MH
Tellima grandiflora (fringe cups) SS

SCROPHULARIACEAE
Castilleja affinis ssp. *affinis* (paintbrush) CH
Castilleja applegatei ssp. *pinetorum* (Applegate's paintbrush) CH, MH
Castilleja lacera (paintbrush) CH
Castilleja miniata ssp. *miniata* (giant red paintbrush) CH, MH
Castilleja pruinosa CH, SS
Castilleja tenuis (paintbrush) CH, SS
Collinsia parviflora MH, SS
Collinsia rattanii MH
Linaria vulgaris (butter and eggs, toad flax) CH
Mimulus guttatus var. *guttatus* (yellow monkeyflower) CH, MH, SS
Mimulus primuloides ssp. *primuloides* (primrose monkeyflower) MH
Orthocarpus bracteosus (purple owl's clover) CH, MH
Orthocarpus imbricatus (imbricated owl's clover) CH, MH, SS
Orthocarpus luteus (yellow owl's clover) CH, MH
Pedicularis densiflora (Indian warrior) CH, MH, SS
Penstemon deustus var. *pedicellatus* (hot rock penstemon) CH, MH, SS
Penstemon heterophyllus var. *purdyi* CH
Penstemon humilis var. *humilis* CH, MH, SS

Penstemon parvulus MH, SS
Penstemon roezlii CH
Penstemon rydbergii var. *oreocharis* CH
Tonella tenella MH
Verbascum blattaria (moth mullein) CH, MH, SS
Verbascum thapsus (flannel mullein) CH, MH, SS
Veronica anagallis-aquatica (water speedwell) CH, MH
Veronica arvensis (veronica, speedwell) CH, MH, SS
Veronica catenata (chain speedwell) MH
Veronica peregrina ssp. *xalapensis* (purslane speedwell) CH, MH

SOLANACEAE
Nicotiana attenuata (coyote tobacco) CH, SS
Solanum dulcamara (bittersweet nightshade) CH

URTICACEAE
Urtica dioica ssp. *holosericea* (stinging nettle) CH, MH, SS

VALERIANACEAE
Plectritis brachystemon CH
Plectritis congesta (short-spurred plectritis, sea-blush) CH, MH
Plectritis macrocera SS

VIOLACEAE
Viola adunca MH
Viola bakeri CH, MH, SS
Viola purpurea ssp. *purpurea* (mountain violet) CH
Viola sororia ssp. *affinis* (leonte violet) SS

VISCACEAE
Phoradendron densum (dense mistletoe) CH, MH, SS
Phoradendron juniperinum (juniper mistletoe) IG
Phoradendron villosum (oak mistletoe) CH, IG, SS

ZYGOPHYLLACEAE
Tribulus terrestris (puncture vine) SS

GRASSES AND GRASS-LIKE PLANTS

CYPERACEAE
Carex dudleyi (sedge) CH
Cyperus squarrosus CH
Eleocharis acicularis (spikerush) CH
Scirpus acutus var. *occidentalis* (hardstem bulrush, tule) CH, SS
Scirpus microcarpus (tule) CH, MH, SS
Scirpus pungens (three-square bulrush) SS

JUNCACEAE
Juncus effusus var. *pacificus* CH
Juncus sp. (rush) SS

POACEAE
Avena barbata (wild oats) CH, MH
Bromus carinatus var.? (California brome) CH
Bromus hordaeceus SS
Bromus madritensis ssp. *rubens* (foxtail chess, red brome) CH, MH, SS
Bromus tectorum (cheatgrass) CH, MH, SS
Cynosurus echinatus (hedgehog dogtail) CH, MH, SS
Elymus elymoides ssp. *elymoides* (squirrel-tail) CH, MH, SS
Elymus glaucus ssp. *glaucus* (blue wild rye) MH, SS
Festuca idahoensis (Idaho fescue) MH, SS
Hordeum depressum (low barley) SS
Hordeum sp. (fox-tail barley) CH, SS
Koeleria macrantha (junegrass) CH, MH, SS
Phalaris arundinacea (canary reed grass) CH, MH, SS
Phleum pratense (timothy) CH, MH, SS
Phragmites australis (common reed) CH
Poa bulbosa (Hoover grass, bulbous bluegrass) CH, MH, SS
Polypogon monspeliensis (annual beard grass) SS
Taeniatherum caput-medusae (medusa-head wild rye) MH

TYPHACEAE
Sparganium sp. (bur-reed) CH, MH
Typha latifolia (cattail) CH, SS

FERNS

DENNSTAEDTIACEAE
Pteridum aquillinum var. *pubescens* (bracken fern) CH, MH

DRYOPTERIDACEAE
Athyrium filix-femina var. *cyclosorum* (lady fern) CH
Cystopteris fragilis (brittle bladder fern) CH, MH
Polystichum imbricans ssp. *imbricans* (imbricated sword fern) CH

PTERIDACEAE
Cryptogramma acrostichoides (American parsley fern) CH

HORSETAILS

EQUISETACEAE
Equisetum arvense (horsetail) CH, SS
Equisetum hyemale ssp. *affine* (smooth scouring rush) CH, MH

LICHENS

Bryoria fremontii (black hanging lichen) CH, MH, SS
Hypogymnia imshaughii CH
Letharia vulpina (wolf moss) CH, MH, SS
Usnea lapponica (white hanging lichen) MH

Key

CH	=	Chicken Hills Quadrangle
MH	=	Mule Hill Quadrangle
SS	=	Secret Springs Mountain Quadrangle
_x	=	Plant Map Location supported by a Herbarium Sample (within the author's possession)

Vascular Plant Names derived from and updated by The Jepson Manual, 1993
Moss and Lichen Names derived from Mosses, Lichens & Ferns of Northwest North America, 1988

Compilation Notes: Plant Locations are primarily derived from occurrences in plant lists compiled in 1998, 1999, and 2000 during ethnobotanical surveys conducted by Susan M. Gleason. Other sources of information include - plant samples within the collections possessed by the author; plants mentioned in notes taken by the author while doing archaeological and other work in the area between 1992-2000; plants reported in the 1993 and 1997 notes of Donn Todt; and locations noted within the California Native Plant Society's 1994 publication of its Inventory of Rare and Endangered Plants

Cautionary Note: Many plants have a acknowledged wider distribution than that which is reported by this list, but until a confirmed map point is recorded that larger distribution will not be reflected herein. Furthermore, the map occurrence frequency of a plant should not be taken as a reflection of the abundance of such a plant within any single quadrangle map area. Additionally, several plants are known to be in the area covered within this list but have yet to be confirmed by a specific reference to a location within the mapped area.

Revised June 20, 2002

Susan M. Gleason, UCR

Appendix K – Wildlife Species List

Priority Species Within the Upper Klamath River Management Area

Species	Federal Status	BLM Status	Other Status
Bat, Townsend's big eared	None	Bureau Tracking	State Sensitive
Deer, Black- tailed	None		Social status
Deer, Mule	None		Social status
Eagle, Bald	Threatened		
Elk	None		Social status
Goshawk, Northern	None	Bureau Sensitive	State Sensitive
Nuthatch, Pygmy	None	Bureau Tracking	State Sensitive Protection Buffer
Owl, Flammulated	None	Bureau Sensitive	Protection Buffer
Owl, Great Gray	None	Bureau Tracking	Protection Buffer
Owl, Northern Spotted	Threatened	Bureau Sensitive	
Woodpecker, White-headed	None	Bureau Sensitive	State Sensitive Protection Buffer

<u>List and status of the amphibians, reptiles, birds, and mammals documented to occur, or with the potential to occur, within the Upper Klamath River Management Area.</u>

		STATUS			
Common Name	***Scientific Name***	**FWS**	**BLM**	**OR**	**CA**
AMPHIBIANS					
Ensatina	*Ensatina eschscholtzii*				
Frog, Bull	*Rana catesbeiana*				
Frog, Foothill Yellow-legged	*Rana boylii*		BA	V	CSC
Frog, Oregon Spotted	*Rana pretiosa*		BA	C	CSC
Frog, Pacific Chorus *	*Hyla regilla*				
Frog, Tailed	*Ascaphus truei*		BT	V	CSC
Newt, Rough-skinned	*Taricha granulosa*				
Salamander, Long-toed	*Ambystoma macrodactylum*				
Salamander, Pacific Giant	*Dicamptodon tenebrosus*				
Spadefoot, Great Basin	*Scaphiopus intermontanus*				
Toad, Western *	*Bufo boreas*		BT	V	

REPTILES		**FWS**	**BLM**	**OR**	**CA**
Boa, Rubber *	*Charina bottae*				
Garter Snake, Common *	*Thamnophis siralis*				
Garter Snake, Klamath	*Thamnophis elegans biscutatus*				
Garter Snake, Northwestern	*Thamnophis ordinoides*				
Garter Snake, Western Aquatic	*Thamnophis couchii*				
Garter Snake, Western Terrestrial*	*Thamnophis elegans*				
Kingsnake, Common *	*Hypsiglena torquata*		BT	V	
Kingsnake, California Mountain*	*Lampropeltis zonata*		BT	V	
Lizard, Northern Alligator	*Elgaria coerulea*				
Lizard, Northern Sagebrush *	*Sceloporus graciosus graciosus*		BT		
Lizard, Short-horned	*Phrynosoma douglassii*				
Lizard, Southern Alligator *	*Elgaria multicarinata*				
Lizard, Western Fence *	*Sceloporus occidentalis*				
Pond Turtle, North-Western *	*Clemmys marmorata marmorata*		BT	C	CSC
Racer, Western Yellow-bellied *	*Coluber constrictor morman*				
Rattlesnake, Western *	*Crotalis viridis*				
Skink, Western *	*Eumeces skiltonianus*				
Slider, Red-eared	*Pseudemys scripta elegans*				
Snake, Gopher *	*Pituophis catenifer*				
Snake, Night	*Hypsiglena torquata*				
Snake, Ringneck *	*Diadophispunctatus*				
Snake, Sharptail *	*Contia tenuis*		BT	V	
Whipsnake, Striped *	*Masticophis taeniatus*				

FURBEARERS		**FWS**	**BLM**	**OR**	**CA**
Badger, American	*Taxidea taxus*				
Beaver, American *	*Castor canadensis*				
Bobcat *	*Lynx rufus*				
Coyote *	*Canis latrans*				
Ermine	*Mustela erminea*				
Fisher	*Martes pennanti*		BT	C	CSC

FURBEARERS (continued)		**FWS**	**BLM**	**OR**	**CA**
Fox, Common Gray *	*Urocyon cinereoargenteus*				
Fox, Red	*Vulpes vulpes*				
Marten, American	*Martes americana*		BT	V	
Mink *	*Mustela vison*				
Muskrat *	*Ondatra zibethica*				
Otter, River *	*Lutra canadensis*				
Raccoon *	*Procyon lotor*				
Ringtail *	*Bassariscus astutus*		BT	U	
Weasel, Long-tailed	*Mustela frenata*				

BATS		**FWS**	**BLM**	**OR**	**CA**
Bat, Big Brown *	*Eptesicus fuscus*				
Bat, Hoary	*Lasiurus cinereus*				
Bat, Pallid	*Antrozous pallidus*		BT	V	CSC
Bat, Silver-haired	*Lasionycteris noctivagans*		BTO	U	
Bat, Townsend's Big-eared *	*Corynothinus townsendii*		BT	C	CSC
Myotis, California *	*Myotis californicus*				
Myotis, Fringed	*Myotis thysanodes*		BT	V	
Myotis, Little Brown *	*Myotis lucifugus*				
Myotis, Long-eared	*Myotis evotis*		BT	U	
Myotis, Long-legged	*Myotis volans*		BT	U	
Myotis, Western small-footed	*Myotis ciliolabrumaka*		BT	U	
Myotis, Yuma *	*Myotis yumanensis*		BTO		

BIG GAME		**FWS**	**BLM**	**OR**	**CA**
Bear, Black *	*Ursus americanus*				X
Boar, Wild *	*Sus scrofa*			X	X
Deer, Black-tailed *	*Odocoileus hermionus columbianus*			X	
Deer, Mule *	*Odocoileus hermionus hermionus*				X
Elk *	*Cervus elaphus*			X	X
Mountain Lion *	*Felis concolor*			X	X

SMALL ANIMALS		FWS	BLM	OR	CA
Chipmunk, Least	*Tamias minimus*				
Chipmunk, Yellow-pine	*Tamias amoenus*				
Cottontail, Mountain	*Sylviagus nuttallii*				
Gopher, Botta's Pocket	*Thomoys bottae*				
Gopher, Western Pocket	*Thomoys mazama*				
Hare, Snowshoe	*Lepus americanus*				
Marmot, Yellow-bellied	*Marmota flaviventris*				
Mole, Broad-footed	*Scapanus latimous*				
Mole, Shrew	*Neurotrichus gibbsii*				
Mouse, Deer	*Peromyscus maniculatus*				
Mouse, Pacific Jumping	*Zapus trinotatus*				
Mouse, Western Harvest	*Reithrodontomys meqalotis*				
Mouse, Western Jumping	*Zapus princeps*				
Pika, American	*Ochotona princeps*				
Porcupine, Common	*Erethizon dorsatum*				
Jack Rabbit, Black-tailed	*Lepus californicus*				
Shrew, Dusky	*Sorex obscurus*				
Shrew, Marsh	*Sorex bendirii*				
Shrew, Trowbridge	*Sorex trowbridgii*				
Shrew, Vagrant	*Sorex vagrans*				
Shrew, Water	*Sorex palustris*				
Skunk, Striped	*Mephitis mephitis*				
Skunk, Western Spotted	*Spilogale qnaeilis*				
Squirrel, Belding's Ground	*Spermophilus beldingi*				
Squirrel, California Ground	*Spermophilus beecheyi*				
Squirrel, Golden-mantled Ground	*Spermophilus lateralis*				
Squirrel, Douglas	*Tamiasciurus douglasii*				
Squirrel, Northern Flying	*Glaucomys sabrinus*				
Squirrel, Western gray	*Sciurus griseus*				
Vole, Heather	*Phenacomys intermedius*				
Vole, Long-tailed	*Microtus longicaudus*				
Vole, Montane	*Microtis montanus*				
Vole, Western Red-backed	*Clethrionomys californicus*				
Woodrat, Bushy-tailed	*Neotoma cinera*				
Woodrat, Dusky-footed	*Neotoma fuscipes*				

BIRDS OF PREY		FWS	BLM	OR	CA
Eagle, Bald *	*Haliaeetus leucocephalus*	FT		ST	SE
Eagle, Golden *	*Aquila chrysaetos*				FP
Falcon, Peregrine *	*Falco peregrinus*		BS	SE	SE
Falcon, Prairie *	*Falco mexicanus*				CSC
Goshawk, Northern *	*Accipiter gentilis*		BS	C	CSC
Hawk, Sharp-shinned *	*Accipiter striatus*				CSC
Hawk, Cooper's *	*Accipiter cooperii*				CSC
Hawk, Red-tailed *	*Buteo jamaicensis*				
Kestrel, American *	*Falco sparverius*				
Merlin *	*Falco columbaris*		BA		CSC
Osprey *	*Pandion haliaetus*				CSC
Owl, Flammulated *	*Otus flammeolus*		BS	C	
Owl, Great Gray	*Strix nebulosa*		BT	V	SE
Owl, Great Horned *	*Bubo virginianus*				
Owl, Long-eared *	*Asio otus*				
Owl, Northern Pygmy *	*Glaucidium gnoma*				
Owl, Northern Saw-whet *	*Aegolius acadicus*				
Owl, Northern Spotted	*Strix occidentalis caurina*	FT		ST	
Owl, Western Screech *	*Otus kennicottii*				

GAME BIRDS		FWS	BLM	OR	CA
Dove, Mourning *	*Zenaida macroura*				
Grouse, Blue *	*Dendragapus obscurus*				
Grouse, Ruffed	*Bonasa umbellus*				
Quail, California *	*Callipepla californica*				
Quail, Mountain *	*Oreortyz pictus*		BT	U	
Turkey, Wild *	*Meleagris gallopavo*				

WOODPECKERS		FWS	BLM	OR	CA
Flicker, Northern *	*Colaptes auratus*				
Sapsucker, Red-breasted *	*Sphyrapicus rubber*				
Sapsucker, Red-naped	*Sphyrapicus nuchalis*				
Sapsucker, Williamson's	*Sphyrapicus thyroideus*		BT	U	
Woodpecker, Acorn *	*Melanerpes formicivorus*		BT		

WOODPECKERS (continued)		FWS	BLM	OR	CA
Woodpecker, Black-backed	*Picoides arcticus*	BS	BS	C	
Woodpecker, Downy *	*Picoides pubescens*				
Woodpecker, Hairy *	*Picoides villosus*				
Woodpecker, Lewis'*	*Melanerpes lewis*		BS	C	
Woodpecker, Pileated *	*Dryocopus pileatus*		BT	V	
Woodpecker, Three-toed	*Picoides tridactylus*		BS	C	
Woodpecker, White-headed *	*Picoides albolarvatus*		BS	C	

WATER ASSOCIATED BIRDS		FWS	BLM	OR	CA
Bufflehead *	*Bucephala albeala*		BA	U	
Coot, American	*Fulica americana*				
Cormorant, Double-crested *	*Phalacrocorax auritus*				
Duck, Harlequin	*Histrionicus histronicus*				
Duck, Ring-necked	*Aythyra collaris*				
Duck, Ruddy	*Oxyura jamaicensis*				
Duck, Wood*	*Aix sponsa*				
Egret, Great *	*Casmerodius albus*		BT		
Egret, Snowy	*Egretta thula*		BA	V	
Gadwall	*Anas strepera*				
Goldeneye, Barrow's	*Bucephala islandica*		BT	U	CSC
Goldeneye, Common	*Bucephala clangula*				
Goose, Canada *	*Branta canadensis*				
Goose, Ross'	*Chen rossii*				
Goose, Snow	*Chen caerulescens*				
Goose, White-fronted	*Anser albitrons*				
Grebe, Clark's	*Aechmophprus clarkii*				
Grebe, Eared	*Podiceps nigricollis*				
Grebe, Horned	*Podiceps auritus*		BT	P	
Grebe, Pied-billed	*Podilymbus podiceps*				
Grebe, Western	*Aechmophorus occidentalis*				
Gull, Bonaparte's	*Larus philidelphia*				
Gull, California *	*Larus californicus*				CSC
Gull, Ring-billed*	*Larus californicus*				

WATER ASSOCIATED BIRDS (continued)		**FWS**	**BLM**	**OR**	**CA**
Heron, Black-crowned Night *	*Nycticorax nycticorax*				
Heron, Great Blue *	*Ardea herodias*				
Heron, Green-backed	*Butorides striatus*				
Killdeer	*Charadrius vociferous*				
Merganser, Common *	*Mergus merganser*				
Merganser, Hooded	*Lophodytes cucullatus*				
Mallard *	*Anas paltyrhynchos*				
Pelican, American White*	*Pelecanus erythrorhynchos*		BA	V	CSC
Pintail, Northern	*Anas acuta*				
Redhead	*Aythyra americana*				
Sandpiper, Spotted *	*Actitis macularia*				
Shoveler, Northern	*Anas clypeata*				
Snipe, Common	*Galinago gallingo*				
Teal, Green-winged	*Anas crecca*				
Teal, Blue-winged	*Anas discors*				
Teal, Cinnamon	*Anas cyahoptera*				
Tern, Black	*Chlidonias niger*		BT		CSC
Tern, Caspian	*Sterna caspia*				
Tern, Forster’s	*Sterna forsteri*		BT		
Wigeon, American	*Anas americana*				

LAND BIRDS		**FWS**	**BLM**	**OR**	**CA**
Blackbird, Brewer’s *	*Euphagus cyanocephalus*				
Blackbird, Red-winged *	*Agelaius phoeniceus*				
Blackbird, Tricolored	*Agelaius tricolor*		BA	P	CSC
Blackbird, Yellow-headed	*Xanthocephalus xanthocephalus*				
Bluebird, Mountain *	*Sialia currucoides*				
Bluebird, Western *	*Sialia mexicana*				
Bunting, Lazuli *	*Passerina amoena*				
Bushtit *	*Pasltriparus minimus*				
Chat, Yellow-breasted *	*Icteria virens*				CSC
Chickadee, Black-capped *	*Parus articapillus*				CSC
Chickadee, Chestnut-backed	*Parus rufescens*				
Chickadee, Mountain *	*Parus gambeli*				

LAND BIRDS (continued)		FWS	BLM	OR	CA
Cowbird, Brown-headed *	*Molothrus ater*				
Creeper, Brown *	*Certhia Americana*				
Crossbill, Red *	*Loxia curvirostra*				
Dipper, American *	*Cinclus mexicanus*				
Finch, Cassin's *	*Carpodacus cassinii*				
Finch, House *	*Carpodacus mexicanus*				
Finch, Purple *	*Carpodacus cassinii*				
Flicker, Northern *	*Colaptes auratus*				
Flycatcher, Ash-throated	*Myiarchus cinerascens*				
Flycatcher, Cordilleran	*Empidonax occidentalis*				
Flycatcher, Dusky *	*Empidonax oberholseri*				
Flycatcher, Gray *	*Empidonax wrightii*				
Flycatcher, Hammond's	*Empidonax hammondii*				
Flycatcher, Olive-sided *	*Contopus borealis*		BT	V	
Flycatcher, Pacific-slope	*Empidonax difficilis*				
Flycatcher, Willow *	*Empidonax trailii*		BT	U	SE
Gnatcatcher, Blue-gray	*Polioptila caerulea*		BT		
Goldfinch, American *	*Carduelis tristis*				
Goldfinch, Lesser *	*Carduelis psaltria*				
Grosbeak, Black-headed *	*Phucticus lelanocephalus*				
Grosbeak, Evening	*Coccothraustes vespertinus*				
Grosbeak, Rose-breasted *	*Pheucticus ludovicianus*				
Hummingbird, Allen's *	*Selasphorus sasin*		BT		
Hummingbird, Anna's	*Calypte anna*				
Hummingbird, Black-chinned	*Archilochus alexandri*				
Hummingbird, Calliope *	*Stellula calliope*				
Hummingbird, Rufus	*Selasphorus rufus*				
Junco, Dark-eyed *	*Junco hyemalis*				
Kinglet, Golden-crowned *	*Regulus satrapa*				
Kinglet, Ruby-crowned *	*Regulus calendula*				
Kingbird, Western	*Tyrannus verticalis*				
Kingfisher, Belted *	*Ceryle alcyon*				
Martin, Purple	*Progne subis*		BS	C	CSC
Meadowlark, Western *	*Sturnella neglecta*				
Nighthawk, Common *	*Chordeiles minor*				
Nuthatch, Pygmy *	*Sitta pygmaea*		BT	V	
Nuthatch, Red-breasted *	*Sitta Canadensis*				
Nuthatch, White-breasted *	*Sitta carolinersis*				

LAND BIRDS (continued)		FWS	BLM	OR	CA
Oriole, Bullock's *	*Icterus bullockii*				
Pipit, American	*Anthus rubescens*				
Phoebe, Say's	*Sayornis saya*				
Poorwill, Common	*Phalaenopitlus nuttallii*				
Redstart, American *	*Setophaga ruticilla*				
Robin, American *	*Turdus migratorius*				
Siskin, Pine *	*Carduelis pinus*				
Solitaire, Townsend's *	*Myadestes townsendi*				
Sparrow, Brewer's	*Sipzella breweri*				
Sparrow, Chipping*	*Spizella passerina*				
Sparrow, Fox *	*Passerella iliaca*				
Sparrow, Gambell's White-crowned *	*Zonotrichia leucophrys*				
Sparrow, Golden-crowned	*Zonotrichia atricapilla*				
Sparrow, House *	*Passer domesticus*				
Sparrow, Lincoln's *	*Melospiza lincolnii*				
Sparrow, Puget Sound White-crowned*	*Zonotrichia leucophrys*				
Sparrow, Savannah *	*Passerculus sandwichensis*				
Sparrow, Song *	*Melospiza melodia*				
Sparrow, Vesper	*Pooecetes graminues*				
Starling, European	*Sturnus vulgaris*				
Swallow, Bank *	*Riparia riparia*		BT	U	ST
Swallow Barn,	*Hirundo rustica*				
Swallow, Cliff	*Hirundo pyrrchonota*				
Swallow, N. Rough-winged *	*Stelgidopteryx serripennis*				
Swallow, Tree *	*Tachycineta bicolor*				
Swallow, Violet-green *	*Tachycineta thalassina*				
Swift, Vaux's *	*Aeronautes saxatails*				CSC
Tanager, Western *	*Piranga ludoviciana*				
Titmouse, Juniper *	*Baeolophus ridgwayi*				
Titmouse, Oak *	*Bueolophus inornatus*				
Thrush, Hermit *	*Catharus guttatus*				
Thrush, Swainson's	*Catharus ustulatus*				
Thrush, Varied *	*Ixoreus naevius*				
Towhee, California	*Pipilo crissalis*				
Towhee, Green-tailed *	*Piplo chlorurus*				
Towhee, Spotted *	*Pipilo maculates*				
Vireo, Cassin's *	*Vireo cassinii*				

LAND BIRDS (continued)		FWS	BLM	OR	CA
Vireo, Red-eyed *	*Vireo olivaceus*				
Vireo, Warbling *	*Vireo gilvus*				
Warbler, Black-throated Gray *	*Dendroica nigrescens*				
Warbler, Hermit	*Dendroica occidentalis*				
Warbler, MacGillivray's *	*Oprorni xolmieis*				
Warbler, Nashville *	*Vermivora ruficapilla*				
Warbler, Orange-crowned *	*Vermivora celata*				
Warbler, Townsend's	*Dendroica townsendii*				
Warbler, Wilson's *	*Wilsoni pusillaa*				
Warbler, Yellow-rumped *	*Dendroica coronata*				
Warbler, Yellow *	*Dendroica pexechia*				CSC
Waxwing, Bohemian *	*Bombycilla garrulous*				
Waxwing, Cedar *	*Bombycilla cedrorum*				
Wood-peewee, Western *	*Contopus sordidulus*				
Wren, Bewick's	*Thryomanes bewickii*				
Wren, Canyon *	*Catherpes mexicanus*				
Wren, House *	*Troglodytes aedon*				
Wren, Marsh *	*Cistothorus mexicanus*				
Wren, Rock	*Salpinctes obsoletus*				
Wren, Winter *	*Troglodytes troglodytes*				
Wrentit *	*Chamaea fasciata*				
Yellowthroat, Common *	*Geothlypis trichas*				

OTHER BIRDS		FWS	BLM	OR	CA
Crow, American *	*Corvus brachyrhynchos*				
Jay, Steller's *	*Cyanocitta stelleri*				
Jay, Western Scrub *	*Aphelocoma californica*				
Magpie, Black-billed *	*Pica pica*				
Nutcraker, Clark's *	*Nucifraga columbiana*				
Raven, Common *	*Corvus corax*				
Vulture, Turkey *	*Cathartes aura*				

Appendix K - Wildlife Species List

Table Codes
* Documented Occurrence

Abbreviations used in **FWS** (U.S. Fish and Wildlife Service):
FE: Listed as endangered by U.S. Fish and Wildlife Service
FT: Listed as threatened by the U.S. Fish and Wildlife Service

Abbreviations used in **BLM** (Bureau of Land Management):
BA(O): BLM Assessment in Oregon
BT(O): Bureau Tracking Oregon
BS: Bureau Sensitive

Abbreviations used in **OR** (Oregon State):
SE: State Endangered
ST: State Threatened
C: Critical
V: Vulnerable
P: Peripheral/Naturally Rare
U: Undetermined Status

Abbreviations used in **CA** (California State):
CSC: Species of Special Concern
SE: State Endangered
ST: State Threatened
FP: Fully Protected

Appendix L – Aquatic Conservation Strategy Evaluation

The Aquatic Conservation Strategy (ACS) was developed (as part of the Northwest Forest Plan) to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The ACS is designed to meet the following objectives:

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

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

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

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

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

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

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

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

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

This appendix will provide detailed information regarding the type, location, and intensity of proposed management actions near watercourses, and will identify the cumulative effects of these actions on the functionality of the riparian reserve system within the planning area.

Additionally, this appendix will summarize the effects of each alternative on the nine ACS objectives. This evaluation will be based on actions proposed across the entire planning area.

Riparian Reserves

Riparian reserves apply on to federal land. In order to assess the relative effects of proposed actions on federal land and recommended actions on non-federal land, “riparian corridors” were delineated for non-federal lands within the planning area.

Assumptions

Because of the proximity of hydrologic features to one another in some areas, numerous types of riparian reserves overlap. In these situations, effects were discussed only for one type of reserve, in order to avoid "double counting" of effects. Reserve types were prioritized as follows: fish-bearing streams, non-fish-bearing streams, wetlands greater than one acre, wetlands less than one acre, and reservoirs. For example, a vegetation treatment proposed within the reserve of both a fish-bearing stream and a wetland less than one acre would be documented as an effect to the stream.

The overall extent of riparian reserves and riparian corridors in the planning area may be overestimated in this analysis. The extent and seasonality of every intermittent and ephemeral stream has not been ground-truthed. In order to maintain a "margin of safety" in this analysis, non-perennial streams were assumed to be intermittent (though some are likely ephemeral), and thus received a 140-foot buffer (equivalent to the height of one site potential tree). The reserves associated with fish-bearing streams and wetlands are mapped accurately.

The shape of riparian reserves often takes a linear form, following the transition from riverine and riparian environments to upland features. Proposed actions within reserves can be considered as points (such as campsites), lines (such as roads and trails), and polygons (such as vegetation treatment units). Linear and polygon features would have the most influence on the function of riparian reserves, since they would impact larger portions of the reserve system. Despite their relatively small areal extent, linear features would have a disproportionate impact on functions such as connectivity and CWD recruitment. Point features would not be expected to have large overall effects, but could affect local features, and in some cases could cause effects that perpetuate downstream.

Common to all Alternatives

Best Management Practices and guidance from the KFRA ROD/RMP will be implemented when delineating riparian reserves.

Scenery Management – Proposed vegetation planting at campgrounds, river access points, and in the vicinity of PacifiCorp facilities would add minor habitat value to developed sites that are within riparian reserves.

Recreation Management – Most recreation sites in the planning area occur within the riparian reserves of the river. With regards to the impacts of recreation resource management on riparian reserves, management actions can be categorized as one of the following:

- Existing site management - Management of existing sites would continue, except at those sites discussed below under a specific alternative. Use levels and types of use would not be expected to change at existing sites. Hazard trees near developed campsites would be felled.

- Site development - Site development includes the construction of new recreation sites or facilities. In the planning area, this includes boat launches, dispersed campgrounds, and developed campgrounds. In general, each such development would permanently remove vegetation, alter the patterns of water flow, and, where developments extend to streambanks, require bank stabilization and hardening.

- Site upgrades or expansion - Actions associated with proposed site upgrades or expansions include building parking areas, constructing fire rings, and installing toilets. Although constructed parking areas represent a long-term commitment to allow continued use of user-created sites within riparian reserves, if properly located they can prevent undue soil damage caused by the presence of multiple unnecessary parking areas and spur roads. Likewise, though toilets represent a commitment to continued use of sites within riparian reserves, their presence would reduce the volume of human waste that enters surface water or is exposed to the elements and available for transport or incorporation into soils. The construction of fire rings may encourage the use of riparian forests as a source of firewood, though this use would likely occur regardless of whether or not constructed fire rings were present. Use of firewood at upgraded or expanded sites would be expected to increase if the proposed actions lead to increased visitor use.

- Site rehabilitation or relocation - Rehabilitation or relocation of sites would, in most cases, restore the potential for native plant communities to develop and, over the long-term, fulfill ecological functions such as sediment trapping, floodplain infiltration, and large wood recruitment.

- Trail construction and management - Construction and maintenance of new or existing trails (including former roads) will likely require clearing down wood from the path of trails. This will make down wood less stable and more likely to be removed from the locality, either by sliding downhill or by becoming entrained in river flows. Trails built in mid-slope positions may cause interception and rerouting of overland and subsurface flow paths. Trails built in low lying areas can redirect the flow of water through seasonally wet areas and can also cause trampling of seasonally wet soils and associated vegetation communities.

- Management of recreation opportunities (such as OHV use) - Management of recreation use levels and types varies between alternatives. In all alternatives, enforcement of existing regulations limiting OHV use to designated roads would decrease damage to riparian areas and have a beneficial impact on riparian reserves. Motorized boating would be restricted in Segments 1 and 2 and would not cause substantial impacts to riparian reserves in Segment 3.

Road Management – In all alternatives, there would be a net reduction in riparian road mileage in the reserves associated with both fish-bearing streams and other types of watercourses.

Many of the proposed road management actions within each alternative are designed to reduce sediment delivery, meadow damage, runoff generation, or alteration of hydrologic flow paths. In addition, some road treatments designed to accommodate increased recreation use would also address these concerns. As such, road decommissioning, obliteration, spot improvements, and contiguous improvements are collectively termed “restoration road treatments” for purposes of some discussions. These actions would reduce direct and indirect detrimental effects to riparian processes such as site productivity, infiltration, and sediment storage.

Roads that are open for motorized access require periodic maintenance that may have detrimental effects to riparian reserves. Falling and bucking of hazard trees and trees that have fallen across or near roads causes a reduction in the volume of stable CWD available to stream channels, floodplains, and riparian communities. Grading of road surfaces can deliver sediment to stream channels or riparian communities in adjacent low-lying areas, and may lead to the development of berms that divert flow paths. Road maintenance can remove riparian vegetation and disturb ditches and cutbanks that have been stabilized by vegetation cover.

Conversely, maintaining stream crossings, road drainage features, and road surfaces reduces the likelihood of stream crossing failure and diversion of flow paths onto roads.

Sediment delivery from newly constructed roads is often very high during the first few storms (Brown, 1983). Road construction within riparian reserves totals less than a mile in all alternatives, and would be done primarily to maintain access to areas while allowing more extensive road obliteration.

In order to reduce detrimental effects of roads and road management, best management practices will be implemented during road management activities within riparian reserves. These would include, among other things, installation of drainage features designed to prevent delivery of sediment and excess runoff to riparian areas, grading to minimize diversion of natural flow paths, installation of water bars, and minimal bucking of large wood.

The proposed removal and improvement of stream crossings would result in reduced impairment of the processes that control storage and transport of watershed products (water, sediment, CWD, and organisms). These actions would thus have a beneficial effect on the functionality of riparian reserves.

Vegetation Treatments – Vegetation treatments within riparian reserves will incorporate guidance from the Northwest Forest Plan and the KFRA RMP/ROD.

Noxious Weeds – Physical, biological, and chemical methods of noxious weed control would be implemented at known weed populations, including areas within riparian reserves. These actions would beneficially affect the diversity of riparian plant communities.

PacifiCorp Facilities – The minimum total footprint of PacifiCorp hydroelectric facilities within riparian reserves is about nine acres. This figure does not include parking areas and short spur roads, nor does it include low voltage powerlines. In Segment 1, about 2.5 acres of BLM land and 3.5 acres of PacifiCorp land near the river are affected. In Segment 2, about 3 acres of BLM land are impacted.

It is assumed that these facilities would remain in all alternatives. In Alternative 3, one option to attain management objectives includes recommending altering and possibly removing some elements of the hydroelectric project. These actions would be dependent on the ongoing Federal Energy Regulatory Commission relicensing process, and additional NEPA analysis would occur prior to any such actions.

Range Management – The installation of fences around sensitive meadows (as proposed in the vegetation management section) would reduce utilization of grasses and shrubs by cattle and wild horses, thus reducing the extent of bare ground and enhancing the recovery of native plant communities. The extent of fencing varies by alternative.

Alternative 1

Recreation Management – In Alternative 1, about 17 acres within riparian reserves would be directly impacted by recreation sites (see Table L-1). This level of development is lower than Alternatives 2 and 4 but higher than Alternative 3. In Segments 1 and 2, the majority of these impacts are on BLM land. In Segment 3, all of the impacts are on PacifiCorp land.

Site development: No new recreation sites would be developed within riparian reserves in this alternative.

Site upgrades/expansion: The upper bench portion of the Stateline recreation site would be upgraded and expanded. This could lead to increased recreation use in the adjacent riparian reserve.

Site rehabilitation/relocation: The dispersed camp sites on the west side of the river to the northwest of Frain Ranch would no longer be accessible by motorized vehicles. This would decrease recreation use at these sites.

Trail network: About 4.4 miles of trail would parallel the river within riparian reserves in Segments 2 and 3. Portions of the trail would be built on the bed of a decommissioned road and would not create any additional impacts (see Table L-2). An additional mile of trail would be constructed in areas more than 280 feet from fish-bearing streams.

Recreation opportunities: The installation of fences and obstructions on the perimeter of wet meadows (as proposed in the vegetation management section) would decrease OHV damage to riparian reserves.

Whitewater boating would remain at or near existing levels, and bank trampling would not be expected to increase.

The low frequency of vehicle patrols would continue to slightly reduce unauthorized activities that detrimentally affect riparian reserves, though impacts of OHV use and other activities would continue to occur in areas of high use (such as Frain Ranch).

Road Management – Of all alternatives, Alternative 1 would have the most limited program of restoration road treatments within riparian reserves. (See Tables L-3a, L-3b, L-4a and L-4b, as well as the Roads and Access section of this EIS).

Throughout the planning area about 27 miles of roads within riparian reserves would be open, seasonally open, or open to administrative access. Slightly more than 16 miles would be near fish-bearing streams (see Table L-5).

Vegetation Treatments – Less than 250 acres of vegetation management actions would occur within riparian reserves in Alternative 1. Less than 100 acres of treatments would occur near fish-bearing streams (see Table L-6).

Riparian Vegetation: Refer to the discussion of riparian areas within the Vegetation Management section of this EIS.

Irrigated Meadows: No restoration of the irrigated meadows on PacifiCorp land in Segment 3 would be recommended in this alternative.

Upland Vegetation Treatments: About 200 acres of upland vegetation types (dry meadow, oak woodlands, mixed brush, mixed conifer woodlands, and rabbitbrush/sagebrush) within riparian reserves would be affected by proposed actions, entirely on BLM land.

Vegetation management actions that occur within forest or woodland vegetation types (including oak and mixed conifer woodlands) would have the most effect on stream shading and large wood recruitment. About 170 acres of such treatments would occur within reserves, including about 90 acres near fish-bearing streams.

Land Tenure – The development of new coordinated management agreements for PacifiCorp land or land tenure adjustments is not proposed in this alternative. Some types of management of lands near watercourses would continue to adversely affect aspects of riparian structure and function.

Cumulative Effects – Due to the limited scope of actions designed to restore riparian processes, this alternative is likely to maintain, rather than restore, the functionality of riparian reserves and other land near riparian features.

Recreation facilities would affect about 17 acres within riparian reserves, which is more than Alternative 3 but less than Alternatives 2 and 4. No new sites would be constructed within riparian reserves.

Nine acres would continue to be directly impacted by hydroelectric facilities.

This alternative has the lowest level of road decommissioning and road improvements, and the highest open road mileage, within riparian reserves. Although some of the roads that cause the most impacts to riparian reserves would be decommissioned or relocated, roads would continue to deliver runoff and sediment to watercourses, and would adversely affect the function of riparian reserves.

Alternative 2

Recreation Management – In Alternative 2, about 24 acres within riparian reserves and riparian corridors would be directly impacted by recreation sites (see Table L-1). This level of development is equivalent to Alternative 4, and is higher than Alternatives 1 and 3. In Segments 1 and 2, the majority of these impacts are on BLM land. In Segment 3, all of the impacts are on PacifiCorp land.

Site development: Site development in Alternative 2 is moderately extensive compared to other alternatives. One new site is proposed in both Segment 1 (a boat launch) and Segment 2 (a day use area), and two new sites (a boat launch and a campground) are proposed in Segment 3.

The proposed campground in Segment 3 would extend over approximately 5 acres of river terrace.

Site upgrades/expansion: In Alternative 2, proposed actions of this type are less extensive than in Alternative 4 and more extensive than in Alternatives 1 and 3.

Parking at two interpretive/fishing sites in Segment 1 would be improved, but the sites would not be substantially expanded. It is possible that the Topsy campground would be expanded in the future, although actions would be focused outside of the riparian reserve.

At the four sites within riparian reserves that will be upgraded in Segment 2, proposed actions include installing or replacing toilets at two sites, installing fire rings or picnic tables, or improving parking. A boat launch would be installed at Frain Ranch. None of the upgraded sites would be substantially expanded.

Facilities at the Stateline boat launch and at Access 5, Access 4, Access 3, and Access 2 would be upgraded. The camping area on the upper bench at Stateline (outside of the riparian reserve) would be expanded. These actions would increase recreation use within nearby riparian reserves.

Site rehabilitation/relocation: Limited site rehabilitation or relocation would occur in Segment 2 in this alternative.

The dispersed camp sites on the west side of the river to the northwest of Frain Ranch would no longer be accessible by motorized vehicles. This would decrease recreation use at these sites.

One site in the Klamath River Campground would be relocated away from a sensitive riparian area. One of the camp sites in the Turtle Camp area would be relocated, though it would remain within the riparian reserve and would be closer to the river.

Trail network: An extensive trail network would cross through area near streams in all segments of the planning area. Most of the new trails would require new construction (see Table L-2).

Recreation opportunities: Supplying information through an enhanced education program, increased monitoring of OHV use, and the installation of fences and obstructions on the perimeter of wet meadows (as proposed in the Vegetation Management section) would decrease damage to riparian reserves.

Increase management presence would reduce unauthorized activities that damage riparian reserves to continue, though perhaps not as effectively as the on-site presence proposed in Alternative 4.

Road Management – There would be an overall decrease in road mileage within riparian reserves in this alternative, although riparian road mileage in Segment 1 would increase slightly.

Alternative 2 would have the most extensive program of restoration road treatments within riparian reserves. (See Tables L-3a, L-3b, L-4a and L-4b, as well as the Roads and Access section of this EIS).

Throughout the planning area about 22 miles of roads within riparian reserves would be open, seasonally open, or open to administrative access. Slightly more than 14 miles are near fish-bearing streams (see Table L-5).

Vegetation Treatments – Over 1,300 acres of vegetation management actions would occur within riparian reserves in Alternative 2, including more than 700 acres of treatments near fish-bearing streams (see Table L-6).

Riparian Vegetation: Refer to the discussion of riparian areas within the Vegetation Management section of this EIS.

Irrigated Meadows: It would be recommended that the 370 acres mapped as irrigated meadows on PacifiCorp land in Segment 3 be managed to restore native plant communities appropriate for the site. Natural patterns of inundation and infiltration would be restored through the use of irrigation infrastructure and earthmoving.

Upland vegetation treatments: About 830 acres of upland vegetation types (dry meadow, oak woodlands, mixed shrub, mixed conifer woodlands, and rabbitbrush/sagebrush) near watercourses would be affected by proposed actions. About 620 acres of these treatments would occur on BLM land. Exposed areas resulting from these treatments would potentially deliver runoff and sediment to stream channels until ground cover returns.

Vegetation management actions that occur within forest or woodland vegetation types (including oak and mixed conifer woodlands) would have the most effect on stream shading and large wood recruitment. About 640 acres of such treatments would occur near watercourses, including about 370 acres near fish-bearing streams and 35 acres near wetlands greater than one acre in size. About 490 acres, including 330 acres near fish-bearing streams and 5 acres near large wetlands, would be affected on BLM land.

Noxious Weeds: Post-project surveys would ensure that project implementation does not lead to establishment of new weed populations.

Land Tenure – If undertaken, the development of cooperative management agreements or land tenure adjustments for PacifiCorp lands containing riparian reserves adjacent to the river or along the mainstem of Shovel and Negro Creeks would likely result in enhanced riparian resource values.

Cumulative Impacts – Actions proposed in this alternative would have a relatively high likelihood of maintaining or restoring riparian reserve functionality.

Twenty-five acres within riparian reserves would be impacted by recreation facilities, including five new sites within riparian reserves.

Nine acres would continue to be directly impacted by hydroelectric facilities.

The extent of road decommissioning and obliteration in riparian reserves would be slightly less, and open road mileage would be slightly higher, than in Alternative 3. Less road improvements would occur than in Alternative 4, but more would occur than in Alternative 1 and 3.

Alternative 3

Recreation Management – In Alternative 3, about 9 acres within riparian reserves would be directly impacted by recreation sites (refer to Table L-1). Of all alternatives, Alternative 3 has the lowest level of recreation development. In Segments 1 and 2, the majority of these impacts are on BLM land. In Segment 3, all of the impacts are on PacifiCorp land.

Site development: Site development within riparian reserves in Alternative 3 is limited and includes only one site in Segment 3.

Site upgrades/expansions: No site upgrades within riparian reserves are proposed in this alternative.

Site rehabilitation/relocation: Rehabilitation or relocation of sites within riparian reserves is most extensive in this alternative. All sites within the Klamath River campground would be moved to 100 feet from the high water line of the river. This would reduce, but not eliminate, the direct impacts to riparian reserves associated with this campground. Motorized access will be limited and site rehabilitation will occur in the Turtle Camp area and on both sides of the river in the vicinity of Frain Ranch. These actions would benefit the functionality of riparian reserves.

The raft launch area and campsites on the lower bench at Stateline will be relocated to Access 6. There would be minor benefits to riparian values as a result of removing an existing recreation site and, potentially, decommissioning the access road.

Trail network: A limited trail network would be constructed along the river, primarily in Segment 2. A portion of the trail network would utilize existing roads, thereby reducing the impact of creating the trail system. Trail mileage near the river in this alternative is lower than in Alternatives 2 and 4 (see Table L-2).

Recreation opportunities: Extensive fencing and installation of obstructions around wet meadows (as proposed in the vegetation management section) would reduce detrimental impacts of OHV use in riparian reserves.

Reduced levels of whitewater recreation would reduce bank trampling.

Reduced management presence might allow some unauthorized activities that damage riparian reserves to continue.

Road Management – There would be an overall decrease in road mileage within riparian reserves in all segments of the planning area in this alternative. This alternative has the highest level of road decommissioning within reserves.

Alternative 3 would have an extensive program of restoration road treatments within riparian reserves. (See Tables L-3a, L-3b, L-4a and L-4b, as well as the Roads and Access section of this EIS). Proposed road improvements are more extensive than in Alternative 1, but less than in Alternatives 2 and 4. The limited extent of road improvements in this alternative could allow ongoing sediment delivery, though this would be mitigated by road decommissioning and relatively low levels of traffic.

Throughout the planning area about 23 miles of roads within riparian reserves would be open, seasonally open, or open to administrative access, including about 13 miles near fish-bearing streams (see Table L-5).

Vegetation Treatments – Over 1,750 acres of vegetation management actions would occur within riparian reserves in Alternative 3, including more than 850 acres of treatments near fish-bearing streams (see Table L-6).

Riparian Vegetation: Refer to the discussion of riparian areas within the Vegetation Management section of this EIS.

Irrigated Meadows: It would be recommended that the 370 acres mapped as irrigated meadows on PacifiCorp land in Segment 3 be managed to restore native plant communities appropriate for the site. Natural patterns of inundation and infiltration would be restored through the use of irrigation infrastructure and earthmoving.

Upland vegetation treatments: About 1,140 acres of upland vegetation types (dry meadow, oak woodlands, mixed shrub, mixed conifer woodlands, and rabbitbrush/sagebrush) near watercourses would be affected by proposed actions. About 770 acres of these treatments would occur on BLM land.

Vegetation management actions that occur within forest or woodland vegetation types (including oak and mixed conifer woodlands) would have the most effect on stream shading and large wood recruitment. About 840 acres of such treatments would occur near watercourses, including about 440 acres near fish-bearing streams and 45 acres near wetlands greater than one acre in size. More than 600 acres, including 390 acres near fish-bearing streams and 5 acres near large wetlands, would be affected on BLM land.

Noxious Weeds: Post-project surveys would ensure that project implementation does not lead to establishment of new weed populations.

Land Tenure – If undertaken, the development of coordinated management agreements or land tenure adjustments for PacifiCorp lands containing riparian reserves adjacent to the river and throughout Segment 3 would likely result in enhanced riparian resource values.

Cumulative Impacts – Actions proposed in this alternative would have the highest likelihood of maintaining or restoring riparian reserve functionality.

Recreation impacts to riparian processes would be much less extensive than in Alternatives 2 and 4, though some site clearing and installation of impervious surfaces would occur.

Nine acres would continue to be directly impacted by hydroelectric facilities.

This alternative has the highest level of road decommissioning and obliteration and the lowest open road mileage within riparian reserves. Overall, road management actions proposed in this alternative would have the highest likelihood of supporting the functionality of riparian reserves.

Potential management agreements or land tenure adjustments would benefit the function of riparian reserves along the river and many perennial and intermittent tributary streams.

Alternative 4

Recreation Management – In Alternative 4, a minimum of about 25 acres within riparian reserves would be directly impacted by recreation sites (see Table L-1). In Segments 1 and 2, the majority of these impacts are on BLM land. In Segment 3, the gross majority of the impacts are on PacifiCorp land.

Site development: Site development in Alternative 4 is the most extensive of all alternatives.

One new site (a boat launch immediately downstream form J.C. Boyle Dam) is proposed within riparian reserves in Segment 1, and an additional site outside of the riparian reserve (the campground at Big Bend) would result in more foot traffic through riparian reserves along the river. Three new sites, including two boat launch areas and a campground would be developed within riparian reserves in Segment 2. Two new sites would be developed in Segment 3: a boat launch area at Access 6 and a large campground in the meadow west of the mouth of Shovel Creek.

The larger of the two proposed campgrounds in Segment 3 would extend over approximately 5 acres of river terrace.

Site upgrades/expansion: Two sites in Segment 1, seven sites in Segment 2, and five sites in Segment 3 would be upgraded or expanded.

Parking at two interpretive/fishing sites in Segment 1 would be improved, but the sites would not be substantially expanded.

In Segment 2, proposed actions include installing or replacing toilets at 5 sites, installing fire rings or picnic tables, or improving parking. Boat launch facilities would also be added at Frain Ranch.

Two of the upgraded sites in Segment 2 would also be substantially expanded. The Klamath River Campground would be expanded to accommodate increased use, and portions of the riparian reserve would be affected. New camp sites, new group sites, utilities, and a boat launch would be added at this site. In the Turtle Camp area, a third site would be added.

In Segment 3, facilities at the Stateline boat launch and at Access 5, Access 4, Access 3, and Access 2 would be upgraded.

Site rehabilitation/relocation: Relocation of sites within riparian reserves will occur to a very limited extent in this alternative, and will be focused along the river. One of the camp sites in the Turtle Camp area would be relocated, though it would remain within the riparian reserve and would be closer to the river.

Trail network: This alternative proposes an extensive trail network, including trails along the river and parallel to Shovel Creek (see Table L-2). Most of the trails would require new construction and vegetation removal. The trail adjacent to Shovel Creek would pass through or near well developed riparian hardwood forests and numerous small wet meadows.

Recreation opportunities: In addition to enhanced outreach to OHV users and increased monitoring of OHV use, the installation of fences and obstructions on the perimeter of wet meadows (as proposed in the vegetation management section) would decrease OHV use in riparian areas and thus reduce detrimental impacts to riparian reserves.

Increased levels of whitewater recreation would cause more bank trampling.

Motorized boating in Segment 3 could create wakes that would increase bank erosion and detrimentally impact bank vegetation.

The presence of an on-site caretaker or seasonal employee at the Powerhouse site, Hoover Ranch, Lower Frain Ranch, and the Beswick area would reduce unauthorized activities (such as OHV use) that cause detrimental impacts to areas near streams and wetlands.

Road Management – There would be an overall decrease in road mileage within riparian reserves in this alternative, although riparian road mileage in Segment 1 would increase slightly. Numerous roads within riparian reserves would be improved to accommodate increased recreation use.

Alternative 4 would have a moderately extensive program of restoration road treatments within riparian reserves. (See Tables L-31, L-3b, L-4a and L-4b**,** as well as the Roads and Access section of this EIS).

Alternative 4 has the greatest extent of roads that would be open for varying periods of time. Throughout the planning area about 27 miles of roads within riparian reserves would be open, seasonally open, or open to administrative access, including about 16 miles near fish-bearing streams (refer to Tables L-3a, L-3b, L-4a and L-4b,

Vegetation Treatments – Over 960 acres of vegetation management actions would occur within riparian reserves in Alternative 4, including about 450 acres of treatments near fish-bearing streams (refer to table L-5).

Riparian Vegetation: Refer to the discussion of riparian areas within the Vegetation Management section of this EIS.

Irrigated Meadows: No restoration of the irrigated meadows on PacifiCorp land in Segment 3 would be recommended.

Upland Vegetation Treatments: About 920 acres of upland vegetation types (dry meadow, oak woodlands, mixed shrub, mixed conifer woodlands, and rabbitbrush/sagebrush) near watercourses would be affected by proposed actions. About 640 acres of these treatments would occur on BLM land.

Vegetation management actions that occur within forest or woodland vegetation types (including oak and mixed conifer woodlands) would have the most effect on stream shading and large wood recruitment. About 660 acres of such treatments would occur near streams and wetlands, including about 370 acres near fish-bearing streams and 35 acres near wetlands greater than one acre in size. 490 acres, including 330 acres near fish-bearing streams and five acres near large wetlands, would be affected on BLM land.

Noxious Weeds – Surveys near popular recreation sites would ensure that increased recreation use does not lead to establishment of new weed populations in areas near watercourses.

Land Tenure – If undertaken, the development of cooperative management agreements or land tenure adjustments for lands containing riparian reserves adjacent to the river and throughout Segment 3 would likely result in enhanced riparian resource values.

Cumulative Impacts – Actions proposed in this alternative would have a moderate likelihood of maintaining or restoring riparian reserve functionality.

This alternative would have the highest number of recreation sites, and the greatest level of recreation use, within riparian reserves, including seven new sites. Overall, about 25 acres within riparian reserves would be impacted by recreation developments.

Nine acres would be directly impacted by hydroelectric facilities.

The magnitude of reductions in road mileage within riparian reserves would be lower than Alternatives 2 and 3 but higher than Alternative 1. This alternative has the highest level of road improvements within riparian reserves (slightly more than Alternative 2). Open road mileage within riparian reserves in this alternative is about the same Alternative 1.

Irretrievable, Irreversible, and Unavoidable Impacts

Proposed campgrounds, boat launch facilities, bridges, and roads would permanently (though not irreversibly) remove vegetation and affect hydrologic and geomorphic processes over a small portion of the total area near streams and wetlands.

Evaluation of ACS Objectives

This section will essentially be a discussion of the cumulative effects of proposed actions on the values described in the nine ACS objectives. The discussion will summarize, for each alternative, whether and how proposed actions will lead to the maintenance of high quality aquatic/riparian habitat and the restoration of degraded aquatic/riparian habitat. In addition, the extent of "maintenance" and "restoration" actions will be compared relative to the "decision-making space" framed by Alternative 1 (no change in management direction) and Alternative 3 (comprehensive restoration). In some cases, it will be possible to maintain or restore conditions without addressing the issues that are most significant or are the cause of ongoing resource concerns.

If it is determined that proposed actions would prevent attainment of ACS objectives over the long-term, management options to improve conditions would be developed. These could range from modifying proposed actions to removing from consideration those proposed actions (or elements of proposed actions) that would prevent attainment. The appropriate management option depends on the condition and functionality of the rest of the planning area, the beneficial uses that occur, and the extent of other actions that restore processes to within the range of natural variability (Final SEIS, vol. II, page B-83). In all cases, actions would be designed and implemented so that, at a minimum, they would not retard or prevent attainment of ACS objectives.

Refer to Table L-7 for a summary and comparison of the effects of proposed actions on ACS objectives.

Alternative 1

Objective 1: "Watershed and landscape-scale features"

Some enhancement of watershed-level features and vegetation communities would occur under this alternative. Implementation of fuels management actions consistent with the RMP and Fuels Management EA to reduce fuel loading and increase mast crops for wildlife would be expected to protect the existing diversity and complexity of the *vegetation community within the canyon in the long term (greater than ten years). However the rate of recovery would be the lowest when compared to the other three alternatives.*

As a result of the level of actions proposed under this alternative, a short term (over the next ten years) risk would exist to degrade watershed level features as a result of catastrophic fire. Only a small percentage of the planning area vegetation would be treated per year (on average) under this alternative. High fuel loading and ladder fuels currently present within the planning area stands, increases the risk and extent of potential wild fires within the canyon. Massive loss of the vegetation community within the canyon would substantially alter the landscape within the canyon. The distribution, diversity, and complexity of the watershed would be highly altered as a result of large scale stand replacement fires. Depending on the scale and intensity of these fires, species adapted to the unique environment within the canyon would lose the watershed and landscape features that currently offer protection.

Objective 2: "Spatial and temporal connectivity"

The lateral connectivity of the river to adjacent riparian areas in Segment 2 and 3 would continue to be adversely affected by flow ramping at the powerhouse. No actions would be taken to accelerate the recovery of stream channel – floodplain connectivity. The lateral connectivity within riparian areas, and of riparian areas to adjacent upland areas, would be improved by road decommissioning and by stream crossing enhancements.

The lateral connectivity of instream habitats within the river would remain impaired under this alternative. Peaking operation of the J.C. Boyle facility results in daily dewatering of bank habitat. Proposed instream streamflows (per BLM water right claims) would reduce, but not eliminate, the effect of this loss of aquatic habitat by increasing baseflows. However bank habitats along the edge of the active channel would remain inaccessible during base summer flows

Road decommissioning or stream crossing enhancement would improve the longitudinal connectivity of riparian areas along some watercourses. Longitudinal connectivity along the river would continue to be impaired by sidecast material in Segment 1, water temperature gradients at the powerhouse, and the patchy distribution of riparian vegetation other than reed canary grass. Connectivity between the river within the planning area and adjacent river reaches, and with nearby key watersheds, would continue to be impaired by hydroelectric facilities.

Overall, connectivity within the planning area would be restored somewhat, but overall would not be substantially improved relative to the current condition.

Objective 3: "Physical integrity"

Channel configurations in the river would continue to be adversely affected by the design and operation of the J.C. Boyle facility.

The existing condition of the river, which reflects past effects of the presence and operation of the J.C. Boyle facility, as well as other past and/or ongoing land use effects (including construction of bridges and irrigation diversions, grazing, and historic log drives), would not be restored. The effects of the road sidecast in Segment 1 would not be addressed.

Currently degraded habitat conditions in some tributary streams would not be addressed, but could recover over the long-term. Conditions in other streams would continue to respond to dis-equilibrium between watershed conditions and channel form by widening and incising. Current conditions would not be maintained. In the long-term, the physical integrity of the aquatic system in the river, including shorelines, banks and bottom configurations, would be further degraded relative to current conditions.

Within the Planning Area the ongoing alterations in streamflow and sediment regimes would be expected to directly alter the dimensions of the stream channel (Rosgen 1996). The reduced supply of coarse sediment, coupled with the release of peaking flows, has likely resulted in continued channel widening, incision, and substrate armoring. The no-action alternative would not meet the intent of this objective by continuing to degrade the channel.

<u>Objective 4: "Water quality"</u>

Assuming the Upper Klamath Lake and scheduled Upper Klamath River TMDLs/WQRPs are implemented, water quality in the planning area would eventually improve.

Water quality in the lower portion of Segment 1 would continue to be of a different character than water quality in the rest of the river, and the water quality and temperature gradient that exists at the powerhouse would persist. Warming rates and DO levels in Segment 1 would continue to be affected by the diversion at J.C. Boyle Dam. Maximum daily temperatures and warming rates in Segments 2 and 3 would be reduced as a result of increased baseflows.

Withdrawals from Shovel and Negro Creeks would not be altered. These diversions likely have an adverse effect on water temperature in these streams.

Overall, there would be slight improvements in certain water quality parameters, although important water quality concerns (and the effects of altered water quality on beneficial uses) in the planning area would not be comprehensively addressed.

<u>Objective 5: "Sediment regime"</u>

The supply of coarse sediment in the river would continue to be reduced by the presence of J.C. Boyle Dam. Although some coarse sediment is supplied to the river from hillslopes and bank erosion, this supply is likely relatively minor compared to that which is transported in the Keno reach of the river and in Spencer Creek (and is subsequently captured in J.C. Boyle Reservoir).

The timing and duration of sediment entrainment and transport would continue to be affected by peaking operations at the powerhouse. These operations release flows on the order of 3,000 cfs, which are nearly equivalent to the calculated 1.5-year recurrence interval flow in Segment 2.

The supply of fine sediment from roads and the use of the emergency spillway would be reduced.

Although ongoing effects to coarse sediment supply and transport would not be addressed, the duration of peaking flows would be reduced and existing sediment regimes would generally be maintained or slightly improved.

<u>Objective 6: "Instream flows"</u>

The BLM proposed instream flow would be based on water rights claims for fisheries and recreational values. Additional increases in baseflow may be recommended as part of FERC relicensing of the Klamath Project. The flow regime that would occur within the planning area, including peaking for power production, would reflect flow patterns that have been occurring since the construction of the J.C. Boyle facility.

Spatial and temporal distribution of peak, high, and low flows would continue to be altered compared to unimpaired flows. The effects of flow regulation at Upper Klamath Lake, in combination with the diversion and releases related to hydropower generation at J.C. Boyle, results in higher and earlier peak flows, decreased summer minimum flows, and greater annual flow variability (BHI 1996). Summer baseflows would be expected to be enhanced below the powerhouse, as a result of BLM water claims, to benefit aquatic species. The duration of peaking flows would be reduced in order to provide elevated baseflows during late spring and summer months. However, the impacts to physical process resulting from the increased duration of channel forming flows (during periods when both turbines at the J.C. Boyle powerhouse are operating) would be expected to continue.

Water level fluctuations associated with powerhouse operations would be highest in this alternative.

The streamflows proposed in this alternative, while continuing to limit channel processes, would constitute a minor improvement over existing conditions.

Objective 7: "Floodplain inundation and water table elevation"

Floodplain inundation along the river likely occurs only during flows in excess of about 3,300 cfs. Flows at or below this level are likely sufficiently frequent that the shape of the channel has adjusted to convey these flows without inundating the minor floodplains that occur in Segments 1 and 2. The magnitude and frequency of flow fluctuations caused by peaking operations at the powerhouse would be reduced, thereby partially addressing concerns regarding the effects of frequent inundation and exposure of riparian areas.

Irrigation of the terraces and relic floodplains in Segment 3 mimics natural inundation somewhat, though the duration and frequency of inundation during summer and fall months does not mimic natural patterns.

Actions designed to restore floodplain connectivity in tributary streams are not proposed in this alternative. Stream channels are in the process of recovering from past land use and are adjusting to flows and sediment supplied from their upper watersheds, and new floodplains are forming (at lower elevations and of narrower widths than the relic floodplains).

Current water table elevations in upland wet meadows are sufficient to support riparian vegetation communities. Human modifications to flow paths affect the extent of inundation in some areas, but would not be addressed in this alternative. Upslope treatments could increase the amount of water available in a few wet meadows.

Overall, the processes driving floodplain inundation and water table elevation would be maintained.

Objective 8: "Plant communities"

The hydrologic and geomorphic processes that influence the extent and character or riparian vegetation communities would continue to be affected by the presence and operation of the J.C. Boyle hydroelectric facility. Ramping in Segments 2 and 3 would continue to affect the frequency, timing, and magnitude of flow fluctuations, and would confer a competitive advantage plant species (such as reed canary grass) that reproduce vegetatively, and can tolerate such flow regimes (Conchou and Fustec, 2001). Irrigated meadows in Segment 3 would continue to support mainly non-native species.

Downstream from the powerhouse, increased baseflows would reduce the magnitude of daily flow fluctuations, thus reducing the lateral extent of the area affected by ramping. The extent of riparian vegetation along the river would continue to be limited by the lack of alluvial surfaces (due in part to altered sediment regimes, refer to the discussion of Objective 5) and, in Segment 1, the effect of the side cast material. Ongoing channel widening would eventually lead to reductions in the extent of riparian areas along some portions of the river.

Other proposed actions in or adjacent to riparian areas (recreation developments, road decommissioning, vegetation treatments, and exclosure construction) would have a moderate net beneficial effect on riparian communities along the river and tributary streams (though less so than in Alternatives 2 and 3).

Riparian areas along tributary streams and in wet meadows would be maintained or restored. Riparian areas along the river would be maintained and would continue to resemble the existing communities.

Objective 9: "Habitat"

The proposed road treatments and increased based flows within the no-action alternative would be expected to maintain and potentially enhance the condition of existing habitats within the planning area. This alternative would do the least to increase access to and quality of habitats within the planning area.

Alternative 2

Objective 1: "Watershed and landscape-scale features"

A moderate level of enhancement of landscape level features, such as forested communities and floodplain and terrace wet meadows, would occur under this alternative. Reduced fuel loading and increased diversity of terrestrial habitats within the planning area would be expected to have beneficial impacts on the vegetation community, thereby protecting the diversity and complexity of landscape scale features within the canyon in the long term (greater than ten years).

The short term (over the next ten years) risk of catastrophic fire occurring within the planning area would be reduced, due to accelerated rates of fuels management in the canyon. The distribution, diversity, and complexity of the watershed would be protected from extensive stand replacement fires as a result.

The degree of proposed landscape scale treatments would be expected to have an increased recovery over actions proposed in Alternative 1, and less than those actions proposed in Alternatives 3 and 4.

Objective 2: "Spatial and temporal connectivity"

The lateral connectivity within riparian areas, and of riparian areas to adjacent upland areas, would be improved by road decommissioning and by stream crossing enhancements.

The lateral connectivity of aquatic habitat may remain partially impaired with continued peaking flows during spring and summer months under this alternative. However, active restoration efforts would be conducted to increase lateral connectivity of aquatic habitats within the planning area. Installation of bankfull benches in Segment 1, proposed channel enhancements in all segments, treatment of side channels, and sediment augmentation would be expected to restore connections between riparian and aquatic interfaces by reducing the extent of exposed substrate during peaking operations.

Road decommissioning or stream crossing enhancement would improve the longitudinal connectivity of riparian areas along some watercourses. Longitudinal connectivity would be enhanced by instream streamflow alterations that reduce temperature gradients. Longitudinal connectivity between the river within the planning area and upstream reaches, and an upstream key watershed, would be improved with alteration of fish passage facilities at the J.C. Boyle hydroelectric facilities. Longitudinal connectivity for fish species between the river within the planning area and downstream reaches, and with a downstream key watershed, would generally continue to be impaired by hydroelectric facilities. Connectivity between the river within the planning area and adjacent river reaches, and with nearby key watersheds, would continue to be impaired by hydroelectric facilities.

Some alteration of longitudinal connectivity between Segment 1 and J.C. Boyle reservoir would occur as a result of water releases designed to provide increased baseflow in the bypass reach. Most flow is screened from downstream movement to the planning area reaches; 10 to 50 cfs is released for the fish ladder. Augmentation of flow released thru unscreened spillways would provide enhanced downstream connectivity.

Connectivity within the planning area would be enhanced and substantial enhancements in riparian–channel connectivity would occur. Due to continued peaking impacts, however, the overall benefits of proposed projects may be temporally and spatially limited.

Objective 3: "Physical integrity"

The effects of the J.C. Boyle facility on channel morphology in the mainstem would be mitigated by a combination of passive (i.e., gravel augmentation) and active (i.e., installation of structural features) restoration actions. These actions would also address the effects of other past or ongoing land use activities, and would reduce bank erosion and channel widening.

Degraded habitat conditions in some tributary streams would be addressed by a limited program of instream restoration. The diversion structure in Negro Creek would no longer require maintenance (which involves straightening of short lengths of stream channel).

The physical integrity of the aquatic system in the river, including shorelines, banks and bottom configurations, would be restored to a moderate degree relative to the current degraded condition.

Objective 4: "Water quality"

Assuming the Upper Klamath Lake and scheduled Upper Klamath River TMDLs/WQMPs are implemented, water quality in the planning area would eventually improve.

The difference in water quality between the downstream end of Segment 1 and the area immediately downstream from the powerhouse would be reduced as a result of increased baseflows released from the dam. Warming rates and DO levels in Segment 1 would continue to be affected by the diversion at J.C. Boyle Dam. Maximum daily temperatures and warming rates in Segments 2 and 3 would be reduced as a result of increased baseflows.

It would be recommended that the timing and magnitude of irrigation withdrawals from Shovel Creek would be altered to reduce adverse impacts to water quality, and that the diversion on Negro Creek be removed. If implemented, these actions would reduce the rate of warming in the lower portion of Shovel Creek.

This alternative proposes an approach that would address the most critical water quality concerns within the planning area, and would have a moderate likelihood of resulting in improved water quality and beneficial uses.

Objective 5: "Sediment regime"

The supply of coarse sediment in the river would continue to be affected by the presence of J.C. Boyle Dam. In this alternative, a program of sediment replenishment would be designed to deliver coarse sediment at one or more locations to augment the existing supply to the river downstream from the dam. Although the timing and magnitude of replenishment events would mimic natural processes as closely as possible, practical constraints would prevent complete restoration of the sediment regime. For instance, the timing of sediment replenishment events might not be coincident with peak flow events, due to limited road access during the wet season.

The timing and duration of sediment entrainment and transport would continue to be affected by peaking operations at the powerhouse. These operations release flows on the order of 3,000 cfs, which are nearly equivalent to the calculated 1.5-year recurrence interval flow in Segment 2. The combination of increased sediment supply and increased sediment storage capacity (near CWD placements, for instance) would serve to reduce the net rate at which sediment is exported from the planning area.

The possible onset of weekend recreation flow releases in Segment 1 would not be likely to substantially affect transport of coarse sediment, since the flows would probably not be of sufficient magnitude to entrain coarse material.

The supply of fine sediment originating from roads and the use of the emergency spillway would be reduced.

Ongoing effects to the supply and transport of fine and coarse sediment would be addressed. A moderate level of restoration of sediment regimes would occur.

Objective 6: "Instream flows"

The BLM would recommend a "modified run-of-the-river" flow regime that would be based in part on water rights claims for fisheries and recreational values. This flow regime would restore key aspect of unimpaired flows, such as higher baseflow and reduced magnitude, frequency, and rate of change of flow fluctuations.

The timing and magnitude of peak and low flows would continue to be altered from unimpaired flows. Flow regulation at Upper Klamath Lake, in combination with the diversion and releases related to hydropower generation at J.C. Boyle, results in higher and earlier peak flows, decreased summer minimum flows, and greater annual flow variability (BHI 1996). Summer baseflows would be enhanced below the powerhouse, to benefit aquatic species. The duration of peaking flows would be reduced in order to emulate natural flow regimes more closely and provide elevated baseflows during late spring and summer months. The occurrence of powerhouse outflows that are near the historic annual average peak flow would be reduced.

Stage fluctuations associated with powerhouse operations would still occur, but would be reduced relative to current conditions. The lateral extent of the area affected by fluctuating flows would be reduced as a result of in-stream restoration projects.

The streamflow regimes proposed in this alternative would constitute a substantial improvement over existing conditions.

Objective 7: "Floodplain inundation and water table elevation"

Floodplain inundation along the river likely occurs during flows in excess of about 3,300 cfs. Flows at or below this level are likely sufficiently frequent that the shape of the channel has adjusted to convey these flows without inundating the minor floodplains that occur in Segments 1 and 2. The magnitude and frequency of flow fluctuations caused by peaking operations at the powerhouse would be reduced, and the timing of seasonal flow patterns would be partly restored, thereby addressing concerns regarding the effects of frequent inundation and exposure of riparian areas.

It would be recommended that irrigation of the meadows in Segment 3 be adjusted to reduce impacts to fisheries and aquatic resources, and occur earlier in the growing season. This would more closely mimic natural patterns and timing of floodplain inundation.

Actions designed to restore channel processes and floodplain connectivity are proposed for portions of Hayden Creek, Shovel Creek, and, potentially, other fish-bearing streams. These actions would likely restore connectivity with portions of relic floodplains that are rarely inundated at present.

Current water table elevations in upland wet meadows are sufficient to support riparian vegetation communities. Human modifications to flow paths affect the extent of inundation in some areas, but would not be addressed in this alternative. Upslope treatments could increase the amount of water available in numerous wet meadows.

Overall, the processes driving floodplain inundation and water table elevation would be maintained and restored, and the intent of this objective would be met.

Objective 8: "Plant communities"

The effects of the J.C. Boyle hydroelectric facility on the hydrologic and geomorphic processes that influence the extent and character of riparian vegetation communities would be greatly reduced. Regardless, ramping in Segments 2 and 3 to attain recreation flows would continue to affect the frequency, timing, and magnitude of flow fluctuations, and would confer a competitive advantage plant species (such as reed canary grass) that reproduce vegetatively and can tolerate such flow regimes (Conchou and Fustec, 2001). Downstream from the powerhouse, increased baseflows would reduce the magnitude of daily flow fluctuations, thus reducing the lateral extent of the area affected by ramping.

The extent of alluvial surfaces capable of supporting riparian vegetation would increase as a result of active and passive restoration measures.

Other proposed actions in or adjacent to riparian areas (recreation developments, road decommissioning, vegetation treatments, and exclosure construction) would, overall, have a moderate net beneficial effect on riparian communities along the river and tributary streams.

Overall, a moderate degree of active and passive restoration of riparian communities would occur in this alternative.

Objective 9: "Habitat"

Alternative 2 would maintain and enhance riparian areas and upland habitats located throughout the watershed over an indefinite time period. The proposed vegetation treatments would enhance these habitats to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species. Alternative 2 is expected to maintain this objective in the short-term and would restore habitat through vegetation recovery over the long-term. When compared to Alternative 4, this alternative would be approximately equal in condition improvements, but would be less than those efforts proposed under Alternative 3.

Alternative 3

<u>Objective 1: "Watershed and landscape-scale features"</u>

Extensive enhancement of landscape level features, such as forested communities, wet meadows, and riverine riparian areas, would occur under this alternative. Reduced fuel loads and increased diversity of terrestrial habitats within the planning area would be expected to have beneficial impacts on the vegetation community, thereby protecting the diversity and complexity landscape scale features within the canyon in the long term (greater than ten years).

The short term (over the next ten years) risk of catastrophic fire occurring within the planning area would be reduced, due to accelerated rates of fuels management in the canyon. The distribution, diversity, and complexity of the watershed would be protected from extensive stand replacement fires as a result.

The alternative would have the highest rate of treatment and thus bring fuel loading and vegetation conditions within the natural range of variation within the shortest time period when compared to Alternatives 1, 2, and 4.

<u>Objective 2: "Spatial and temporal connectivity"</u>

The lateral connectivity within riparian areas, and of riparian areas to adjacent upland areas, would be improved by road decommissioning and by stream crossing enhancements.

The lateral connectivity of aquatic habitat would be largely restored under this alternative. Artificial peaking flows would generally be eliminated or reduced in all segments, minor fluctuation within the natural range of variability for the system may continue, under this alternative. In addition active restoration efforts would be conducted to increase lateral connectivity of aquatic habitats within the planning area. Removal of sidecast in Segment 1, proposed channel enhancements in all segments, treatment of side channels, and sediment regime restoration would be expected to restore connections between riparian and aquatic interfaces. These would occur as a result of increased water depths, increased bank habitat, and the reduced extent of exposed substrate during low flow periods.

Road decommissioning or stream crossing enhancement would improve the longitudinal connectivity of riparian areas along some watercourses. Longitudinal connectivity would be enhanced by instream streamflow alterations that reduce temperature gradients. Longitudinal connectivity between the river within the planning area and upstream reaches, and an upstream key watershed, would be improved with alteration of fish passage facilities at the J.C. Boyle hydroelectric facilities. Longitudinal connectivity for fish species between the planning area and downstream river reaches would continue to be impaired by hydroelectric facilities. Longitudinal connectivity would remain impaired for most other aquatic and riparian dependant species between the planning area, all other reaches, and key watersheds, by hydroelectric facilities within the river and riparian areas that obstruct or hinder corridors of migration.

Alteration of longitudinal connectivity of Segment 1 to J.C. Boyle reservoir would occur as a result water releases for geomorphic flows and increased baseflows. Currently most flow is screened from downstream movement to the planning area reaches; 10 to 50 cfs is released for the fish ladder. Augmentation of flow released through unscreened spillways would provide enhanced downstream connectivity.

Connectivity within the planning area would be enhanced and substantial enhancements in riparian –channel connectivity would occur. This alternative provides the greatest potential for recovery of spatial and temporal connectivity of the planning area to upper river reaches and the Spencer Creek Key Watershed.

<u>Objective 3: "Physical integrity"</u>

The effects of the J.C. Boyle facility on channel morphology in the mainstem would be mitigated by either (1) a combination of passive (i.e., gravel augmentation) and active (i.e., installation of structural features) restoration actions, and/or (2) removing the J.C. Boyle facility. If implemented, instream restoration actions would also address the effects of other past or ongoing land use activities, and would reduce bank erosion and channel widening.

Degraded habitat conditions in some tributary streams would be addressed by an extensive program of instream restoration. The diversion structures in Shovel and Negro Creeks would no longer require maintenance (which involves straightening of short lengths of stream channel).

The physical integrity of the aquatic system in the river, including shorelines, banks and bottom configurations, would be beneficially affected by an extensive program of instream restoration.

Objective 4: "Water quality"

Assuming the Upper Klamath Lake and scheduled Upper Klamath River TMDLs/WQMPs are implemented, water quality in the planning area would eventually improve.

The difference in water quality between the downstream end of Segment 1 and the area immediately downstream from the powerhouse would be reduced as a result of increased baseflows released from the dam. If the J.C. Boyle facility remains in place, warming rates and DO levels in Segment 1 would continue to be affected by the diversion at the dam. Maximum daily temperatures and warming rates in Segments 2 and 3 would be reduced as a result of increased baseflows.

If the irrigation diversion points on Shovel Creek and Negro Creek are decommissioned, the effects of these withdrawals on warming rates would be eliminated.

This alternative proposes the most comprehensive approach to address critical water quality concerns within the planning area, and thus would be the most likely to result in improved water quality and beneficial uses.

Objective 5: "Sediment regime"

If the J.C. Boyle facility remains in place, a system (possibly involving a sediment pass-through around J.C. Boyle reservoir) would be designed to convey sediment past the dam and into the river. This system would likely be capable of restoring (to unimpaired conditions) the character, timing, and duration of bedload transport processes. If the J.C. Boyle facility is removed, the short- and long-term effects on sediment supply and transport would be addressed.

If the J.C. Boyle facility remains in place, it is likely that the timing and duration of sediment entrainment and transport would continue to be affected by peaking operations at the powerhouse. These operations release flows on the order of 3,000 cfs, which are nearly equivalent to the calculated 1.5-year recurrence interval flow in Segment 2. The combination of increased sediment supply and increased sediment storage capacity (near CWD placements, for instance) would serve to reduce the net rate at which sediment is exported from the planning area.

The supply of fine sediment originating from roads and the use of the emergency spillway would be reduced.

Overall, Alternative 3 proposes the most comprehensive approach to sediment management in the planning area, and would be the most likely to restore sediment regimes to within the natural range of variability.

Objective 6: "Instream flows"

The BLM proposed instream flow would recommend a "run-of-the-river" flow regime downstream from the powerhouse that mirrors the volume of water flowing into J.C. Boyle Reservoir and minimizes flow fluctuations associated with peaking operations at the powerhouse. This flow regime would be developed in consultation with PacifiCorp and federal, State, and tribal stakeholders during the FERC relicensing process. The flow regime variation would occur within the planning area unimpaired by existing J.C. Boyle hydroelectric facilities.

Flow regulation at Upper Klamath Lake, results in higher and earlier peak flows, decreased summer minimum flows, and greater annual flow variability (BHI 1996). Summer baseflows would be enhanced below the powerhouse, as a result of BLM recommended flows. Peaking flows would be minimized/eliminated in order to provide elevated baseflows during late spring and summer months. The occurrence, duration, and magnitude of channel forming flows would be within the range of natural variation.

Stage fluctuations associated with powerhouse operations would be eliminated. Peaking in the Keno reach could cause occasional stage fluctuations, since peaks generated by irrigation return flows would be passed through J.C. Boyle reservoir.

The streamflow regime proposed in this alternative would result in the greatest benefit to aquatic and riparian habitats in the planning area, and constitute a major improvement over existing conditions.

Objective 7: "Floodplain inundation and water table elevation"

Floodplain inundation along the river likely occurs during flows in excess of about 3,300 cfs. Flows at or below this level are likely sufficiently frequent that the shape of the channel has adjusted to convey these flows without inundating the minor floodplains that occur in Segments 1 and 2. The magnitude and frequency of flow fluctuations caused by peaking operations at the powerhouse would be reduced, thereby partially addressing concerns regarding the effects of frequent inundation and exposure of riparian areas.

Irrigation of the meadows in Segment 3 would be adjusted to reduce impacts to fisheries and aquatic resources, and would likely occur earlier in the growing season and deliver less water. This would more closely mimic natural patterns and timing of floodplain inundation.

Actions designed to restore channel processes and floodplain connectivity are proposed for portions of Hayden Creek, Shovel Creek, and other fish-bearing streams. These actions would likely restore connectivity with portions of relic floodplains that are rarely inundated at present. The extent of active floodplains adjacent to these streams would be greater than in other alternatives.

Current water table elevations in upland wet meadows are sufficient to support riparian vegetation communities. Human modifications to flow paths that affect the extent of inundation in some areas would be addressed in this alternative. Upslope treatments could increase the amount of water available in numerous wet meadows.

Overall, the processes driving floodplain inundation and water table elevation would be maintained and restored, and the intent of this objective would be met.

Objective 8: "Plant communities"

The effects of the J.C. Boyle hydroelectric facility on the hydrologic and geomorphic processes that influence the extent and character or riparian vegetation communities would be reduced or mitigated. Regardless, ramping in Segments 2 and 3 would continue to affect the frequency, timing, and magnitude of flow fluctuations, and would confer a competitive advantage to plant species (such as reed canary grass) that reproduce vegetatively and can tolerate such flow regimes (Conchou and Fustec, 2001). Downstream from the powerhouse, increased baseflows would reduce the magnitude of daily flow fluctuations, thus reducing the lateral extent of the area affected by ramping.

The extent of alluvial surfaces capable of supporting riparian vegetation would increase as a result of active and passive restoration measures.

Other proposed actions in or adjacent to riparian areas (road decommissioning, vegetation treatments, and exclosure construction) would beneficially affect riparian communities along the river and tributary streams.

Overall, this alternative proposes the most extensive program of active and passive restoration of riparian communities.

Objective 9: "Habitat"

Alternative 3 is the most aggressive in enhancing riparian areas and upland habitats across the watershed and would protect habitat over an indefinite time period. The proposed vegetation treatments would enhance these habitats to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species. This alternative would be expected to maintain the objective in the short-term, with application of appropriate BMP's and PDF's and would restore habitat through vegetation recovery over the long-term. This alternative, when compared to all the other alternatives, would be expected to provide the greatest benefit to existing and potential habitats in the planning area.

Alternative 4

Objective 1: "Watershed and landscape-scale features"

A moderate level of enhancement of some landscape level features would be focused primarily on forested and upland communities. Reduced fuel loading and increased diversity of terrestrial habitats within the planning area would be expected to have beneficial impacts on the vegetation community and would protect the diversity and complexity of landscape scale features within the canyon in the long term (greater than ten years).

The short term (over the next ten years) risk of catastrophic fire occurring within the planning area would be reduced, due to accelerated rates of fuels management in the canyon. The distribution, diversity, and complexity of the watershed would be protected from extensive stand replacement fires as a result.

The degree of proposed landscape scale treatments would be expected to have an increased recovery over actions proposed in Alternative 1, nearly identical to Alternative 2, and less than those actions proposed in Alternative 3.

Objective 2: "Spatial and temporal connectivity"

The lateral connectivity of the river to adjacent riparian areas in Segment 2 and 3 would continue to be adversely affected by flow ramping at the powerhouse. Minimal active restoration efforts would be conducted to increase lateral connectivity of aquatic habitats within the planning area. The lateral connectivity within riparian areas, and of riparian areas to adjacent upland areas, would be improved by road decommissioning and by stream crossing enhancements.

The lateral connectivity of in river habitats would remain impaired under this alternative. Peaking operations at the J.C. Boyle facility would result in daily dewatering of bank habitat. Proposed fish based on BLM water rights claims would reduce the affect of this loss of aquatic habitat by increasing baseflows. However the active channel bank habitats would remain inaccessible during base summer flows. Lateral connectivity along the river in Segment 1 would continue to be impaired by sidecast material and the patchy distribution of riparian vegetation other than reed canary grass.

Road decommissioning or stream crossing enhancement would improve the longitudinal connectivity of riparian areas along some watercourses. Longitudinal connectivity of the Klamath River would be enhanced by increased baseflows, which would be expected to reduce the magnitude of thermal gradients near the J.C. Boyle powerhouse.

Longitudinal connectivity for fish species would be improved between the river within the planning area and upstream reaches (including an upstream Key Watershed) by enhancing facilities for upstream passage and increasing the rate of unscreened spill at the J.C. Boyle dam. The presence and operation of hydroelectric facilities would continue to impair longitudinal connectivity between the planning area and adjacent river reaches for most aquatic and riparian dependent species.

Connectivity within the planning area would be enhanced and enhancements in riparian –channel connectivity would occur. However, due to continued peaking the overall benefits of proposed projects may be temporally and spatially limited.

Objective 3: "Physical integrity"

Channel configurations in the river would continue to be adversely affected by the presence and operation of the J.C. Boyle facility. The reduced supply of coarse sediment, coupled with the release of peaking flows (including recreation releases in Segment 1), would contribute to channel widening and incision. Proposed site-specific fisheries enhancement projects (including gravel placement and installation of structures) would have a slight beneficial effect on channel processes, but would not address the primary causes of channel instability (a lack of coarse sediment and frequent peaking flows).

The existing condition of the river, which reflects past effects of the J.C. Boyle facility, as well as other past and/or ongoing land use effects (including construction of bridges and irrigation diversions, grazing, and historic log drives), would be addressed by a program of site-specific treatments. The effects of the sidecast in Segment 1 would not be addressed.

Currently degraded habitat conditions in some tributary streams would be addressed, but in a limited fashion that would focus primarily on productivity, rather than channel processes. Depending on how they are implemented, these actions could have either beneficial or detrimental long-term effects on channel integrity. Conditions in other streams would continue to respond to dis-equilibrium between watershed conditions and channel form by widening and incising.

The physical integrity of the aquatic system in the river, including shorelines, banks and bottom configurations, would be slightly restored relative to the current degraded condition. The integrity of tributary stream channels could be maintained, restored, or degraded. Overall, it is likely that existing conditions would be maintained, but not substantially restored.

Objective 4: "Water quality"

Assuming the Upper Klamath Lake and scheduled Upper Klamath River TMDLs/WQMPs are implemented, water quality in the planning area would eventually improve.

Except during periods when recreation flows are released from the dam, water quality in the lower portion of Segment 1 would continue to be of a different character than water quality in the rest of the river, and the water quality and temperature gradient that exists at the powerhouse would persist. Warming rates and DO levels in Segment 1 would continue to be affected by the diversion at J.C. Boyle Dam. Maximum daily temperatures and warming rates in Segments 2 and 3 would be reduced as a result of increased baseflows.

No alterations in withdrawals from Shovel and Negro Creeks would be recommended. These diversions likely would continue to have an adverse effect on water temperature in these streams.

Overall, there would be slight improvements in certain water quality parameters, although important water quality concerns (and the effects of altered water quality on beneficial uses) in the planning area would not be comprehensively addressed.

Objective 5: "Sediment regime"

The supply of coarse sediment in the river would continue to be reduced by the presence of J.C. Boyle Dam. This alternative proposes to place gravel in certain areas of the river. Although these placements would augment the supply of coarse sediment derived from hillslopes and bank erosion, the total supply of coarse sediment would likely be relatively minor compared to that which is transported in the Keno reach of the river and in Spencer Creek (and is subsequently captured in J.C. Boyle Reservoir).

The timing and duration of sediment entrainment and transport would continue to be affected by peaking operations at the powerhouse. These operations release flows on the order of 3,000 cfs, which are nearly equivalent to the calculated 1.5-year recurrence interval flow in Segment 2. In addition, the release of recreation flows in Segment 1 could lead to increased rates of sediment transport through this reach.

The supply of fine sediment originating from roads and the use of the emergency spillway would be reduced.

Limited restoration of coarse sediment would occur in specific areas, but ongoing effects to coarse sediment supply and transport would not be addressed.

Objective 6: "Instream flows"

The proposed instream flow would in part be based on water claims for fisheries and recreational values. Additional increases in baseflow may be recommended as part of FERC relicensing of the Klamath Project. The flow regime that would occur within the planning area, including peaking for power production, would reflect flow patterns that have been occurring since the construction of the J.C. Boyle facility. Proposed peaking events in the bypass reach that do not accelerate erosion of exposed hill slope, and do not mobilize in channel sediments would have minimal impacts on aquatic habitats.

Spatial and temporal distribution of peak, high, and low flows would continue to be altered from unimpaired flows. Flow regulation at Upper Klamath Lake, commingled with the diversion and releases related to hydropower generation at J.C. Boyle, results in higher and earlier peak flows, decreased summer minimum flows, and greater annual flow variability (BHI 1996). Summer baseflows would be enhanced below the powerhouse, as a result of BLM water claims and FERC baseflow increases, to benefit aquatic species. The duration of peaking flows would be reduced in order to provide elevated baseflows during late spring and summer months. However, the impacts to physical process resulting from increased duration channel forming flows when operating two turbines would be expected to continue.

Stage fluctuations associated with powerhouse operations would be frequent and of relatively high magnitude in this alternative.

The streamflow regime proposed in this alternative would constitute a minor improvement over existing conditions but would while continue to affect channel processes.

Objective 7: "Floodplain inundation and water table elevation"

Floodplain inundation along the river likely occurs during flows in excess of about 3,300 cfs. Flows at or below this level are likely sufficiently frequent that the shape of the channel has adjusted to convey these flows without inundating the minor floodplains that occur in Segments 1 and 2. Proposed restoration of channel form in Segment 1 would result in re-creation of area that could be inundated on the west side of the river. The magnitude and frequency of flow fluctuations caused by peaking operations at the powerhouse would be reduced, thereby partially addressing concerns regarding the effects of frequent inundation and exposure of riparian areas. This benefit would be offset somewhat by the implementation of a weekend peaking regime in Segment 1.

Irrigation of the relic floodplains in Segment 3 mimics natural inundation somewhat, though the duration and frequency of inundation during summer and fall months does not reflect natural patterns.

A limited program of actions designed to enhance fish habitat in tributary streams is proposed in this alternative. In the long-term, these streams will continue to adjust to flows and sediment supplied from their upper watersheds, and incipient floodplains will form (at a lower elevation that the relic floodplains). The proposed actions could improve stream channel connectivity with incipient or relic floodplains.

Current water table elevations in upland wet meadows are sufficient to support riparian vegetation communities. Human modifications to flow paths affect the extent of inundation in some areas. Upslope treatments could increase the amount of water available in a few wet meadows.

Overall, the processes driving floodplain inundation and water table elevation would be maintained or, in some areas, restored somewhat.

Objective 8: "Plant communities"

The hydrologic and geomorphic processes that influence the extent and character or riparian vegetation communities would continue to be affected by the presence and operation of the J.C. Boyle hydroelectric facility. Ramping in Segments 2 and 3 would continue to affect the frequency, timing, and magnitude of flow fluctuations, and would confer a competitive advantage to plant species (such as reed canary grass) that reproduce vegetatively and can tolerate such flow regimes (Conchou and Fustec, 2001). Downstream from the powerhouse, increased baseflows would reduce the magnitude of daily flow fluctuations, thus reducing the lateral extent of the area affected by ramping. The onset of ramping in Segment 1 could have a detrimental effect on riparian vegetation.

The extent of riparian vegetation along the river would continue to be limited by the lack of alluvial surfaces, due in part to altered sediment regimes (refer to the discussion of Objective 5) and, in Segment 1, the effect of the sidecast material. Irrigated meadows in Segment 3 would continue to support mainly non-native species.

Other proposed actions in or adjacent to riparian areas (recreation developments, road decommissioning, vegetation treatments, and exclosure construction) would have a moderate net beneficial effect on riparian communities along the river and tributary streams (though less so than in Alternatives 2 and 3).

Overall, this alternative proposes a limited program of active and passive restoration in riparian communities, with most of the restoration work occurring adjacent to tributaries and in wet meadows.

Objective 9: "Habitat"

Alternative 4 would maintain riparian areas and enhance and maintain upland habitats located throughout the watershed over an indefinite time period. The proposed vegetation treatments would enhance these habitats to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species. This alternative is expected to maintain the objective in the short-term and would restore habitat through vegetation recovery over the long-term. This alternative, when compared to Alternative 2 would be approximately equal in condition improvements, but would be less than those efforts proposed under Alternative 3.

Table L-1. Recreation developments within riparian reserves (acres)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**
Segment 1								
BLM		3	<1	3		3		3
PacifiCorp			<1		<1		1	
Segment 2								
BLM	9		11	1	2	2	14	1
PacifiCorp	3	<1	4	<1			4	<1
Segment 3								
BLM							<1	
PacifiCorp	1	<1	1	4	2	<1	2	4
Total	13	4	17	8	4	6	17	8

Table L-2. Proposed trails within riparian reserves and riparian corridors (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	**All Other Riparian Features**	**Fish-B earing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**
Segment 1								
New Trail		0.1	5.1	0.3			5.2	0.4
Existing Roadbed								
Segment 2								
New Trail	2.8	0.8	9.6		5.7		9.8	
Existing Roadbed	1.4		2.8		3.0		2.6	
Segment 3								
New Trail	0.2	0.1	1.8	0.6			2.5	0.8
Existing Roadbed			0.3	0.1	0.3	0.1		0.1
Total								
New Trail	3.0	1.0	16.5	0.9	5.7		17.5	1.2
Existing Roadbed	1.4		3.1	0.1	3.3	0.1	2.6	0.1

Table L-3a. Proposed/recommended road construction and decommissioning within riparian reserves and riparian corridors, by segment (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 2								
Construction	<0.1	0.1	0.1	<0.1		0.1	0.1	0.1
Decommissioning			<0.1	0.1	<0.1	<0.1	<0.1	
Obliteration	2.6	1.0	4.4	1.3	5.6	1.5	3.1	1.1
Segment 3								
Construction			0.1	0.4	<0.1	0.1	0.1	0.4
Decommissioning					<0.1	0.6		
Obliteration			0.4	0.1	0.6	0.1	0.1	0.1
Total [1]								
Construction	<0.1	0.1	0.2	0.4	<0.1	0.2	0.2	0.5
Decommissioning			<0.1	0.1	0.1	0.6	<0.1	
Obliteration	2.6	1.0	4.8	1.4	6.2	1.6	3.2	1.2

[1]Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table L-3b. Proposed/recommended road construction and decommissioning within riparian reserves and riparian corridors, by ownership (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
BLM								
Construction	0.1		0.1			0.1	0.1	
Decommissioning						0.3		
Obliteration	2.0	0.6	2.5	0.8	3.6	0.9	2.0	0.6
PacifiCorp								
Construction		0.1	0.1	0.5	<0.1	0.1	0.1	0.5
Decommissioning			<0.1	0.1	<0.1	0.4	<0.1	
Obliteration	0.7	0.4	2.4	0.6	2.5	0.7	1.2	0.5
Total [1]								
Construction	0.1	0.1	0.2	0.5	<0.1	0.2	0.2	0.5
Decommissioning			<0.1	0.1	<0.1	0.7	<0.1	
Obliteration	2.7	1.0	4.9	1.4	6.1	1.6	3.2	1.1

[1]Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table L-4a. Proposed/recommended road improvements within riparian reserves and riparian corridors, by segment (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**
Segment 1								
Spot		0.2	0.6	0.2	0.6	0.2		
Contiguous							0.6	0.2
Segment 2								
Spot	0.1	1.0	2.7	1.4	0.1	0.9	0.2	0.3
Contiguous			0.8	0.2		0.2	3.6	1.5
Segment 3								
Spot			0.6	<0.1	0.1	<0.1	0.6	<0.1
Contiguous			0.1		0.1		0.1	
Total [1]	0.1	1.2	4.8	1.8	0.9	1.4	5.1	2.0

[1]Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table L-4b. Proposed/recommended road improvements within riparian reserves and riparian corridors, by ownership (miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**	**Fish-Bearing Streams**	**All Other Riparian Features**
BLM								
Spot	0.1	0.7	3.3	1.1	0.7	0.7	0.2	0.2
Contiguous			0.7	0.1		0.1	4.1	1.2
PacifiCorp								
Spot		0.4	0.6	0.5	0.1	0.5	0.6	0.1
Contiguous			0.1	0.1	0.1	0.1	0.1	0.5
Total [1]	0.1	1.8	4.7	1.8	0.9	1.4	5.0	2.0

[1]Due to rounding, the totals presented in this table may not correspond exactly with other tables.

Table L-5. Summary of road status[1] designations for roads within riparian reserves and riparian corridors, by segment (in miles)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
Segment 1								
Open	2.9	0.4	2.7	0.3	1.0	0.2	2.7	0.4
Admin. Use			0.2	0.1	1.9	0.2	0.2	
Segment 2								
Open	6.6	3.8	5.1	3.4	0.5	1.0	5.1	5.2
Seasonal Closure	0.7	1.1	0.5	0.7	3.1	2.9	1.0	0.1
Admin. Use	0.4	0.8	0.4	0.8	1.1	0.9	1.2	
Segment 3 [2]								
Open	2.7	2.5	2.9	2.8	2.5	3.1	3.4	2.8
Seasonal Closure							0.3	0.2
Admin. Use	2.9	2.6	2.5	2.6	2.5	2.0	2.0	2.4
Total								
Open	12.2	6.7	10.7	6.5	4.0	4.3	11.2	8.4
Seasonal Closure	0.7	1.1	0.5	0.7	3.1	2.9	1.3	0.3
Admin. Use	3.3	3.4	3.1	3.5	5.5	3.1	3.4	2.4

[1] This table refers only to those roads that are open to public and/or administrative access for at least part of each year.
[2] With the exception of Topsy Road, roads on non-PacifiCorp private land in Segment 3 were assumed to be closed to use by the general public.

Table L-6. Proposed/recommended vegetation treatments within riparian reserves and riparian corridors (acres).

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features	Fish-Bearing Streams	All Other Riparian Features
BLM								
Forest/Woodland	88	80	331	156	389	213	331	156
Dry Meadow/Shrub	2	32	32	102	47	117	32	115
Riparian	1	6	16	14	28	17	3	6
PacifiCorp								
Forest/Woodland		1	35	115	47	183	35	138
Dry Meadow/Shrub			25	37	30	112	31	83
Riparian/Irrigated	3	8	287	223	316	249	12	10
USFS								
Forest/Woodland						6		
Riparian/Irrigated						2		
Private								
Riparian					3	2		
Total								
Forest/Woodland	88	81	367	270	436	403	367	294
Dry Meadow/Shrub	2	32	57	139	76	229	62	198
Riparian/Irrigated	4	14	303	237	344	269	14	16
Grand Total	94	127	727	646	856	901	443	508

Table L-7. Effects[1] on Aquatic Conservation Strategy Objectives

ACS Objective	Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	+	++	+++	++
2	+	++	+++	++
3	0	++	+++	0
4	+	++	++	+
5	0	++	+++	+
6	+	++	+++	+
7	0	++	+++	+
8	0	++	+++	+
9	+	++	+++	++

[1] The relative cumulative effect of the proposed alternatives on the nine ACS objectives is as follows:
"0" indicates that the objective would be maintained,
"+" indicates a slight degree of restoration,
"++" indicates a moderate degree of restoration, and
"+++" indicates an extensive degree of restoration.

Appendix M – Monitoring Plan

Introduction

Purpose and Need

Regulations require the BLM to monitor land use plan decisions (43 CFR 1610.4-9) and to adopt a monitoring program for any mitigation incorporated into decisions based on environmental impact statements (40 CFR 1505.2[c]). In addition, protection and enhancement of outstandingly remarkable river values is a mandate of the Wild and Scenic Rivers Act. In order to verify the trend of river resource conditions and to guide future management decisions, it is desirable to systematically sample public land, file the data in an organized fashion, and provide for periodic evaluation of the information obtained. This monitoring plan will assist in the scheduling, budgeting, and reporting of the monitoring process.

Monitoring Area

The area included in this monitoring plan consists of all public land administered by the BLM from rim to rim along the Klamath River mainstem (see Map 1 of the DEIS). Any private lands that were acquired in the future by the BLM would also be included.

Objectives

The objectives of this monitoring plan are to:

- Provide for systematic evaluation of each mitigation measure incorporated into the Klamath River Management Plan.
- Outline the minimum standards of information needed to satisfy the Clean Water Act and the Endangered Species Act.
- Provide for systematic evaluation of rate of change to ecological and social conditions occurring as a result of human actions.
- Provide a way to anticipate and plan for future funding needs.

Budget Constraints

It is important to note that the objectives of this monitoring plan are based on the assumption that annual budget allocations will support full implementation of the Klamath River Management Plan. If actual budgets were significantly different from those projected, desired restoration and enhancement activities would necessarily be reduced, along with the monitoring actions that are associated with them. However, systematic monitoring and evaluation would continue at a level commensurate with the management actions that are implemented, and to ensure that the outstandingly remarkable values of the Klamath River are preserved.

Monitoring Program

Implementation Monitoring

When determining whether a course of action is having the desired effects, the first step to take is implementation monitoring. This type of monitoring answers the question: "Were the actions detailed in the Record of Decision accomplished as designed?" Implementation monitoring will be conducted on each mitigation measure incorporated into the Klamath River Management Plan, and disclosure of accomplished actions will be documented in achievement reports. For many mitigation measures, such as standard Best Management Practices, the only monitoring necessary would be implementation monitoring.

Effectiveness Monitoring

If more monitoring information is desired, the second phase of monitoring is to determine whether the actions documented in the implementation phase of monitoring are having any effect. This phase answers the question: "Did the actions accomplished meet the objectives in the Record of Decision?" Thus, effectiveness monitoring includes obtaining field observations that meet approved protocol, and evaluating the data gathered to determine whether conditions remain within the bounds and intent of Plan direction.

Validation Monitoring

The validation phase of monitoring seeks to resolve whether the course of action is having the desired effects. Validation answers the question: "Were the initial assumptions used to develop the Klamath River Management Plan correct?" The validation phase also forms the background for adaptive management, and would become the initial data set for the next round of decision making.

Monitoring Actions

A. Cultural Resources

Monitoring Action (Validation): Human pressure on cultural sites monitoring.
Objective: Analysis of and monitoring of human pressure on cultural sites.
History: Increased human usage in an area increases impacts to cultural resources.
Site Selection: Chose three sites located in or adjacent to popular recreation areas, three sites located in areas of mid-range usage, and three sites in areas of little to no use. The sites that are chosen need to be of similar site types and should be dispersed relatively evenly throughout the three river segments.
Frequency: The sites should be checked every fall at the end of the height of recreation use in the canyon.
Methods: A form would be developed to describe observations upon visits and photo points would be established. The first visit will establish the baseline data from which future observations will be compared.
Deviations from Standard Methodology: No standard methodology exists at present.
Responsibility: KFRA Cultural Resource Management personnel.

Monitoring Action (Effectiveness and Validation): Site Preservation Treatment Monitoring
Objective: Review the effectiveness of implemented site protection measures.
History: Stabilization, rehabilitation, and other preservation efforts are suggested in the Klamath River Management Plan. Many of the preservation treatments, especially the historic, are designed to reduce erosional deterioration. These treatments are not mitigation actions tied to ground disturbing projects. Mitigation actions tied to ground disturbing projects would be monitored in a separate study, whereas this study would focus on preservation actions not tied to ground disturbing projects.
Site Selection: All the sites that receive preservation treatment within the selected alternative.
Frequency: Each site would be checked once a year, preferably in early summer to assess winter weather related damage. This annual monitoring effort would last for the life of the plan.
Methods: The site would be visited and a form would be developed to record observations. If damage is present, or evidence that the treatment is showing signs of ineffectiveness, then a photograph would be required to show the ineffective or damage areas. Photos of the treatment areas would be taken before and after treatment implementation, which would serve as the baseline data from which future observations would be compared.
Deviations from Standard Methodology: No standard methodology exists at present.
Responsibility: Primary responsibility would be on KFRA Cultural Resource Management personnel. However, this task could be performed by anyone visiting the area.

Monitoring Action (Implementation and Effectiveness): Mitigation monitoring.
Objective: Monitor mitigation efforts. Ensure that cultural resources are being addressed in action pre-planning processes. Ensure that survey protocols are being followed prior to action implementation and that cultural sites (including religious and traditional use areas) are being adequately protected.
History: Regulations require a responsible and good faith effort to identify cultural properties and take into account any effect an undertaking may have on those resources. (Section 106 and Section 110(a)(2)(E)of the National Historic Preservation Act (NHPA) and 36 CFR Part 80)
Site Selection: The entire Klamath River management planning area.

Frequency: Once a year in early spring. This way actions that were implemented the year before could be checked before the rush of the field season begins. This annual monitoring effort would last for the life of the plan.
Methods: Document baseline data from all known sites within the management planning area prior to implementation of study. Review all action proposals within and adjacent to cultural resource sites to determine if the effect of the action on those resources were considered. If those resources were considered and mitigation occurred, then ground truth the mitigation to ensure that it was implemented. While in the field, a specially designed form would be completed to document the visit and any subsequent observations.
Deviations from Standard Methodology: No standard methodology exists at present.
Responsibility: Primary responsibility would be on KFRA Cultural Resource Management personnel.

Monitoring Action (Implementation): Native American consultation and coordination monitoring.
Objective: To ensure that the BLM is making an effort to work with Native Americans and ensure that Native Americans have access to culturally important areas.
History: Since the passage of the Native American Graves Protection and Repatriation Act in 1990, the BLM has been directed to establish government-to-government relations with tribes (Executive Memorandum of April 29, 1994; Executive Order 13084 of May 14, 1998; and BLM Manual Handbook H-8160-1).
Site Selection: The entire Klamath River management planning area.
Frequency: Annually, primarily in the winter. This effort would last for the life of the plan.
Methods: Review documentation regarding action decisions to ensure that Native American are consulted prior to action implementations.
Deviations from Standard Methodology: No standard methodology exists at present.
Responsibility: Primary responsibility would be on KFRA Cultural Resource Management personnel.

B. Fire and Fuels

Monitoring Action (Effectiveness): Measuring the reduction of ladder fuels in treated forest types through photo points.
Objective: To determine the effect of fuels treatment projects on potential for stand-destroying crown fires.
History: This is a new study.
Site Selection: Same photo points as in vegetation monitoring, number depends on alternative chosen.
Frequency: Initial data collection would precede vegetative treatments; then photos would be taken in the first, fifth, and tenth years after implementation. Photo monitoring would then continue at ten-year intervals.
Methods: Standard methods for photo monitoring points would be used.
Deviations from Standard Methodology: Standard methodology will be used.

Monitoring Action (Effectiveness): Measuring the reduction of ladder fuels in treated forest types through stand exams.
Objective: To determine the effect of fuels treatment projects on potential for stand destroying crown fires.
History: Silvicultural exams in treatment areas are conducted across the resource area.
Site Selection: Sample plots for measurement will be the same as in vegetation monitoring.
Frequency: Initial data collection would precede vegetative treatments; post-treatment data would be collected in the first fifth, and tenth years after implementation.
Methods: Standard methods for silvicultural exams would be used.
Deviations from Standard Methodology: Standard methodology will be used.

C. Fish Resources

Monitoring Action (Effectiveness): Upper Klamath River Spawning Surveys
Objective: Document changes in spawning behavior in the Upper Klamath River. Did spawning of suckers and or trout increase as is relates to flow, sediment, and temperature alterations?
History: Limited knowledge exists on trout or sucker spawning in the Planning area. Flow regimes may be affecting the spawning behavior of Lost River and shortnose suckers in the Klamath River (Salt Caves 1987). Temperature may also serve as an important stimulus for spawning behavior in sucker species (Perkins et al 2000). The entrainment of sediment within the reservoirs of Upper Klamath River has altered gravel distribution and abundance. Lost River and shortnose suckers appear to show a gravel preference as spawning substrate (Buettner and Scoppettone 1990). Spawning gravels for redband trout is limited within the main channel of the Klamath River (Salt Caves 1986). The proposed actions within the River Plan would alter flow regimes, temperature impacts, and sediment regimes within the

Planning area. Efforts to determine the effectiveness of these projects should be based on behavioral indications of success in fish species, i.e. occurrence of spawning may be one indicator.
Site Selection: Based on Physical Habitat Survey and anecdotal indications of preferred spawning areas. Stratify river and tributaries based on Rosgen type and other physical features (such as the powerhouse) in order to develop distribution and relative occurrence of spawning behavior across the full planning area.
Frequency: Annual efforts should be made prior and post project implementation in order to determine occurrence. For stream spawning populations suckers begin their spawning migration in late February, March, or early April depending on peak flows with spawning activity continuing well into May (Stubbs and White 1993).
Methods: ODFW stream survey protocols for salmonids spawning surveys. Redd sampling, using serber sampling gear or freeze cores, may be desirable in order to assess successful spawning and to validate visual observations. All sucker surveys would be conducted according to established protocols (example studies: Buettner and Scoppettone 1990 for spawning activities, Markle and Simon 1993 for larvae presence/absence). Benthic sampling, such as serber sampler, may be necessary for determining occurrence of sucker spawning.
Deviations from Standard Methodology: None

Monitoring Action (Effectiveness): Upper Klamath River Physical Habitat Surveys
Objective: Document changes in the aquatic habitats of the Upper Klamath River. Did we improve baseflow main channel habitats such as pool depths, pool distribution, instream cover, and riparian bank cover? Did we reduce stranding habitats, cutoffs, bank shear?
History: Large alterations in daily and weekly flows, especially as it relates to base flow, can highly impact the riparian habitat, and channel geomorphology. The proposed actions within the River Plan would alter flow regimes, sediment regimes, and geomorphic features within the Planning area. Efforts to determine the physical changes and trend in the aquatic habitat within the planning area would be a useful indicator of project effectiveness.
Site Selection: All fish bearing reaches within the Planning Area. Baseline surveys of the Klamath River were completed in 1998. Shovel Creek and Hayden Creek below migratory barriers should also be surveyed. Other reaches could be surveyed, as fish distribution within the planning area is refined. Priorities for surveys within tributary reaches should be based on relative size or potential contribution to aquatic habitat and refugia in the planning area.
Frequency: Resurvey of aquatic habitats should occur at the conclusion of major river modification projects in order to determine new base lines. Decadal resurvey of the river reach should be conducted in order to determine change and trend (if possible)
Methods: Hankin and Reeves modified habitat inventories, such as ODFW Physical Habitat Surveys, or Forest Service Level II Stream Inventories. The habitat surveys should assess current habitat condition such as location and abundance of spawning gravel, rearing habitat, adult cover, migration corridors, and condition of riparian areas.
Deviations from Standard Methodology: None

Monitoring Action (Effectiveness): Upper Klamath River Fish Migration Surveys
Objective: Did passage/movement improve as it relates to flow modifications; attraction flows, temperature adjustments, planning area flow regimes?
History: Redband trout passage studies at JC Boyle indicated that in 1959, over 5,500 trout used the ladder (Hanel and Gerlach 1964) while from 1988-91; only 70 to 588 trout used the ladder. This indicates a dramatic decline in fish passage (Hemmingsen et al. 1992). Contemporary passage continues to be less than 10% of that reported one year after project construction of JC Boyle Dam. ODFW in its *Biennial Report on the Status of Wild Fish in Oregon* (1995) noted that inadequate upstream fish passage facilities at JC Boyle Dam is the probable cause of the decline fish numbers from 1959 to 1992. The proposed alteration in attractions flow, changes in flow regimes, and alteration in temperature fluctuation within the planning area would be anticipated to alter migratory behavior of fish populations. Efforts to determine the effectiveness of these projects should be based on behavioral indications of success in fish species, i.e. unimpeded movement between the mainstem Klamath River and spawning/rearing/adult/overwinter habitats.
Site Selection: Target locations with known or suspected passage concerns. Locations should include at a minimum sites at JC Boyle Powerhouse, major instream springs, bypass screen outfall, and ladder entrance
Frequency: Existing information on fish passage using a mark and recapture methodology (Hemmingsen et al. 1992) with current facilities and operations could serve as baseline. Repeating this study upon implementation of proposed actions would indicate initial changes in migratory behavior. ODFW conducted annual surveys over four years in order to assess conditions. Similar efforts for effectiveness monitoring of BLM actions would be recommended. Using radio-telemetry technologies would require completion of baseline data. Multiple post implementation resurveys using radio-telemetry would be recommended in order to assess migratory trends.
Methods: Conduct biological evaluations, such as through radio-telemetry or mark and recapture surveys, to assess migratory characteristics (migration delays, fallback or injury, fishway entrances, ladder configurations, velocity

barriers, temperature barriers, flow attraction concerns, and others). Radio telemetry studies would have the greatest ability to show migratory behavior along the full length of the planning area and would be the recommended method.
Deviations from Standard Methodology: Due to the site-specific nature of the proposed modifications additional survey locations, assuming implementation of ODFW methodology may be required in order to determine effects of individual modifications.

Monitoring Action (Effectiveness/Validation): Upper Klamath River Fisheries Assessment
Objective: Did redband trout age structure or growth rate change within the Klamath River planning area?
History: In high-gradient systems trout production can be greatly affected by limited habitat features rather than food supply (Behnke 1992). Oregon Department of Fish and Wildlife fisheries biologists have noted that fish in the planning area appear to be smaller in size on average than fish observed in the Keno reach of the river (Smith 2000, *personal communication*). Excessive recruitment into the population, where young and adult fish are competing for a common food supply results in short-lived, slow-growing individuals and a population whose biomass is tied up in small young fish (Behnke 1992). Based on the population estimates and the existing conditions made up mostly of adult habitat and poor upstream passage at J. C. Boyle Dam the trout population could be exceeding carrying capacity and the additional recruitment of trout to these segments could then affect the trout size/age structure. Proposed actions to alter flow regimes, sediment management, channel profiles, and passage concerns would be expected to alter key habitat quantity, quality and occupancy thus affecting fishery resources. Altering aquatic habitat to enhance the trout bioenergetics (length/weight relationship or age class distribution) would need to be validated in order to determine the effectiveness of proposed projects and support additional instream work.
Site Selection: Assuming implementation of a mark and recapture study in order to assess fish passage those sites chose may also function as sites for assess changes in physiological morphological features of native fish fauna.
Frequency: Sufficient baseline data from the Keno Reach and the Planning area must be available prior to project implementation. Additional data would need to be collected subsequent to project implementation. Alternative one would have minimal sampling. Alternative two and four would have intermediate levels of resurvey. Alternative three would need to be the most ambitious.
Methods: Conduct biological evaluations, bioassesment surveys or stratified electro-shocking surveys, to assess changes in fisheries resources.
Deviations from Standard Methodology: None

Monitoring Action (Effectiveness/Validation): Upper Klamath River Recreational Creel Survey
Objective: Meeting the goals and objective for protecting and enhancing the Recreation and Fisheries ORVs.
History: The numerous trout present within the Klamath River, and the ability for Upper Klamath Basin redband trout to attain very large sizes lead in part to the designation of the Keno Dam to Stateline reach as a wild trout management area in Oregon. Oregon Department of Fish and Wildlife fisheries biologists have noted that fish in the analysis area appear to be smaller in size on average than fish observed in the Keno reach of the river (Smith 2000, *personal communication*). The proposed projects were designed to enhance the recreational fishing experience thus providing opportunity to angle for large trout. The effectiveness of these projects to support larger trout sizes need to be validated in order to determine future project implementation.
Site Selection: Depends on Creel methodology: Check Stations may include Fish Access #1, Topsy Grade into the canyon, and the Emergency Spill way. Roaming surveys would include pressure counts along the full planning area and subsequent interviews based on dense use locations. Angler Box surveys would have similar stations as described for check stations
Frequency: Volunteer angler box surveys would be continuously employed when other methods are not in use. Angler check stations and roaming angler surveying would be targeted for heavy use periods.
Methods: Three methods could be employed, individually or combined, in order to assess angler success. One: Angler check stations have been installed in past creel efforts. This type of methodology could be employed to interview angler success when leaving the planning area. Additional stations may need to be employed at other key access points in order to increase accuracy of upstream angling effort, example station location. Two: Roaming angler surveying could be employed in order to gain information of angler success and location of efforts. Roaming surveys could include pressure counts and angler interviews. Three: Angler box surveys may also be employed; locations at key funnel points to enter the canyon, where anglers could volunteer catch information and deposit within the holding boxes provided.
Deviations from Standard Methodology: None.

D. Grazing Management

Monitoring Action (Implementation): Grazing use supervision & permit compliance monitoring study.
Objective: To monitor permitted grazing use and detect unauthorized use.
History: Existing or ongoing management action. Though not formally outlined in Bureau Manuals or Technical References, the need for grazing use compliance checks are implicit in the grazing regulations (43 CFR 4100), TR-4400-2: *Rangeland Monitoring - Actual Use Reporting*, past litigation, common sense, etc.
Site Selection: Entire analysis area (Oregon & California) - public and private – depending on alternative selected. Year-to-year site selection is dependent on where (and if) livestock are licensed and grazed.
Frequency: Dependent on alternative selected and level of grazing use, but at least twice per year in the analysis area – once in early to mid summer and once in the early fall. More would be done if chronic unauthorized use becomes an issue.
Methods: There is no standard methodology. Use supervision is done in a fashion necessary to assure that proper grazing use is being made and is typically done from the ground (on foot, truck, horseback) but may be done from the air (helicopter, fixed wing).
Deviations from Standard Methodology: There is no standard methodology to deviate from – just the use of common sense and a method appropriate for the terrain and season.
Responsibility: Primarily KFRA range management/monitoring personnel, though this task could be performed by anyone visiting the planning area.

Monitoring Action (Effectiveness/Validation): Rangeland trend monitoring
Objective: To measure changes in vegetation over the long term.
History: Several nested frequency trend studies were established in the Oregon portions of the Klamath Canyon in the early 1990's – 2 on PP&L lands and 1 on the BLM. The BLM study has been re-read once since establishment. The PP&L studies have not been re-read, but resumption of the readings could occur if necessary, depending on which alternative is selected
Site Selection: The sites were selected to measure the change of several major grazed vegetation types within the canyon. There are no existing trend studies in the California portion of the planning area. No additional study areas would be selected under any alternative.
Frequency: Read every 5 years according the KFRA *Coordinated Monitoring and Evaluation Plan for Grazing Allotments* (located in the KFRA office) and the below listed manuals.
Methods: These studies were established and read as outlined in the 1996 Interagency Technical Reference 1734-4: *Sampling Vegetation Attributes* and its predecessor the 1985 Technical Reference 4400-4: *Rangeland Monitoring: Trend Studies*.
Deviations from Standard Methodology: Some subtle variations of the process have been made and are outlined in the Edge Creek allotment monitoring file located in the KFRA office.
Responsibility: KFRA range management/monitoring personnel

Monitoring Action (Implementation/Effectiveness): Utilization measurements within upland and riparian areas via utilization points ("Key Forage Plant Method" on the uplands, "Stubble Height" on riparian) and/or utilization pattern mapping.
Objective: To ensure that utilization levels stay within KFRA RMP/ROD (Appendix H) prescribed use levels and to provide specific information into the evaluation of observed condition/trends to help modify/fine-tune future grazing utilization standards.
History: The existing studies would continue to be read if grazing continues in the planning area; study elimination, occasional spot checks, or indefinite deferral if grazing is eliminated.
Site Selection: The existing utilization points were selected to stratify the grazing use areas to properly portray the grazing use; most are on private lands. No additional study areas would be selected, except on PP&L meadow lands if management responsibility is assumed by the BLM.
Frequency: Dependent on the alternative selected and as outlined in the KFRA *Coordinated Monitoring and Evaluation Plan for Grazing Allotments*. If no livestock grazing is authorized, utilization is not necessary.
Methods: These will be read as outlined in the 1996 Interagency Technical Reference 1734-3: *Utilization Studies and Residual Measurements* and its predecessor the 1984 Technical Reference 4400-3: *Rangeland Monitoring: Utilization Studies*.
Deviations from Standard Methodology: None specifically known or planned.
Responsibility: KFRA range management/monitoring personnel

Monitoring Action (Implementation/Effectiveness/Validation): Modified Cole Browse (shrub utilization)
Objective: To monitor the grazing use of important shrub species – primarily those valuable as winter deer forage (wedgeleaf ceanothus and serviceberry). This study is designed to differentiate between cattle grazing use (fall reading) and deer browsing (subsequent spring reading).
History: These studies were established in 1991 because of historical concerns about forage competition between livestock and deer. The studies have not been reread since there has been very little cattle grazing in the area since establishment. No additional studies would be established under any alternative.
Site Selection: The studies sites were selected to represent typical use areas for both deer and cattle.
Frequency: Dependent on alternative selected and as outlined in the KFRA *Coordinated Monitoring and Evaluation Plan for Grazing Allotments*, but generally no more often that every 5 years. If no livestock grazing is authorized, this study will not be reread.
Methods: Studies will be read as outlined in the 1996 Interagency Technical Reference 1734-3: *Utilization Studies and Residual Measurements* and its predecessor the 1984 Technical Reference 4400-3: *Rangeland Monitoring: Utilization Studies*.
Deviations from Standard Methodology: The modified method used in the KFRA is explained in a memorandum in the Edge Creek Allotment file, located in the KFRA office.
Responsibility: KFRA range management/monitoring personnel

E. Noxious Weeds

Monitoring Action (Effectiveness): Effects of control methods on noxious weed populations and on non-target vegetation.
Objective: Document effectiveness of integrated noxious weed control methods.
History: This is an expansion of ongoing monitoring in the resource area.
Site Selection: Sites will be selected from noxious weed populations documented at treated with Pesticide Application Records submitted by weed treatment crew.
Frequency: Sites for monitoring will be selected annually and monitored a sufficient period post-treatment of observe treatment effects.
Methods: Qualitative observations on the vigor and appearance of the target species and the surrounding vegetation will be documented on standardized forms.
Deviations from Standard Methodology: None.

Monitoring Action (Effectiveness): Survey for noxious weeds post-project implementation.
Objective: To detect new noxious weed populations established after implementation of ground disturbing activities.
History: This type of monitoring is a recommended component of an integrated noxious weed management program.
Site Selection: Alternative 2 & 3: Areas where ground disturbing vegetation management actions have been implemented. Alternative 4: Areas adjacent to construction of recreation facilities and adjacent to high use recreation areas.
Frequency: Alternatives 2 & 3: Annually for three years after project implementation. Alternative 4: Annually for three years after construction of high use recreation areas. Every three years in areas adjacent to high use recreation areas.
Methods: Intuitive controlled survey of entire project area.
Deviations from Standard Methodology: None.

F. Recreation Management

Monitoring Action (Effectiveness/Validation): Limits of Acceptable Change (LAC) (Physical, and social component)
Objective: To define unique recreation resource values to be maintained and enhanced, and visitor experience types or settings to be managed.
History: This study will likely be incorporated into the Recreation Resource Management Plan being developed by PacifiCorp as part of the Klamath Hydroelectric Project (RRMP) re-licensing recreation studies. The completed draft RRMP is scheduled for release by PacifiCorp with the Final License Application in Winter 2004. It is anticipated that the BLM will partner with PacifiCorp on the development and implementation of this study, for including any additional recreation resources, values and settings not covered by the RRMP.
Site Selection: Entire analysis area (Oregon & California) - public and private – depending on alternative selected.
Frequency: Two levels of periodic surveys and data collection efforts are anticipated: Annual data collection at recreation sites and use areas (during primary use season) using readily available data collected by recreation staff

during normal routine management of recreation resources. In addition, more in-depth recreation surveys and data collection are anticipated to be conducted by PacifiCorp and BLM periodically (10-15 years) or when determined to be needed sooner.
Methods: Adapted from Wilderness Campsite Monitoring Methods: A Sourcebook, David N. Cole, USDA FS, Intermountain Research Station, General Technical Report INT-259, April 1989.
Deviations from Standard Methodology: After indicators have been selected for the LAC study, monitoring may be refined or modified to meet the needs of the study.
Responsibility: Primarily KFRA recreation management/monitoring personnel in conjunction with anticipated PacifiCorp recreation monitoring.

Monitoring Action (Effectiveness): Boating use data collection
Objective: To determine how the type and amount of boating use changes over time without management intervention, and to determine how the type and amount of boating use is affected by various management actions as identified in the ROD.
History: Boating use data has been collected annually since 1981. This will be a continuation of the information that is presently collected.
Site Selection: The study will focus on all three segments (Oregon and California), depending on the alternative selected. Primary information will be gathered at the Spring Island launch site and other sites if they are developed. Commercial whitewater outfitters will provide additional supporting data through end-of-season use reports.
Frequency: Annually, during the primary float boating season (Memorial Day through mid-September.
Methods: Data is collected from both private and commercial users through self-registration at boater registration stations currently located at Spring Island launch and at Frain Ranch. Additional boater registration stations will be installed if new launch sites are developed. River rangers provide compliance checks through launch site visitor contact and river patrols.
Deviations from Standard Methodology: Monitoring methods and registration forms may be refined or modified to meet the needs of the study
Responsibility: KFRA recreation management/monitoring personnel

G. Scenic Quality

Monitoring Action (Effectiveness): BLM Visual Resource Management (VRM) related to specific projects.
Objective: To ensure that projects or management actions maintain or enhance the scenic quality of the landscape in their immediate viewshed.
History: This technique has been used with all projects that have ground disturbance or the potential to impact scenic quality/visual resources.
Site Selection: For a given project in the planning area, or highly visible from the planning area, key observation points of the project will be established.
Frequency: The VRM process is used during the design and planning phase as a mitigation technique, and during construction or project implementation and afterwards to monitor.
Methods: From the BLM manual, section H-8400.
Deviations from standard methodology: The VRM process will be used at a level commensurate with the size, scope, and potential to cause negative scenic impacts, of the specific project.
Responsibility: Led by KFRA Recreation staff, with interdisciplinary assistance.

Monitoring Action (Effectiveness): Use BLM VRM to monitor overall scenic quality of the planning area.
Objective: To determine if scenic quality of the planning area is being maintained or enhanced on a broad scale, landscape level.
History: This will be a new study
Site Selection: Key observation points (KOPs) will be established throughout the planning area.
Frequency: The initial study will be conducted within 1 year of the approval of the Klamath River Management Plan. Follow up studies will be conducted at a regular interval, every 3-5 years.
Methods: From the BLM manual, section H-8400.
Deviations from standard methodology: None
Responsibility: Led by KFRA Recreation staff, with interdisciplinary assistance.

H. Soil Resources

Monitoring Action (Implementation/Effectiveness/Validation): Quantitative soil bulk density and soil areal extent monitoring (meets criteria, results from this monitoring effort are used to determine compliance with RMP and regional Standards and Guidelines.
Objective: Detect detrimental soil resource changes (i.e. soil compaction), which may result from ground disturbing activities.
History: These studies are currently conducted throughout the resource area to comply with RMP and regional standards and guidelines.
Site Selection: Monitor 20% of resource area projects that involve ground-disturbing activities. This includes ground-disturbing projects, which may occur within the analysis area. Projects selected for monitoring will be representative of the soil types and projects within the analysis area.
Frequency: Prior to and following projects that meet site selection criteria.
Methods: Regionally accepted soil monitoring methodology for quantitatively detecting changes in soil bulk density and soil areal extent disturbance.
Deviations from Standard Methodology: None.
Responsibility: KFRA monitoring personnel.

I. Special Status Plant Species

Monitoring Action (Implementation): Implementation of required surveys.
Objective: To insure required surveys are completed such that there is a high probability to detect special status plant species.
History: This is an expansion of ongoing monitoring in the resource area.
Site Selection: Proposed ground disturbing project areas under all alternatives.
Frequency: Prior to implementation of the ground disturbing projects and during the appropriate season for proper identification. May require one or more entries into proposed project areas.
Methods: Review of project documentation to determine if the required surveys have been performed and these data have been considered in project design or mitigation.
Deviations from Standard Methodology: None.

Monitoring Action (Effectiveness): Effects of restoration actions.
Objective: To determine the effect of restoration actions on potentially affected populations of special status plants.
History: Each monitoring study would new and independent.
Site Selection: If a special status plant population would potentially be affected by a restoration action, then a monitoring study would be initiated.
Frequency: Initial data collection would precede implementation of the restoration action, then data would be collected annually for the first three years after implementation. Thereafter, data would be collected every three to five years.
Methods: Methods would be chosen appropriate to the life form and life history of the subject species using *Measuring & Monitoring Plant Populations*, Elzinga et al. 1998, BLM Technical Reference 1730-1 as a reference.
Deviations from Standard Methodology: Methods will vary depending on the life form, life history and/or phrenology of the species, and the size and/or shape of the population.

J. Vegetation

Monitoring Action (Effectiveness): Effects of vegetation management actions.
Objective: To determine the effect of vegetative treatments on plant communities and regrowth.
History: This is a new study.
Site Selection: Random selection of six or more points, depending on alternative chosen.
Frequency: Initial data collection would precede vegetative treatments; then photos would be taken in the first, fifth, and tenth years after implementation. Photo monitoring would then continue at ten-year intervals.
Methods: Standard methods for photo monitoring points would be used.
Deviations from Standard Methodology: Standard methodology will be used.

Monitoring Action (Validation): Validation of vegetation management actions.
Objective: To determine whether the completed vegetative treatments meet the silvicultural objectives identified for each project area.
History: Silvicultural exams in treatment areas are conducted across the resource area.
Site Selection: Random selection of approximately 1 plot/10 acres treated.
Frequency: Initial data collection would precede vegetative treatments; post-treatment data would be collected in the first year after implementation.
Methods: Standard methods for silvicultural exams would be used.
Deviations from Standard Methodology: Standard methodology will be used.

Monitoring Action (Effectiveness): Assessment of riparian plant community composition and condition.
Objective: Determine the effects of management actions on the distribution, composition, and condition of riparian vegetation communities. Over time, determine the trend of these parameters.
History: Riparian monitoring occurs throughout the resource area as a component of the range monitoring program.
Site Selection: A series of representative riparian areas along the river (approximately 6 sites), tributary streams (approximately 2 sites each along Hayden and Shovel Creeks), and upland wet meadows (Exclosure, Frain, and Rock Creek meadows) will be selected as long-term monitoring sites.
Frequency: These sites will be monitored every three years to determine trends and condition.
Methods: BLM monitoring protocols described in Myers (1989), Cagney (1993), and Winward (2000) will be used to develop site-specific methodologies. Sampling will consist of a combination of Greenline surveys, transects and plots, and/or photo points. In forested riparian communities along Shovel Creek, stand exams may be used rather than riparian monitoring methods. Periodic Proper Functioning Condition surveys may be used to efficiently expand monitoring efforts to cover larger areas.
Deviations from Standard Methodology: In general, the accepted methodology will not be altered. Site- or project-specific concerns may lead to minor adjustments in sample design or monitoring methods.
Responsibility: KFRA and PacifiCorp personnel.

K. Watershed Values

Monitoring Action (Baseline Information): Multiparameter water quality monitoring.
Objective: Assess condition and trends in surface water quality
History: Conducted by ODEQ since 1959.
Site Selection: Spring Island Boat Launch (downstream from J.C. Boyle Powerhouse)
Frequency: Five to seven times per year
Methods: Standard ODEQ sampling and analysis protocols.
Deviations from Standard Methodology: None.
Responsibility: It is assumed that ODEQ personnel will continue to periodically conduct water quality sampling.

Monitoring Action (Effectiveness): Monitoring of OHV use in wet meadows and riparian areas.
Objective: Determine the extent of damage caused by unauthorized OHV use and the effectiveness of proposed exclosures and road management actions.
History: New monitoring effort
Site Selection: All wet meadows or riparian areas within the planning area
Frequency: Whenever BLM rangers or natural resource specialists are in the canyon. In Alternative 4, staff would visit wet meadows twice on an annual basis for the specific purpose of assessing OHV use.
Methods: Use of the OHV Observation Report notebook by field-going staff and volunteers will be complemented with occasional visits to wet meadows and riparian areas to determine if OHV use is causing damage to riparian soils and vegetation. If a camera is on hand, photos will be taken.
Deviations from Standard Methodology: The Observation Report notebook will be used according to the instructions included within the notebook. A standard form will be created to document impacts to wet meadows and riparian areas.
Responsibility: KFRA staff, especially watershed and recreation specialists.

Monitoring Action (Effectiveness/Validation): Water temperature monitoring
Objective: Measure annual, seasonal, and daily ranges in water temperature, in order to assess water quality, habitat value, and the effects of proposed actions.
History: PacifiCorp and BLM have conducted limited water temperature monitoring in the past.

Site Selection: Will depend on the alternative. At a minimum, sites will include the upstream and downstream ends of Segment 1, downstream from the powerhouse, at the downstream end of Segment 3, and at the mouth of Shovel Creek. In Alternatives 2 and 3, which have more proposed or recommended changes in flow regimes, more sites would be selected.
Frequency: Data will be collected every hour. Temperature loggers will be deployed year round, if feasible. At a minimum, loggers will be deployed during the summer and fall.
Methods: Standard ODEQ methodology. Temperature data will be analyzed to determine if management actions are affecting (either beneficially or adversely) compliance with state standards and BLM objectives.
Deviations from Standard Methodology: None.
Responsibility: KFRA, ODEQ, California SWRCB, and PacifiCorp personnel will cooperate to select sites, deploy and retrieve data loggers, and interpret results.

Monitoring Action (Effectiveness/Validation): Macroinvertebrate sampling
Objective: Assess macroinvertebrate populations within the river and other fish-bearing streams
History: Limited macroinvertebrate sampling has occurred in Hayden Creek in the past.
Site Selection: Various sites within the river and other streams.
Frequency: Twice a year, every 2 years.
Methods: Standard ODEQ methodology. Analysis will be contracted to a qualified lab.
Deviations from Standard Methodology: None.
Responsibility: KFRA, ODEQ, California SWRCB, and PacifiCorp personnel will cooperate to select sites, collect samples, and interpret results.

Monitoring Action (Effectiveness/Validation): Geomorphic response to fluvial restoration projects.
Objective: Quantify the nature and extent of channel response to fluvial restoration actions (including implementation of "channel maintenance" flow regimes, gravel augmentation, channel realignment, CWD placement, and removal of old bridge abutments).
History: A limited number of cross-section transects have been surveyed in the planning area for the purpose of modeling instream flows to support fisheries. These transects would likely not be adequate to meet the objectives of this monitoring task.
Site Selection: This monitoring would only occur if fluvial restoration actions occur, and the scope of the monitoring effort will be related to the scope of the restoration actions. Transects would be located in reaches that either are representative of channel conditions or are selected for instream restoration treatments (including reaches in tributary streams). Representative reaches would be used if the only restoration actions are process-based (i.e., alterations to flow and sediment regimes) (about four representative reaches would be selected, and about six transects would be located in each reach). A series of site-specific transects would be used if the only treatments are feature-based (i.e., channel realignment, CWD placement, etc.). Both representative reaches and site-specific transects may be required if a combination of process-based and feature-based actions is implemented.
Frequency: Initial data collection will occur prior to restoration project implementation. Subsequent data collection will occur after the first winter, after the first flood with flows greater than 3,300 cfs, and after subsequent large (approximately, greater than five year recurrence interval) floods (or on a schedule of approximately every 5 years, if large floods do not occur within the first few years of project implementation). Scheduled monitoring will end 10 years after project implementation.
Methods: The methods described in Harrelson et al. (1994) will be used to select, monument, and survey transects. Photo points will also be used to document changes in channel form.
Deviations from Standard Methodology: None.
Responsibility: Design of the monitoring network would be a cooperative effort among stakeholders (KFRA, ODFW, CDFG, PacifiCorp, and others). Funding to support the monitoring program would be derived from stakeholders and/or grants.

Monitoring Action (Effectiveness): Tagging and tracking of CWD placements
Objective: Determine whether instream CWD placements are functioning as intended. Determine the stability of CWD placements and track movements of placed CWD to determine if recreation opportunities or recreation user safety is affected.
History: No monitoring of this type currently occurs on the KFRA.
Site Selection: This monitoring would only occur if fluvial restoration actions occur, and the scope of the monitoring effort will be related to the scope of the restoration actions. A representative sample of placed CWD pieces and log jams will be monitored.

Frequency: Initial data collection will occur immediately after piece placement. Subsequent data collection will occur after the first winter, after the first flood with flows greater than 3,300 cfs and after subsequent large (approximately, greater than five year recurrence interval floods (or on a schedule of approximately every 5 years, if large floods do not occur within the first few years of project implementation). Scheduled monitoring will end 10 years after project implementation.
Methods: Naturally-occurring and placed CWD pieces will be marked in multiple places with metal tags. The characteristics of individual pieces and log jams will be noted. The location of pieces and jams will be recorded with a GPS unit.
Deviations from Standard Methodology: No standard methodology exists.
Responsibility: Design of the monitoring network would be a cooperative effort among stakeholders (KFRA, ODFW, CDFG, PacifiCorp, and others). Funding to support the monitoring program would be derived from stakeholders and/or grants.

Monitoring Action (Effectiveness): Assessment of fluvial restoration effects on channel substrate.
Objective: Determine the effect of altered flow and sediment regimes on the character of channel substrate.
History: No monitoring of this type has occurred within the planning area.
Site Selection: A number of gravel bars would be selected for long-term monitoring. Two sites would be located within representative reaches in the planning area (these would be the same as any reaches selected in the "Geomorphic response to fluvial restoration projects" monitoring task). At each site, surface substrate would be sampled with a series of grids on representative geomorphic surfaces. In order to ensure long-term replication, set locations (such as the head, tail, and side) on the selected gravel bars may be used, rather than relying on geomorphic mapping.
Frequency: Initial data collection will occur prior to implementation of process-based fluvial restoration programs (this monitoring would only occur in Alternatives 2, 3, and 4). Subsequently, data collection will occur on an annual basis (since flows capable of entraining and transporting gravel likely will occur on an annual basis). Scheduled monitoring will end 10 years after project implementation.
Methods: Sampling protocols described in Bunte and Abt (2001) would be utilized.
Deviations from Standard Methodology: The location of grid sampling areas on selected gravel bars may be based on site characteristics rather than geomorphic mapping.
Responsibility: Design of the monitoring network would be a cooperative effort among stakeholders (KFRA, ODFW, CDFG, PacifiCorp, and others). Funding to support the monitoring program would be derived from stakeholders and/or grants.

Monitoring Action (Effectiveness): Measurement of water table depths and soil moisture in Segment 3 irrigated meadows.
Objective: To determine the effect on water table depths of recommended alterations in patterns and timing of irrigation in the floodplains adjacent to the river in Segment 3. This information will help differentaite the effects of irrigation and natural sub-irrigation from the river, and will help guide the recommended adaptive management strategy for these lands.
History: No monitoring of this type currently occurs.
Site Selection: Study transects will be located perpendicular to the river. These transects will be located to sample representative irrigation regimes (there are multiple ditches that convey irrigation water, and their management will vary) and soil characteristics.
Frequency: Data loggers will be installed to sample water table depths throughout the year. Monitoring will continue for five years following the first adjustment to irrigation management.
Methods: An effective method of measuring water table depth involves installing shallow wells (with casings of PVC pipe) and measuring atmospheric pressure (at the bottom of the well) as a surrogate for the height of the overlying water column. The relationship between atmospheric pressure and water table depth would be calibrated with field measurements of water table depth.
Deviations from Standard Methodology: No standard methodology exists
Responsibility: KFRA and PacifiCorp personnel will cooperate to develop and implement this monitoring task.

L. Wild Horse Management

Monitoring Action (Implementation): Herd Population Census.
Objective: To monitor herd population numbers, structure, color, and other attributes as necessary. A "current inventory of the numbers of animals and their area of use" is required by the Wild Horse & Burro regulations (43 CFR 4710.2) for all Herd Areas.

History: Existing or ongoing management action necessary to assure that the wild horse population is within the established AML (Appropriate Management Level – 43 CFR 4710.3-1) for the Pokegama Herd Management Area (HMA).
Site Selection: Census will be done within the Pokegama HMA and reasonable buffer area outside the established Herd Area boundary.
Frequency: Every year at some level sufficient to monitor the herd population level.
Methods: Will follow that generally outlined in the Wild Horse & Burro policies and guidance. Though there is no one standard method, census is done primarily from the air (helicopter preferred), though often supplemented with ground counts (truck, on foot, horseback).
Deviations from Standard Methodology: No standard methodology to deviate from; acceptable methods used are dependent on terrain, season, personnel, and funding.
Responsibility: KFRA range management/wild horse/monitoring personnel

M. Wildlife

Eagles
Monitoring Action (Effectiveness): Occupancy and Status
Objectives: Determine occupancy and possible changes as a result of project development.
History: On-going cooperative study.
Site selection: All known sites
Methods: Aerial surveys (April and June) with follow-ups by ground observations. Yearly surveys.
Responsibility: Oregon State University cooperative study.

Peregrines
Monitoring Action (Effectiveness): Occupancy and Status
Objectives: Determine occupancy and possible changes as a result of project development.
History: On-going study.
Site selection: All known and potential sites.
Methods: Ground observations. Yearly surveys required for first 5 years after de-listing, periodically after that.

Big Game populations/upland game
Completed by ODFW and CFG

Neotrops/landbirds
Monitoring Action (Effectiveness): Frequency/density
Objectives: Determine occupancy and possible changes as a result of vegetation project development.
History: Follow-up to a current baseline study (on-going cooperative study).
Site selection: Counts along established routes.
Methods: Point count surveys (April through June), area searches. Develop methodology to monitor special status species.

Monitoring Action (Effectiveness): Nest search
Objectives: Determine occupancy and possible changes as a result of project development.
History: New study
Site selection: All habitat types
Methods: Ground searches during nesting season (mid-May through July). Each study completed in one year.

Monitoring Action (Effectiveness): Mist net stations, point counts, various methods.
Objectives: Determine occupancy and possible changes as a result of habitat development.
History: On-going cooperative study.
Site selection: **E**stablished stations in preferred riparian habitat.
Methods: Mist net stations (May through October). Baseline for 5 more years, then 2 consecutive years periodically.

Herptile studies
Monitoring Action (Effectiveness): Pond turtle populations - frequency
Objectives: Determine occupancy and possible populations changes as a result of project development.
History: New trend study
Site selection: Individual counts along river.

Methods: Area searches or timed searches during routine river patrols or separate float trips

Monitoring Action (Effectiveness): Area search, drift fences, various methods.
Objectives: Determine occupancy and possible changes as a result of project development.
History: Currently a cooperative study.
Site selection: Habitat areas or spring sites.
Methods: Area searches constrained by time or area, aquatic surveys, and develop methodology to monitor special status species.

<u>Bats</u>
See cave management plan

Table M-1. Monitoring actions by resource of concern

CULTURAL RESOURCES

Monitoring action: *(Validation) for human pressure on cultural sites*

Objective: Analysis of and monitoring of human pressure on cultural sites.

Frequency: The sites should be checked every fall at the end of the height of recreation use in the canyon.

Methods: A form would be developed to describe observations upon visits and photo points would be established. The first visit will establish the baseline data from which future observations will be compared.

History: Increased human usage in an area increases impacts to cultural resources.

Deviations from standard methodology: No standard methodology exists at present.

Site selection: Chose three sites located in or adjacent to popular recreation areas, three sites located in areas of mid-range usage, and three sites in areas of little to no use. The sites that are chosen need to be of similar site types and should be dispersed relatively evenly throughout the three river segments.

Responsibility: KFRA Cultural Resource Management personnel.

Monitoring action: *(Effectiveness and validation) for site preservation treatment*

Frequency: **Frequency:** Each site would be checked once a year, preferably in early summer to assess winter weather related damage. This annual monitoring effort would last for the life of the plan.

Objective: Review the effectiveness of implemented site protection measures.

Methods: The site would be visited and a form would be developed to record observations. If damage is present, or evidence that the treatment is showing signs of ineffectiveness, then a photograph would be required to show the ineffective or damage areas. Photos of the treatment areas would be taken before and after treatment implementation, which would serve as the baseline data from which future observations would be compared.

History: Stabilization, rehabilitation, and other preservation efforts are suggested in the Klamath River Management Plan. Many of the preservation treatments, especially the historic, are designed to reduce erosional deterioration. These treatments are not mitigation actions tied to ground disturbing projects. Mitigation actions tied to ground disturbing projects would be monitored in a separate study, whereas this study would focus on preservation actions not tied to ground disturbing projects.

Deviations from standard methodology: No standard methodology exists at present.

Site selection: All the sites that receive preservation treatment within the selected alternative.

Responsibility: Primary responsibility would be on KFRA Cultural Resource Management personnel. However, this task could be performed by anyone visiting the area.

Monitoring action: *(Implementation and Effectiveness) for mitigation*

Frequency: Once a year in early spring. This way actions that were implemented the year before could be checked before the rush of the field season begins. This annual monitoring effort would last for the life of the plan.

Objective: Monitor mitigation efforts. Ensure that cultural resources are being addressed in action pre-planning processes. Ensure that survey protocols are being followed prior to action implementation and that cultural sites (including religious and traditional use areas) are being adequately protected.

Methods: Document baseline data from all known sites within the management planning area prior to implementation of study. Review all action proposals within and adjacent to cultural resource sites to determine if the effect of the action on those resources were considered. If those resources were considered and mitigation occurred, then ground truth the mitigation to ensure that it was implemented. While in the field, a specially designed form would be completed to document the visit and any subsequent observations.

History: Regulations require a responsible and good faith effort to identify cultural properties and take into account any effect an undertaking may have on those resources. (Section 106 and Section 110(a)(2)(E)of the National Historic Preservation Act (NHPA) and 36 CFR Part 80)

Deviations from standard methodology: No standard methodology exists at present.

Site selection: The entire Klamath River management planning area.

Responsibility: Primary responsibility would be on KFRA Cultural Resource Management personnel.

Monitoring action: *(Implementation) for Native American consultation and coordination.*

Frequency: Annually, primarily in the winter. This effort would last for the life of the plan.

Objective: To ensure that the BLM is making an effort to work with Native Americans and ensure that Native Americans have access to culturally important areas.

Methods: Review documentation regarding action decisions to ensure that Native American are consulted prior to action implementations.

History: Since the passage of the Native American Graves Protection and Repatriation Act in 1990, the BLM has been directed to establish government-to-government relations with tribes (Executive Memorandum of April 29, 1994; Executive Order 13084 of May 14, 1998; and BLM Manual Handbook H-8160-1).

Deviations from standard methodology: No standard methodology exists at present.

Site selection: The entire Klamath River management planning area.

Responsibility: Primary responsibility would be on KFRA Cultural Resource Management personnel.

FIRE AND FUELS

Monitoring action*: (Effectiveness) for measuring the reduction of ladder fuels in treated forest types through photo points.*

Frequency: Initial data collection would precede vegetative treatments; then photos would be taken in the first, fifth, and tenth years after implementation. Photo monitoring would then continue at ten-year intervals.

Objective: To determine the effect of fuels treatment projects on potential for stand-destroying crown fires.

Methods: Standard methods for photo monitoring points would be used.

History: This is a new study.

Deviations from standard methodology: Standard methodology will be used.

Site selection: Same photo points as in vegetation monitoring, number depends on alternative chosen.

Responsibility:

Monitoring action*: (Effectiveness) for measuring the reduction of ladder fuels in treated forest types through stand exams.*

Frequency: Initial data collection would precede vegetative treatments; post-treatment data would be collected in the first fifth, and tenth years after implementation.

Objective: To determine the effect of fuels treatment projects on potential for stand destroying crown fires.

Methods: Standard methods for silvicultural exams would be used.

History: Silvicultural exams in treatment areas are conducted across the resource area.
Site selection: Sample plots for measurement will be the same as in vegetation monitoring.

Deviations from standard methodology: Standard methodology will be used.
Responsibility:

FISH RESOURCES

Monitoring action: *(Effectiveness) for upper Klamath River spawning surveys*

Frequency: Annual efforts should be made prior and post project implementation in order to determine occurrence. For stream spawning populations suckers begin their spawning migration in late February, March, or early April depending on peak flows with spawning activity continuing well into May (Stubbs and White 1993).

Objective: Document changes in spawning behavior in the Upper Klamath River. Did spawning of suckers and or trout increase as is relates to flow, sediment, and temperature alterations?

Methods: ODFW stream survey protocols for salmonids spawning surveys. Redd sampling, using serber sampling gear or freeze cores, may be desirable in order to assess successful spawning and to validate visual observations. All sucker surveys would be conducted according to established protocols (example studies: Buettner and Scoppettone 1990 for spawning activities, Markle and Simon 1993 for larvae presence/absence). Benthic sampling, such as serber sampler, may be necessary for determining occurrence of sucker spawning.

History: Limited knowledge exists on trout or sucker spawning in the Planning area. Flow regimes may be affecting the spawning behavior of Lost River and shortnose suckers in the Klamath River (Salt Caves 1987). Temperature may also serve as an important stimulus for spawning behavior in sucker species (Perkins et al 2000). The entrainment of sediment within the reservoirs of Upper Klamath River has altered gravel distribution and abundance. Lost River and shortnose suckers appear to show a gravel preference as spawning substrate (Buettner and Scoppettone 1990). Spawning gravels for redband trout is limited within the main channel of the Klamath River (Salt Caves 1986). The proposed actions within the River Plan would alter flow regimes, temperature impacts, and sediment regimes within the Planning area. Efforts to determine the effectiveness of these projects should be based on behavioral indications of success in fish species, i.e. occurrence of spawning may be one indicator.

Deviations from standard methodology: None.

Site selection: Based on Physical Habitat Survey and anecdotal indications of preferred spawning areas. Stratify river and tributaries based on Rosgen type and other physical features (such as the powerhouse) in order to develop distribution and relative occurrence of spawning behavior across the full planning area.

Responsibility:

Monitoring action: *(Effectiveness) for upper Klamath River physical habitat surveys*

Frequency: Resurvey of aquatic habitats should occur at the conclusion of major river modification projects in order to determine new base lines. Decadal resurvey of the river reach should be conducted in order to determine change and trend (if possible)

Objective: Document changes in the aquatic habitats of the Upper Klamath River. Did we improve baseflow main channel habitats such as pool depths, pool distribution, instream cover, and riparian bank cover? Did we reduce stranding habitats, cutoffs, bank shear?

Methods: Hankin and Reeves modified habitat inventories, such as ODFW Physical Habitat Surveys, or Forest Service Level II Stream Inventories. The habitat surveys should assess current habitat condition such as location and abundance of spawning gravel, rearing habitat, adult cover, migration corridors, and condition of riparian areas.

History: Large alterations in daily and weekly flows, especially as it relates to base flow, can highly impact the riparian habitat, and channel geomorphology. The proposed actions within the River Plan would alter flow regimes, sediment regimes, and geomorphic features within the Planning area. Efforts to determine the physical changes and trend in the aquatic habitat within the planning area would be a useful indicator of project effectiveness.

Deviations from standard methodology: None.

Site selection: All fish bearing reaches within the Planning Area. Baseline surveys of the Klamath River were completed in 1998. Shovel Creek and Hayden Creek below migratory barriers should also be surveyed. Other reaches could be surveyed, as fish distribution within the planning area is refined. Priorities for surveys within tributary reaches should be based on relative size or potential contribution to aquatic habitat and refugia in the planning area.

Responsibility:

Monitoring action: *(Effectiveness) for upper Klamath River fish migration*

Frequency: Existing information on fish passage using a mark and recapture methodology (Hemmingsen et al. 1992) with current facilities and operations could serve as baseline. Repeating this study upon implementation of proposed actions would indicate initial changes in migratory behavior. ODFW conducted annual surveys over four years in order to assess conditions. Similar efforts for effectiveness monitoring of BLM actions would be recommended. Using radio-telemetry technologies would require completion of baseline data. Multiple post implementation resurveys using radio-telemetry would be recommended in order to assess migratory trends.

Objective: Did passage/movement improve as it relates to flow modifications; attraction flows, temperature adjustments, planning area flow regimes?

Methods: Conduct biological evaluations, such as through radio-telemetry or mark and recapture surveys, to assess migratory characteristics (migration delays, fallback or injury, fishway entrances, ladder configurations, velocity barriers, temperature barriers, flow attraction concerns, and others). Radio telemetry studies would have the greatest ability to show migratory behavior along the full length of the planning area and would be the recommended method.

History: Redband trout passage studies at JC Boyle indicated that in 1959, over 5,500 trout used the ladder (Hanel and Gerlach 1964) while from 1988-91; only 70 to 588 trout used the ladder. This indicates a dramatic decline in fish passage (Hemmingsen et al. 1992). Contemporary passage continues to be less than 10% of that reported one year after project construction of JC Boyle Dam. ODFW in its *Biennial Report on the Status of Wild Fish in Oregon* (1995) noted that inadequate upstream fish passage facilities at JC Boyle Dam is the probable cause of the decline fish numbers from 1959 to 1992. The proposed alteration in attractions flow, changes in flow regimes, and alteration in temperature fluctuation within the planning area would be anticipated to alter migratory behavior of fish populations. Efforts to determine the effectiveness of these projects should be based on behavioral indications of success in fish species, i.e. unimpeded movement between the mainstem Klamath River and spawning/rearing/adult/overwinter habitats.

Site selection: Target locations with known or suspected passage concerns. Locations should include at a minimum sites at JC Boyle Powerhouse, major instream springs, bypass screen outfall, and ladder entrance.

Deviations from standard methodology: Due to the site-specific nature of the proposed modifications additional survey locations, assuming implementation of ODFW methodology may be required in order to determine effects of individual modifications.

Responsibility:

Monitoring action: *(Effectiveness/validation) for upper Klamath River fisheries assessment*

Frequency: Sufficient baseline data from the Keno Reach and the Planning area must be available prior to project implementation. Additional data would need to be collected subsequent to project implementation. Alternative one would have minimal sampling. Alternative two and four would have intermediate levels of resurvey. Alternative three would need to be the most ambitious.

Objective: Did redband trout age structure or growth rate change within the Klamath River planning area?

History: In high-gradient systems trout production can be greatly affected by limited habitat features rather than food supply (Behnke 1992). Oregon Department of Fish and Wildlife fisheries biologists have noted that fish in the planning area appear to be smaller in size on average than fish observed in the Keno reach of the river (Smith 2000, *personal communication*). Excessive recruitment into the population, where young and adult fish are competing for a common food supply results in short-lived, slow-growing individuals and a population whose biomass is tied up in small young fish (Behnke 1992). Based on the population estimates and the existing conditions made up mostly of adult habitat and poor upstream passage at J. C. Boyle Dam the trout population could be exceeding carrying capacity and the additional recruitment of trout to these segments could then affect the trout size/age structure. Proposed actions to alter flow regimes, sediment management, channel profiles, and passage concerns would be expected to alter key habitat quantity, quality and occupancy thus affecting fishery resources. Altering aquatic habitat to enhance the trout bioenergetics (length/weight relationship or age class distribution) would need to be validated in order to determine the effectiveness of proposed projects and support additional instream work.

Methods: Conduct biological evaluations, bioassesment surveys or stratified electro-shocking surveys, to assess changes in fisheries resources.

Deviations from standard methodology: None.

Site selection: Assuming implementation of a mark and recapture study in order to assess fish passage those sites chose may also function as sites for assess changes in physiological morphological features of native fish fauna.

Responsibility:

Monitoring action: **(***Effectiveness/Validation) for upper Klamath River recreational creel survey*

Frequency: Volunteer angler box surveys would be continuously employed when other methods are not in use. Angler check stations and roaming angler surveying would be targeted for heavy use periods.

Objective: Meeting the goals and objective for protecting and enhancing the Recreation and Fisheries ORVs.

Methods: Three methods could be employed, individually or combined, in order to assess angler success. One: Angler check stations have been installed in past creel efforts. This type of methodology could be employed to interview angler success when leaving the planning area. Additional stations may need to be employed at other key access points in order to increase accuracy of upstream angling effort, example station location. Two: Roaming angler surveying could be employed in order to gain information of angler success and location of efforts. Roaming surveys could include pressure counts and angler interviews. Three: Angler box surveys may also be employed; locations at key funnel points to enter the canyon, where anglers could volunteer catch information and deposit within the holding boxes provided.

History: The numerous trout present within the Klamath River, and the ability for Upper Klamath Basin redband trout to attain very large sizes lead in part to the designation of the Keno Dam to Stateline reach as a wild trout management area in Oregon. Oregon Department of Fish and Wildlife fisheries biologists have noted that fish in the analysis area appear to be smaller in size on average than fish observed in the Keno reach of the river (Smith 2000, *personal communication*). The proposed projects were designed to enhance the recreational fishing experience thus providing opportunity to angle for large trout. The effectiveness of these projects to support larger trout sizes need to be validated in order to determine future project implementation.

Deviations from standard methodology: None.

Site selection: Depends on Creel methodology: Check Stations may include Fish Access #1, Topsy Grade into the canyon, and the Emergency Spill way. Roaming surveys would include pressure counts along the full planning area and subsequent interviews based on dense use locations. Angler Box surveys would have similar stations as described for check stations.

Responsibility:

GRAZING MANAGEMENT

Monitoring action: *(Implementation) for grazing use supervision and permit compliance.*

Frequency: Dependent on alternative selected and level of grazing use, but at least twice per year in the analysis area – once in early to mid summer and once in the early fall. More would be done if chronic unauthorized becomes an issue.

Objective: To monitor permitted grazing use and detect unauthorized use.

Methods: There is no standard methodology. Use supervision is done in a fashion necessary to assure that proper grazing use is being made and is typically done from the ground (on foot, truck, horseback) but may be done from the air (helicopter, fixed wing).

History: Existing or ongoing management action. Though not formally outlined in Bureau Manuals or Technical References, the need for grazing use compliance checks are implicit in the grazing regulations (43 CFR 4100), TR-4400-2: *Rangeland Monitoring - Actual Use Reporting*, past litigation, common sense, etc.

Deviations from standard methodology: There is no standard methodology to deviate from – just the use of common sense and a method appropriate for the terrain and season.

Site selection: Entire analysis area (Oregon & California) - public and private – depending on alternative selected. Year-to-year site selection is dependent on where (and if) livestock are licensed and grazed.

Responsibility: Primarily KFRA range management/monitoring personnel, though this task could be performed by anyone visiting the planning area.

Monitoring action: *(Effectiveness/validation) for rangeland trend*

Frequency: Read every 5 years according the KFRA *Coordinated Monitoring and Evaluation Plan for Grazing Allotments* (located in the KFRA office) and the below listed manuals.

Objective: To measure changes in vegetation over the long term.

Methods: These studies were established and read as outlined in the 1996 Interagency Technical Reference 1734-4: *Sampling Vegetation Attributes* and its predecessor the 1985 Technical Reference 4400-4: *Rangeland Monitoring: Trend Studies*.

History: Several nested frequency trend studies were established in the Oregon portions of the Klamath Canyon in the early 1990's – 2 on PP&L lands and 1 on the BLM. The BLM study has been re-read once since establishment. The PP&L studies have not been re-read, but resumption of the readings could occur if necessary, depending on which alternative is selected.

Deviations from standard methodology: Some subtle variations of the process have been made and are outlined in the Edge Creek allotment monitoring file located in the KFRA office.

Site selection: The sites were selected to measure the change of several major grazed vegetation types within the canyon. There are no existing trend studies in the California portion of the planning area. No additional study areas would be selected under any alternative.

Responsibility: KFRA range management/monitoring personnel.

Monitoring action: *(Implementation/effectiveness) for utilization measurements within upland and riparian areas via utilization points ("Key Forage Plant Method" on the uplands, "Stubble Height" on riparian) and/or utilization pattern mapping.*

Frequency: Dependent on the alternative selected and as outlined in the KFRA *Coordinated Monitoring and Evaluation Plan for Grazing Allotments*. If no livestock grazing is authorized, utilization is not necessary.

Objective: To ensure that utilization levels stay within KFRA RMP/ROD (Appendix H) prescribed use levels and to provide specific information into the evaluation of observed condition/trends to help modify/fine-tune future grazing utilization standards.

Methods: These will be read as outlined in the 1996 Interagency Technical Reference 1734-3: *Utilization Studies and Residual Measurements* and its predecessor the 1984 Technical Reference 4400-3: *Rangeland Monitoring: Utilization Studies*.

History: The existing studies would continue to be read if grazing continues in the planning area; study elimination, occasional spot checks, or indefinite deferral if grazing is eliminated.

Deviations from standard methodology: None specifically known or planned.

Site selection: The existing utilization points were selected to stratify the grazing use areas to properly portray the grazing use; most are on private lands. No additional study areas would be selected, except on PP&L meadow lands if management responsibility is assumed by the BLM.

Responsibility: KFRA range management/monitoring personnel.

Monitoring action: *(Implementation/effectiveness/validation) modified Cole Browse (shrub utilization)*

Frequency: Dependent on alternative selected and as outlined in the KFRA *Coordinated Monitoring and Evaluation Plan for Grazing Allotments*, but generally no more often that every 5 years. If no livestock grazing is authorized, this study will not be reread.

Objective: To monitor the grazing use of important shrub species – primarily those valuable as winter deer forage (wedgeleaf ceanothus and serviceberry). This study is designed to differentiate between cattle grazing use (fall reading) and deer browsing (subsequent spring reading).

Methods: Studies will be read as outlined in the 1996 Interagency Technical Reference 1734-3: *Utilization Studies and Residual Measurements* and its predecessor the 1984 Technical Reference 4400-3: *Rangeland Monitoring: Utilization Studies*.

History: These studies were established in 1991 because of historical concerns about forage competition between livestock and deer. The studies have not been reread since there has been very little cattle grazing in the area since establishment. No additional studies would be established under any alternative.

Deviations from standard methodology: The modified method used in the KFRA is explained in a memorandum in the Edge Creek Allotment file, located in the KFRA office.

Site selection: The studies sites were selected to represent typical use areas for both deer and cattle.

Responsibility: KFRA range management/monitoring personnel.

NOXIOUS WEEDS

Monitoring action: *(Effectiveness) for effects of control methods on noxious weed populations and on non-target vegetation.*

Frequency: Sites for monitoring will be selected annually and monitored a sufficient period post-treatment of observe treatment effects.

Objective: Document effectiveness of integrated noxious weed control methods.

Methods: : Qualitative observations on the vigor and appearance of the target species and the surrounding vegetation will be documented on standardized forms.

History: This is an expansion of ongoing monitoring in the resource area.

Deviations from standard methodology: None.

Site selection: Sites will be selected from noxious weed populations documented at treated with Pesticide Application Records submitted by weed treatment crew.

Responsibility:

Monitoring action: *(Effectiveness) for survey for noxious weeds post-project implementation.*

Frequency: Alternatives 2 & 3: Annually for three years after project implementation. Alternative 4: Annually for three years after construction of high use recreation areas. Every three years in areas adjacent to high use recreation areas.

Objective: To detect new noxious weed populations established after implementation of ground disturbing activities.

Methods: Intuitive controlled survey of entire project area.

History: This type of monitoring is a recommended component of an integrated noxious weed management program.

Deviations from standard methodology: None.

Site selection: Alternative 2 & 3: Areas where ground disturbing vegetation management actions have been implemented. Alternative 4: Areas adjacent to construction of recreation facilities and adjacent to high use recreation areas.

Responsibility:

RECREATION MANAGEMENT

Monitoring action: *(Effectiveness/Validation) for limits of acceptable change (physical, and social component)*

Frequency: Two levels of periodic surveys and data collection efforts are anticipated: Annual data collection at recreation sites and use areas (during primary use season) using readily available data collected by recreation staff during normal routine management of recreation resources. In addition, more in-depth recreation surveys and data collection are anticipated to be conducted by PacifiCorp and BLM periodically (10-15 years) or when determined to be needed sooner.

Objective: To define unique recreation resource values to be maintained and enhanced, and visitor experience types or settings to be managed.

History: This study will likely be incorporated into the Recreation Resource Management Plan being developed by PacifiCorp as part of the Klamath Hydroelectric Project (RRMP) re-licensing recreation studies. The completed draft RRMP is scheduled for release by PacifiCorp with the Final License Application in Winter 2004. It is anticipated that the BLM will partner with PacifiCorp on the development and implementation of this study, for including any additional recreation resources, values and settings not covered by the RRMP.

Site selection: Entire analysis area (Oregon & California) - public and private – depending on alternative selected.

Methods: Adapted from Wilderness Campsite Monitoring Methods: A Sourcebook, David N. Cole, USDA FS, Intermountain Research Station, General Technical Report INT-259, April 1989.

Deviations from standard methodology: After indicators have been selected for the LAC study, monitoring may be refined or modified to meet the needs of the study.

Responsibility: Primarily KFRA recreation management/monitoring personnel in conjunction with anticipated PacifiCorp recreation monitoring.

Responsibility:

Monitoring action: *(Effectiveness) boating use data collection*

Objective: To determine how the type and amount of boating use changes over time without management intervention, and to determine how the type and amount of boating use is affected by various management actions as identified in the ROD.

History: Boating use data has been collected annually since 1981. This will be a continuation of the information that is presently collected.

Site selection: The study will focus on all three segments (Oregon and California), depending on the alternative selected. Primary information will be gathered at the Spring Island launch site and other sites if they are developed. Commercial whitewater outfitters will provide additional supporting data through end-of-season use reports.

Frequency: Annually, during the primary float boating season (Memorial Day through mid-September.

Methods: Data is collected from both private and commercial users through self-registration at boater registration stations currently located at Spring Island launch and at Frain Ranch. Additional boater registration stations will be installed if new launch sites are developed. River rangers provide compliance checks through launch site visitor contact and river patrols.

Deviations from standard methodology: : Monitoring methods and registration forms may be refined or modified to meet the needs of the study.

Responsibility: *KFRA recreation management/monitoring personnel*

SCENIC QUALITY

Monitoring action: *(Effectiveness) for BLM Visual Resource Management (VRM) related to specific projects.*

Objective: To ensure that projects or management actions maintain or enhance the scenic quality of the landscape in their immediate viewshed.

History: This technique has been used with all projects that have ground disturbance or the potential to impact scenic quality/visual resources.

Site selection: For a given project in the planning area, or highly visible from the planning area, key observation points of the project will be established.

Frequency: The VRM process is used during the design and planning phase as a mitigation technique, and during construction or project implementation and afterwards to monitor.

Methods: From the BLM manual, section H-8400.

Deviations from standard methodology: : The VRM process will be used at a level commensurate with the size, scope, and potential to cause negative scenic impacts, of the specific project.

Responsibility: Led by KFRA Recreation staff, with interdisciplinary assistance.

Monitoring action: *(Effectiveness) for BLM VRM to monitor overall scenic quality of the planning area.*

Objective: To determine if scenic quality of the planning area is being maintained or enhanced on a broad scale, landscape level.

Frequency: The initial study will be conducted within 1 year of the approval of the Klamath River Management Plan. Follow up studies will be conducted at a regular interval, every 3-5 years.

Methods: From the BLM manual, section H-8400.

History: This will be a new study
Site selection: Key observation points (KOPs) will be established throughout the planning area.
Deviations from standard methodology: None.
Responsibility: Led by KFRA Recreation staff, with interdisciplinary assistance.

SOIL RESOURCES

Monitoring action: (Implementation/effectiveness/validation) for quantitative soil bulk density and soil areal extent (meets criteria, results from this monitoring effort are used to determine compliance with RMP and regional Standards and Guidelines.
Frequency: Prior to and following projects that meet site selection criteria.
Objective: Detect detrimental soil resource changes (i.e. soil compaction), which may result from ground disturbing activities.
Methods: Regionally accepted soil monitoring methodology for quantitatively detecting changes in soil bulk density and soil areal extent disturbance.
History: These studies are currently conducted throughout the resource area to comply with RMP and regional standards and guidelines.
Deviations from standard methodology: None.
Site selection: Monitor 20% of resource area projects that involve ground-disturbing activities. This includes ground-disturbing projects, which may occur within the analysis area. Projects selected for monitoring will be representative of the soil types and projects within the analysis area.
Responsibility: KFRA monitoring personnel.

SPECIAL STATUS PLANT SPECIES

Monitoring action: *(Implementation for implementation of required surveys.*
Frequency: Prior to implementation of the ground disturbing projects and during the appropriate season for proper identification. May require one or more entries into proposed project areas.
Objective: To insure required surveys are completed such that there is a high probability to detect special status plant species.
Methods: Review of project documentation to determine if the required surveys have been performed and these data have been considered in project design or mitigation.
History: This is an expansion of ongoing monitoring in the resource area.
Deviations from standard methodology: None.
Site selection: Proposed ground disturbing project areas under all alternatives.
Responsibility:

Monitoring action: *(Effectiveness) for effects of restoration actions.*
Frequency: Initial data collection would precede implementation of the restoration action, then data would be collected annually for the first three years after implementation. Thereafter, data would be collected every three to five years.
Objective: To determine the effect of restoration actions on potentially affected populations of special status plants.
Methods: Methods would be chosen appropriate to the life form and life history of the subject species using *Measuring & Monitoring Plant Populations*, Elzinga et al. 1998, BLM Technical Reference 1730-1 as a reference.
History: Each monitoring study would new and independent.
Deviations from standard methodology: Methods will vary depending on the life form, life history and/or phrenology of the species, and the size and/or shape of the population.
Site selection: If a special status plant population would potentially be affected by a restoration action, then a monitoring study would be initiated.
Responsibility:

VEGETATION

Monitoring action: *(Effectiveness) for effects of vegetation management actions.*

Frequency: : Initial data collection would precede vegetative treatments; then photos would be taken in the first, fifth, and tenth years after implementation. Photo monitoring would then continue at ten-year intervals.

Objective: To determine the effect of vegetative treatments on plant communities and regrowth.

Methods: Standard methods for photo monitoring points would be used.

History: This is a new study.

Deviations from standard methodology: Standard methodology will be used.

Site selection: Random selection of six or more points, depending on alternative chosen.

Responsibility:

Monitoring action: (*Validation)for validation of vegetation management actions.*

Frequency: Initial data collection would precede vegetative treatments; post-treatment data would be collected in the first year after implementation.

Objective: To determine whether the completed vegetative treatments meet the silvicultural objectives identified for each project area.

Methods: Standard methods for silvicultural exams would be used.

History: Silvicultural exams in treatment areas are conducted across the resource area.

Deviations from standard methodology: Standard methodology will be used.

Site selection: Random selection of approximately 1 plot/10 acres treated.

Responsibility:

WATERSHED VALUES

Monitoring action: *(Baseline Information) for Upper Klamath River Canyon Road Inventory*

Frequency: One time only. Database will be updated as proposed actions are implemented.

Objective: Comprehensive and accurate inventory of roads and road conditions

Methods: Vehicle-based GPS work linked with real-time GIS.

History: Completed in summer 2001. Cooperative agreement with PacifiCorp.

Deviations from standard methodology: No standard methodology exists.

Site selection: Entire planning area, except for private land in California.

Responsibility:

Monitoring action: *Action (Baseline Information) for multiparameter water quality monitoring.*

Frequency: Five to seven times per year

Objective: Assess condition and trends in surface water quality

Methods: Standard ODEQ sampling and analysis protocols.

History: Conducted by ODEQ since 1959.

Deviations from standard methodology: None.

Site selection: Spring Island Boat Launch (downstream from J.C. Boyle Powerhouse)

Responsibility:

Monitoring action: *(Effectiveness) for monitoring of OHV use in wet meadows and riparian areas.*

Frequency: Whenever BLM rangers or natural resource specialists are in the canyon

Objective: Determine the extent of damage caused by unauthorized OHV use and the effectiveness of proposed exclosures and road management actions.

Methods: Use of the OHV Observation Report notebook by field-going staff and volunteers will be complemented with occasional visits to wet meadows and riparian areas to determine if OHV use is causing damage to riparian soils and vegetation. If a camera is on hand, photos will be taken.

History: New monitoring effort

Deviations from standard methodology: The Observation Report notebook will be used according to the instructions included within the notebook. A standard form will be created to document impacts to wet meadows and riparian areas.

Site selection: All wet meadows or riparian areas within the planning area

Responsibility:

Monitoring action: (Effectiveness/validation) for water temperature monitoring

Objective: Measure annual, seasonal, and daily ranges in water temperature, in order to assess water quality, habitat value, and the effects of proposed actions.

History: PacifiCorp and BLM have conducted limited water temperature monitoring in the past.
Site selection: Will depend on the alternative. At a minimum, the upstream and downstream ends of Segment 1, downstream from the powerhouse, at the downstream end of Segment 3, and at the mouth of Shovel Creek. In alternatives 2 and 3, which have more proposed or recommended changes in flow regimes, more sites would be selected.

Frequency: Data will be collected every hour. Temperature loggers will be deployed year round, if feasible. At a minimum, loggers will be deployed during the summer and fall.
Methods: : Standard ODEQ methodology. Temperature data will be analyzed to determine if management actions are affecting (either beneficially or adversely) compliance with state standards and BLM objectives.
Deviations from standard methodology: None.

Responsibility:

Monitoring action: *(Effectiveness/validation) for macroinvertebrate sampling*
Objective: Assess macroinvertebrate populations within the river and other fish-bearing streams
History: Limited macroinvertebrate sampling has occurred in Hayden Creek in the past.
Site selection: Various sites within the river and other streams.

Frequency: Twice a year, every 2 years.

Methods: Standard ODEQ methodology. Analysis will be contracted to a qualified lab.
Deviations from standard methodology: None.

Responsibility:

Monitoring action: *(Effectiveness/validation) geomorphic response to fluvial restoration projects.*

Objective: Quantify the nature and extent of channel response to fluvial restoration actions (including implementation of "channel maintenance" flow regimes, gravel augmentation, channel realignment, CWD placement, and removal of old bridge abutments).
History: A limited number of cross-section transects have been surveyed in the planning area for the purpose of modeling instream flows to support fisheries. These transects would likely not be adequate to meet the objectives of this monitoring task.
Site selection: This monitoring would only occur if fluvial restoration actions occur, and the scope of the monitoring effort will be related to the scope of the restoration actions. Transects would be located in reaches that either are representative of channel conditions or are selected for instream restoration treatments (including reaches in tributary streams). Representative reaches would be used if the only restoration actions are process-based (i.e., alterations to flow and sediment regimes) (about four representative reaches would be selected, and about six transects would be located in each reach). A series of site-specific transects would be used if the only treatments are feature-based (i.e., channel realignment, CWD placement, etc.). Both representative reaches and site-specific transects may be required if a combination of process-based and feature-based actions is implemented.

Frequency: : Initial data collection will occur prior to restoration project implementation. Subsequent data collection will occur after the first winter and after large flood events (or on a schedule of approximately every 5 years, if large floods do not occur within the first few years of project implementation). Scheduled monitoring will end 10 years after project implementation.
Methods: The methods described in Harrelson et al. (1994) will be used to select, monument, and survey transects. Photo points will also be used to document changes in channel form.

Deviations from standard methodology: None.

Responsibility:

Monitoring action: *(Effectiveness) for tagging and tracking of CWD placements*

Objective: Determine whether instream CWD placements are functioning as intended. Determine the stability of CWD placements and track movements of placed CWD to determine if recreation opportunities or recreation user safety is affected.

History: No monitoring of this type currently occurs on the KFRA.

Site selection: A representative sample of placed CWD pieces and log jams will be monitored.

Frequency: Initial data collection will occur immediately after piece placement. Subsequent data collection will occur after the first winter and after large flood events (or on a schedule of approximately every 5 years, if large floods do not occur within the first few years of project implementation). Scheduled monitoring will end 10 years after project implementation.

Methods: Naturally-occurring and placed CWD pieces will be marked in multiple places with metal tags. The characteristics of individual pieces and log jams will be noted. The location of pieces and jams will be recorded with a GPS unit.

Deviations from standard methodology: No standard methodology exists.

Responsibility:

Monitoring action: Action *(Effectiveness) assessment of fluvial restoration effects on channel substrate.*

Objective: Determine the effect of altered flow and sediment regimes on the character of channel substrate.

History: No monitoring of this type has occurred within the planning area.

Site selection: A number of gravel bars would be selected for long-term monitoring. Two sites would be located within representative reaches in the planning area (these would be the same as any reaches selected in the “Geomorphic response to fluvial restoration projects” monitoring task). At each site, surface substrate would be sampled with a series of grids on representative facies types. In order to ensure long-term replication, set locations (such as the head, tail, and side) on the selected gravel bars may be used, rather than relying on facies mapping.

Frequency: Initial data collection will occur prior to implementation of process-based fluvial restoration programs (this monitoring would only occur in alternatives 2, 3, and 4). Subsequent data collection will occur after the first winter and after large flood events (or on a schedule of approximately every 5 years, if large floods do not occur within the first few years of project implementation). Scheduled monitoring will end 10 years after project implementation.

Methods: Sampling protocols described in Bunte and Abt (2001) would be utilized.

Deviations from standard methodology: The location of grid sampling areas on selected gravel bars may be based on general representativeness rather than facies mapping.

Responsibility:

Monitoring action: *(Effectiveness) for assessment of riparian plant community composition and condition.*

Objective: Determine the effects of management actions on the distribution, composition, and condition of riparian vegetation communities. Over time, determine the trend of these parameters.

Frequency: These sites will be monitored every three years to determine trends and condition.

Methods: BLM monitoring protocols described in Myers (1989), Cagney (1993), and Winward (2000) will be used to develop site-specific methodologies. Sampling will consist of a combination of Greenline surveys, transects and plots, and/or photo points. In forested riparian communities along Shovel Creek, stand exams may be used rather than riparian monitoring methods. Periodic Proper Functioning Condition surveys may be used to efficiently expand monitoring efforts to cover larger areas.

History: Riparian monitoring occurs throughout the resource area as a component of the range monitoring program.

Site selection: A series of representative riparian areas along the river (approximately 6 sites), tributary streams (approximately 2 sites each along Hayden and Shovel Creeks), and upland wet meadows (Exclosure, Frain, and Rock Creek meadows) will be selected as long-term monitoring sites.

Deviations from standard methodology: In general, the accepted methodology will not be altered. Site- or project-specific concerns, or advancements in the field of soils monitoring, may lead to minor adjustments in sample design or monitoring methods.

Responsibility:

Monitoring action: *(Effectiveness) for measurement of water table depths and soil moisture in Segment 3 floodplains*

Objective: To determine the effect on water table depths of recommended alterations in patterns and timing of irrigation in the floodplains adjacent to the river in Segment 3. This information will help differentiate the effects of irrigation and natural sub-irrigation from the river, and will help guide the recommended adaptive management strategy for these lands.

History: No monitoring of this type currently occurs.

Site selection: Study transects will be located perpendicular to the river. These transects will be located to sample representative irrigation regimes (there are multiple ditches that convey irrigation water, and their management will vary) and soil characteristics.

Frequency: Data loggers will be installed to sample water table depths throughout the year.

Methods: An effective method of measuring water table depth involves installing shallow wells (with casings of PVC pipe) and measuring atmospheric pressure (at the bottom of the well) as a surrogate for the height of the overlying water column. The relationship between atmospheric pressure and water table depth would be calibrated with field measurements of water table depth.

Deviations from standard methodology:

Responsibility:

WILD HORSE MANAGEMENT

Monitoring action: *(Implementation) herd population census.*

Objective: To monitor herd population numbers, structure, color, and other attributes as necessary. A "current inventory of the numbers of animals and their area of use" is required by the Wild Horse & Burro regulations (43 CFR 4710.2) for all Herd Areas.

History: Existing or ongoing management action necessary to assure that the wild horse population is within the established AML (Appropriate Management Level – 43 CFR 4710.3-1) for the Pokegama Herd Management Area (HMA).

Site selection: Census will be done within the Pokegama HMA and reasonable buffer area outside the established Herd Area boundary.

Frequency: Every year at some level sufficient to monitor the herd population level.

Methods: Will follow that generally outlined in the Wild Horse & Burro policies and guidance. Though there is no one standard method, census is done primarily from the air (helicopter preferred), though often supplemented with ground counts (truck, on foot, horseback).

Deviations from standard methodology: No standard methodology to deviate from; acceptable methods used are dependent on terrain, season, personnel, and funding.

Responsibility: KFRA range management/wild horse/monitoring personnel

WILDLIFE

Eagles

Monitoring action: *(Effectiveness) occupancy and Status*

Objective: Determine occupancy and possible changes as a result of project development.

History: On-going cooperative study.

Site selection: All known sites

Frequency:

Methods: Aerial surveys (April and June) with follow ups by ground observations. Yearly surveys.

Deviations from standard methodology:

Responsibility:

Peregrines

Monitoring action: *(Effectiveness) occupancy and Status*

Objective: Determine occupancy and possible changes as a result of project development.

Frequency:

Methods: Ground observations. Yearly surveys required for first 5 years after de-listing, periodically after that.

History: On-going study.
Site selection: All known and potential sites.
Deviations from standard methodology:
Responsibility:

Big Game populations/upland game

Monitoring action: Completed by ODFW and CFG
Objective:
History:
Site selection:
Frequency:
Methods:
Deviations from standard methodology:
Responsibility:

Neotrops/ landbirds

Monitoring action: *(Effectiveness) frequency/density*
Objective: Determine occupancy and possible changes as a result of project development.
History: On-going cooperative study.
Site selection: Point counts along established routes.
Frequency:
Methods: Point count surveys (April through June), area searches, develop methodology to monitor special status species. 3-5 years baseline and then 2 consecutive years of surveys periodically after treatments.
Deviations from standard methodology:
Responsibility:

Monitoring action: *(Effectiveness) nest search*
Objective: Determine occupancy and possible changes as a result of project development.
History: New study
Site selection: All habitat types
Frequency:
Methods: Ground searches during nesting season (mid-May through July). Each study completed in one year.
Deviations from standard methodology:
Responsibility:

Monitoring action: *(Effectiveness) mist net stations*
Objective: Determine occupancy and possible changes as a result of habitat development.
History: On-going cooperative study.
Site selection: Established stations in preferred riparian habitat.
Frequency:
Methods: Mist net stations (May through October). Baseline for 5 more years, then 2 consecutive years periodically.
Deviations from standard methodology:
Responsibility:

Herpetile studies

Monitoring action: *(Effectiveness) for pond turtle populations - frequency*
Objective: Determine occupancy and possible populations changes as a result of project development.
History: New trend study
Site selection: Individual counts along river.
Frequency:
Methods: Area searches or timed searches during routine river patrols or separate float trips
Deviations from standard methodology:
Responsibility:

Monitoring action: *(Effectiveness) area search*
Objective: Determine occupancy and possible changes as a result of project development.
History: Currently a cooperative study.
Site selection: Habitat areas or spring sites.
Frequency: Currently a cooperative study.
Methods: Area searches constrained by time or area, aquatic surveys, and develop methodology to monitor special status species.
Deviations from standard methodology:
Responsibility:

Bats

Monitoring action: See cave management plan.
Objective:
History:
Site selection:
Frequency:
Methods:
Deviations from standard methodology:
Responsibility:

Vegetation

Monitoring action: *(Effectiveness) for frequency/density*
Objective: Determine occupancy and possible changes as a result of project development.
Frequency:
Methods: Point count surveys (April through June), area searches. Develop methodology to monitor special status species.

History: On-going cooperative study.
Site selection: Point counts along established routes.

Deviations from standard methodology:
Responsibility:

Table M-2. Monitoring actions for the Upper Klamath River Management Plan

Monitoring activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cultural Resources				
Human Pressure on Cultural Sites	Not Recommended	Every Year - fall	Not Recommended	Every Year - fall
Site Preservation Treatment	Not Recommended	Every Year - spring/early summer	Every Year - spring/early summer	Every Year - spring/early summer
Mitigation	Every Year - spring	Every Year - spring	Every Year - spring	Every Year - spring
Native American Consultation and coordination	Every Year - winter	Every Year - winter	Every Year - winter	Every Year - winter
Fire and Fuels				
Photo Points	Initial data collection would precede implementation of vegetative treatments. Data would be collected in the first, fifth, and tenth years after implementation. Thereafter, data would be collected every ten years.			
Stand Exams	Approximately 120 plots per decade	Approximately 450 plots per decade	Approximately 700 plots per decade	Approximately 460 plots per decade
Fish				
Spawning Surveys	N/A	Pre- and post-project winter/spring monitoring-- limited annual effort	Pre- and post-project winter/spring monitoring-- extensive annual effort	Pre- and post-project winter/spring monitoring-- limited annual effort
Habitat Surveys	Upon completion of proposed projects and then every decade			
Migration Surveys	N/A	Pre and post project spring/ summer/ fall monitoring over four years		
Fisheries Assessment	N/A	Pre and post project spring/ summer/ fall monitoring over four years		
Creel Surveys	N/A	Adaptive implementation based on actual use for recreation fishing Initial survey, pre- and post-project implementation		
Grazing				
Use Supervision & Compliance	Twice a year – summer & fall	Twice a year – summer & fall	Twice a year – summer & fall	Twice a year – summer & fall
Trend	Every 5 years	Every 5 years	N/A	Every 5 years
Utilization	3 times per decade	3 times per decade	N/A for cattle grazing As needed for wildlife	3 times per decade
Cole Browse	Every 5 years	Every 5 years	N/A for cattle grazing As needed for wildlife	Every 5 years
Noxious Weeds				
Weed Treatment Effects	Every Year	Every Year	Every Year	Every Year

Post-project weed surveys	N/A	Annually for three years after project implementation	Annually for three years after project implementation	Annually for three years after implementation & every 3 years for high use
Recreation				
Limits of Acceptable Change	Annual data collection at recreation sites	Annual at recreation sites-- LAC data collection every decade	Annual at recreation sites-- LAC data collection every 15 years	Annual at recreation sites-- LAC data collection every decade
Boating Use Data Collection	Annual during primary use season & regular river patrols	Annual during primary use season-- new launch sites & regular river patrols	Annual during primary use season-- reduced level of patrols and visitor contact	Annual during primary use season-- new launch sites & regular river patrols
Scenic Qualities				
Visual Resource Management	Project-by-project basis	Project-by-project basis	Project-by-project basis	Project-by-project basis
Overall Scenic Quality	Initial study will be conducted within 1 year of the approval of the Klamath River Management Plan-- Follow up studies will be conducted at a regular interval, every 3-5 years			
Soils				
Bulk Density & Areal Extent Disturbance	20% of ground-disturbing projects on resource area	20% of ground-disturbing projects on resource area	20% of ground-disturbing projects on resource area	20% of ground-disturbing projects on resource area
Special Status Plants				
Survey Implementation	Prior to implementation of ground-disturbing projects			
Population Monitoring	Initial data collection would precede implementation of the restoration action. Data would be collected annually for the first three years after implementation. Thereafter, data would be collected every three to five years.			
Vegetation				
Photo Points	Initial data collection would precede implementation of vegetative treatments.			

	Data would be collected in the first, fifth, and tenth years after implementation. Thereafter, data would be collected every ten years.			
Silviculture Exams	Approximately 120 plots per decade	Approximately 450 plots per decade	Approximately 700 plots per decade	Approximately 460 plots per decade
Riparian Vegetation	Every 3 years for 1 decade after treatment	Every 3 years for 1 decade after treatment	Every 3 years for 1 decade after treatment	Every 3 years for 1 decade after treatment
Watershed				
Water Quality	Oregon Department of Environmental Quality	Oregon Department of Environmental Quality	Oregon Department of Environmental Quality	Oregon Department of Environmental Quality
OHV Use	Informal schedule	Informal schedule	Informal schedule	Informal schedule plus 4 days field visits per year
Water Temperature	Every year	Every year	Every year	Every year
Macroinvertebrate Sampling	Every 2 years	Every 2 years	Every 2 years	Every 2 years
Geomorphic Response	N/A	Prior to project implementation, after first winter, after first flood greater than 3,300 cfs, and after subsequent large (recurrence interval of approximately 5 years) flood events (or every 5 years, if no large floods)		
Aquatic CWD Tracking	N/A	Immediately after project implementation, after first winter, after first flood greater than 3,300 cfs, and after subsequent large (recurrence interval of approximately 5 years) flood events (or every 5 years, if no large floods)		
Channel Substrate	N/A	Prior to project implementation and every year thereafter		
Water Table Depth	N/A	Every Year	Every Year	N/A
Wild Horses				
Population Census	Every Year	Every Year	Every Year	Every Year
Wildlife				
Eagles	Oregon State University Cooperative Study	Oregon State University Cooperative Study	Oregon State University Cooperative Study	Oregon State University Cooperative Study

Peregrines (Baseline to 2005)	Every decade	Every 5 years	Every decade	Every Year
Big Game & Upland Game	State Agencies	State Agencies	State Agencies	State Agencies
Neotrops & Landbirds—Various Methods	N/A	N/A	1 Year in Every decade	N/A
Neotrops & Landbirds—Various Methods (Baseline to 2006-2008)	2 Consecutive Years in Every decade	2 Consecutive Years in Every decade	2 Consecutive Years in Every 5 Years	2 Consecutive Years in Every 5 Years
Herptiles--Pond turtles	Every 2 years	Every year	Every 5 years	Every year, several times per month at different daily times
Herptiles--Area search/ Various Methods	Every decade	Every 5 years	Every 5 years	Every decade

Table M-3. Monitoring costs for the Upper Klamath River Management Plan

Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cultural Resources				
Human Pressure on Cultural Sites	$0	$5,000/decade	$0	$5,000/decade
Site Preservation Treatment	$0	$5,000/decade	$5,000/decade	$5,000/decade
Mitigation	Initially - $5,000 After 1st year - $700	Initially - $5,000 After 1st year - $700	Initially - $5,000 After 1st year - $700	Initially - $5,000 After 1st year - $700
Native American Consultation and coordination	$2,500/decade	$2,500/decade	$2,500/decade	$2,500/decade
Fire and Fuels				
Photo Points	Refer to Vegetation Photo Points	Refer to Vegetation Photo Points	Refer to Vegetation Photo Points	Refer to Vegetation Photo Points
Stand Exams	Included in Vegetation Stand Exams	Included in Vegetation Stand Exams	Included in Vegetation Stand Exams	Included in Vegetation Stand Exams
Fish				
Spawning Surveys	$0	$5,000/year - no substrate samples	$10,000/year – with substrate samples	$5,000/year - no substrate samples
Habitat Surveys	$30,000 to resurvey Klamath River ($1,400 per mile)			
Migration Surveys	$0	Trapping survey $25,000 per year	Radio-telemetry $50,000 first year and $25,000 per additional year	Trapping survey $25,000 per year
Fisheries Assessment	$0	Combined with migration study	Combined with migration study; add $5,000 for additional sites	Combined with migration study
Creel Surveys	$0	$60,000/year active creel	$5,000/year passive creel	$60,000/year active creel
Grazing				
Use Supervision & Compliance	$3,000/decade	$3,000/decade	$3,000/decade	$3,000/decade
Trend	$1,000/decade	$1,000/decade	$0	$1,000/decade
Utilization	$1,000/decade	$1,000/decade	$0	$1,000/decade
Cole Browse	$1,000/decade	$1,000/decade	$0	$1,000/decade
Noxious Weeds				
Weed Treatment Effects	$2,250/year	$4,500/year	$4,500/year	$4,500/year
Post-project weed surveys	$0	$1,200/year	$2,000/year	$1,500/year
Recreation				
Limits of Acceptable Change	$500/year	$15,000/year (2013-2014)	$10,000/year (2018-2019)	$15,000/year (2013-2014)
Boating Use Data Collection	$7,500/year	$10,000/year	$7,500/year	$10,000/year

Scenic Qualities				
Visual Resource Management	$3,000/project	$3,000/project	$3,000/project	$3,000/project
Overall Scenic Quality	Initial study - $2,000 Every 3-5 years - $2,000	Initial study - $2,000 Every 3-5 years - $2,000	Initial study - $2,000 Every 3-5 years - $2,000	Initial study - $2,000 Every 3-5 years - $2,000
Soils				
Bulk Density & Areal Extent Disturbance	$10,000/decade	$20,000/decade	$30,000/decade	$20,000/decade
Special Status Plants				
Survey Implementation	$500/year	$1,000/year	$1,500/year	$1,000/year
Population Monitoring	$450/year	$675/year	$900/year	$675/year
Vegetation				
Photo Points	Initially - $2,000 First, fifth, and tenth years - $1,000 - Thereafter every ten years - $1,000			
Silviculture Exams	$2,250/decade	$8,450/decade	$13,125/decade	$8,625/decade
Riparian Vegetation	$9,000/decade	$9,000/decade	$9,000/decade	$9,000/decade
Watershed				
Water Quality	$0	$0	$0	$0
OHV Use	Occurs as part of regular duties	Occurs as part of regular duties	Occurs as part of regular duties	$1,000
Water Temperature	$7,500/decade	$7,500/decade	$7,500/decade	$7,500/decade
Macroinvertebrate Sampling	$50,000/decade	$50,000/decade	$50,000/decade	$50,000/decade
Geomorphic Response	N/A	$20,000/decade	$20,000/decade	$20,000/decade
Aquatic CWD Tracking	N/A	$7,000/decade	$10,000/decade	$5,000/decade
Channel Substrate	N/A	$25,000/decade	$25,000/decade	$25,000/decade
Water Table Depth	N/A	$17,000/decade	$17,000/decade	N/A
Wild Horses				
Population Census	$500/decade	$500/decade	$500/decade	$500/decade
Wildlife				
Eagles	Cooperative--BLM portion is $2000/year	Cooperative--BLM portion is $2000/year	Cooperative--BLM portion is $2000/year	Cooperative--BLM portion is $2000/year
Peregrines (Baseline to 2005)	$100/year	$200/year	$100/year	$1,000/year
Big Game & Upland Game	$0	$0	$0	$0
Neotrops & Landbirds—Various Methods	N/A	N/A	$40,000	N/A
Neotrops & Landbirds—Various Methods (Baseline to 2006-2008)	$14,400/year	$28,800/year	$28,800/year	$28,800/year
Herptiles--Pond turtles	$1,000/year	$2,000/year	$400/year or	$4,000/year
Herptiles--Area search	N/A	$1,600/year	$1,600/year	$1,600/year

Appendix N – References

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Appendix O – Index

Appendix P – List of Agencies Receiving This EIS

The Council on Environmental Quality requires that certain agencies obtain comments from Federal, State, and Local agencies, and Tribes. The different agencies have jurisdiction by law or special expertise on environmental quality issues addressed in an EIS.

Required Agencies
Environmental Protection Agency

Office of Environmental Project Review

Office of Public Affairs

Natural Resources Library

Bureau of Land Management Director

Other Federal Agencies
USDA Forest Service
- Winema National Forest
- Klamath National Forest
- Goosenest Ranger District
- Six Rivers National Forest

USDI Bureau of Land Management
- Oregon/Washington State Office
- California State Office
- Medford District
- Prineville District
- Lakeview District
- Redding Field Office
- National Training Center

US Bureau of Mines
- Branch of Mineral Assessment
- Western Field Operations Center

USDI Bureau of Reclamation
- Denver Federal Center
- Klamath Basin Area Office
- Washington D.C. Office

USDI Fish and Wildlife Service
- Division of Environmental Coordination
- Klamath Basin Area Office

USDI Minerals Management Service, Offshore Environmental Assessment Division

USDI National Park Service
- Division of Environmental Compliance (762)
- Crater Lake National Park

US Air Force
- Office of Deputy A/S of the
Environment, Safety, Occupational Health
- HQ-USAF/LEEV, Environmental Division

Army Corps of Engineers, North Pacific Division

Department of Energy, Office of Environmental Compliance (EH-23)

Environmental Protection Agency
- Office of Federal Activities
- Environmental Review Coordinator, EPA Region IX
- Environmental Review Coordinator, EPA Region X

Federal Energy Regulatory Commission, Division of Environmental Analysis, Hydro Power Licensing

Bureau of Indian Affairs, Montague, CA

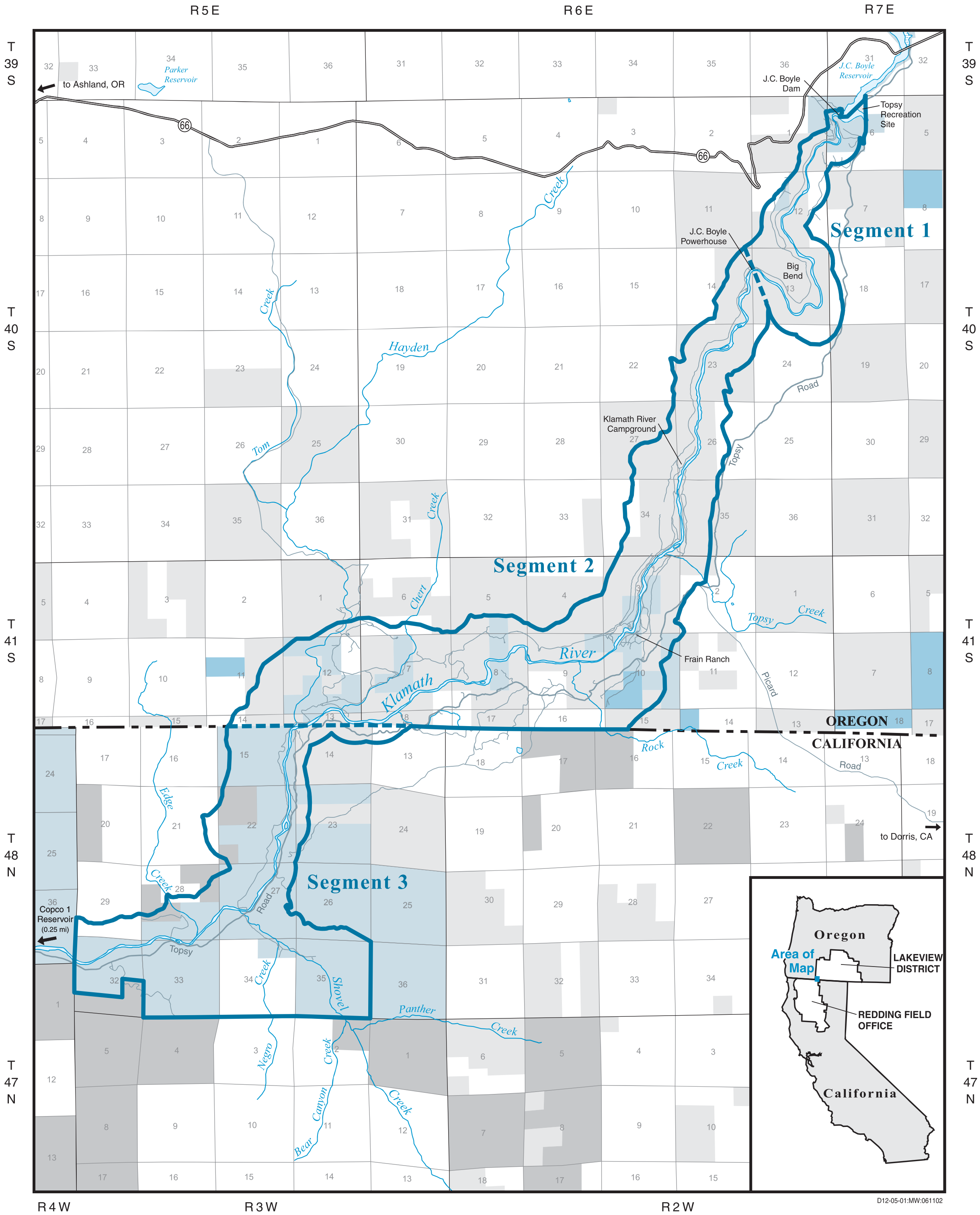
State and Local Agencies

California Resources Agency
California Department of Boating & Waterways
California Department of Fish and Game
California Department of Forestry
California Department of Water Resources
California Environmental Protection Agency
California State Lands Commission
California Water Resources Control Board

Oregon Parks and Recreation Department
Oregon Department of Environmental Quality
Oregon Water Resources Department
Oregon Department of Transportation
Oregon Governor's Forest Planning Team

Indian Tribes and Native American Groups
Klamath Tribes
Hoopa Valley Reservation
Karuk Tribe of California
Quartz Valley Indian Reservation
Shasta Nation

County and Local Government
Klamath County Board of Commissioners
Siskiyou County Board of Supervisors
Modoc County Board of Supervisors



LEGEND

- Project Area Boundary Alternative 2
- River Segment Boundary
- Open Water
- Wetlands
- Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

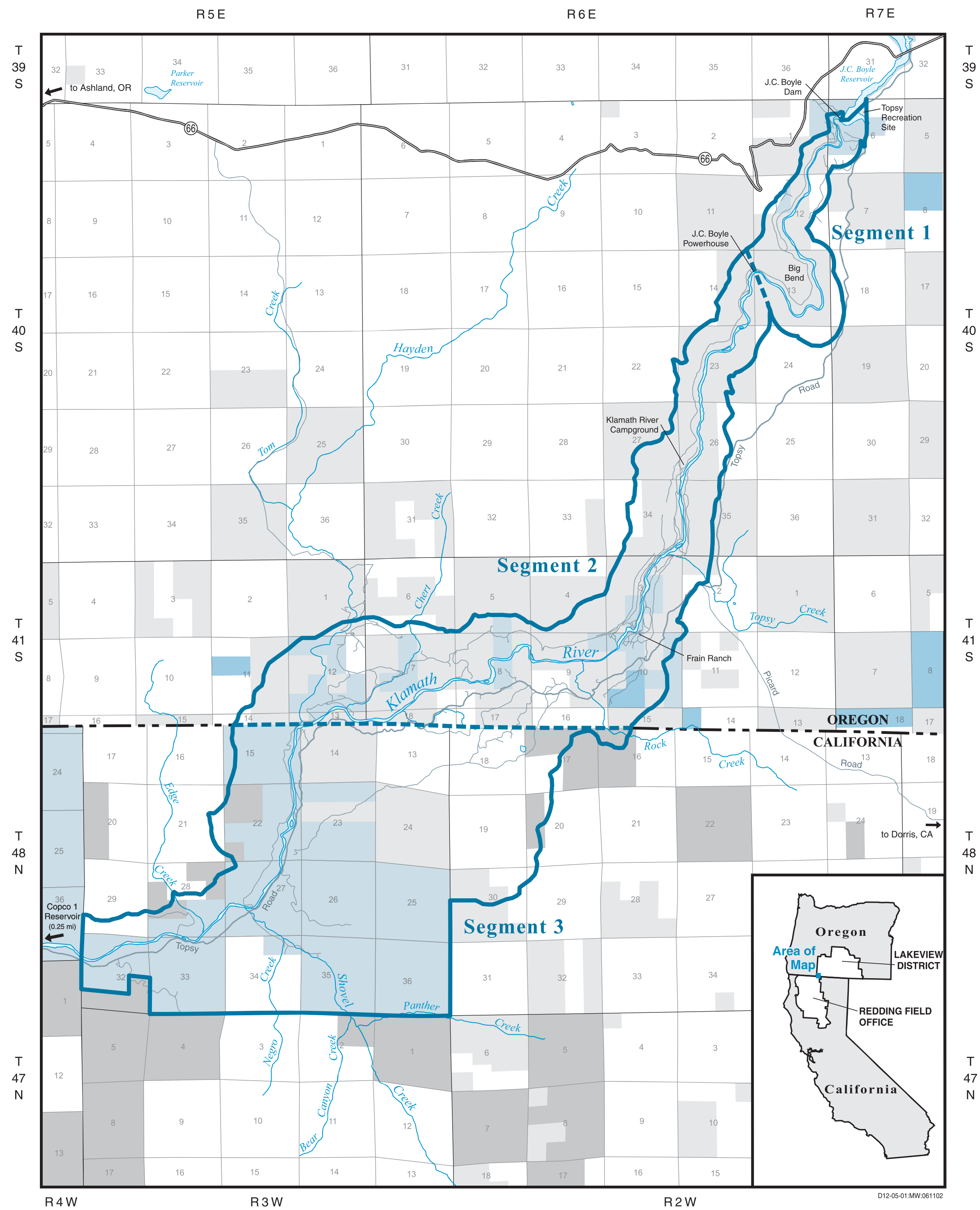
OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area
CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments

2003

Map 10: Project Area Boundary Alternative 2

(**Map 11** on back)



LEGEND

- Project Area Boundary Alternative 3
- River Segment Boundary
- Open Water
- Wetlands
- Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

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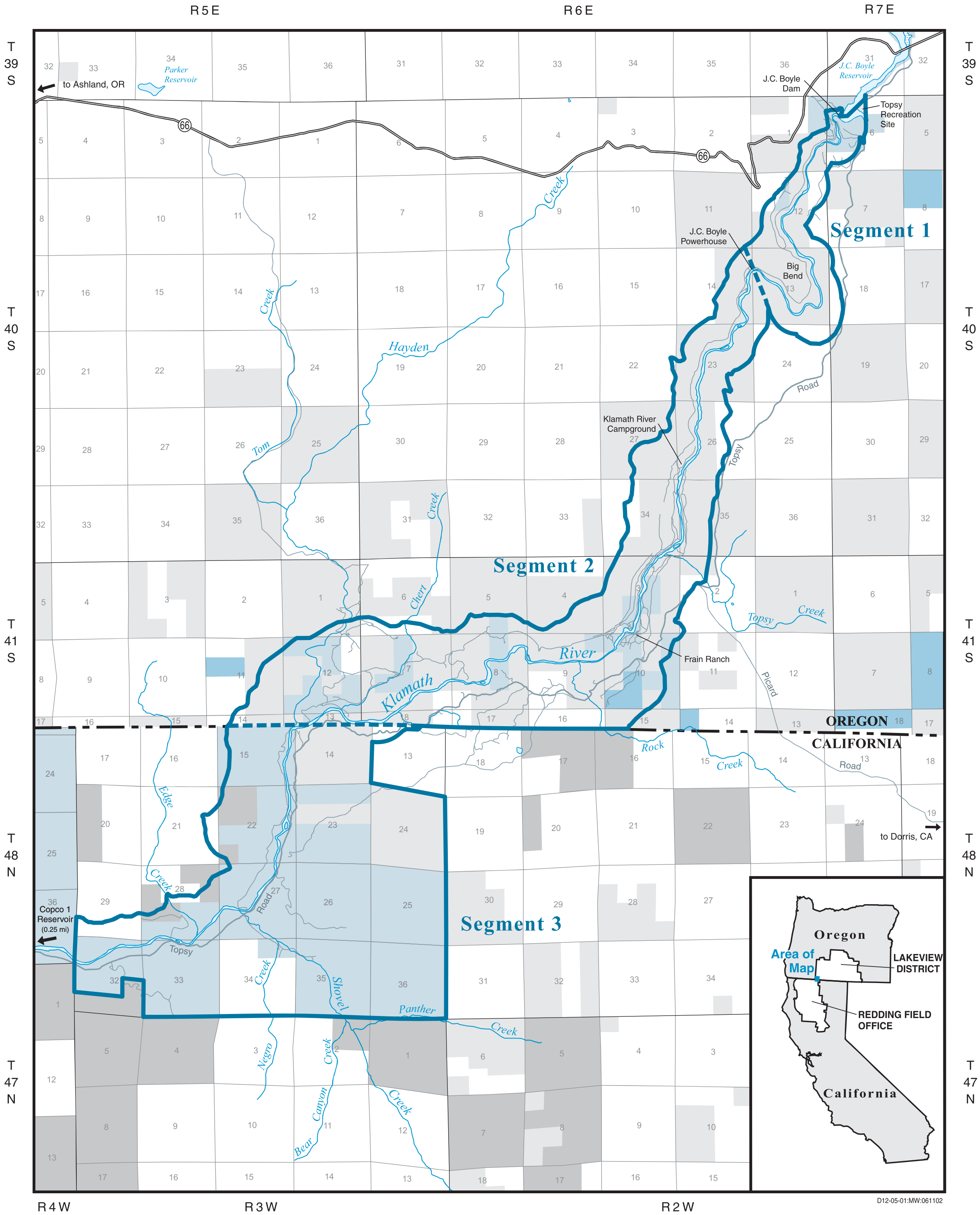
Map 11: Project Area Boundary Alternative 3

(**Map 10** on back)



LEGEND

- Project Area Boundary Alternative 4
- River Segment Boundary
- Open Water
- Wetlands
- Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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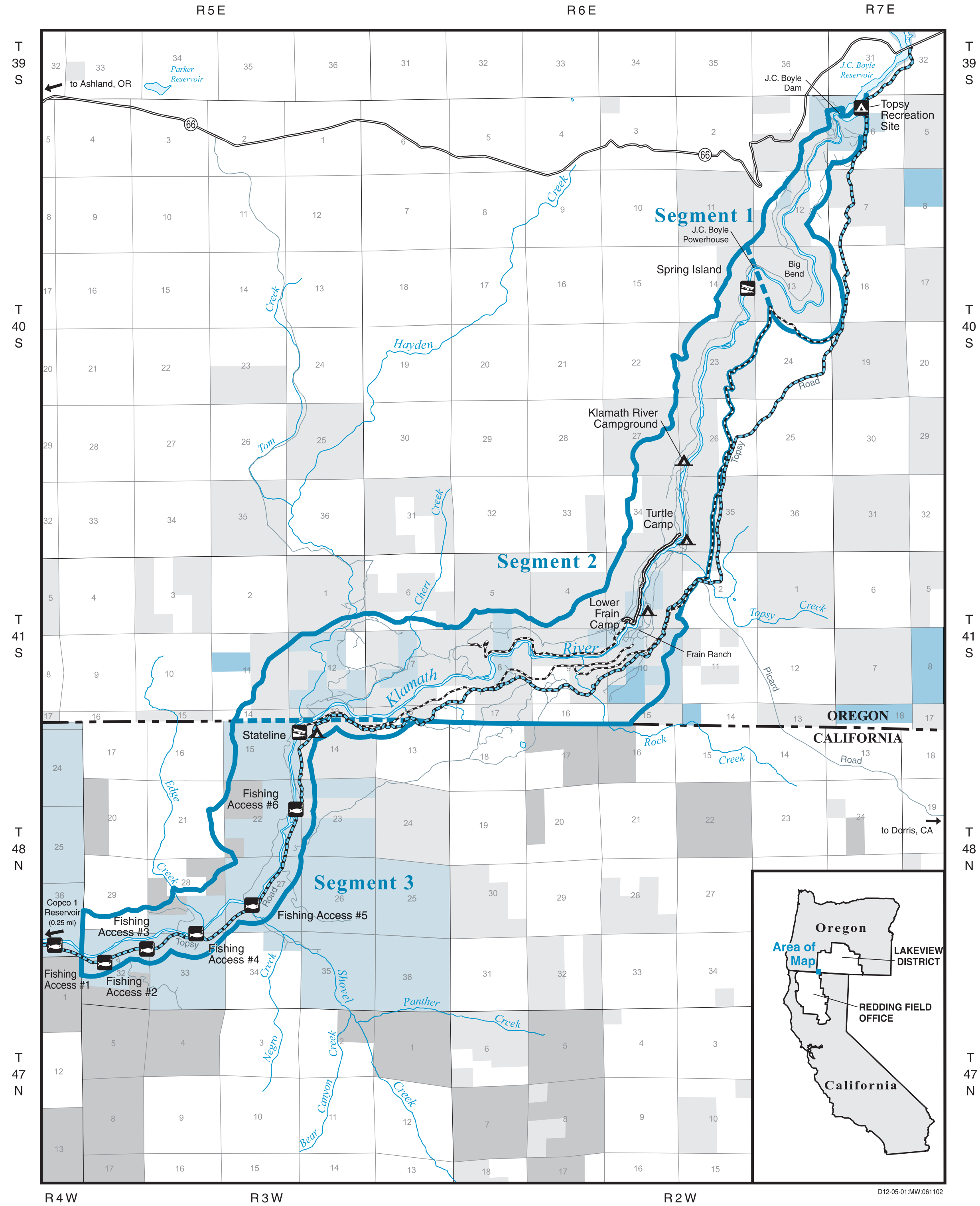
Map 12: Project Area Boundary Alternative 4

(**Map 13** on back)



LEGEND

- Back Country Byway
- New Trail Construction
- Road Converted to Trail
- Campground
- Boat Ramp
- Dispersed Camp
- Fishing Access
- Project Area Boundary Alternative 1
- River Segment Boundary
- Highway
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

1 0 1 2 MILES

1 0 1 2 KILOMETERS

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OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area

CALIFORNIA
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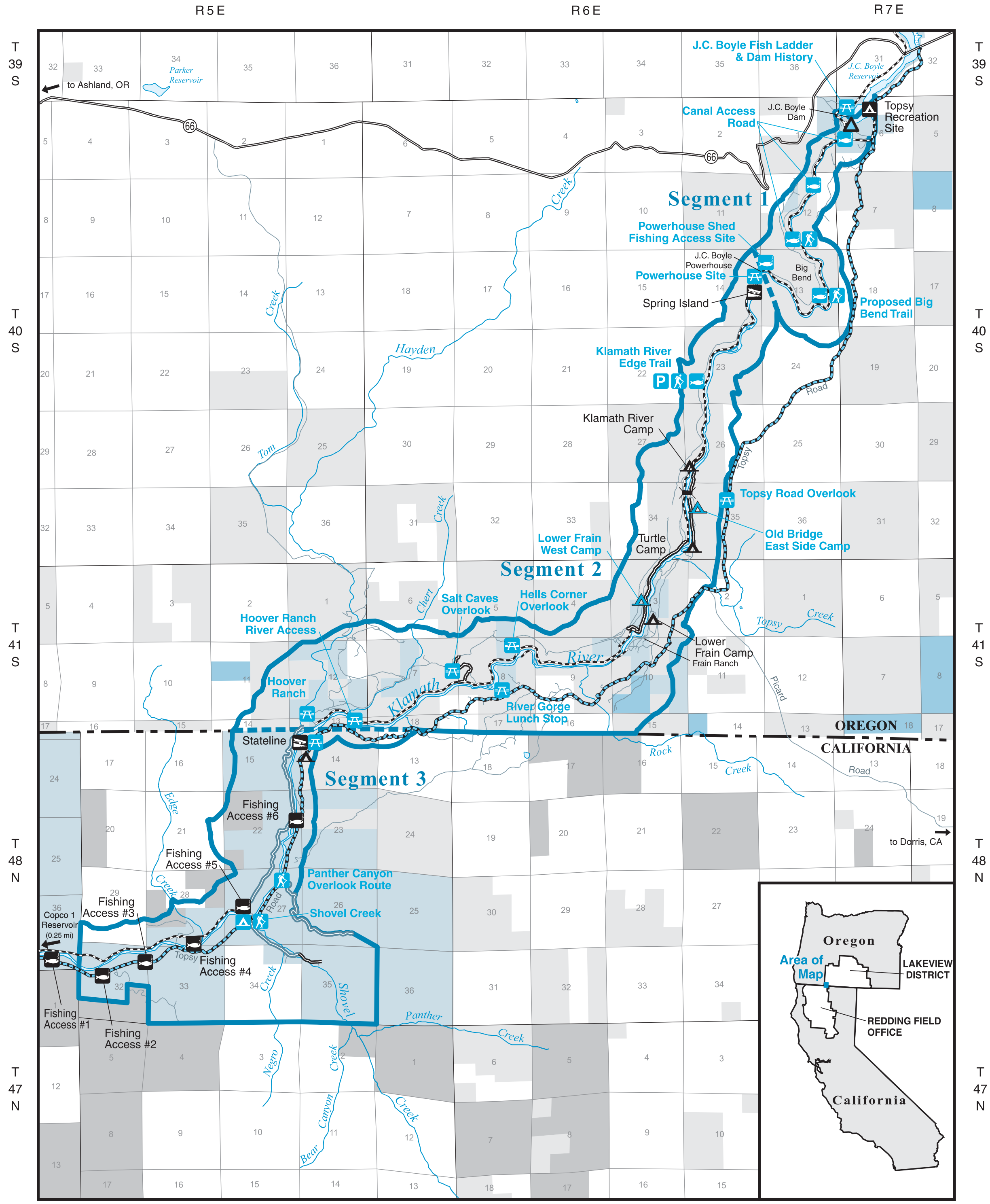
2003

Map 13: Recreation Proposal Alternative 1

(**Map 12** on back)



LEGEND

- Back Country Byway and National Historical Trail
- New Trail Construction
- Road Converted to Trail
- Trail on Road
- Proposed Foot Bridge
- Proposed Motorized Bridge
- Proposed Campground
- Campground
- Proposed Boat Ramp
- Boat Ramp
- Proposed Dispersed Camp
- Dispersed Camp
- Proposed Fishing Access
- Fishing Access
- Proposed Parking Area
- Proposed Day Use Area
- Proposed Trailhead
- Project Area Boundary Alternative 2
- River Segment Boundary
- 66 Highway
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

1 0 1 2 MILES

1 0 1 2 KILOMETERS

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OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area

CALIFORNIA
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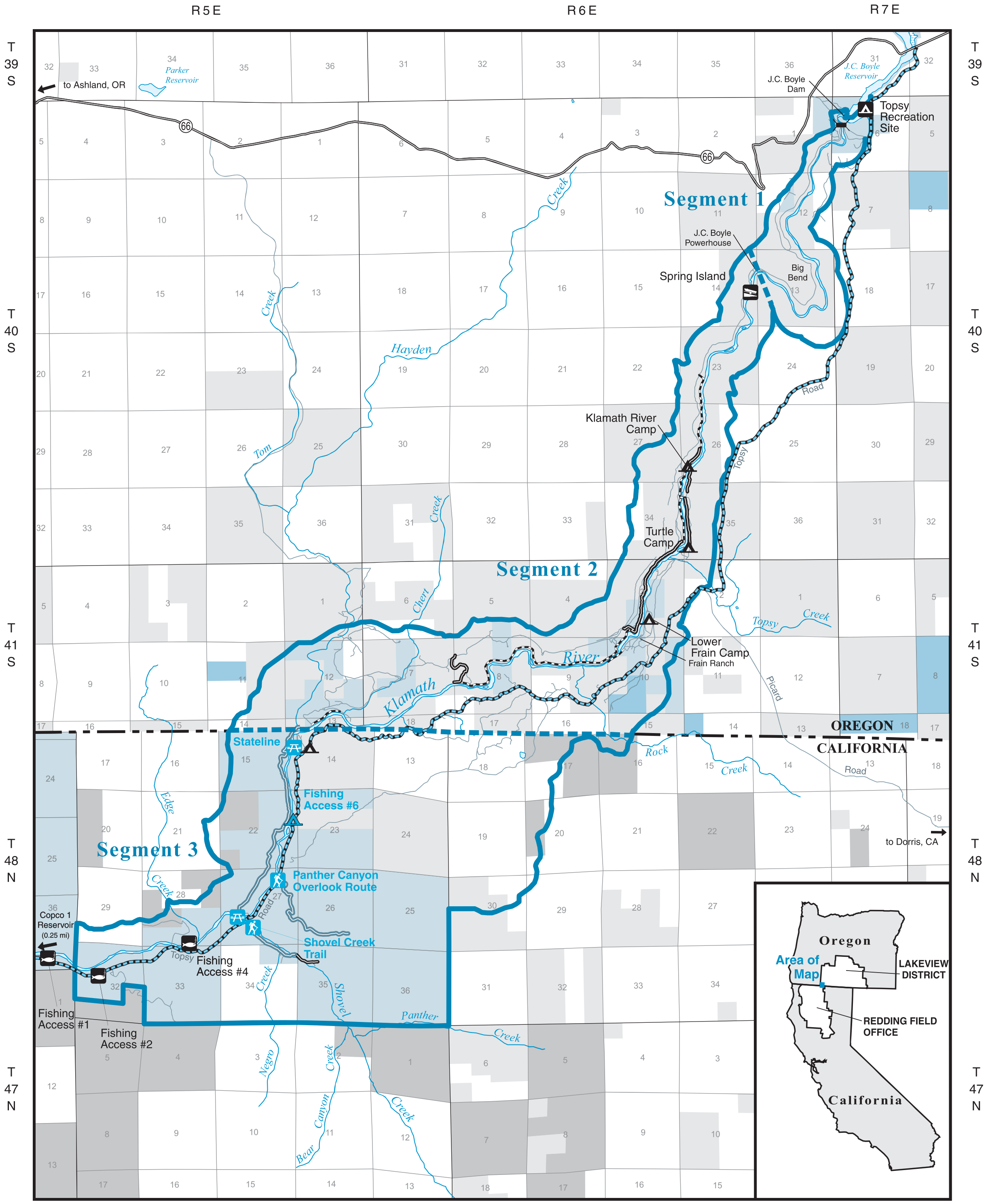
2003

Map 14: Recreation Proposal Alternative 2

(**Map 15** on back)



LEGEND

- Back Country Byway & National Nistorical Trail
- New Trail Construction
- Road Converted to Trail
- Trail on Road
- Proposed Foot Bridge
- Campground
- Proposed Day Use Area
- Boat Ramp
- Fishing Access
- Proposed Dispersed Camp
- Dispersed Camp
- Proposed Trailhead
- Project Area Boundary Alternative 3
- River Segment Boundary
- Highway
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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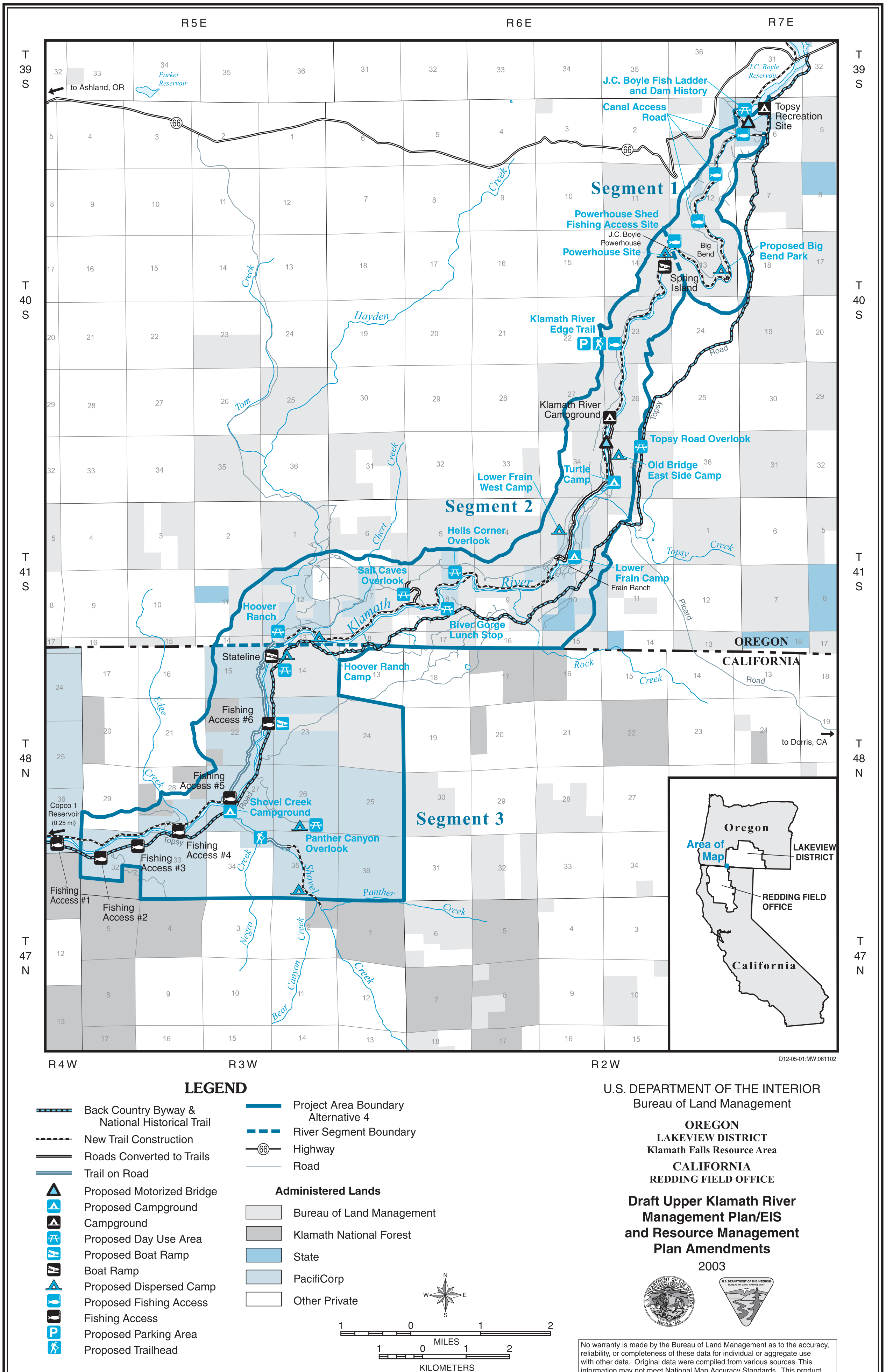
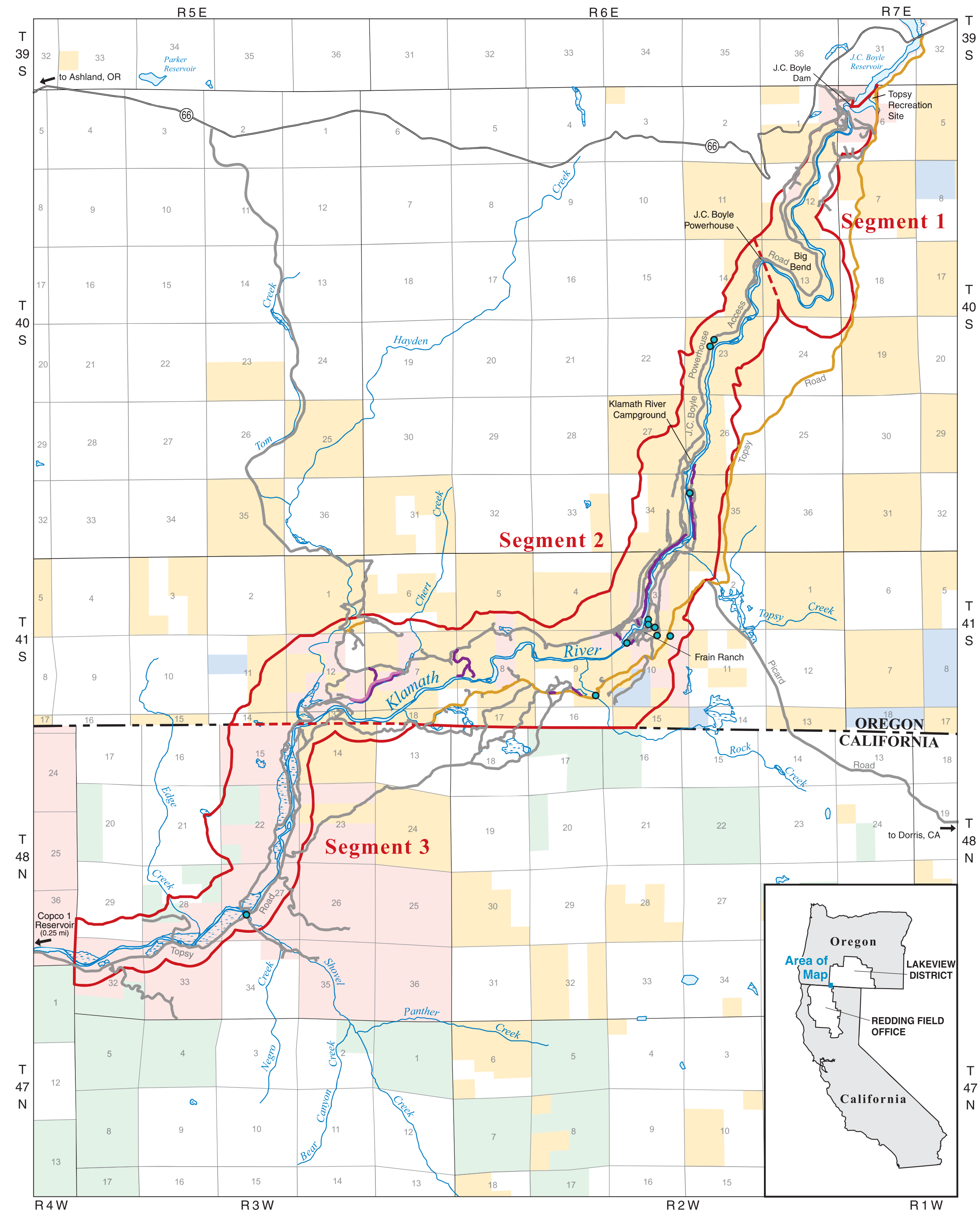
Map 15: Recreation Proposal Alternative 3

(**Map 14** on back)



Map 16: Recreation Proposal Alternative 4



LEGEND

Highway

Road Treatments

- No Action
- Spot Improvement
- Obliterate
- Construction
- Stream Crossing Treatments

Project Area Boundary - Alternative 1

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N E S W

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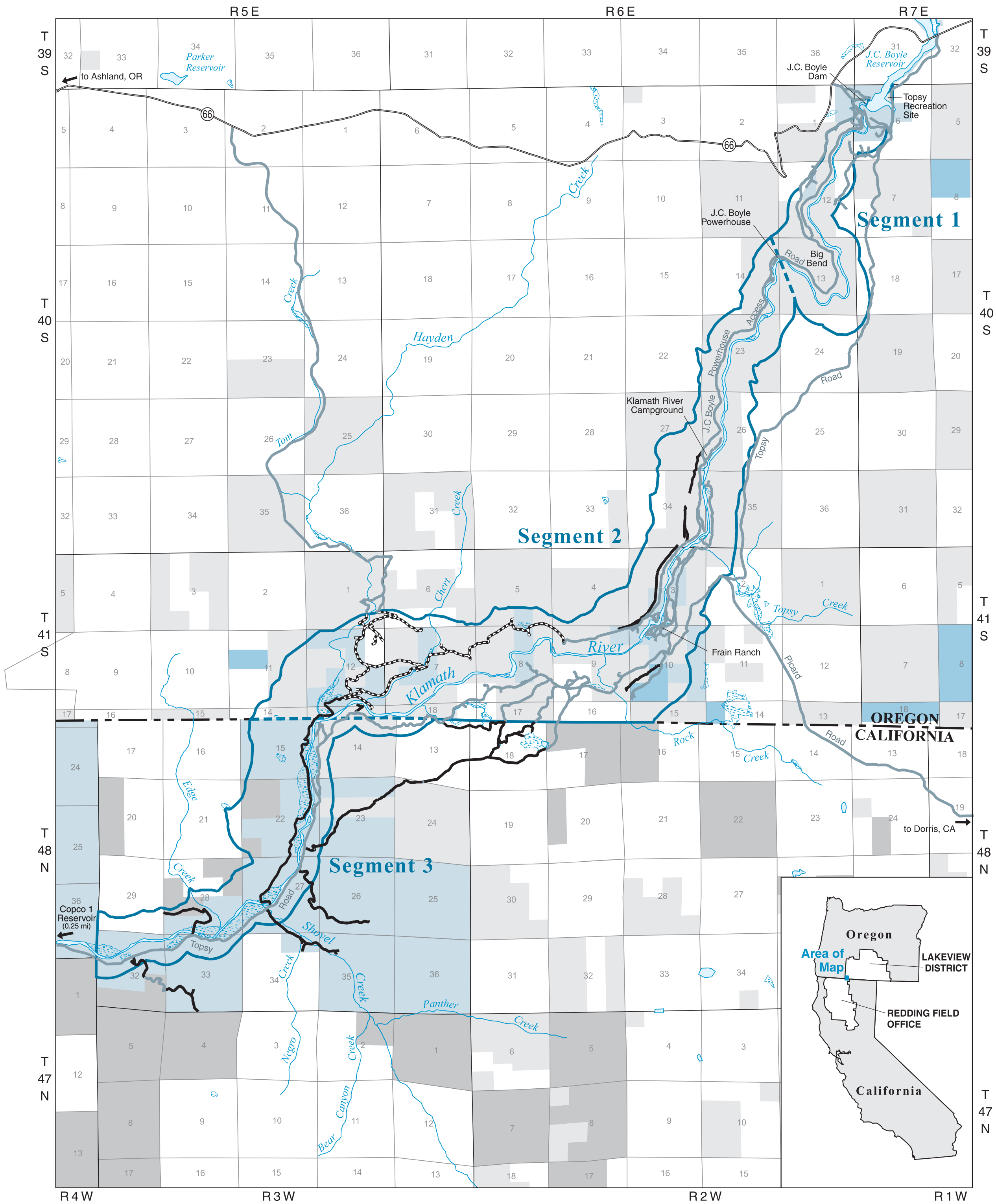
Map 17a: Proposed Road Treatments - Alternative 1



LEGEND

- Highway
- **Road Status Designations**
  - Open
  - Administrative Use
  - Seasonal Closure
- Project Area Boundary - Alternative 1
- River Segment Boundary
- **Administered Lands**
  - Bureau of Land Management
  - Klamath National Forest
  - State
  - PacifiCorp
  - Other Private

N E S W

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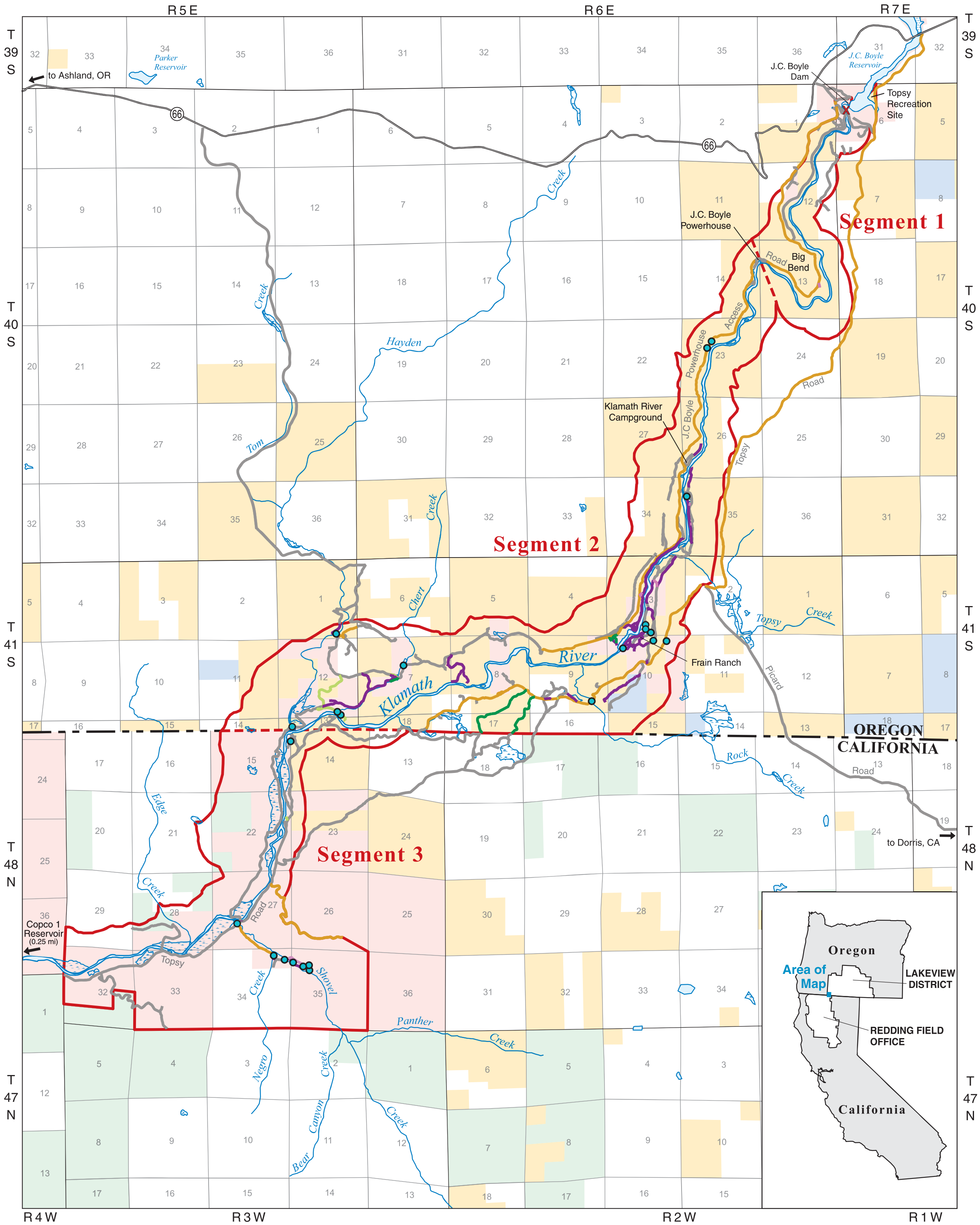
Map 17b: Proposed Road Status Designations - Alternative 1



LEGEND

Highway

Road Treatments

- No Action
- Spot Improvement
- Contiguous Improvement
- Decommission
- Obliterate
- Construction
- X Bridge Replacement
- Stream Crossing Treatments

Project Area Boundary - Alternative 2

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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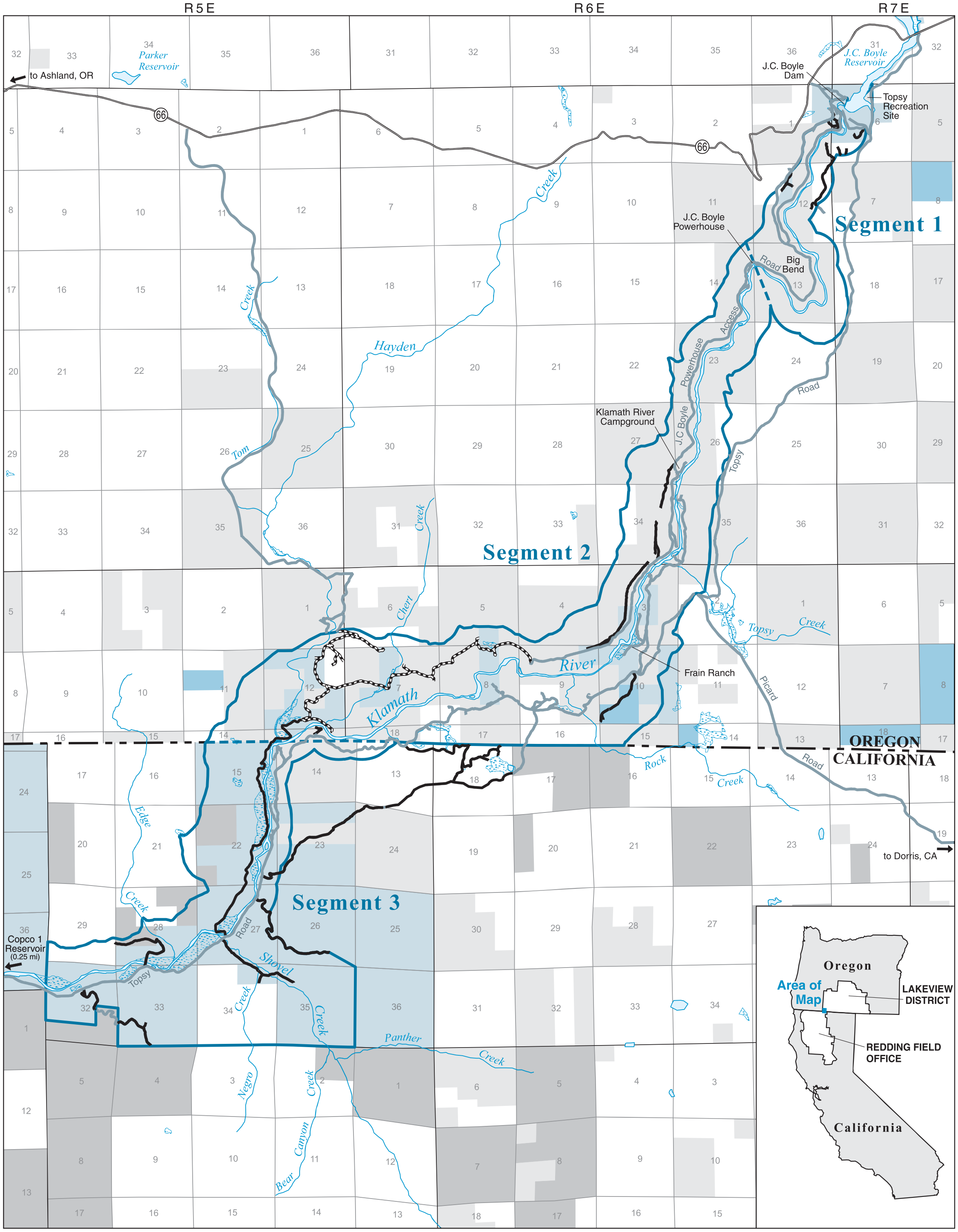
Map 18a: Proposed Road Treatments - Alternative 2



LEGEND

Highway

Road Status Designations

- Open
- Administrative Use
- Seasonal Closure

Project Area Boundary - Alternative 2

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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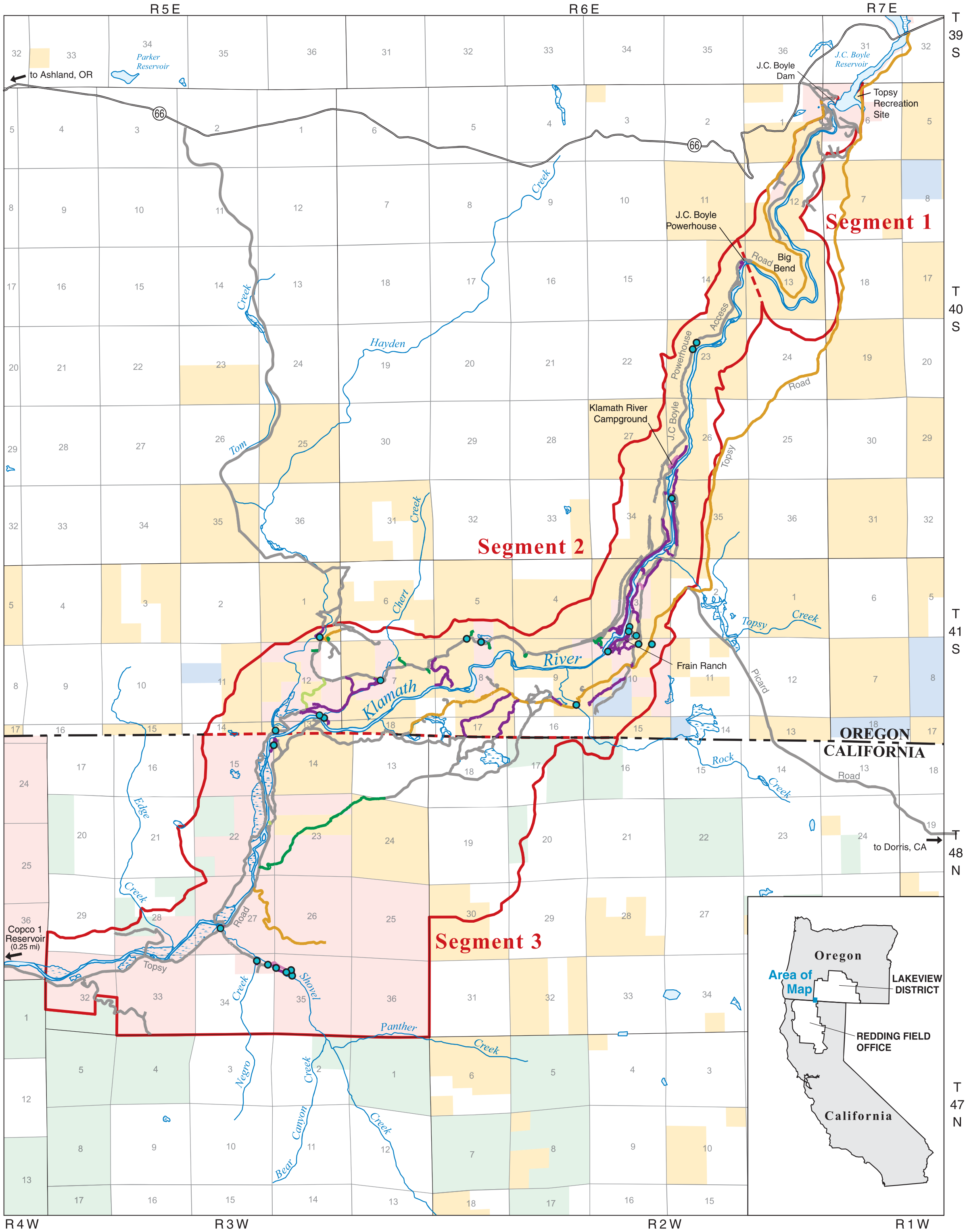
Map 18b: Proposed Road Status Designations - Alternative 2



LEGEND

Highway

Road Treatments

- No Action
- Spot Improvement
- Contiguous Improvement
- Decommission
- Obliterate
- Construction
- Stream Crossing Treatments

Project Area Boundary - Alternative 3

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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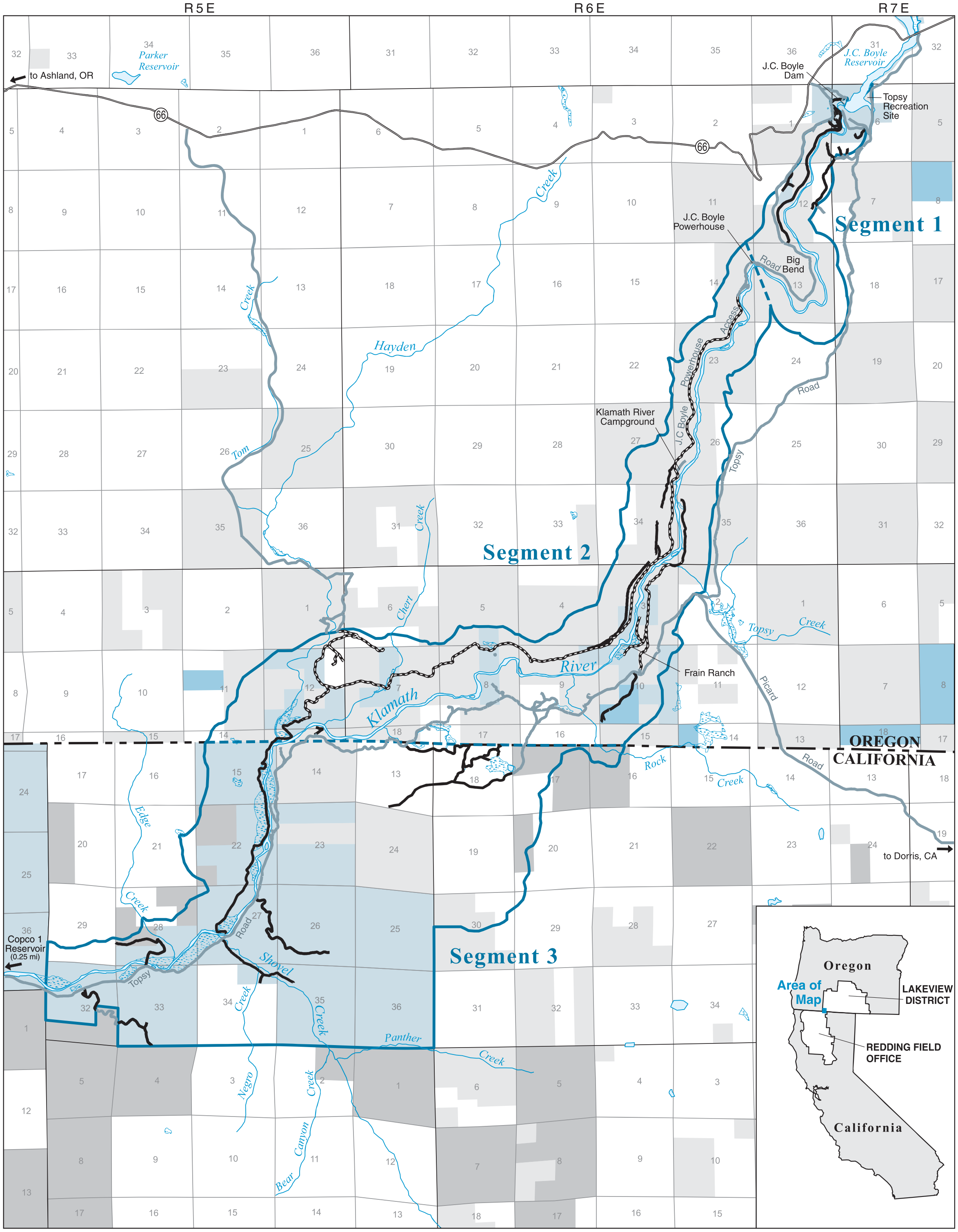
Map 19a: Proposed Road Treatments - Alternative 3



LEGEND

Highway

Road Status Designations

- Open
- Administrative Use
- Seasonal Closure

Project Area Boundary - Alternative 3

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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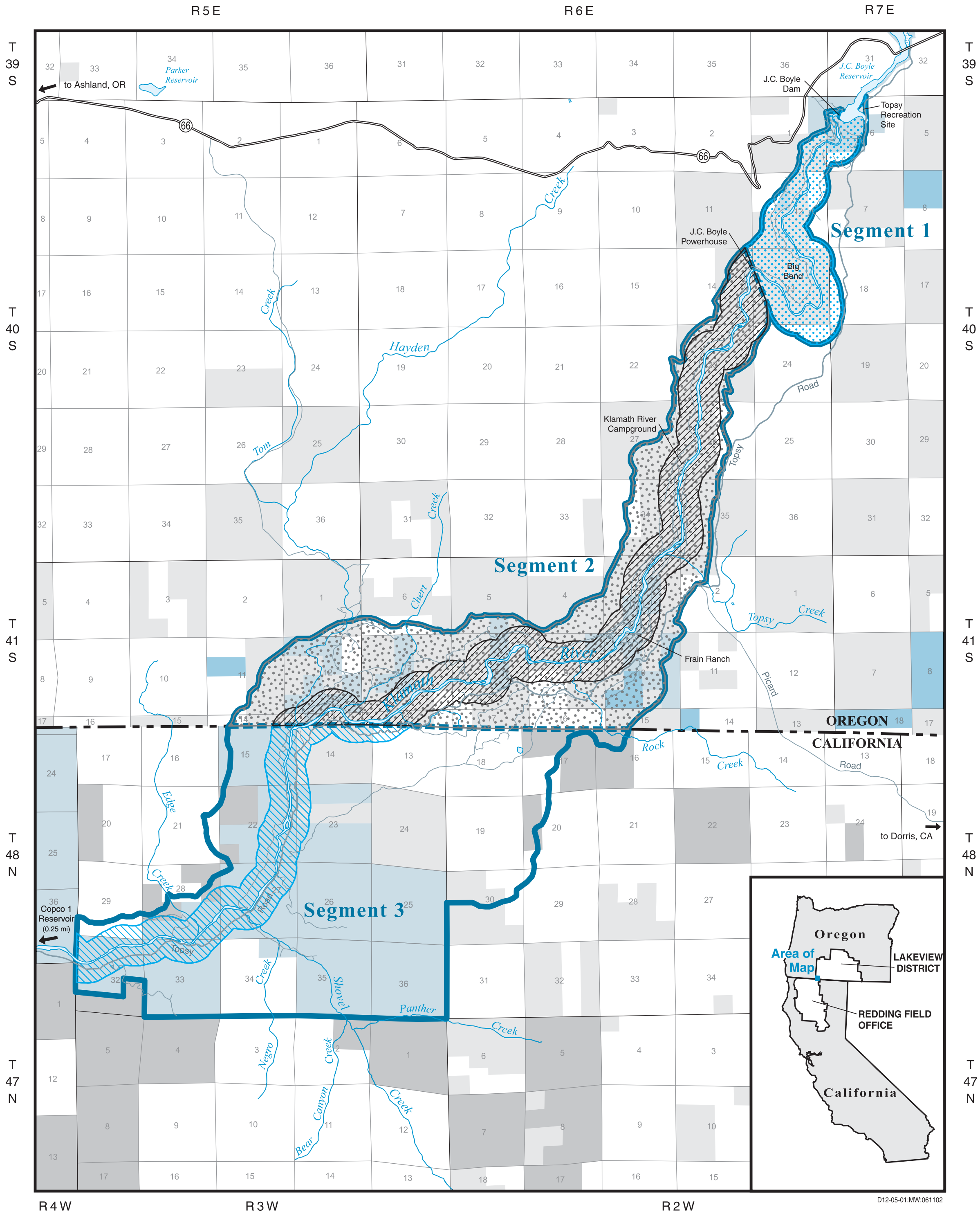
Map 19b: Proposed Road Status Designations - Alternative 3



LEGEND

- Designated Area of Critical Environmental Concern
- Proposed Area of Critical Environmental Concern
- Designated Wild & Scenic River/ Oregon State Scenic Waterway
- Eligible and Suitable Wild and Scenic River (Under Interim Management)
- Upper Klamath River Planning Area Boundary
- River Segment Boundary
- Highway
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

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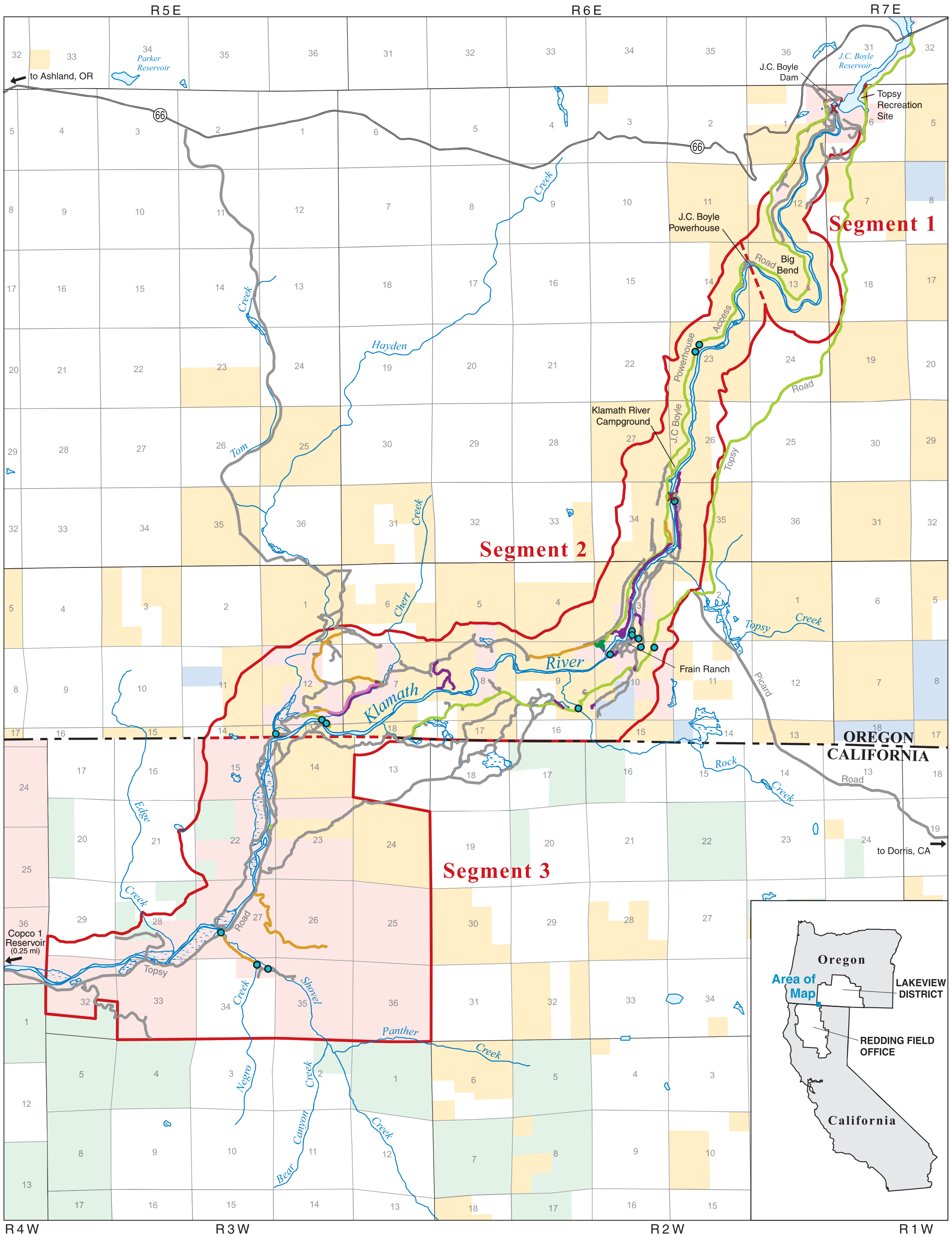
Map 2: Klamath River Designations

(**Map 3** on back)



LEGEND

Highway

Road Treatments

- No Action
- Spot Improvement
- Contiguous Improvement
- Decommission
- Obliterate
- Construction
- Bridge Replacement
- Stream Crossing Treatments

Project Area Boundary - Alternative 4

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N E S W

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KILOMETERS

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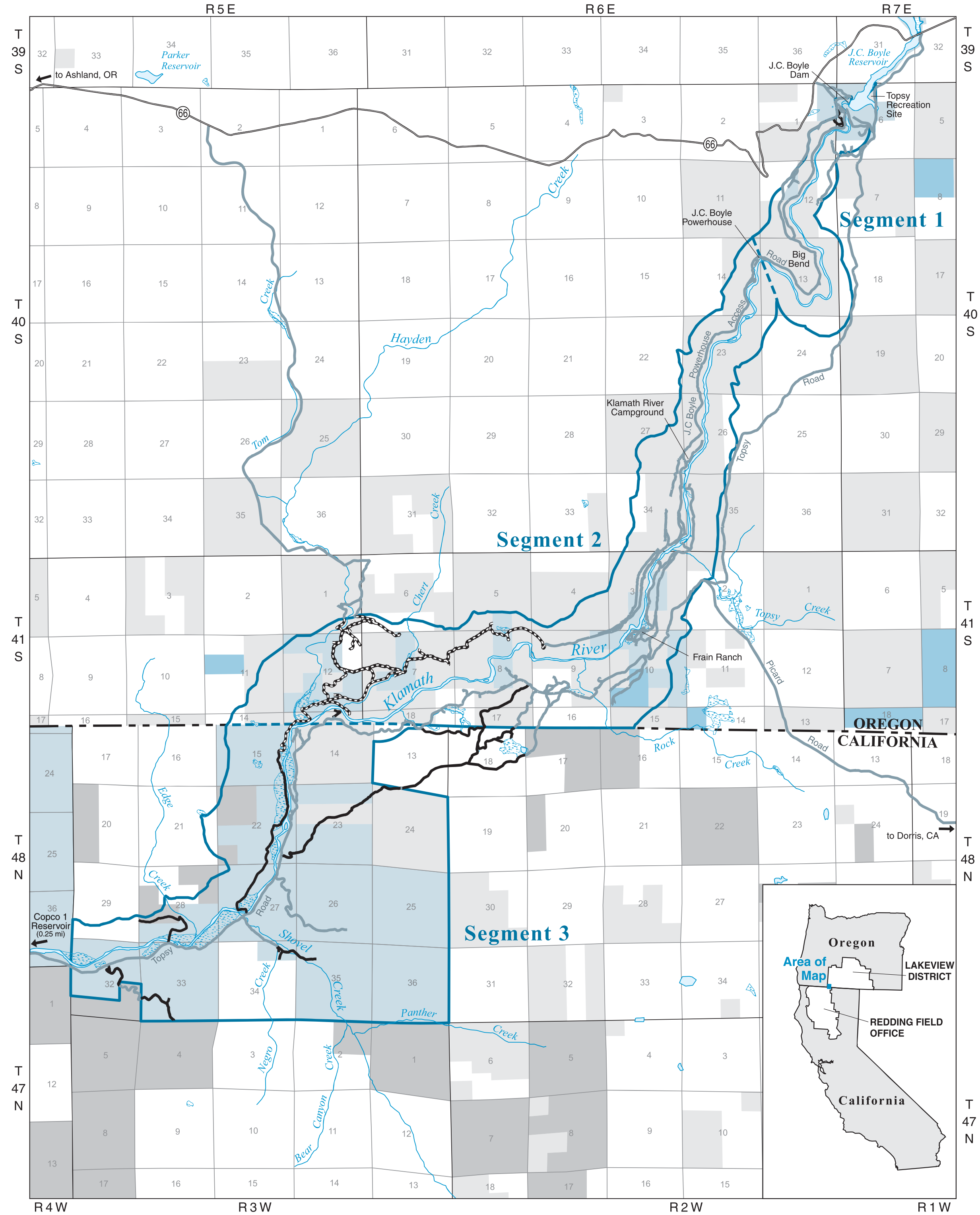
Map 20a: Proposed Road Treatments - Alternative 4



LEGEND

Highway

Road Status Designations

- Open
- Administrative Use
- Seasonal Closure

Project Area Boundary - Alternative 4

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N E S W

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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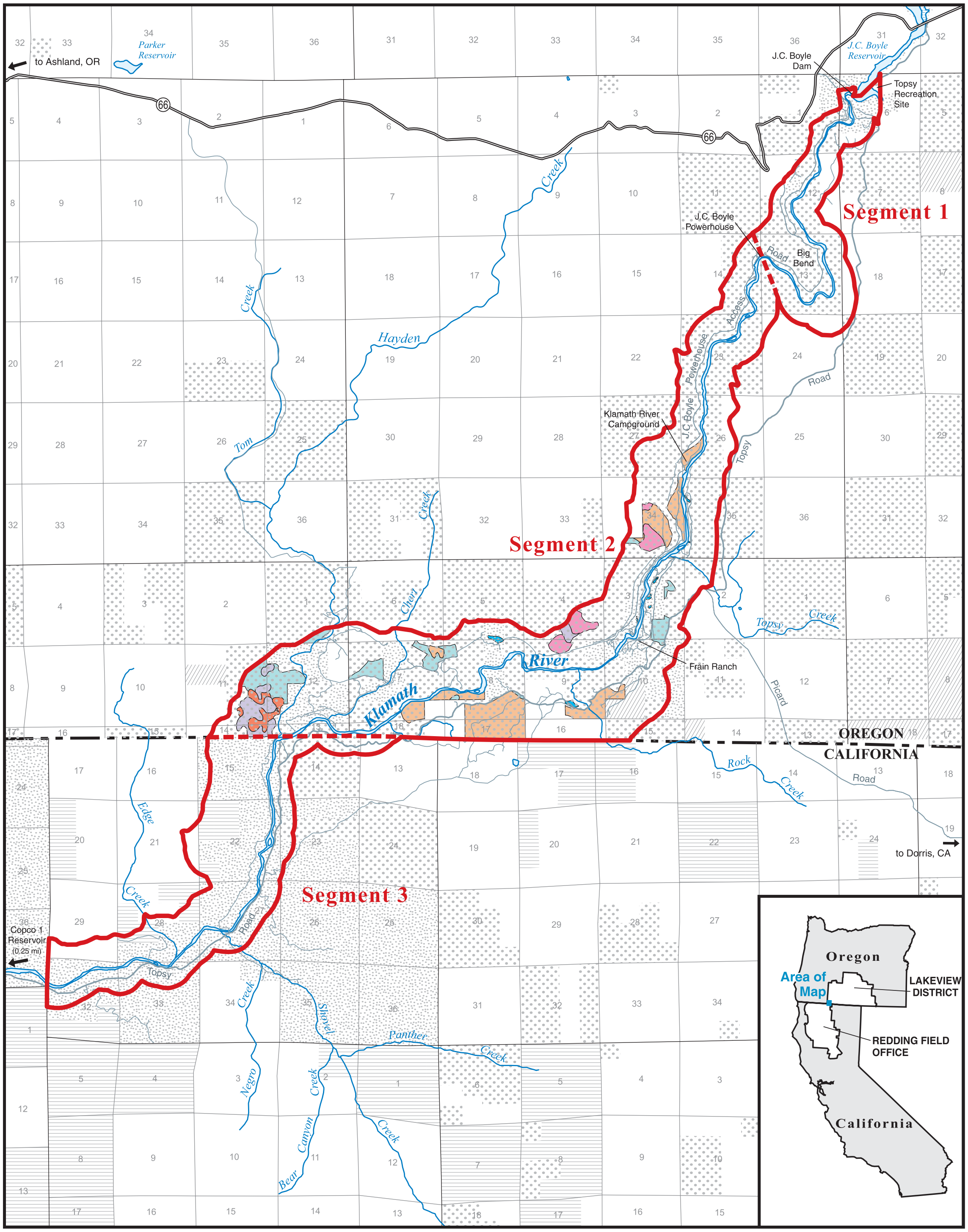
Map 20b: Proposed Road Status Designations - Alternative 4



LEGEND

Invasive Species Removal and Prescribed Burning:

- Dry Meadow

Prescribed Burning

- Mixed Shrub

Thinning and Fuel Reduction

- Open Oak Woodland
- Dense Oak Woodland
- Conifer Forest and Woodland

Riparian Restoration Treatments

- Riparian

- Project Area Boundary Alternative 1
- River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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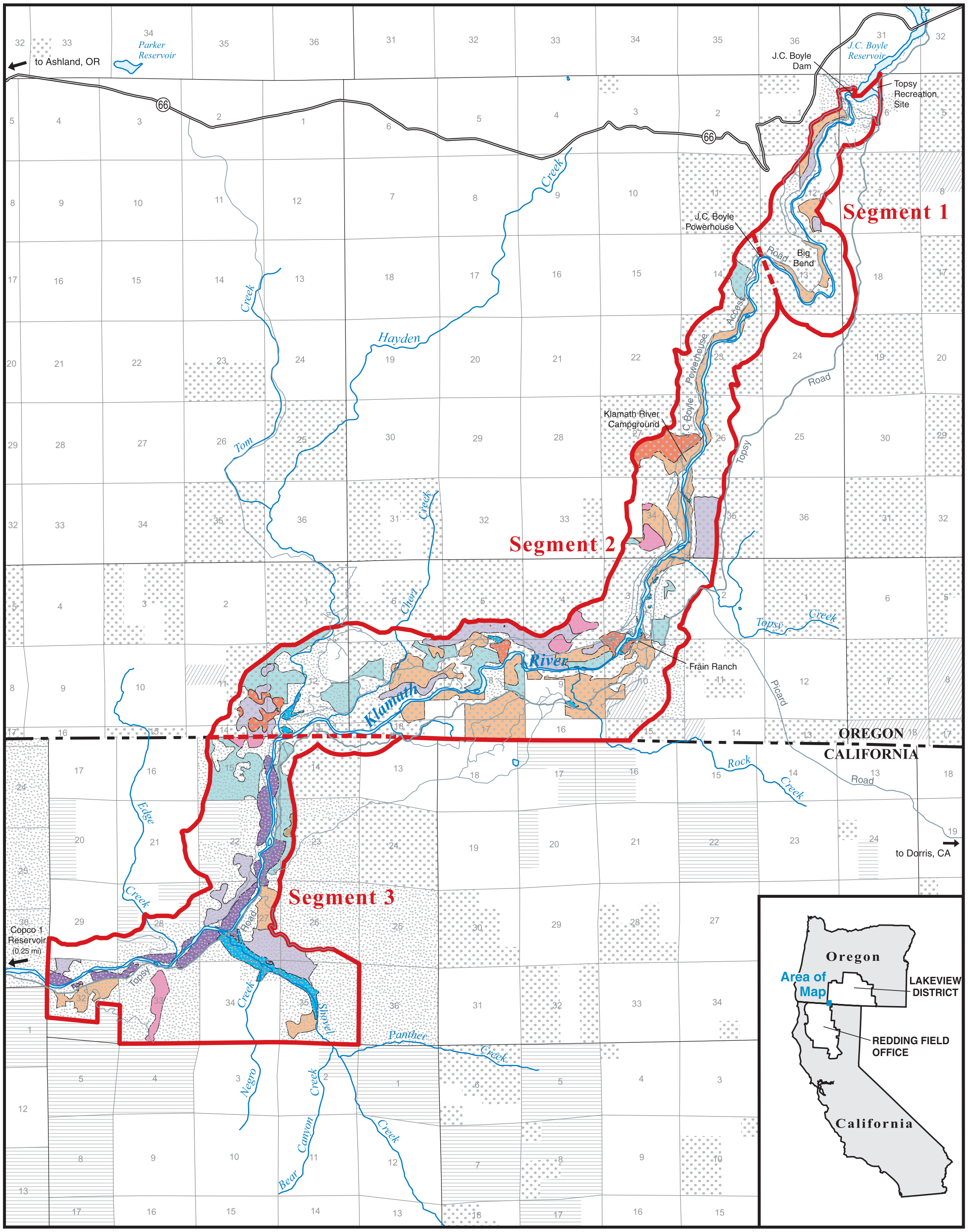
Map 21: Proposed Vegetation Treatments - Alternative 1

(**Map 22** on back)



LEGEND

Invasive Species Removal and Prescribed Burning:
- Dry Meadow

Prescribed Burning
- Rabbitbrush - Sagebrush
- Mixed Shrub

Thinning and Fuel Reduction
- Open Oak Woodland
- Dense Oak Woodland
- Conifer Forest and Woodland

Adaptive Management
- Irrigated Meadow

Riparian Restoration Treatments
- Riparian

Project Area Boundary Alternative 2
River Segment Boundary

Administered Lands
- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2
KILOMETERS 1 0 1 2

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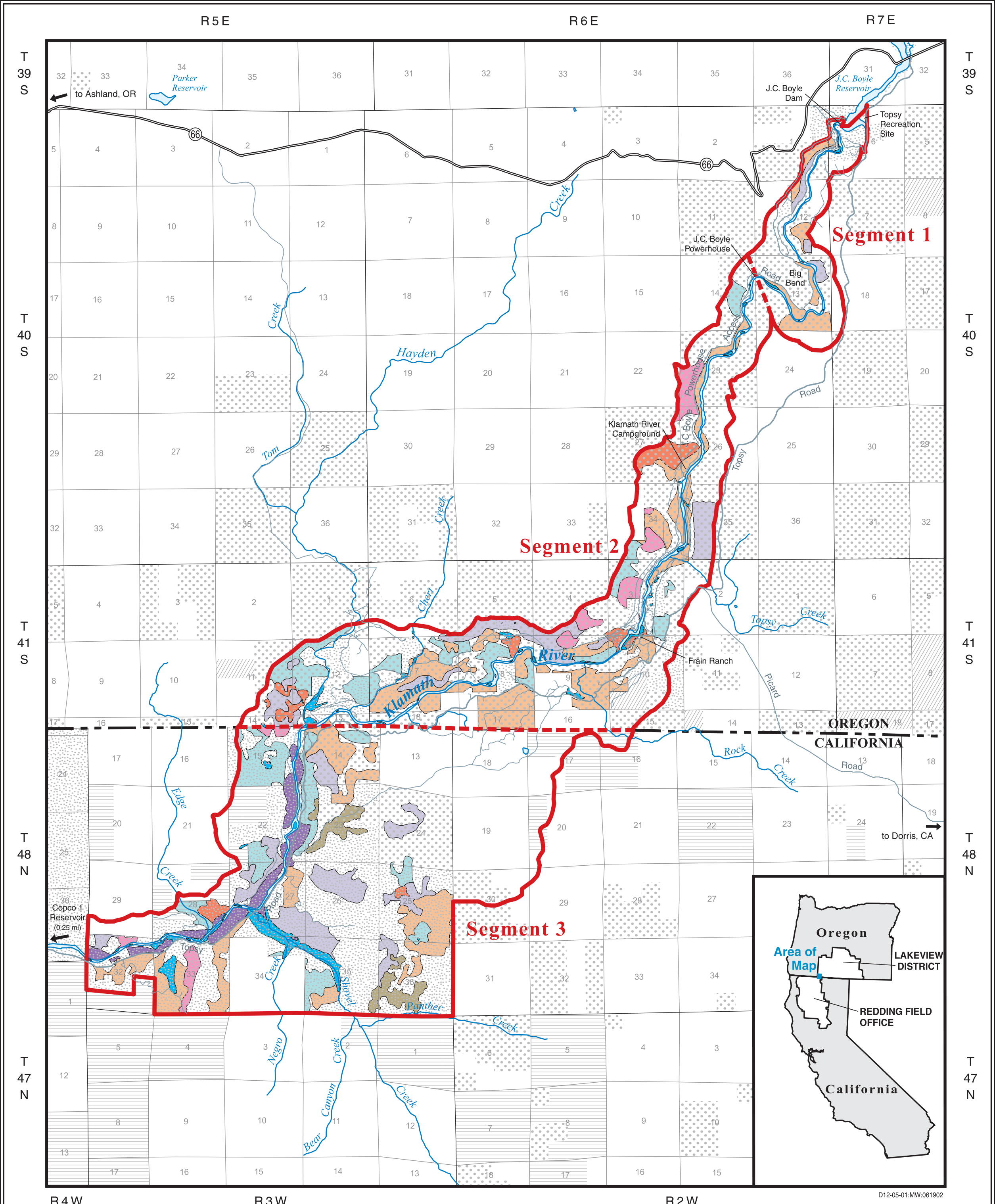
Map 22: Proposed Vegetation Treatments - Alternative 2

(**Map 21** on back)



LEGEND

Invasive Species Removal and Prescribed Burning:

- Dry Meadow

Prescribed Burning

- Rabbitbrush - Sagebrush
- Mixed Shrub

Thinning and Fuel Reduction

- Open Oak Woodland
- Dense Oak Woodland
- Conifer Forest and Woodland

Adaptive Management

- Irrigated Meadow

Riparian Restoration Treatments

- Riparian

Project Area Boundary Alternative 3

River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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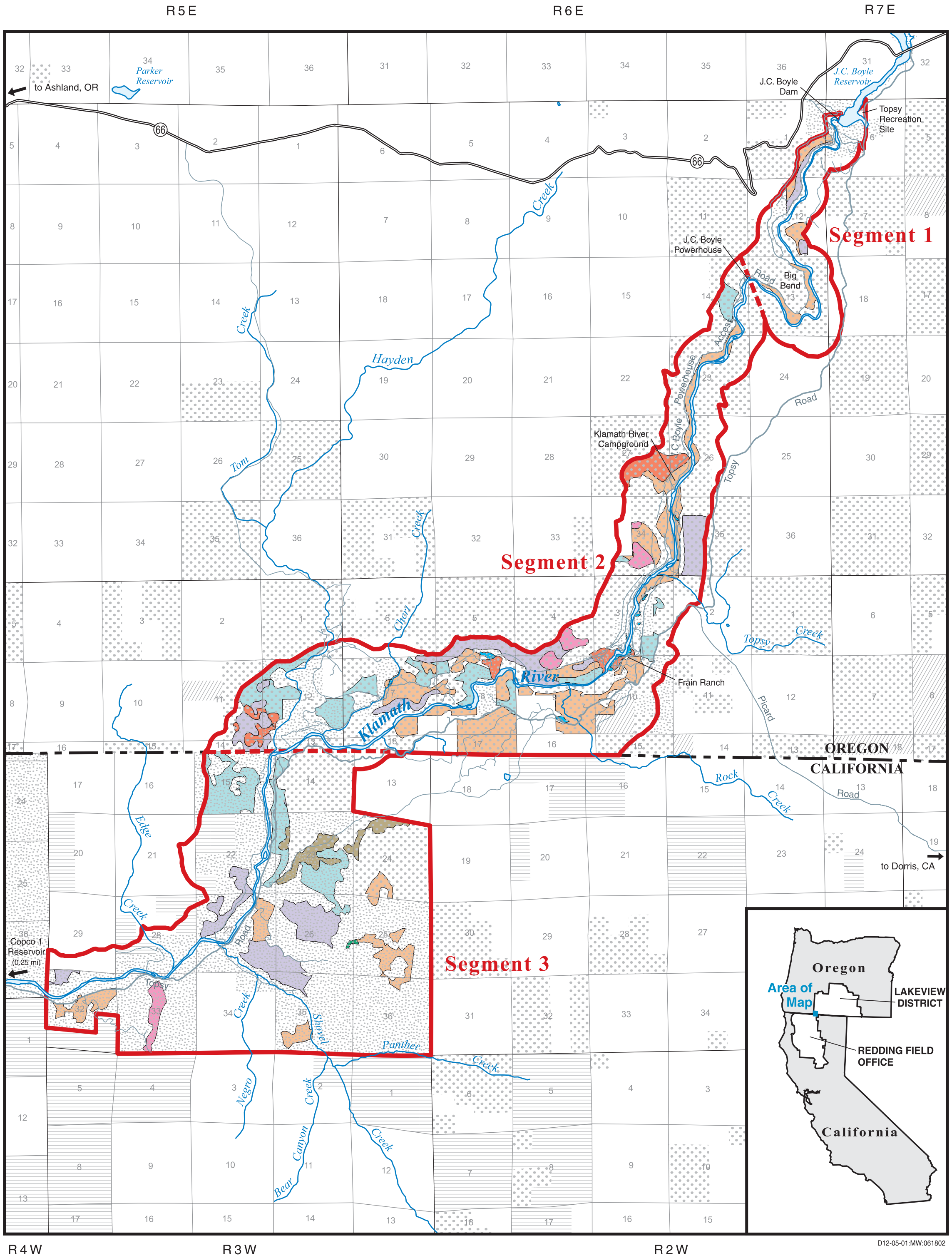
Map 23: Proposed Vegetation Treatments - Alternative 3

(**Map 24** on back)



LEGEND

Invasive Species Removal and Prescribed Burning:
- Dry Meadow

Invasive / Juvenile Juniper Removal & Prescribed Burning
- Juniper Woodland

Prescribed Burning
- Rabbitbrush - Sagebrush
- Mixed Shrub

Thinning and Fuel Reduction
- Open Oak Woodland
- Dense Oak Woodland
- Conifer Forest and Woodland

Riparian Restoration Treatments
- Riparian

Project Area Boundary Alternative 4

River Segment Boundary

Administered Lands
- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

1 0 1 2 MILES

1 0 1 2 KILOMETERS

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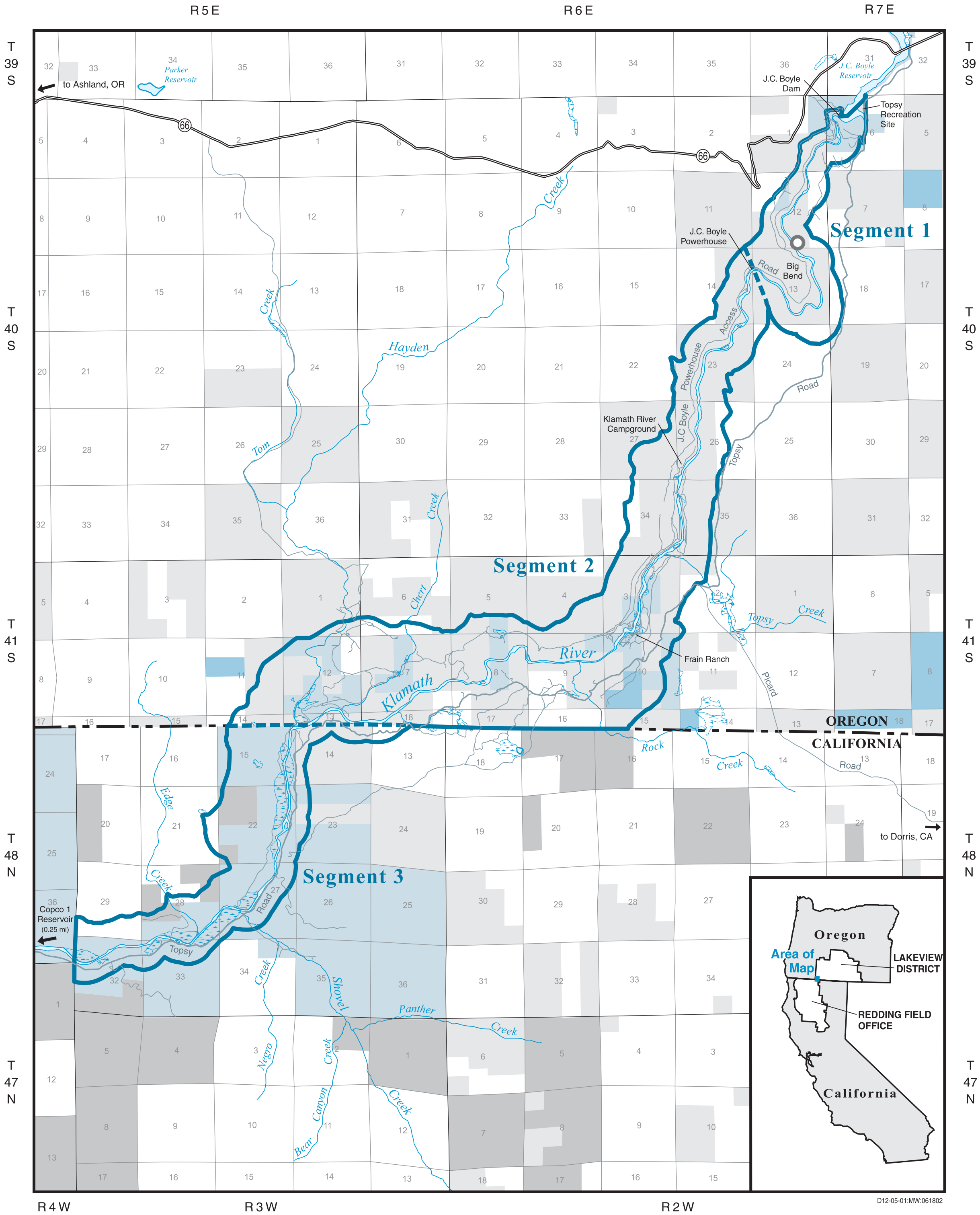
Map 24: Proposed Vegetation Treatments - Alternative 4

(**Map 23** on back)



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LEGEND

Stablize Chute

Project Area Boundary Alternative 1

River Segment Boundary

Administered Lands

Bureau of Land Management

Klamath National Forest

State

PacifiCorp

Other Private

N W E S

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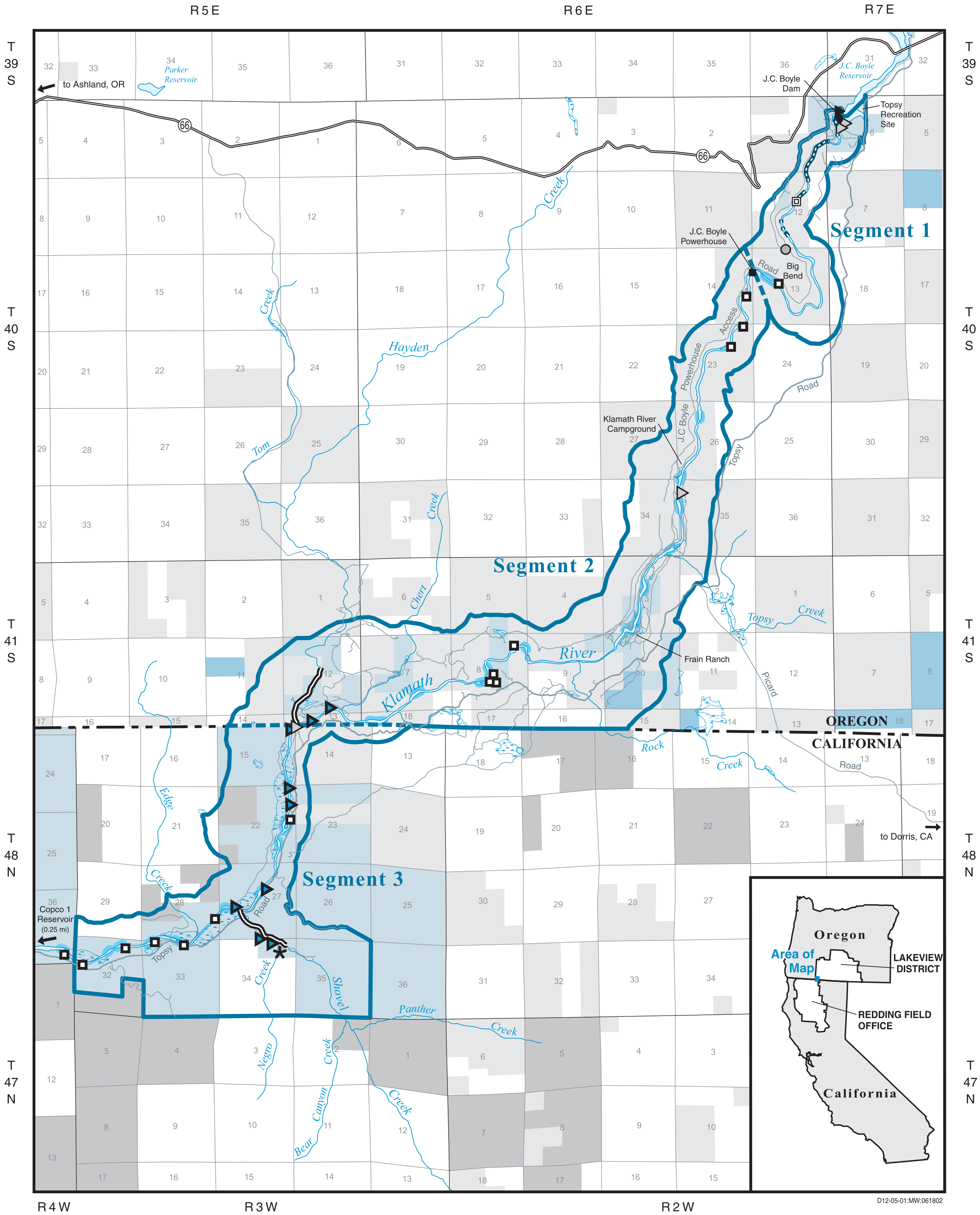
Map 25: Proposed Fisheries Actions - Alternative 1

(**Map 26** on back)



LEGEND

- Install Bankfull Bench
- Extensive Tributary, Limited Main Large Woody Debris
- Enhance Channel Width
- Open Channel for Passage
- Improve Bypass Flow
- Improve Cutoff
- Redesign Bridge Site
- Redesign Diversion
- Redesign Ladder
- Remove Bridge Site
- Remove Diversion
- Restore Chute
- Move Outfall
- Project Area Boundary Alternative 2
- River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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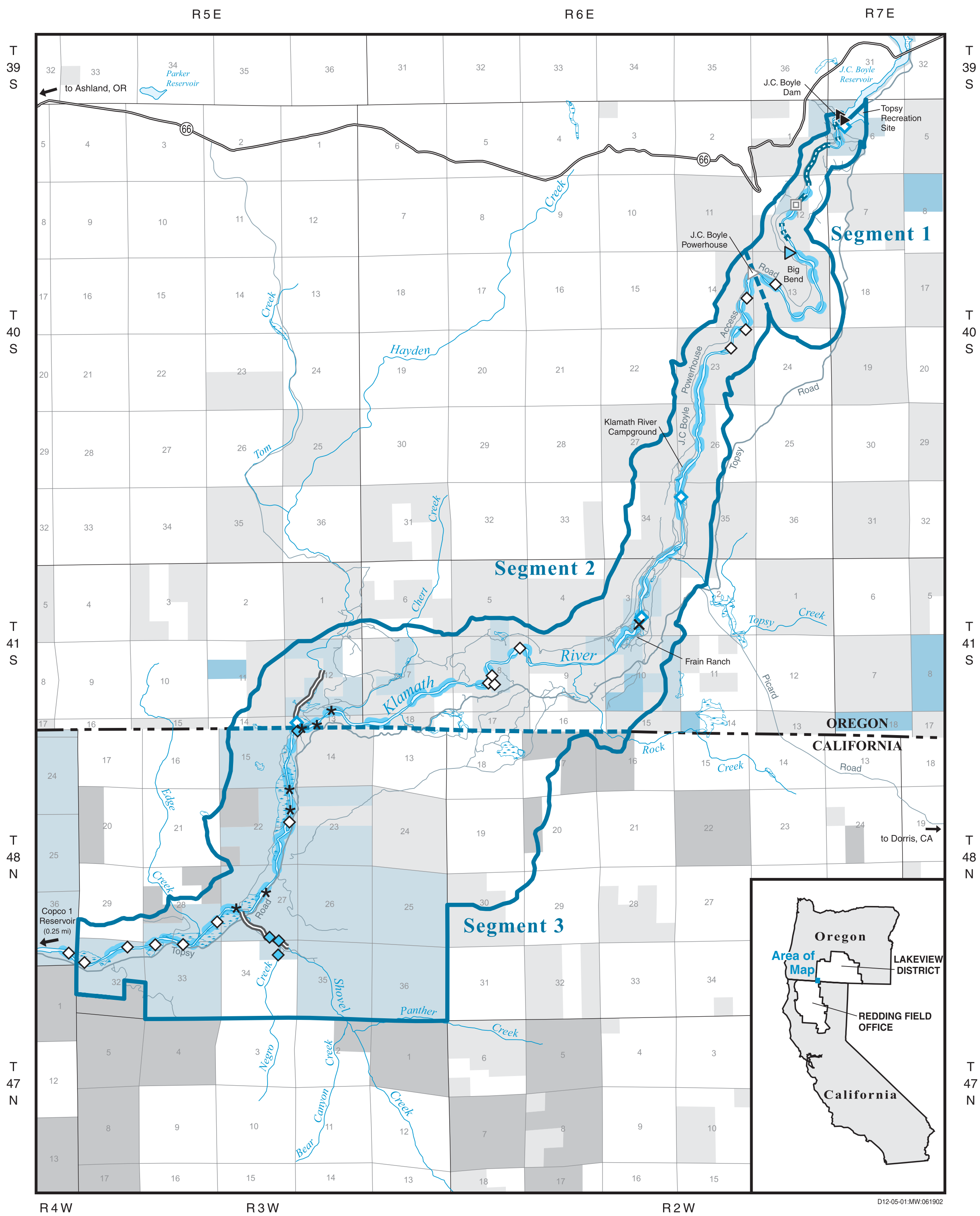
Map 26: Proposed Fisheries Actions - Alternative 2

(**Map 25** on back)



LEGEND

- Remove Sidecast in Floodplain
- Extensive Large Woody Debris, All Reaches
- Restore Channel Width
- Restore Channel for Passage
- Restore Meadow and Channel
- Restore Bypass Flows
- Restore Flow
- Restore Chute
- Remove Cutoff
- Remove Diversion
- Remove Bridge Site
- Remove or Redesign Diversion

- Project Area Boundary Alternative 3
- River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

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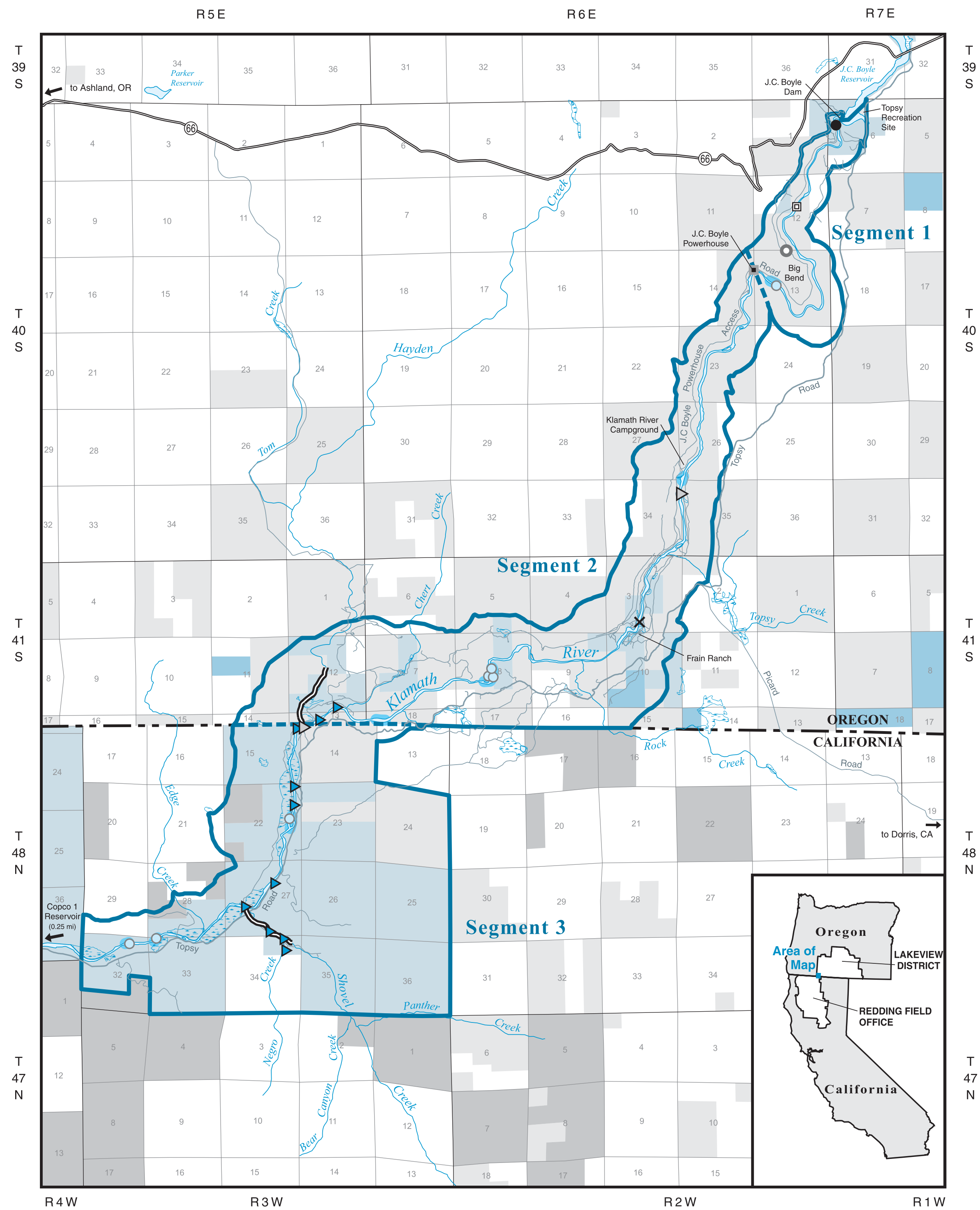
Map 27: Proposed Fisheries Actions - Alternative 3

(**Map 28** on back)



LEGEND

- Limited Tributary, Minimal Main Large Woody Debris
- Narrow Channel Width
- Open Channel for Passage
- Restore Meadow & Channel
- Improve Bypass Flows
- Redesign Bridge Site
- Redesign Diversion
- Stabilze Chute
- Enhance Cutoff
- Relocate Bypass Outfall Flow
- Project Area Boundary Alternative 4
- River Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

1 0 1 2 MILES

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Map 28: Proposed Fisheries Actions - Alternative 4

(**Map 27** on back)

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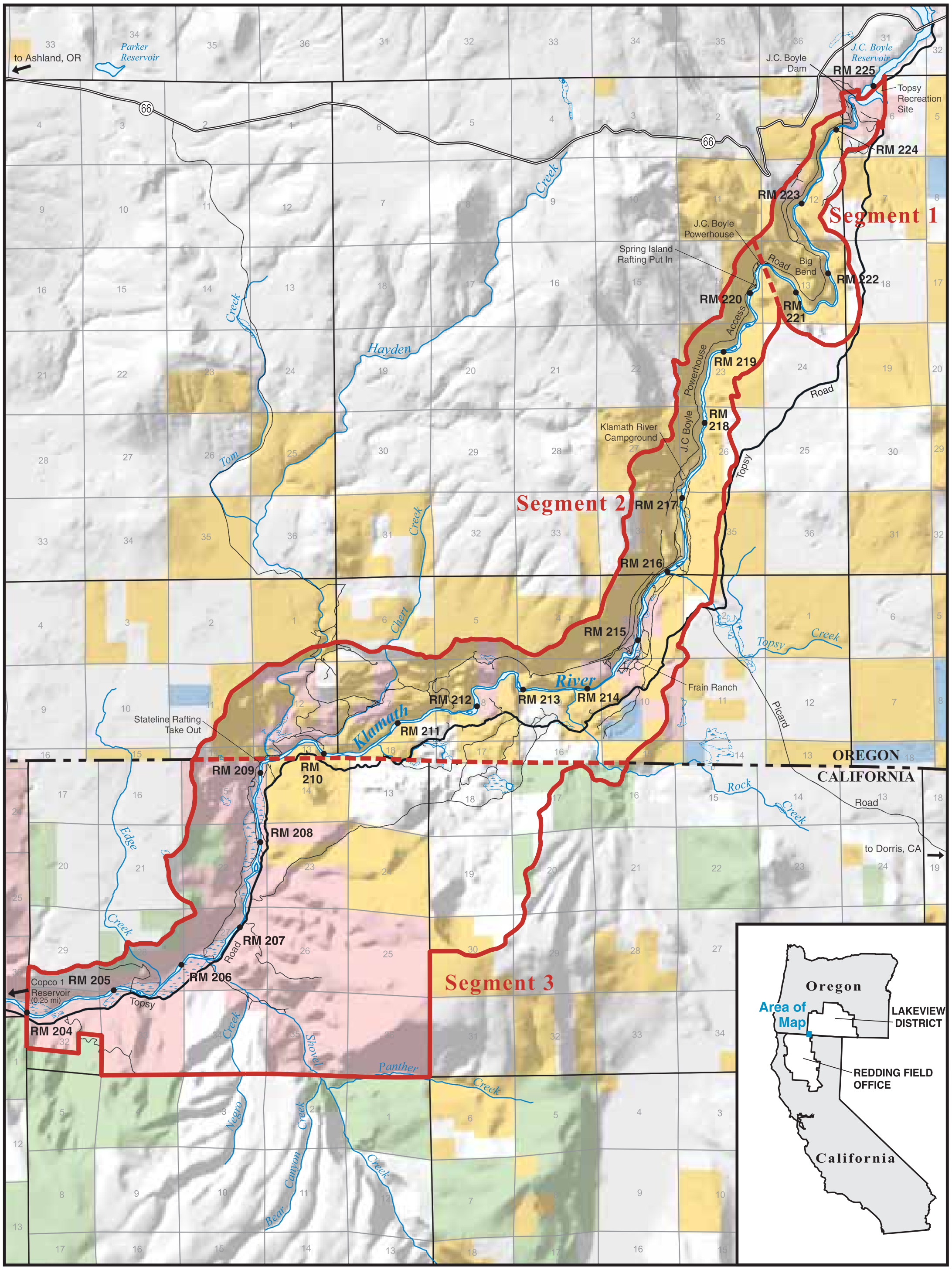

LEGEND

- Upper Klamath River Planning Area Boundary
- River Segment Boundary
- RM 205 • River Miles
- Open Water
- Wetlands
- 66 Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N W E S

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MILES

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KILOMETERS

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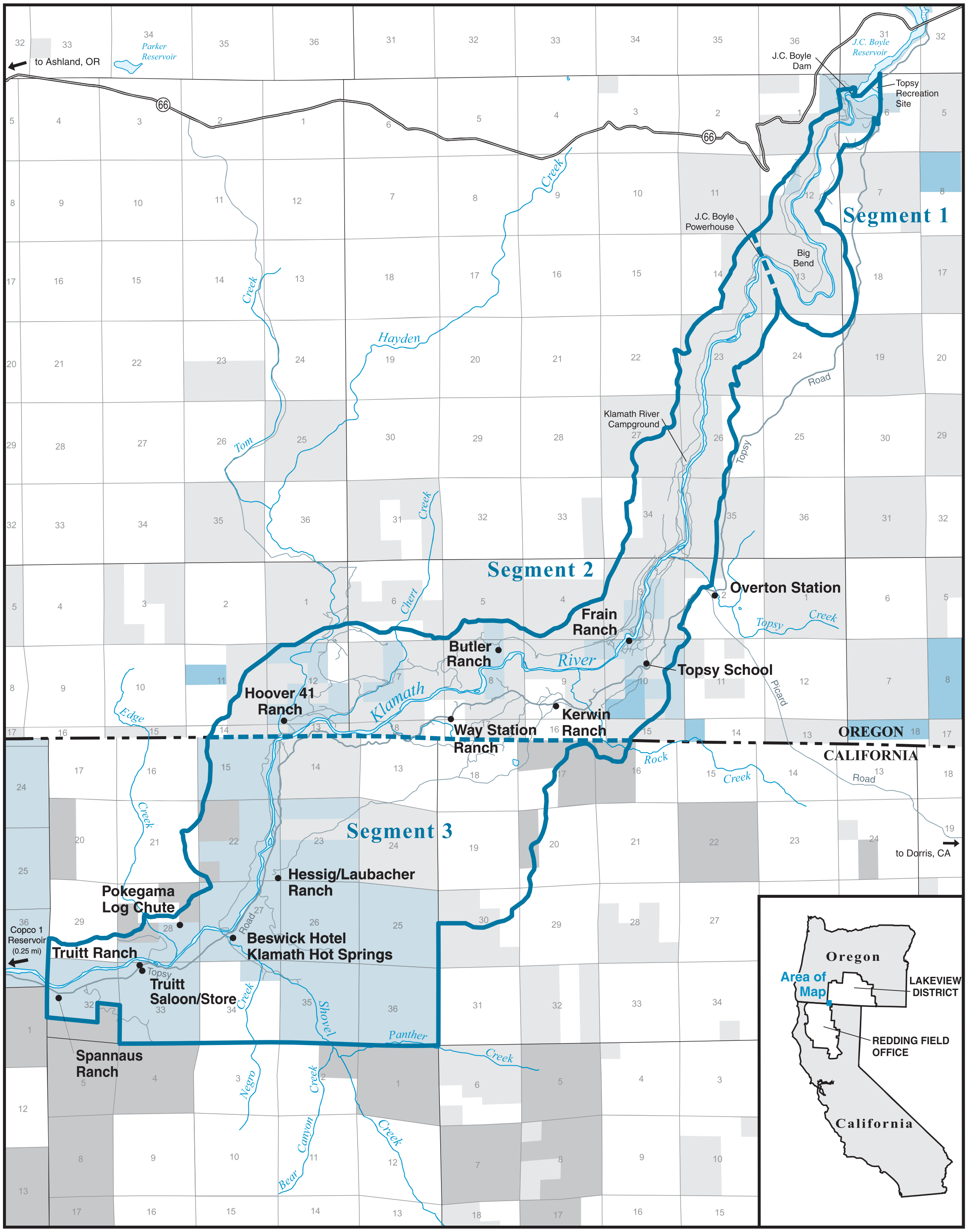
Map 3: Land Status

(**Map 2** on back)



LEGEND

- Historic Sites
- Upper Klamath River Planning Area Boundary
- River Segment Boundary
- 66 Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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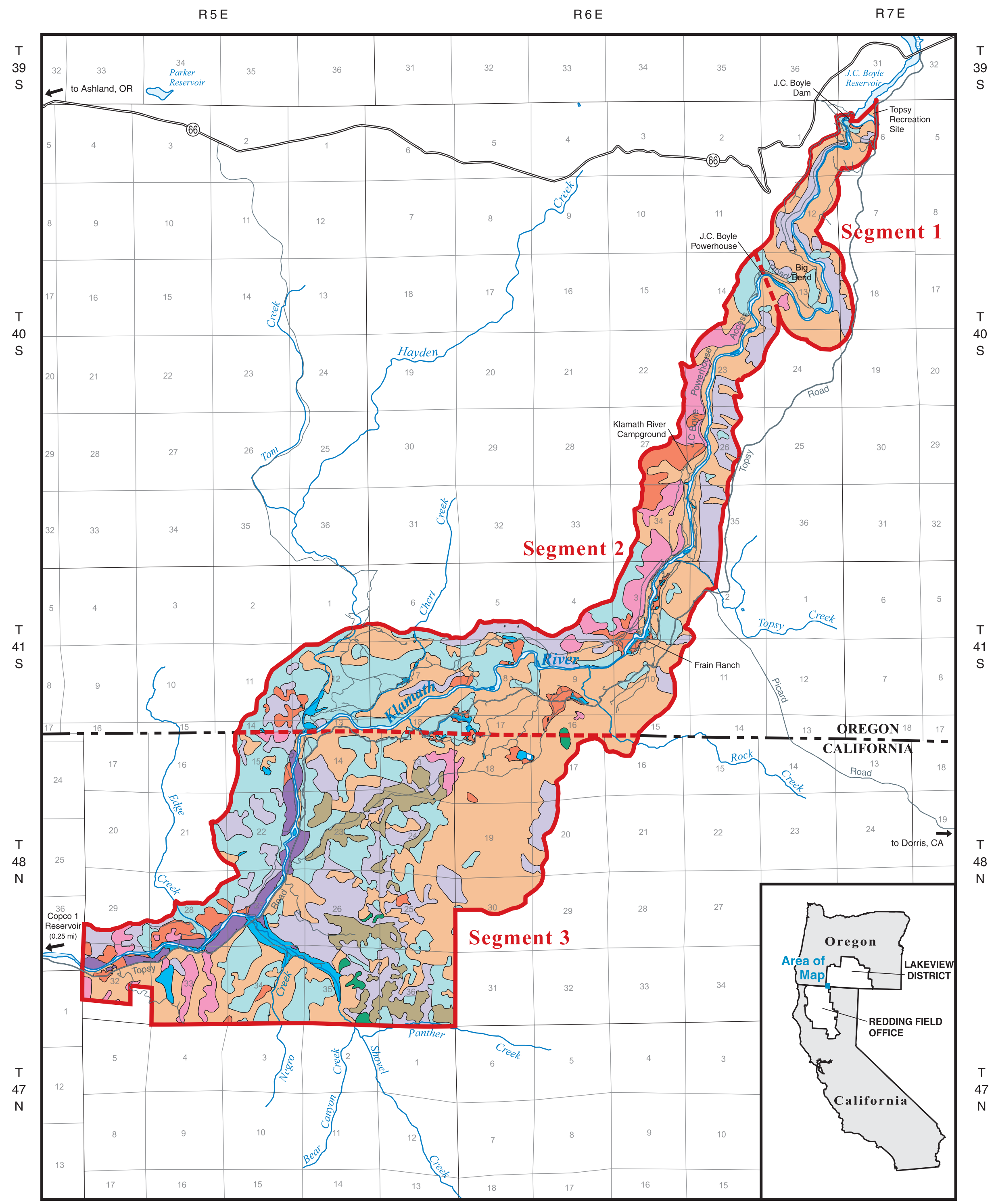
Map 4: Historic Sites

(**Map 5** on back)



LEGEND

Vegetation Type

- Dry Meadow
- Juniper Woodland
- Rabbitbrush - Sagebrush
- Mixed Shrub
- Open Oak Woodland
- Dense Oak Woodland
- Conifer Forest and Woodland
- Irrigated Meadow
- Riparian

- Upper Klamath River Planning Area Boundary
- River Segment Boundary
- Highway
- Road

MILES 1 0 1 2

KILOMETERS 1 0 1 2

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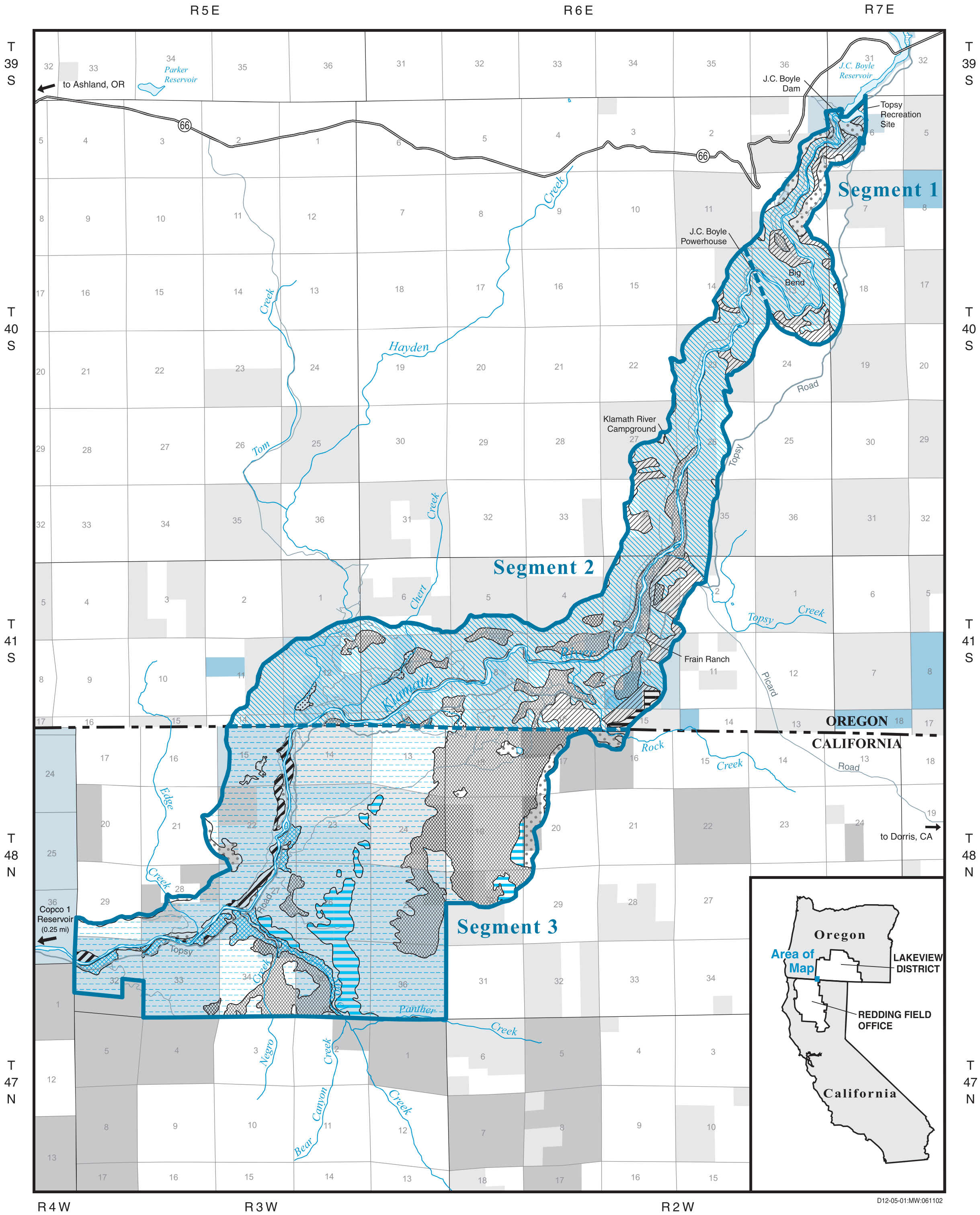
Map 5: Planning Area Vegetation Map

(**Map 4** on back)



LEGEND

Major Oregon Soil Series

- Bogus
- Terrabella Clay Loam
- Skookhum & McMullin
- Greystoke & Pinehurst
- Miscellaneous

Major California Soil Series

- Bogus
- Rock Outcrop
- Medford
- Lassen & Kuck & Lithic
- Jenny
- Miscellaneous

Timber Productivity Capability Classification System

- Fragile Soil

Upper Klamath River Planning Area Boundary

Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

N S E W

1 0 1 2
MILES
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KILOMETERS

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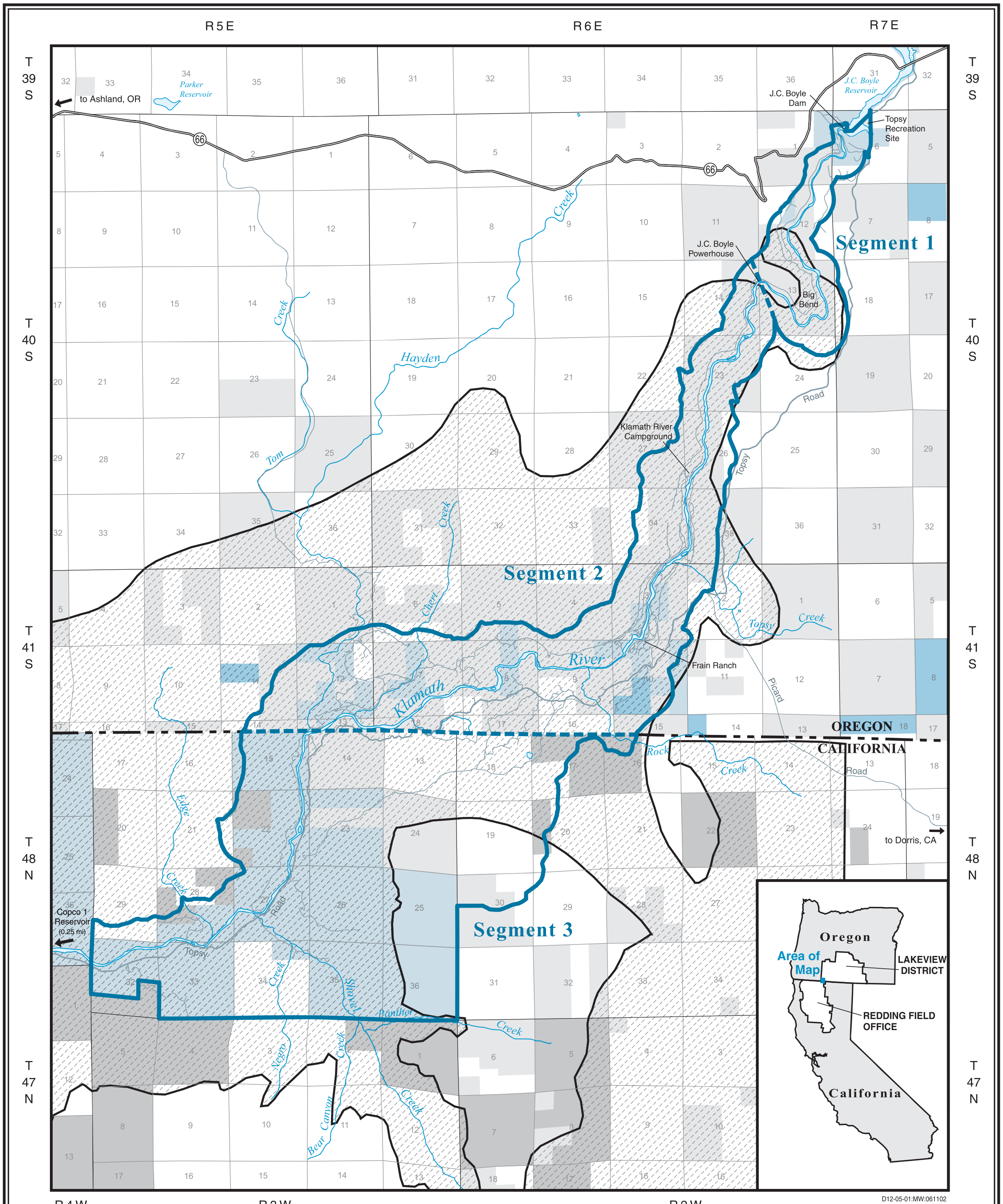
Map 6: Planning Area Soils Maps

(**Map 7** on back)



LEGEND

- Critical Big Game Winter Range
- Upper Klamath River Planning Area Boundary
- River Segment Boundary
- Open Water
- Wetlands
- Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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KILOMETERS 1 0 1 2

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area

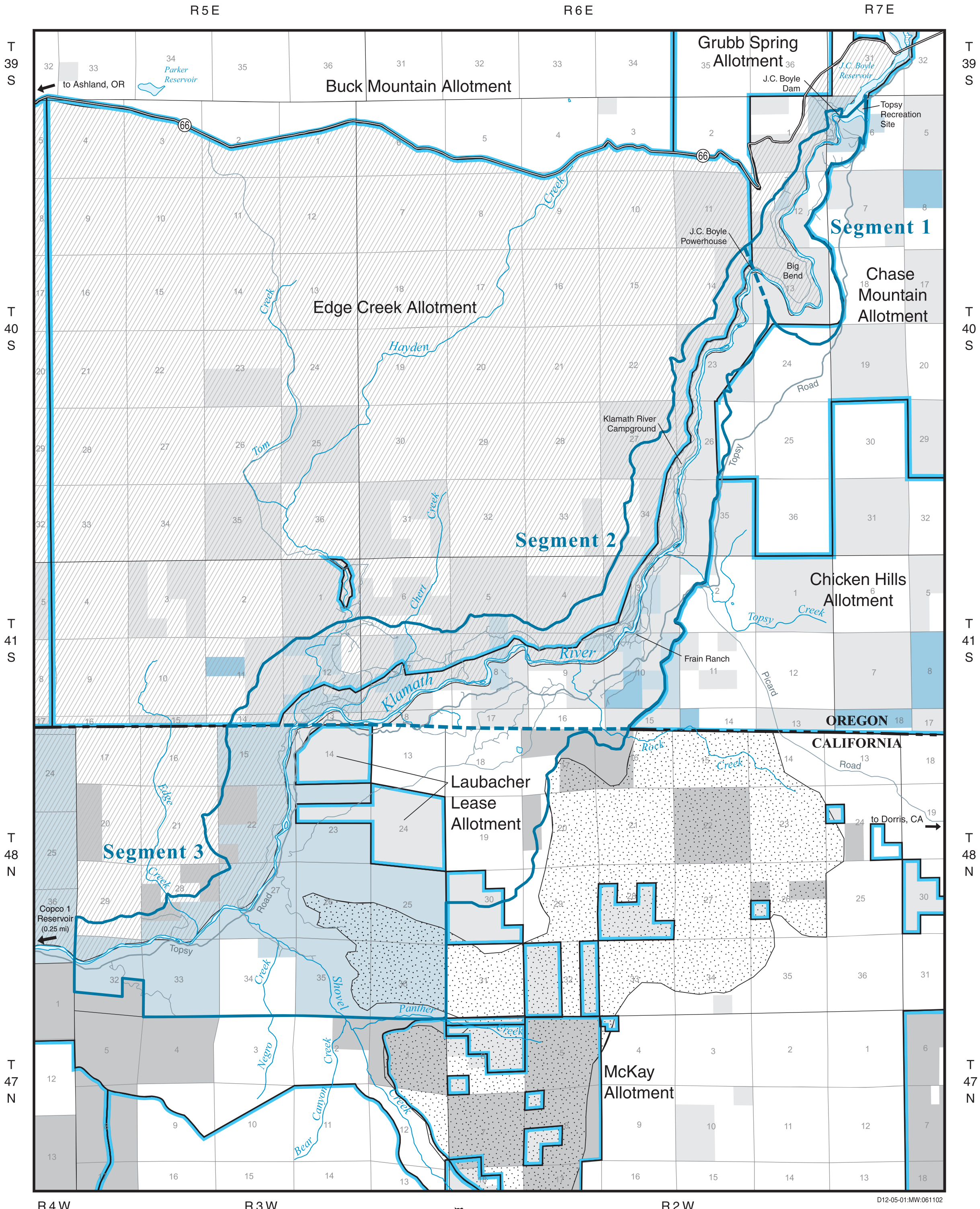
CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments

2003

Map 7: Critical Big Game Winter Range

(**Map 6** on back)



LEGEND

- McGavin Peak Wild Horse Herd Management Area
- Pokegama Wild Horse Herd Management Area
- Grazing Allotment
- Upper Klamath River Planning Area Boundary
- Segment Boundary

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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Bureau of Land Management

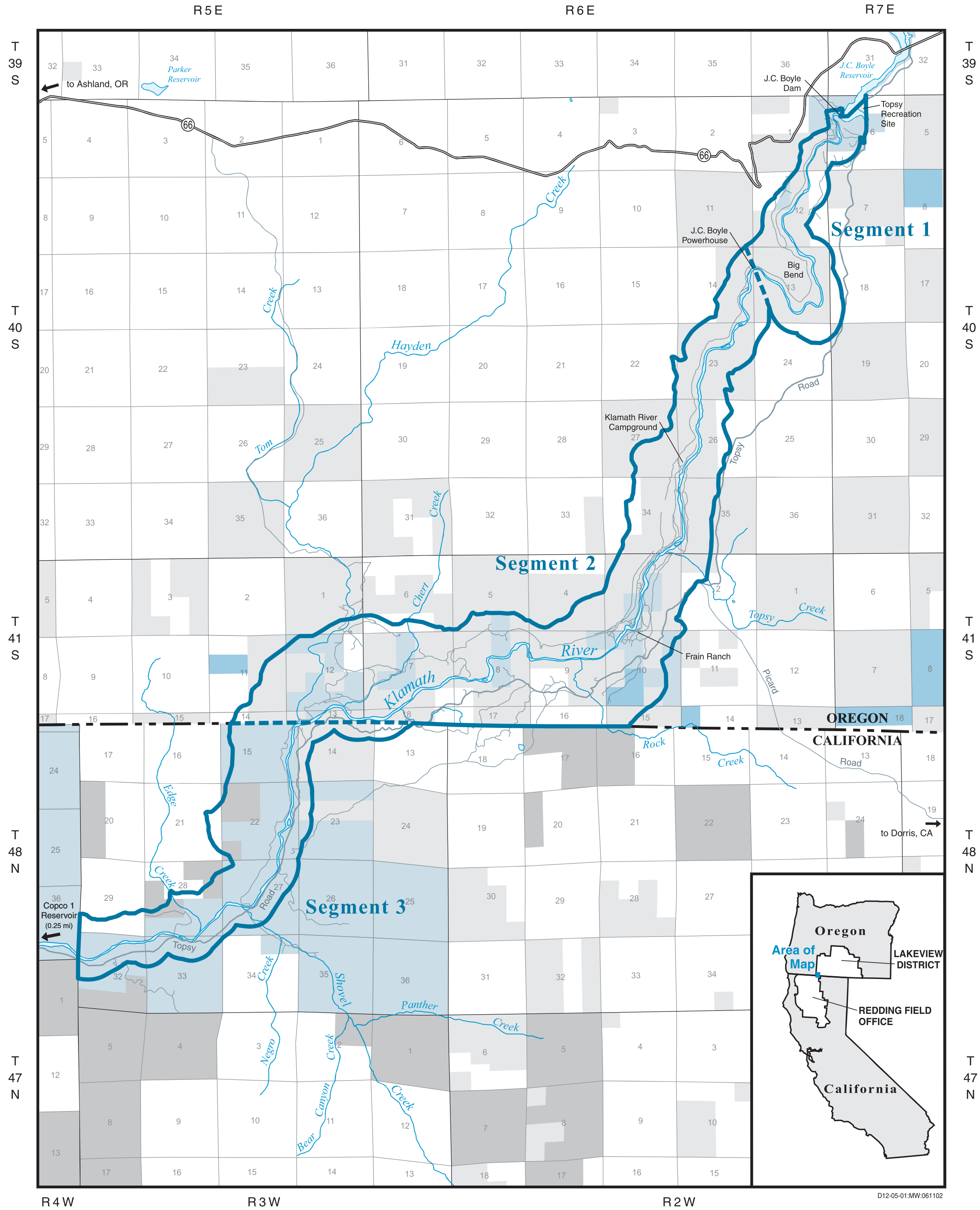
OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area
CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments

2003

Map 8: Grazing Allotments and Wild Horse Herd Management Areas

(**Map 9** on back)



LEGEND

- Project Area Boundary Alternative 1
- River Segment Boundary
- Open Water
- Wetlands
- Highway
- Primary Access Road
- Road

Administered Lands

- Bureau of Land Management
- Klamath National Forest
- State
- PacifiCorp
- Other Private

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KILOMETERS

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Bureau of Land Management

OREGON
LAKEVIEW DISTRICT
Klamath Falls Resource Area
CALIFORNIA
REDDING FIELD OFFICE

Draft Upper Klamath River Management Plan/EIS and Resource Management Plan Amendments

2003

Map 9: Project Area Boundary Alternative 1

(**Map 8** on back)

Draft Klamath River Management Plan
Environmental Impact Statement
Public Comment Form

The public comment period is May 16 to August 13, 2003.
Please have comments postmarked by August 13.

You are welcome to use this form or other means for submitting comments to the Bureau of Land Management.

- You may send written comments to:
  - Larry Frazier, Project Team Leader
  - Bureau of Land Management
  - 2795 Anderson Avenue, Building 25
  - Klamath Falls, OR 97603

- Electronic (e-mail) comments may be sent to:
  - krmp@or.blm.gov

Please note that comments, including names and street addresses of respondents, will be available for public review at the BLM office during regular business hours. 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 prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

____ ← (Check here if you want your name withheld)

Name	
Organization	
Address	

Below are some questions you may want to consider during your review and comment on the document.

Does the Draft EIS:
- address the issues you think are most important?
- present an adequate range of alternatives?
- clearly and accurately disclose the potential effects of actions, or is there important information that is missing?

For the alternatives:
- Does the Preferred Alternative identified in the DEIS provide for an appropriate mix of resource uses and protection?
- Are there elements (actions) of the other alternatives that should be included in the Preferred Alternative?
- Are there elements of the Preferred Alternative that you think should be eliminated or changed?
- Do you have a different preferred alternative from the ones presented in the DEIS?
- Is there a mix of actions that you think should be designed into a new alternative?

You may use the space below for answering questions on the previous page
or making any other comments related to the plan or the public process.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Klamath Falls Resource Area
2795 Anderson Avenue, Building 25
Klamath Falls, Oregon 97603-7891
Phone: (541) 883-6916 | Fax: (541) 884-2097
E-Mail Address: Username@or.blm.gov
Website: http://www.or.blm.gov/Lakeview/kfra/index.htm

IN REPLY REFER TO:
1610 (014)

May 30, 2003

The Draft Upper Klamath River Management Plan Environmental Impact Statement (EIS) and Resource Management Plan Amendments was mailed to you early this month. If you did not receive it, please contact Klamath Falls Resource Area Office (BLM) at 541-883-6916. The Draft Plan is also available on the following public access web site: www.or.blm.gov/Lakeview

The public comment period began on May 16, 2003 and will close on August 13, 2003.

Public meetings will be held to provide a general overview and then allow the public to get specific information on topics that most interest them. Meetings are scheduled as follows:

- June 9, Klamath Falls, OR - Klamath County Fairgrounds Office Building, Conference Room B, (5:30pm to 8:30pm),
- June 10, Copco, CA - Copco Community Center, (6:30pm to 8:30pm), and
- June 11, Yreka, CA - Best Western Miners Inn Conference Center (5:30pm to 8:30pm)

If you have comments, please send them postmarked by August 13, 2003 to: Larry Frazier, Project Team Leader, Bureau of Land Management, 2795 Anderson Avenue, Building 25, Klamath Falls, Oregon, 97603, or via email (krmp@or.blm.gov) by the same date. All substantive comments will be fully considered and evaluated in the preparation of the Final Upper Klamath River Management Plan EIS. Please see the attached list for examples of questions that can lead to substantive comments. This will assure the Bureau of Land Management will have the best available information to make decisions.

Please note that comments, including names and street addresses of respondents, will be available for public review at the above address during regular business hours. 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 prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

If you have questions contact Larry Frazier, Project Leader

Sincerely,

Jon Raby, Acting Manager
Klamath Falls Resource Area

Commenting on The Draft Upper Klamath River Management Plan
Environmental Impact Statement (EIS)

The BLM has prepared the Draft EIS to disclose the potential effects of proposed actions for the upper Klamath River planning area. Our goal is to assure that the best available information is ultimately available to the deciding official with completion of a Final EIS. The BLM is soliciting information from the public to improve the Draft document and analysis. We solicit substantive comments that will improve the quality of the document. According to Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (Section 1503.3), "comments on an environmental impact statement or on a proposed action shall be as specific as possible and may address either the adequacy of the statement or the merits of the alternatives discussed or both".

Below are some questions you may want to consider during your review and comment on the document.

Does the Draft EIS:

- address the issues you think are most important?
- present an adequate range of alternatives?
- clearly and accurately disclose the potential effects of actions, or is there important information that is missing?

For the alternatives:

- Does the Preferred Alternative identified in the DEIS provide for an appropriate mix of resource uses and protection?
- Are there elements (actions) of the other alternatives that should be included in the Preferred Alternative?
- Are there elements of the Preferred Alternative that you think should be eliminated or changed?
- Do you have a different preferred alternative from the ones presented in the DEIS?
- Is there a mix of actions that you think should be designed into a new alternative?

Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Ave., Bld. 25
Klamath Falls, Oregon 97603

Upper Klamath River Management Plan
Draft Environmental Impact Statement
Briefing Notes

Notice of Availability published in the Federal Register on May 16, 2003.
(90 day Comment Period – May 16 thru August 13)

Purposes

Existing plans are not sufficient

- **Old "Recreation" Plan (1983)**
- **Resource Management Plans (Redding 1993, Klamath Falls 1995) don't address designations**

Existing designations that will be included in the Upper Klamath River Plan

- **Oregon Scenic Waterway (1988) from J.C. Boyle Powerhouse to Oregon/California state line.**
- **Wild and Scenic River (designated in 1994) under the *Wild and Scenic Rivers Act* from J.C. Boyle Powerhouse to Oregon/California state line (a management plan is required per Act).**
- **Area of Critical Environmental Concern (ACEC) full width of river canyon from J.C. Boyle Powerhouse to Oregon/California state line per the Klamath Resource Area RMP (1995). BLM regulations require an ACEC Plan be developed.**

Linkage to FERC Relicensing Process of PacifiCorp facilities

- **The final River Plan will be sent to Federal Energy Regulatory Commission to serve as the baseline for BLM management within the upper Klamath River Canyon. PacifiCorp has also asked BLM to consider their lands within the planning area.**

Alternatives

Alternative 1 - Existing Management

- **"No action" alternative**
- **No change in Resource Management Plans**
- **Management to follow direction in existing plans**
- **Maintain wild and scenic river outstandingly remarkable values and ACEC values.**

Alternative 2 - Improvement of Resources / Opportunities

- **Maintain and enhance river values per *Wild and Scenic Rivers Act***
- **Resolve resource management conflicts that exist**
- **Do not create additional resource conflicts**

Alternative 3 - Natural Resource Enhancement / Restoration

- **Maintain all outstandingly remarkable values**
- **Enhancement of the values related to natural resources**
- **Emphasis on restoration**

Alternative 4 - Expand Human Use Opportunities

- **Maintain and enhance all outstandingly remarkable values**
- **Enhance human use of the river corridor (greatest recreation emphasis)**
- **Emphasize resource interpretation (wildlife & cultural resources)**
- **Do not create significant conflicts with other values**

Key Actions Considered in each of the Alternatives

- **Vegetation treatments to protect scenic quality**
- **Recreation site and campground development, improvement or closure**
- **Road improvements, decommissioning and closures of redundant roads**
- **Cultural site protection**
- **Reduction of risk of catastrophic wildfires through vegetation treatments/fuel reduction**
- **Wildlife and Fish habitat improvement**
- **Erosion reduction and water quality improvement**
- **Livestock and Wild Horse management**

General Consequences of the Preferred Alternative

- **Greatest scenic quality maintenance**
- **Recreation camping and fishing use at or near current levels**
- **Lowest number of roads open for motorized vehicle use due to road closures to protect or improve other resources, with resulting reduction in off-highway vehicle use opportunities**
- **Whitewater boating opportunities reduced but actual use to remain at or near current levels**
- **Largest amount of vegetation treatments particularly to reduce fuel loading and maintain scenery**
- **Riparian-dependent species benefited the most**
- **Recommended River base flows increased in Segment 1 for fish habitat improvement**
- **J.C. Boyle Powerhouse releases to favor aquatic resources rather than whitewater rafting**
- **Grazing eliminated over time (adaptive use of grazing to manage noxious weeds on irrigated fields)**
- **Largest amount of PacifiCorp land considered for exchange, acquisition or cooperative management**

Rational for Preferred Alternative

- **Importance of Fisheries in Klamath River System**
- **Need for restoration of Klamath Basin fish habitat and water resources**
- **Need for vegetation treatments to reduce fuel loads, protect scenic quality and improve wildlife habitat**
- **Maintains or enhances wild and scenic river outstandingly remarkable values**
- **(Note: Preferred Alternative can change or be modified based on public input)**

Potential Decisions Related to this Analysis

- **Decisions on Land Use actions including:**
  - **Decision on Extension of ACEC in Oregon**
  - **Changes in Land Tenure Direction in California from disposal to retain and acquire (for alternatives 2 through 4)**
- **Determination of Implementation level actions (vegetative treatments, road treatments, recreation site development, etc.)**

Decisions BLM Cannot Make Based on This Analysis

- **Actions directly affecting PacifiCorp facilities or their operation**
- **Actions applicable to PacifiCorp land recommended in this plan; any decisions would be made independently by PacifiCorp**
- **Actions affecting Operation of the Klamath Reclamation Project including flows into and out of the planning area**

Proposed Schedule

- **90 Day Public Comment Period May 16 – August 13, 2003**
- **Prepare FEIS – Fall/Winter 2003**
- **FEIS Released – Winter 2004**
- **Record of Decision – Spring/Summer 2004**

Send Written Comments To:
Larry Frazier, Project Team Leader, Bureau of Land Management, 2795 Anderson Avenue, Building 25, Klamath Falls, Oregon 97603 or via email (krmp@or.blm.gov).

For more information contact Larry Frazier or Don Hoffheins at 541-883-6916.

RIVER PLAN UPDATE

UPPER KLAMATH RIVER MANAGEMENT PLAN EIS

May 2002

PURPOSE FOR THIS UPDATE:

- Inform you of the Bureau of Land Management (BLM) process/progress on this river plan since initial scoping.
- Reference interim products available on the web site.
- Inform you of the upcoming release of the Draft Environmental Impact Statement.
- Update our project mailing list.

BACKGROUND:

The Klamath Falls Resource Area has initiated the planning process for the Upper Klamath River Management Plan (River Plan). This Plan will direct management on federal lands along the 15-mile stretch of the Klamath River in Oregon and 5 miles in the Redding Resource Area in California (see attached map). Because of the distance from Redding and proximity to Klamath Falls, the Klamath Falls Resource Area manages the recreation use on BLM lands in California. The River Management Plan and Environmental Impact Statement (EIS) is being prepared by Klamath Falls Resource Area staff, with input from the Redding staff. A decision on the resulting river management plan will amend both Klamath Falls Resource Area and Redding Resource Management Plans.

The state of Oregon designated an 11-mile segment of the Klamath River as a State Scenic Waterway in 1988. Oregon State Parks and Recreation Department is a partner in the planning effort due to that designation. Chapter 3 of the Plan will include standards and guidelines for State Scenic Waterway management.

The same 11-mile section of the Klamath River within Oregon was designated as a Wild and Scenic River with the classification of "Scenic", under Section 2 (a) (ii) of the Wild and Scenic Rivers Act (W&SR Act). This designation was made by the Secretary of Interior, at the request of Oregon's Governor in 1994. The W&SR Act requires that a management plan be developed to protect and enhance the Outstandingly Remarkable Values

(Background Continued)
for which the river was designated. These values are scenic, recreation, wildlife, fish, Prehistoric, historic and Native American Traditional Use. This plan addresses public issues related to management of these values. The 1995 Klamath Falls Resource Area Resource Management Plan also designated an Area of Critical Environmental Concern surrounding this river section. This river plan would have objectives to maintain, protect and restore relevant and important values.

In California, the 5-mile segment of the Klamath River within the planning area was determined to be eligible for inclusion as a scenic river under the Wild and Scenic River Act, based on a 1990 Final Eligibility and Suitability Report. There has been no designation for this section, however, per the terms of the W&SR Act, the area is under protected management that would not preclude future designation. This particular stretch is the only eligible segment of the 280-mile long Klamath River for which a decision has not yet been made.

The planning area also includes the section of river between John C. Boyle dam and John C. Boyle powerhouse, which are hydroelectric generation facilities owned and operated by PacifiCorp. This plan will include management direction for this four-mile section of river. The PacifiCorp facilities were licensed for a 50-year term in 1956. The relicensing process for these facilities (and others downriver) has begun with the process being managed by the Federal Energy Regulatory Commission. Under the Federal Power Act, BLM has mandatory conditioning authority for any new license issued for these two facilities. Therefore, when the Klamath River Management Plan is completed, it will form the basis for BLM's conditions, (protection, mitigation and enhancement measures) for the new license.

PROJECT SCOPING AND PUBLIC INVOLVEMENT:

Early in the analysis process, based on the "National Environmental Policy Act" (NEPA), the analysis team identifies (1) the issues to be addressed, (2) significant issues to be used in the formulation of alternatives, (3) alternative actions and (4) the depth and scope of the analysis. Following publication of a Notice of Intent to prepare an EIS, two public meetings were held; in Yreka, California, and Klamath Falls, Oregon. These meetings were designed to help the BLM obtain public comments on issues to be addressed to help determine the scope of the environmental analysis to be completed.

Identification of Issues - With the close of the initial scoping comment period on January 31, 2001, 36 written responses (including comments documented at two scoping meetings) had been received. Individual comments within these letters were consolidated into 57 different issue statements addressing 15 topic areas. Additional comments and issues have been obtained throughout the scoping process. Significant issues include:

- W&SR and ACEC Values
- Scenic Quality
- Recreation Activities and Facilities
- Roads And Access
- Cultural Resources - Prehistoric Sites, Traditional Uses, Historic Sites
- Vegetation And Biological Diversity
- Watershed Values
- Wildlife And Fisheries
- Fire And Fuels
- Air Quality
- Land Tenure/Ownership (esp. PacifiCorp)
- Socio-Economics
- PacifiCorp's Power Generating Facilities
- Grazing

ALTERNATIVES BEING CONSIDERED:

Various management actions to address scoping issues were identified and grouped based on the theme of each particular alternative. Implementation of any alternative would help achieve project goals, but to varying levels and over varying timelines.

Alternative 1 - Existing Management

This alternative is considered the "no action" alternative because it would not change any direction that is currently in the Klamath Falls or the Redding resource management plans. Management would continue to follow direction in the existing plans. Values "shall be preserved in free-flowing condition, and … they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations" (section 1[b], "The Wild and Scenic River Act". The goal of the alternative would be to maintain the existing wild and scenic river (scenic classification) outstandingly remarkable values and ACEC values.

Alternative 2 - Improvement of Resources and Opportunities

This alternative was developed in response to direction in the "Wild and Scenic Rivers Act" to maintain and enhance scenic river outstandingly remarkable values. "Each component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included, without … limiting other uses . . . ". The goal of this alternative therefore, would be to not just maintain, but enhance where possible, the outstandingly remarkable values, while resolving resource conflicts that could occur.

Alternative 3 - Natural Resource Enhancement and Restoration

Some public scoping comments suggested that the BLM should manage the Klamath River Canyon in a more natural condition. The goal of this alternative is to maintain and enhance all outstandingly remarkable values, but to place emphasis on enhancement and restoration of values related to natural resources. Proposed actions should achieve this goal but should not create resource management conflicts with other outstandingly remarkable values.

Alternative 4 - Expand Human Use Opportunities

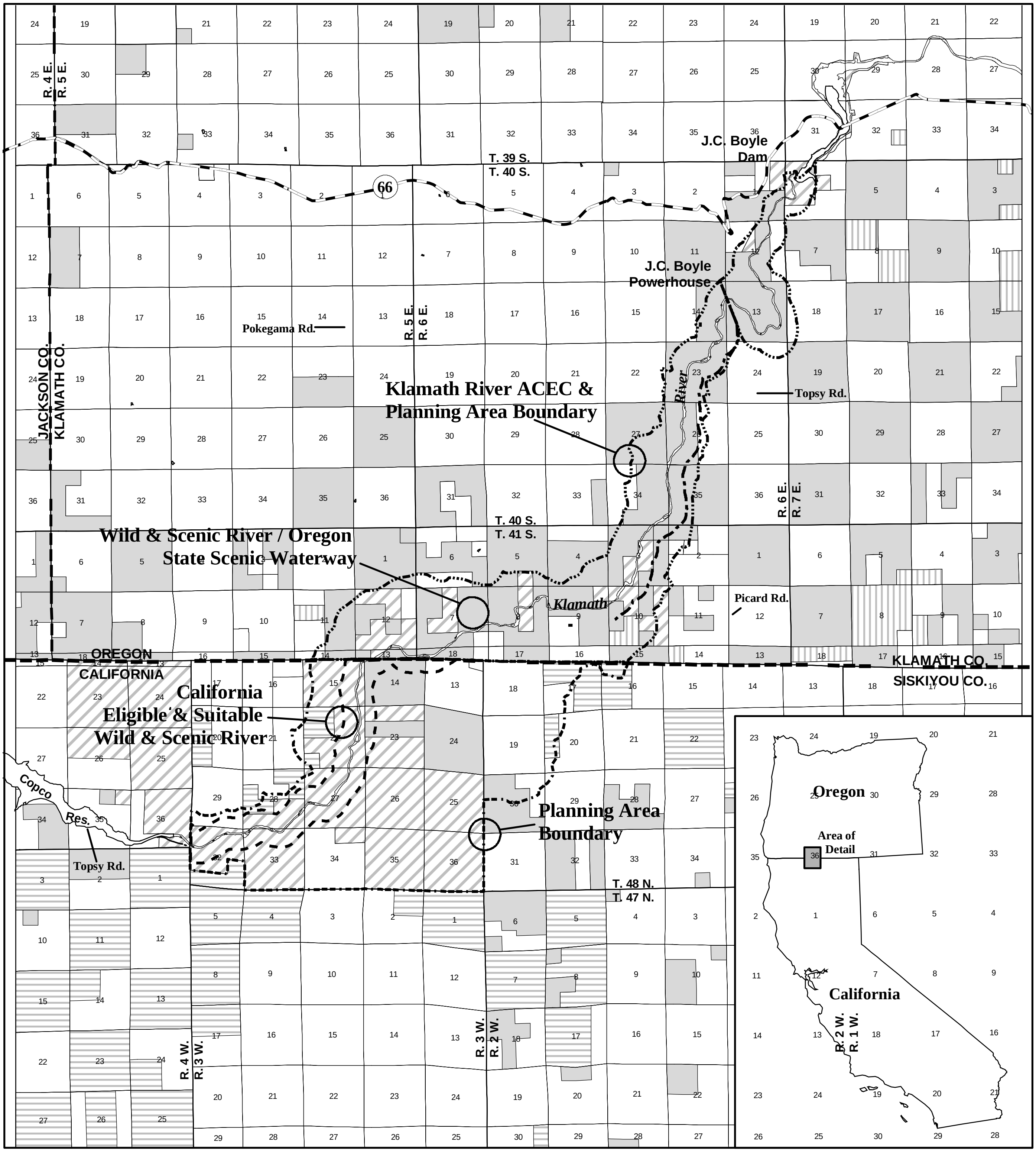
Numerous public scoping comments identified a need for an alternative with greater recreation emphasis. The goal of this alternative is to maintain and enhance all outstandingly remarkable values, but to place emphasis implementing management actions that contribute to human use of the river corridor. This alternative should emphasize utilizing resources for recreation, including interpreting wildlife and cultural resources, but should not create significant conflicts with managing other values.

CURRENT STATUS:

The draft Environmental Impact Statement is being prepared to analyze alternative management actions for the river corridor. It is expected that the Draft Environmental Impact Statement (DEIS) will be released in summer 2002. Public meetings will be held during the review period. In anticipation of the release of the DEIS, we are also updating our mailing list. Please refer to another section of this *Update* for information on receiving the DEIS and helping to update our mailing list.

For more information you may contact:
Don Hoffheins, Planner, Klamath Falls Resource Area at 541-885-4105 or dhoffhei@or.blm.gov
Larry Frazier, Project Leader, Klamath Falls Resource Area at 541-885-4134 or lfrazier@or.blm.gov
Teri Raml, Field Manager, Klamath Falls Resource Area at 541-885-4101 or traml@or.blm.gov
Or find additional documents on our web site: http://www.or.blm.gov/Lakeview/kfra/index.htm

Upper Klamath Wild & Scenic River Mgt. Plan EIS



Wild & Scenic River / Oregon State Scenic Waterway

California Eligible and & Suitable Wild & Scenic River

Klamath River ACEC & Planning Area Boundary

Planning Area Boundary

BLM

USFS

STATE

PPCo

PVT

1:150,000

Miles

0 0.5 1 2

Universal Transverse Mercator
Zone 10 North
North American Datum 1927

No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Michael C. Limb - GIS Coordinator
Prepared 5/2/02
//or9001/gis/klamwsr/base/maps/Planning_area_85x11.mxd

WE NEED YOUR RESPONSE

The Draft Environmental Impact Statement for the Upper Klamath River Management Plan will be available for your review in summer 2002. The document will be approximately 500 pages in length. A summary will be about 50 pages. Each will be available for your review in printed or electronic form. We can mail you either the printed copy or a CD-ROM for you to use on a computer. The document will also be on our web site:
http://www.or.blm.gov/Lakeview/kfra/index.htm

As we prepare to mail out the document, we need to update our mailing list. Therefore, we need you to return this sheet with the appropriate block marked. After filling in the correct block, just fold the page in half so that the "To" address for the BLM is showing (reverse fold from how it was delivered to you), tape the two sides together, place enough postage for letter delivery, and return to us*.

***Note: Please let us know of your preference by June 1, 2002, or your name will be removed from our mailing list.**

- ☐ **Please remove me from the mailing list.**
- ☐ **Keep me on the mailing list but do not send an EIS (I can view it on web site)**
- ☐ **Keep me on the mailing list and send me only a summary of the EIS**
- ☐ **Keep me on the mailing list and send a full printed version of the EIS**
- ☐ **Keep me on the mailing list and send a CD-ROM version of the EIS**

From: ________________________

____

____

To: **Bureau of Land Management**
Klamath Falls Resource Area
2795 Anderson Ave., Bld. 25
Klamath Falls, Oregon 97603

Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Ave., Bld. 25
Klamath Falls, Oregon 97603

COORDINATION EFFORTS FOR THE UPPER KLAMATH RIVER MANAGEMENT PLAN

The Upper Klamath River Management Plan process has included a significant amount of coordination in addition to general public scoping. The process involves integration of two key committees. The Upper Basin subcommittee of the Klamath Provincial Advisory Committee has been advising the BLM during the planning process, especially on issues relevant to the "Northwest Forest Plan". The subcommittee, which includes a Klamath County Commissioner and a Siskiyou County Supervisor, has met numerous times to provide input to the BLM.

An "Interagency Advisory Committee" of Federal, and State agencies includes the US Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife, Oregon Parks and Recreation Department, Oregon Department of Environmental Quality, California Department of Fish and Game, and California Resources Agency. Three meetings have been held to seek comments and feedback from agency representatives.

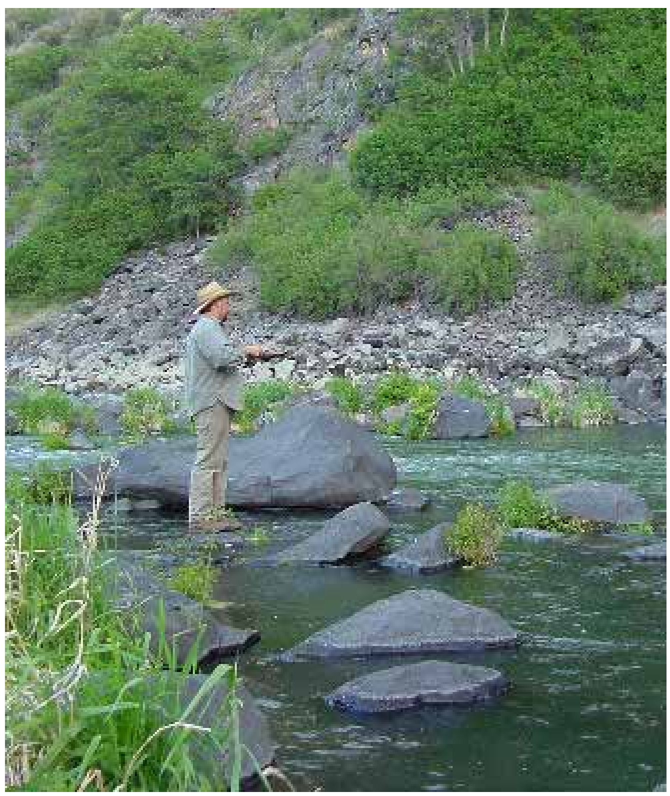
Consultation meetings have been held with the Klamath, Hupa, Yurok, and Karuk Tribes, and Shasta Nation members to inform them about the river plan. There have also been field trips with Klamath and Shasta Tribal members to review sensitive cultural sites within the planning area.

In addition to the official public scoping meetings, many presentations have been made to interested groups and organizations. These include:

- Klamath Audubon Society
- Upper Klamath Working Group
- Klamath Watershed Council
- Klamath Basin Sunrise Rotary
- Klamath-Lake-Modoc-Siskiyou Counties Recreation Working Group
- California Legislative Staff (Feinstein/Herger)
- Oregon Legislative Staff (Walden/Wyden/Smith)
- Copco, CA Community Meeting
- Siskiyou County Supervisors
- Klamath County Commissioners
- Boise Cascade, US Timberlands, Fruit Growers

Scoping Document for the Klamath River Management Plan and Environmental Impact Statement

Revised November 2001



KLAMATH RIVER MANAGEMENT PLAN
PUBLIC SCOPING DOCUMENT

TABLE OF CONTENTS

DESCRIPTION OF THE AREA

The proposed Klamath River Management planning area is from the John C. Boyle Dam (in Oregon) to the slack water of Copco Reservoir in California. The Oregon portion of the plan is about 13 miles long and encompasses about 5,950 acres of public lands. The California River segment is about 5 miles in length and encompasses about 200 acres of public lands.

The proposed project is within Klamath County, Oregon, and Siskiyou County, California. The project is about 25 miles southwest of Klamath Falls, Oregon. For the purposes of this planning effort this river has been divided into three segments.

			Miles
1	from JC Boyle Dam to powerhouse	none	2
2	from powerhouse to OR/CA line	ACEC (rim to rim) OR State Scenic Waterway (1/4m)* Wild & Scenic River (1/4 m)*	11
3	from OR/CA to slack water of Copco	Found to be eligible and suitable for inclusion into the WSR system. No designation but under interim WSR Mgt.	5

* 1/4 mile each side of the river's normal high water mark

Segment 1

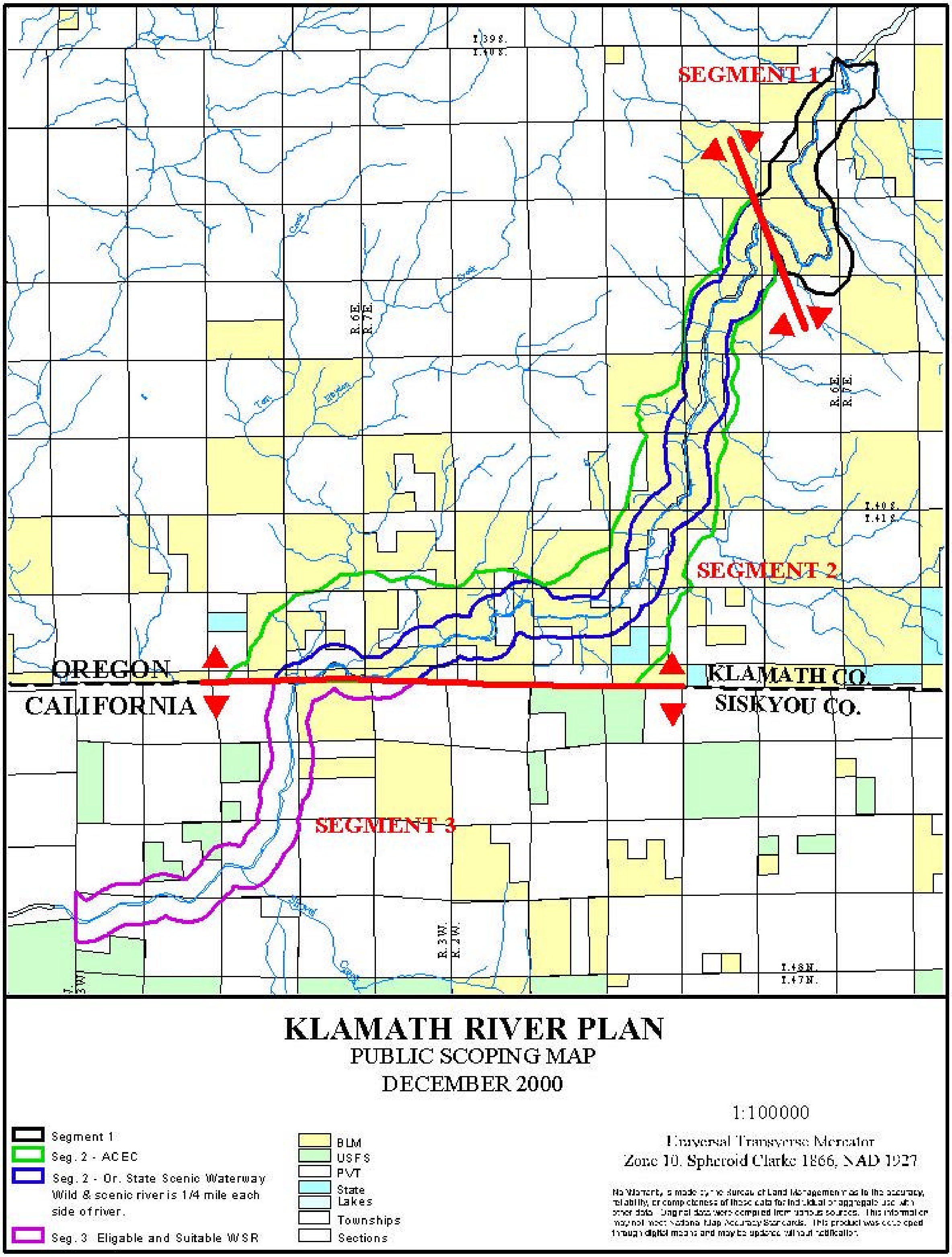
This segment was found not to be eligible or suitable for inclusion into the wild and scenic river system. However, This segment does possess recreation, wildlife, fishery, and visuals quality aspects that need to be considered in the overall planning of the river system.

Segment 2

This segment of the river has similar values associated with the three designations (mentioned in table above). These important values are: Recreation, wildlife, fish, prehistoric, historic, scenic, and Native American tradition use. These values need to be protected or enhanced when considering land management practices or resource activities. The resource values are significant beyond the 1/4 mile boundaries. Therefore this plan will analyze these values from rim-to-rim within the river canyon.

Segment 3

A 1990 river study found this segment to be eligible and suitable for inclusion into the National Wild and Scenic River System. Congress has the authority to make determination on whether this river segment should be included into the national wild and scenic river system. No


SEGMENT 1
SEGMENT 2
SEGMENT 3
OREGON
CALIFORNIA
KLAMATH CO.
SISKYOU CO.
KLAMATH RIVER PLAN
PUBLIC SCOPING MAP
DECEMBER 2000
1:100000
Universal Transverse Mercator
Zone 10, Spheroid Clarke 1866, NAD 1927
Segment 1
Seg. 2 - ACEC
Seg. 2 - Or. State Scenic Waterway
Wild & scenic river is 1/4 mile each side of river.
Seg. 3 Eligable and Suitable WSR
BLM
USFS
PVT
State Lakes
Townships
Sections

designation has been made at the time of this scoping document. This river segment is under interim management until a decision on designation is made.

The public comments from the 1990 Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study stated that the river's values do not stop at the border but rather continue to Copco Reservoir. This study identified the following outstandingly remarkable values for this segment: recreation, wildlife, fish, historic, and scenic. These values are to be protected or enhanced when considering land management practices or resource activities.

PURPOSE AND NEED FOR PROPOSED PLAN

This planning effort is being undertaken because the current recreation plan is almost 20 years old (completed in 1983) and is outdated. There are now overlapping jurisdictions and designations to contend with. At the conclusion of this planning effort there will be one EIS and management plan that will coordinate all activities along the river.

PacifiCorp is beginning the FERC relicensing process for their Klamath River projects (Big Bend #2082 - which includes the John C. Boyle Dam/power plant) and the new plan will be included in their application process. This plan will identified resource needs or concerns that need to be considered during the relicensing process. The proposed river plan is anticipating completion by 2002 and the FERC relicensing completed in 2005.

BACKGROUND INFORMATION

The Klamath Falls Resource Area (KFRA) administers federally owned BLM lands within the Klamath River Canyon from John C. Boyle Dam to Copco Lake, California. Management of the California section is by Memorandum of Understanding (MOU) with the BLM Redding Field Office (dated 10/05/94). An additional MOU, affirming a policy of cooperation and coordination among the BLM, landowners and other public agencies is currently in place (dated 4/25/91). The agreement is with Pacific Power and Light, Oregon Department of Fish and Wildlife, California Department of Fish and Game, Weyerhaeuser Company (as assigned to U.S. Timberlands Services Co. LLC) and the BLM. It establishes a mechanism for coordinating land management programs and planning among cooperating parties. The KFRA, BLM manages several recreation sites, and issues and monitors special recreation permits for commercial whitewater rafting along this section of the river.

The above mentioned existing management plans, rules, laws, and guidelines will continue to provide management direction for the upper Klamath River until a new river management plan is developed to address specific resource concerns.

	Significant Actions Related to the Klamath River
1969	The Oregon Scenic Waterways Act (ORS 390.805 to 390.925), administered under the authority of the Oregon State Parks and Recreation Department (OPRD), is a state-wide law for river conservation that was established by a vote in 1969. The Oregon Scenic Waterways System was established through the Scenic Waterways Act.
1983	BLM developed guidance for management of recreation resources in the Recreation Area Management Plan for the Klamath River Special Recreation Management Area.
1988	In October 1988, the Oregon Omnibus Rivers Act directed the BLM to complete an Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study Report for possible inclusion into the National Wild and Scenic Rivers System. This report was completed in 1990. This report identified an 11 mile segment in Oregon and 5 mile segment in California as eligible and suitable for inclusion into the national wild and scenic river system.
1988	In November 1988, Ballot Measure 7 was passed in Oregon, adding, among other rivers, the upper Klamath River from the John C. Boyle Dam Powerhouse to the Oregon-California state line and 1/4 mile from the ordinary high water mark on each bank , to the Oregon Scenic Waterways System. OPRD has primary administrative responsibility for Oregon Scenic Waterways and explicit authority to regulate land use. OPRD has adopted general rules of land management applicable to all scenic waterways. Specific rules are adopted for individual scenic waterways. There are currently no specific rules set forth for the upper Klamath Scenic Waterway.
1994	In response to a request by Oregon Governor Barbara Roberts to designate the Klamath River under Section 2 (a) (ii) of the National Wild and Scenic Rivers Act, the National Park Service undertook a Klamath Wild and Scenic River Eligibility Report and Environmental Assessment. The recommendations from this report were forwarded to Interior Secretary Bruce Babbitt. In September, 1994, the Upper Klamath River (11 mile segment) from the John C Boyle Powerhouse to the Oregon-California state line was designated as a state-administered component of the National Wild and Scenic River system pursuant to Section 2 (a)(ii) of the National Wild and Scenic River Act.
1995	The federal lands along upper Klamath River are currently managed under the KFRA Resource Management Plan (RMP) and Environmental Impact Statement (1995). The RMP designated an 11 mile segment of the river (rim to rim along the river corridor) from John C Boyle powerhouse to the Oregon-California state line as an ACEC.

PLANNING PROCESS

An interdisciplinary team (IDT) has been established consisting of a team leader, wildlife, fisheries, botany, archaeology, recreation, hydrology, and planning specialists. An interagency Review Committee comprised of representatives from county, state, and federal agencies has been created to ensure that the project complies with regulatory processes in California and Oregon. The Upper Klamath Basin Subcommittee of the Klamath Provincial Advisory Committee was created to provide advice and assist the IDT by gathering information from private river users, local private landowners and other interested parties to be used throughout the river planning process. (See graphic of "River Plan Process").

The Oregon Parks and Recreation Department is a cooperative agency in the preparation of this document. Other cooperating agencies are the BLM/Redding Field Office in California. The

proposed project is for the BLM/Klamath Falls Resource Area to prepare an ACEC/River Management Plan and Environmental Impact Statement for the Klamath River project area. For this River Management Plan and EIS, the State of Oregon will prepare a chapter in the EIS document that will be the management plan for the State Scenic Waterway.

Definition of Area of Critical Environmental Concern (ACEC)

The BLM regulations define an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards".

Definition of Outstandling Remarkable Values (ORV)

Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: "Scenic, recreational, geological, fish and wildlife, historical, cultural, or similar values. Other similar values may include ecological, biological, paleontological, hydrological, scientific, or research.

PRELIMINARY GOALS/OBJECTIVE OF PLANNING PROCESS

Protect or enhance relevant and important values (wildlife, fisheries, historic and pre-historic cultural sites, scenic values, recreation, and native american traditional uses) while allowing compatible resource uses.

PROPOSED ISSUES

Scenic Resources:

One of the ORVs identified is for the river scenic qualities. The consideration of new recreational facilities, prescribe fire, utility development, and roads could impact visual resources.

Recreation Use:

A primary recreational use is white water rafting below the John C. Boyle Dam. The white water rafting opportunities are dependent on the timing and amount of river flow. This outstandingly remarkable value was identified because of the current flow regime, if that regime was to change significantly the recreational opportunities could be reduced.

Other recreational use (both on/off river use) along the Klamath River could increase the number of access points to the river which could damage riparian, upland habitat used by fish or wildlife, and significant cultural sites.

Recreational Carrying Capacity:

Due to the many white water rafting permit requests received and concerns regarding the carrying capacity on the Upper Klamath River, the BLM issued a moratorium in 1996, freezing the number of river permits issued. This was an effort to reduce potential impacts to the resources. There is also concern regarding the increased number of other recreation uses within the river corridor.

This river plan will evaluate the carrying capacity relative to the outstandingly remarkable values.

Roads:

There are numerous roads within the river canyon. BLM has closed a number of these roads via barriers, but many have been breached. OHV activity has led to some increased erosion and sedimentation into the river. Road location could also contribute to increased erosion which could be corrected. These are continuing problems that will need to be evaluated and addressed in the plan.

Facility Development:

Associated with the carrying capacity issue is the improvement and construction of recreational facilities along the river. Some of these new projects could affect the integrity of cultural resources. Proposed trails could lead to increased use within the river corridor. Recreational structures and vegetation are also experiencing increased vandalism.

Land Tenure Adjustments:

Based on informal discussions, PacifiCorp may be interested in exchanging land parcels within the river corridor to consolidate their operations of power generation. For example they would consider exchanging PacifiCorp lands with recreational/cultural interests for those BLM parcels with powerlines or operation facilities. The river plan will identify proposed land exchanges or acquisitions. To date, no specific parcels have been identified.

Pre-Historic/Historic Sites:

The Klamath River banks have many cultural sites. These locations also receive extensive recreation use which has led to damage to these sites. The river plan will identify ways to reduce recreation/cultural use conflicts.

Native American traditional Use:

The canyon has continued use by Native Americans for thousands of years. The canyon is considered to sacred and of immeasurable spiritual significance. Some recreation, land management practice or project activities could impact these areas.

Fisheries:

There is evidence that the water peaking (increase flows), which is necessary to generate power from J.C. Boyle's Dam, impacts the aquatic habitat for fisheries on the stretches analyzed under this plan. There may be opportunities to improve fish habitat. Fisheries is one of the outstandingly remarkable values (ORV) for which the Klamath River was designated a wild and scenic river. Section two of the Klamath River has been identified by Oregon Department or Fish and Wildlife as a wild rainbow trout stream since 1978, while section three has been identified by California Department of Fish and Game as a wild rainbow trout area since 1974**.** There are threatened and endangered (T&E) suckers that use the river. This stretch of river is within the historic range of at least one listed and one proposed anadromous salmonid species.

Fire:

There are heavy fuel loads existing in forested lands in the river canyon. Historically, lightning occurrence is high in this area and, given the steep terrain, any fire occurrence could become a forest stand replacing event. Past examples are the Big Bend and J.C. Boyle fires. This plan would address needs for effective fuel reduction treatments. The potential loss of river canyon scenic characteristics to wildfire would be evaluated in this plan.

Wildlife:

There are T&E (ie. bald eagle, pergine falcon) and special status species (western pond turtle, Townsend big-earred bat, white headed woodpecker) that use the river corridor. This plan would also address unique wildlife habitat such as big game winter habitat and oak woodlands. This plan would also address impacts from wildlife habitat enhancement projects to scenic values and impacts to wildlife from other resource management practices.

Noxious Weeds:

There are invasive weeds (like star thistle) that are existing within the river corridors. These weeds compete with native vegetation and habitat for animals and plants.

POINTS OF CONTACT:

Larry Frazier, Interdisciplinary Team Leader
e-mail: (lfrazier@or.blm.gov)

or

Don Hoffheins, Planning and Environmental Coordinator
e-mail: (dhoffhei@or.blm.gov)

Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Avenue, Building 25
Klamath Falls, OR 97603
Ph: 541-883-6916

SCHEDULE FOR RIVER PLAN

Klamath River ACEC/River Management Plan Environmental Impact Statement Post-Scoping Phase Timeframe for Completion	
	Item
April, 2001	Draft EIS Outline
May, 2001	Analysis of the Management Situation
May, 2001	Finalize Alternative Framework
May-June, 2001	Brief Redding, Medford Offices on PacifiCorp Land Tenure
June-August, 2001	Brief Klamath Falls Resource Area (KFRA) ID Team and District Office
July, 2001	Revision of Pre-Plan, Submitted to OSO, Redding RA
July, 2001	Brief PAC Sub-Committee on Pre-Plan
July-August, 2001	Meet County Commissioners if not at June PAC Sub-Committee Meeting to update on plan
July -August, 2001	Field Data Collection, identification of Alternative Actions
July-August, 2001	Field trips, river trips or meetings with KFRA ID Team, PAC Sub-Committee, Interagency Review Group
August, 2001	Brief Interagency Review Group (In conjunction with FERC Interagency Group)
August, 2001	Newsletter/Update to Public (Redding RA reviews prior to mailing)
September, 2001	Finalize Details of Alternatives
September, 2001	Brief Redding RA & OR and CA State Offices on River Plan on Alternatives (esp. Land Tenure)
October-December, 2001	Prepare ACEC/River Plan (Pre-) DEIS (includes monitoring plan)
January, 2002	Brief California Delegation – Herger's Staff, Siskiyou County Farm Bureau, etc. on river plan
January, 2002	Klamath Falls and Redding Resource Area Review of Pre-DEIS
February, 2002	Interagency Review Group and PAC Subcommittee Review of Pre-DEIS
February, 2002	PAC Sub-Committee & Oregon and California State Office Briefing on River Plan
February-March, 2002	OR & CA State Office review of ACEC/River Plan Pre-DEIS
April, 2002	Revise DEIS
April, 2002	Prepare contract for printing of DEIS
April, 2002	Prepare Federal Register Notice regarding DEIS available for public review
May, 2002	DRAFT EIS Published, sent to public for 90 day review period
Summer, 2002	Public meetings & Field Reviews on DEIS in Klamath Falls, OR and Yreka, CA.

August, 2002	DRAFT Comment Period Ends
September, 2002	Evaluate Public Comments
October-December, 2002	Prepare FEIS
November, 2002	PAC Sub-Committee and Interagency Review Group meetings on FEIS
December, 2002	Newsletter/Update to Public
January, 2003	BLM State Office and KFRA review of ACEC/River Plan Pre-FEIS
January-February, 2003	Finalize EIS w/Response to Comments
March, 2003	OR and CA BLM State Office Review of Final EIS
March, 2003	Prepare Federal Register Notice for FEIS notice for public review
March, 2003	Contract issued for printing of FEIS
April, 2003	Final EIS Published and distributed for public comment

Preparation Plan for the Klamath River Management Plan and Environmental Impact Statement

October 2001

Contents

Preparation Plan for the Klamath River Management Plan/EIS

1. Introduction and Background

This planning effort is being undertaken because the current recreation plan is outdated, almost 20 years old (completed in 1983 by the Medford District). There are now overlapping jurisdictions and designations which did not exist 20 year ago. At the conclusion of this planning effort there will be one EIS and management plan that will guide and coordinate all land management activities along the river. This EIS could amend both the BLM Redding (California) and the Klamath Falls (Oregon) Resource Management Plans.

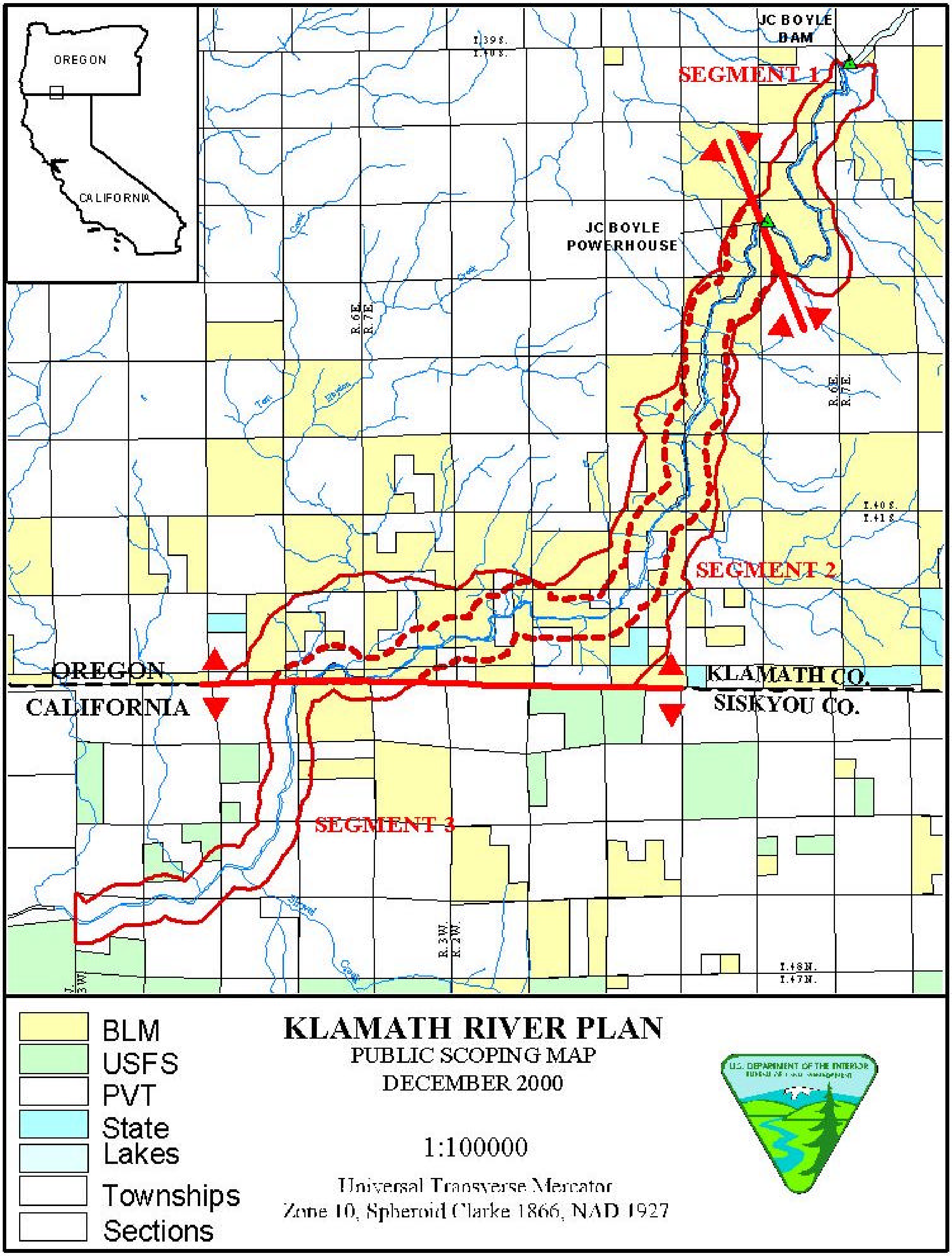
PacifiCorp is beginning the FERC relicensing process for their Klamath River projects (Big Bend #2082 - which includes the John C. Boyle Dam/power plant) - and the new river plan will be used by PacifiCorp as part of their application to FERC. This plan will identify resource concerns that need to be considered during the relicensing process. Completion of the proposed river plan is anticipated by 2003, and the FERC relicensing in 2006.

The Proposed Planning Area

The proposed Klamath River Management planning area is from the John C. Boyle Dam (in Oregon) to the to the slack water of Copco Reservoir in California. The Oregon portion of the plan is about 13 miles long and encompasses about 6000 acres of public lands. The California river segment is about 5 miles in length and encompasses about 200 acres of public lands.

The proposed project is within Klamath County, Oregon and Siskiyou County California. The project is about 25 miles southwest of Klamath Falls, Oregon.

In 1990, the BLM completed an Eligibility and Suitability Study Report for the Upper Klamath River. This river study divided the river into 3 segments. The river study report also determined the outstandingly remarkable values for each river segment. The proposed planning area for the EIS is based on the river segments and the Area of Critical Environmental Concern (ACEC) designated under the Klamath Falls Resource Management Plan. For the purposes of this planning effort, this river has been divided into three segments.


OREGON
CALIFORNIA
JC BOYLE DAM
SEGMENT 1
JC BOYLE POWERHOUSE
SEGMENT 2
OREGON
CALIFORNIA
KLAMATH CO.
SISKYOU CO.
SEGMENT 3
BLM
USFS
PVT
State
Lakes
Townships
Sections
KLAMATH RIVER PLAN
PUBLIC SCOPING MAP
DECEMBER 2000
1:100000
Universal Transverse Mercator
Zone 10, Spheroid Clarke 1866, NAD 1927

			Miles
1	from JC Boyle Dam to powerhouse	none	2
2	from powerhouse to OR/CA line	ACEC (rim to rim) OR State Scenic Waterway (1/4m)* Wild & Scenic River (1/4 m)*	11
3	from OR/CA line to slack water of Copco Reservoir	found to be eligible and suitable for inclusion into the WSR system. No designation but under interim WSR Mgt.	5

* 1/4 mile each side of the river

Segment 1

This segment was found not to be eligible or suitable for inclusion into the wild and scenic river system. However, this segment does possess recreation, wildlife, fishery, and visual quality aspects that need to be considered in the overall planning of the river system.

Segment 2

This segment of the river had resource values identified which are associated with the three designations (mentioned in table above). These important values are: Recreation, wildlife, fish, prehistoric, historic, scenic, and Native American tradition use. These values need to be protected or enhanced when considering land management practices or resource activities. The resource values are significant beyond the 1/4 mile boundaries. Therefore this plan will analyze these values from rim-to-rim within the river canyon.

Segment 3

A 1990 Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study (by BLM) found this segment to be eligible and suitable for inclusion into the National Wild and Scenic River System. Congress has the authority to make determination on whether this river segment should be included into the national wild and scenic river system. No designation has been made at the time of this scoping document. This river segment is under interim management until a decision on designation is made.

The public comments from the 1990 river study stated that the river's values do not stop at the border but rather continue to Copco Reservoir. This study identified the following outstandingly remarkable values for this segment: recreation, wildlife, fish, historic, and scenic. These values are to be protected or enhanced when considering land management practices or resource activities.

BACKGROUND INFORMATION

The Klamath Falls Resource Area (KFRA), of the Lakeview District, administers federally owned BLM lands within the Klamath River Canyon from John C. Boyle Dam to Copco Lake, California. Management of the California section is by Memorandum of Understanding (MOU) with the BLM Redding Field Office (dated 10/05/94). An additional MOU, affirming a policy of cooperation and coordination among the BLM, landowners and other public agencies is currently in place (dated 4/25/91). The MOU is with Pacific Power and Light, Oregon Department of Fish and Wildlife, California Department of Fish and Game, Weyerhaeuser Company (as assigned to U.S. Timberlands Services Co. LLC) and the BLM. It establishes a mechanism for coordinating land management programs and planning among cooperating parties. The KFRA, BLM manages several recreation sites, and issues and monitors special recreation permits for commercial white water rafting along this section of the river.

Year	Significant Actions related to Klamath River
1969	*The Oregon Scenic Waterways Act* (ORS 390.805 to 390.925), administered under the authority of the Oregon State Parks and Recreation Department (OPRD), is a state-wide law for river conservation that was established by a vote in 1969. The Oregon Scenic Waterways System was established through the *Scenic Waterways Act*.
1983	BLM developed guidance for management of recreation resources in the Recreation Area Management Plan for the Klamath River Special Recreation Management Area.
1988	In October 1988, the *Oregon Omnibus Rivers Act* directed the BLM to complete an Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study Report for possible inclusion into the National Wild and Scenic Rivers System. This report was completed in 1990.
1988	In November 1988, Ballot Measure 7 was passed in Oregon, adding, among other rivers, the upper Klamath River (from the John C. Boyle Dam Powerhouse to the Oregon-California state line and 1/4 mile in width from the ordinary high water mark on each bank) to the Oregon Scenic Waterways System. OPRD has primary administrative responsibility for Oregon Scenic Waterways and explicit authority to regulate land use. OPRD has adopted general rules of land management applicable to all scenic waterways. Specific rules are adopted for individual scenic waterways. There are currently no specific rules set forth for the upper Klamath Scenic Waterway.
1990	The BLM Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study was sent to Congress. This study report recommended that segments of the Upper Klamath River be included into the national wild and scenic river system. This report identified an 11 mile segment in Oregon and 5 mile segment in California as eligible and suitable for inclusion into the national wild and scenic river system.
1994	In response to a request by Oregon Governor Barbara Roberts to designate the Klamath River under Section 2 (a) (ii) of the *National Wild and Scenic Rivers Act*, the National Park Service undertook a Klamath Wild and Scenic River Eligibility Report and Environmental Assessment. The recommendations from this report were forwarded to Interior Secretary Bruce Babbitt. In September, 1994, the Upper Klamath River (11 mile segment) from the John C. Boyle Powerhouse to the Oregon-California state line was designated as a state-administered component of the National Wild and Scenic River system pursuant to Section 2 (a)(ii) of the National Wild and Scenic River Act.

Year	Significant Actions related to Klamath River
1995	The federal lands along upper Klamath River are currently managed under the KFRA Resource Management Plan (RMP) and Environmental Impact Statement (1995). The RMP designated an 11 mile segment of the river (rim to rim along the river corridor) from John C Boyle powerhouse to the Oregon-California state line as an ACEC.

The above mentioned existing management plans, rules, laws, and guidelines will continue to provide management direction for the Wild and Scenic Upper Klamath River until a new river management plan is developed to address specific resource concerns.

2. Planning Issues and Management Concerns

This plan is being prepared in cooperation with the BLM Redding Field Office. The Klamath Falls Resource Area has the lead responsibilities for the development of the plan while the Redding Field Office will provide staff support when necessary. Public scoping documents were sent to the public in northern California and southern Oregon. Public scoping meetings were held in Yreka, California and Klamath Falls, Oregon. Scoping and consultation was completed with the Yurok, Hupa, Karuk, and the Klamath Tribes. Public scoping was also completed with the Shasta Nation (not a federally recognized Tribe).

Informal consultations with the USFWS have been initiated to review T&E species concerns that may be associated with the land management practices proposed in EIS.

The list of significant issues is based upon public and agency comments received during the scoping period that closed on January 31, 2001. A detail listing of issues can be found in Attachment 1. The following is a list of Significant Issues that have been recommended by the interdisciplinary team.

Scenic River and ACEC Values
Protection and Enhancement of these values are the primary objectives of this plan. Specifics about these values are mentioned below.

Scenic Quality
One of the ORVs identified is for the river's scenic qualities. The consideration of new recreational facilities, fuel loading, prescribed fire, utility development, and roads, could impact visual resources. How to maintain or enhance scenic qualities is a management concern.

Recreation Activities
A primary recreational use is white water rafting below the John C. Boyle Powerhouse. The white water rafting opportunities are dependent on the timing and amount of river flow released by PacifiCorp. The outstandingly remarkable value was identified as an issue because if the current flow is changed significantly, the white water rafting could be reduced.

Diversity of other recreational activities (both on/off river) is an issue. Recreation use could also increase the number of access points to the river causing damage to riparian and upland habitat and significant cultural sites.

Recreational Carrying Capacity: This issue could affect the recreation user experience within the river canyon. Carrying capacity regarding white water rafting and camping would be the major concern, although carrying capacity for other recreational activities (fishing, hiking, OHV use, etc.) will also need to be identified. Due to the many commercial white water rafting permit requests received and concerns regarding the carrying capacity on the Upper Klamath River, the BLM issued a moratorium in 1996, freezing the number of river permits issued. This was an effort to reduce potential impacts to other resources. There is also concern regarding the increased number of other recreation uses within the river corridor. This river plan will evaluate the carrying capacity, including the number of permitted rafters, relative to potential impacts on the outstandingly remarkable values.

Recreation Facilities
Associated with the recreational carrying capacity issue is the improvement or construction of new recreational facilities along the river. Some of these new projects could affect the integrity of cultural resources and fish habitat. Proposed trails could lead to increased use within the river corridor. There will be a need to evaluate the potential for removal or relocation of facilities to reduce impacts to other resources. Recreational structures are also experiencing increased vandalism and vegetation is being damaged by the public.

Roads and Access:
There are numerous roads within the river canyon. BLM has closed a number of these roads via barriers to protect cultural resources and reduce erosion, but many closures are no longer effective. There is a concern that OHV activity has led to some increased erosion and sedimentation into the river. Roads and access has lead to OHV damage to significant prehistoric and historic sites and Native American traditional use areas. Road location has also contributed to increased erosion which could be corrected. These are continuing problems that would need to be evaluated and addressed in the plan. There is public interest in driving for pleasure and this would be analyzed in the river plan to provide for this type of recreational use.

Cultural Resources/Prehistoric Sites
The Klamath River Canyon has many cultural sites. Several of these locations receive intensive recreation use, resulting in damage to the sites. The river plan would identify ways to reduce recreation/cultural use conflicts. A monitoring plan would be developed to help protect against vandalism and looting of significant sites. The issue of interpretation and protection of pre-historic or historic sites would have to be thoroughly thought out to reduce vandalism and increase public awareness to prevent damage from occurring to sensitive cultural areas.

Native American Traditional Uses
Native Americans have used the river canyon for thousands of years. The canyon is spiritually significant to tribal members. The river canyon is also a source for food gathering. Roads and access has lead to OHV damage to Native American traditional use areas. Concerns regarding access for tribal members and conflicts with OHV activity would be addressed in this plan. This plan would also consider how forest health management practices and prescribed fire could help maintain food gathering areas.

Historic Sites
Historic sites are rapidly deteriorating and have been vandalized. Management concerns exist on how to manage these structures.

Watershed Values
The Klamath River (in the planning area) is listed as “water quality limited” in accordance with Section 303(d) of the Clean Water Act. It has been listed due to impacts of nutrients and elevated stream temperatures on beneficial uses such as habitat for threatened and endangered fish species. Water quality also affects values, such as recreation, for which the river was designated a State Scenic Waterway and National Wild and Scenic River. This plan needs to identify possible ways of protecting and enhancing water quality within the planning corridor in support of other resource values. Management concerns about erosion caused by roads, water flows, riparian vegetation, and watershed processes would be addressed in the plan.

Wildlife And Fisheries
Wildlife:
There are threatened and endangered (i.e. bald eagle, peregrine falcon) and special status species (western pond turtle, Townsend big-eared bat, white headed woodpecker, etc.) that use the river corridor. Habitat for these species would be evaluated to determine the type of management needed to protect or enhance the survival of these species. This plan would also address unique wildlife habitat such as big game winter habitat and oak woodlands. The impacts from wildlife habitat enhancement projects to scenic values and impacts to wildlife from other resource management practices will also be addressed.

Fisheries:
Fisheries is one of the outstandingly remarkable values (ORV) for which the Klamath River was designated a wild and scenic river. Management concerns deal with the endangered (T&E) Lost River and shortnose suckers that use the river. The planning area is within the historic range of T&E listed threatened coho salmon. There are management concerns dealing with resident and anadromous fish passage in the river. The river has been designated as a wild rainbow trout fishery. There are also recreational trout fishing concerns surrounding the lack of large fish within the river. There is evidence that the water peaking (repetitious high flows), which optimizes generation of power from J.C. Boyle’s Dam, impacts the aquatic habitat for fisheries on the stretches analyzed under this plan. There may be opportunities to improve fish habitat. There is speculation that the variation in water flows (for power generation) may affect the size of fish.

Fire And Fuels
Heavy fuel loads exist on forested lands in the river canyon. Historically, lightning occurrence has been high in this area, and, given the steep terrain, any fire occurrence could become a forest stand replacing event. Past examples are the Big Bend and J.C. Boyle fires (in the 1980’s). This plan would address needs for effective fuel reduction treatments. The potential loss of river canyon scenic characteristics to wildfire would be evaluated in this plan. This plan would evaluate management concerns regarding fuel types and level of treatments necessary to protect or enhance the outstandling remarkable values.

Vegetation And Biological Diversity
Vegetation manipulation would be considered in this plan when it could maintain or enhance wildlife and fish habitat, scenic quality, or Native American traditional use areas (food gathering). This plan would evaluate how the vegetation would be managed in the short and long-terms, including control or eradication of exotic or noxious weed species.

Air Quality
The plan will likely propose fuel treatment to enhance wildlife habitat and reduce the potential for catastrophic wildfires. Planned prescribed fires need to be consistent with the *Federal Clean Air Act*. The analysis should identify what effect actions would have on air quality.

Socio-Economics
Potential management actions would have an effect on the local and perhaps regional economy. The analysis needs to consider impacts to individuals, businesses (including permitted outfitters), tribes, minority populations and low-income populations.

PacifiCorp's Power Generating Facilities
PacifiCorp is licensed to operate a series of hydroelectric power generation facilities on the Upper Klamath River. The plan needs to identify the impacts this operation has on the resource values of the canyon.
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Land Tenure/Private Land
PacifiCorp is the major private landowner in the planning area. PacifiCorp has requested, in writing, that BLM explore the possibility of land tenure adjustments during the development of the EIS. A map was submitted to BLM identifying PacifiCorp lands to be considered for a possible land trade, acquisition, or BLM and PacifiCorp mutually beneficial land management arrangement. BLM would need to determine the resource values of the PacifiCorp lands in order to address the resource values associated with recreational use, access, pre-historic and historic sites, Native American traditional uses, fish, and wildlife on the lands they have identified.

This plan would also address issues surrounding the management role the State of Oregon has on private lands within the Oregon Scenic Waterway. There are management concerns surrounding how the federal government can ensure adequate recreational access to the river if it doesn't own the land. Oregon State Scenic Waterway administrative rules for the Klamath River would be developed and made part of the river plan.

Grazing
Issues regarding livestock grazing would be evaluated with the recreation, cultural, riparian and wildlife habitat management concerns.

Cumulative Impacts
Proposed actions cold not only affect resources within the canyon but could also impact the surrounding environment, especially when combined with other management actions on public and private land.

3. Preliminary Planning Criteria

The planning criteria would be focused on the outstandingly remarkable values for the scenic river and ACEC designations in Oregon and the outstandingly values identified in the Klamath Resource Area Resource Management Plan (RMP) in Oregon. The river plan would also focus on the Desired Future Conditions established for the outstandingly remarkable values.

Resource data and values would need to be determined on the PacifiCorp lands that have been included in the EIS planning area. There are over 9,000 acres of PacifiCorp lands that deal with land tenure issues. PacifiCorp has asked BLM to consider their lands in an exchange, purchase, or long term land management agreement scenarios.

Wild and Scenic River (WSR) and ACEC Values

	WSR ORVs	ACEC Values
Segment 2		
Scenic	X	X
Recreation	X	X
Wildlife	X	X
Fish	X	X
Prehistoric	X	X
Historic	X	X
Native American Traditional Use	X	X
Segment 3 (Interim Management)		
Scenic	X	
Recreation	X	
Wildlife	X	
Fish	X	
Historic	X	

4. Data and GIS Needs, Including Data Inventory

The GIS data needs will be developed by the Klamath Falls Resource Area and coordinated with the Redding Field Office staff. The GIS data will then be given to OSO cartography to finalize for the EIS document and printing. There would be instances where the Oregon or California State Offices staff will need to be contacted to provide guidance to the field offices in preparation of the GIS data. The themes needed for the plan would be for:

General location map of the Upper Klamath River
The Klamath River Planning Area Boundary (color map)
Upper Klamath River Power Site Withdrawals
Planning Area Land Ownership
Regional Transportation and Major Population Centers
Access Roads and Recreation Sites

Vegetation (including noxious weeds and special status species)
Visual Resource Categories
Hydrology (streams, springs, etc)
Fuel Types
Prescribed Fire and Fuel Treatment Areas
Grazing Allotments and Wild Horse Herd Management Areas
Critical Deer Winter Range and Peregrine Falcon Habitat Areas
Historic Site Areas

There exists extensive information on wildlife and archeological sites along the river. Additional data collection needs necessary for completion of this plan will be:

Inventory Task	**Time Frame**
Transportation inventory	Field Season 2001
Herptile Survey	Field Season 2000-2001
Vegetation Inventory	Field Season 2001-2002
Fuels Inventory	Fall/Winter 2001-2002
Recreation Use Survey	Field Season 2002*
Scenic Quality Survey	Field Season 2002*

*This inventory information will be requested under FERC relicensing for PacifiCorp to complete between John C Boyle Dam to the Copco II Reservoir. This information is not critical for the river plan development, but would be used for recreation site enhancement or development.

Information will be gathered for developing a water quality restoration plan which would be finalized after Oregon and California determine the Total Maximum Daily Loads for the Klamath River. The TMDLs are expected to be completed in 2004. Currently, there are Aquatic Conservation Strategy, the Klamath Falls Resource Management Plan best management practices, and the Topsy-Pokegama Watershed Assessment to guide water quality management until a water quality restoration plan is developed.

An air resources management plan would be developed for future prescribed burns in the river corridor and included as part of the River Plan/EIS. This plan would utilize satellite imagery to determine vegetation types which would be used to estimate fuel loads. Prescribed fire units would also be proposed within the Klamath River Canyon and smoke management concerns would be addressed in the proposed air resources management plan.

Budget needs for data collection would be for satellite imagery only. All work months would be covered out of the base budget.

Data Need	**FY**	**Cost**
Satellite Imagery	02	$ 5,000
		$ 5,000

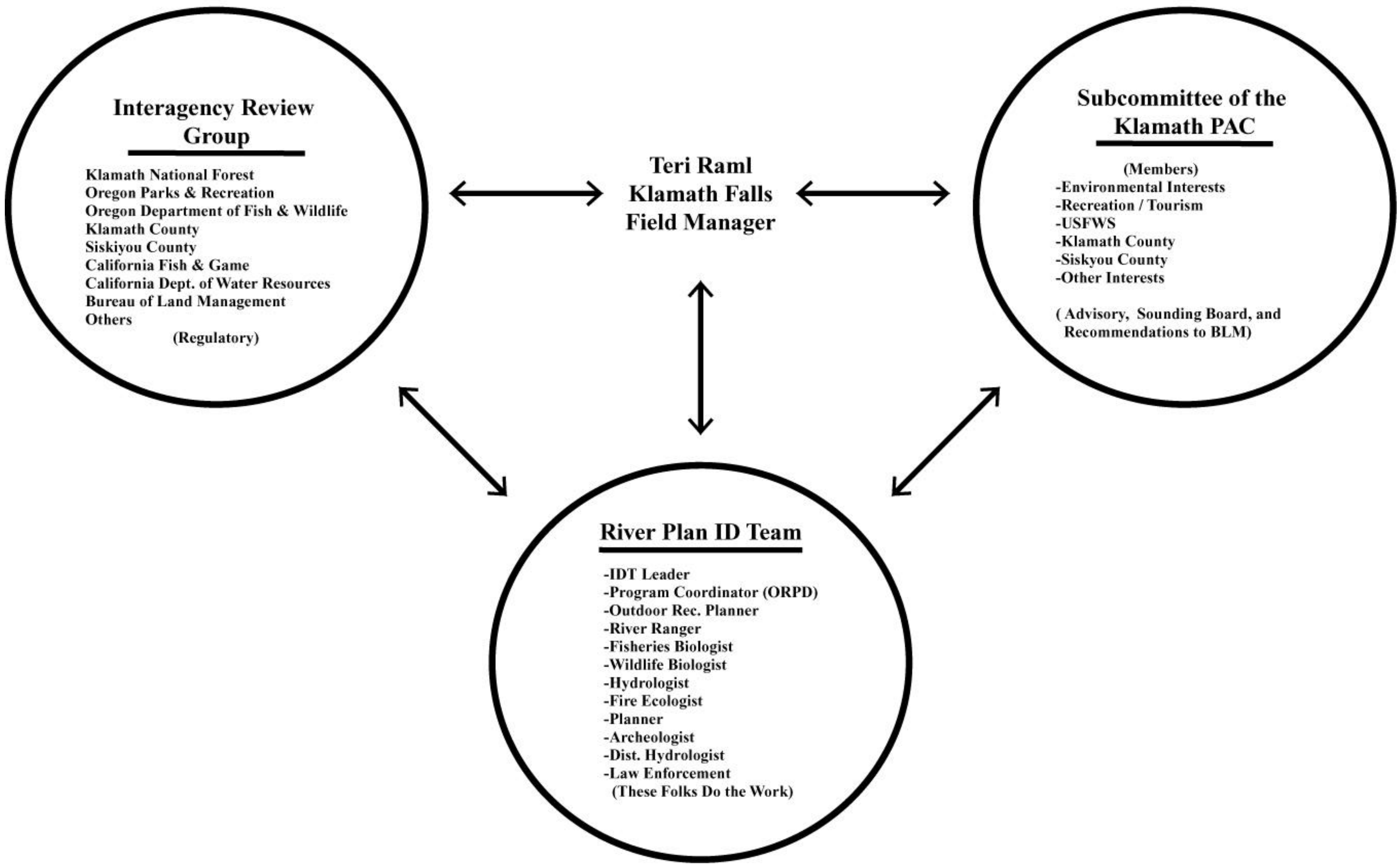
5. Participants in the Process

An interdisciplinary team (IDT) has been established consisting of a team leader, wildlife, fisheries, botany, archaeology, recreation, hydrology, and planning specialists. An Interagency Review Group comprised of representatives from county, state, and federal agencies has been created to ensure that the project complies with regulatory processes in California and Oregon. The Upper Klamath Basin Subcommittee of the Klamath Provincial Advisory Committee was created to provide advice and assist the IDT by gathering information from private river users, local private landowners and other interested parties to be used throughout the river planning process.

The Oregon Parks and Recreation Department is a cooperative agency in the preparation of this document, as is the BLM/Redding Field Office in California. The proposed project is for the BLM/Klamath Falls Resource Area to prepare an ACEC/River Management Plan and Environmental Impact Statement for the Klamath River project area. For this River Management Plan and EIS, the State of Oregon has indicated that they would prepare a chapter in the EIS document that would be the management plan for the State Scenic Waterway.

A detail listing of the BLM River Plan IDT team, the Upper Klamath Basin Subcommittee of the Klamath Provincial Advisory Committee, and the Interagency Review Group can be found in Appendix 4. The following diagram illustrates the interaction of the three groups involved in the planning process.

KLAMATH RIVER PLAN PROCESS



6. Format and Process for the Plan

This river plan will be developed in accordance with the *National Environmental Policy Act* and will adhere to 43 CFR 1610, Resource Management Planning Guidance. An environmental impact statement (EIS) will be prepared to analyze various actions and provide the basis for a decision on future management of the area. A separate Record of Decision will be prepared for the final EIS.

Scoping

Following issuance of the Notice of Intent (November 27, 2000), a public Scoping Document was mailed to various public and agency representatives for their review and response. Public Scoping meetings were held in Yreka, California and Klamath Falls, Oregon to receive comments and identify issues. The scoping was based the protection and enhancement of outstandingly remarkable values identified for the Klamath River inclusion into the national wild and scenic river system. The Klamath Falls Resource Area Management Plan also designated values for designating the Klamath River Canyon as an Area of Critical Environmental Concern (ACEC). See a list of these values in the "Preliminary Planning Criteria" section.

Significant Issues have been identified from the comments received during this scoping period. Desired future conditions of resource values need to be developed for this plan. Significant issues will be used to formulate alternative management strategies for achieving these desired conditions. A full list of issues is included in Attachment 1 of this preparation plan.

Initial Plan/EIS Alternatives

Alternative 1 - Existing Management – This is the no action alternative. There would be minimal change from the direction in the existing Klamath Falls and Redding Resource Area Management Plans. The major goals of this alternative are to:

- Maintain a naturally spawning resident fish population both in terms of catch rate and reproduction.
- Maintain and improve existing water quality in accordance with Oregon and California Total Maximum Daily Loads.
- Maintain the current wildlife surveys and provide limited habitat improvement.
- Maintain existing recreation opportunities and facilities.
- Manage visual resources for Visual Resource Management Class II.
- Manage and protect known pre-historic/historic sites and Native American Traditional use areas. Cultural inventories will be completed when a ground- disturbing project is proposed within the planning area.

Alternative 2 - Improvement of Resources and Opportunities – This alternative was developed in response to the Wild and Scenic Rivers Act direction to manage and resolve conflicts with the outstandingly remarkable values (ORVs). The objective of this alternative would be to maintain the ORVs while resolving resource management conflicts. The major goals of this alternative are to:

- Enhance resident fish species habitat within specific areas of the Klamath River.

-Implement site-specific watershed restoration projects to improve fishery and wildlife habitat objectives.
-Survey for special status wildlife species over present levels. Habitat improvements would occur on vegetative types for the benefit of wildlife species
-Relocate recreation facilities to minimize impacts to other resource values.
-Enhance scenic quality by reducing fuel loads to decrease potential occurrence of stand replacing or catastrophic wildfires.
-Develop site stabilization measures to reduce erosion processes
-Establish an active cultural survey program to increase knowledge of significant pre-historic sites. Establish a monitoring program to enhance cooperation and information sharing of cultural resources with all the interested Tribes.

Alternative 3 - Natural Resource Enhancement/Restoration/Preservation – Public scoping comments received suggested managing the Klamath River Canyon in a more natural condition. The objective of this alternative would enhance natural resource related ORVs while resolving resource management conflicts. The major goals of this alternative are to:
-Restore passage and habitat for resident and anadromous fish species along the full length of the planning area.
-Implement watershed restoration projects to actively pursue Aquatic Conservation Strategy objectives.
-Emphasize inventory and monitoring of special status species. Restore natural ecosystems using management techniques available. Greater emphasize would be placed on providing suitable wildlife habitat.
-Actively use prescribed fire and other management techniques to reduce the threat of wildfire to protect and enhance scenic quality.
-Pursue recreational development to enhance non-motorized and primitive recreational opportunities.
-Use vegetative treatments and prescribed fire to enhance Native American Traditional use food gathering areas.
-Restore historic structures where possible.
-Work with private landowners to minimize the visual affect of their management activities and structures. Make modifications to existing structures and projects to lessen negative visual effects.

Alternative 4 - Expand Human Use Opportunities – Numerous public Scoping comments received identified a need for an alternative with a recreation emphasis. This alternative would protect and enhance resource values within the river corridor with an emphasis for utilizing resources for recreation, including interpreting wildlife and cultural resources, while restoring resources to more natural conditions. The major goals of this alternative are to:
-Develop a plan with local law enforcement and private landowners for reducing vandalism and unregulated target shooting and OHV use.
-Enhance fisheries habitat to provide increased recreational fishing opportunities.
-Implement campground site plans to reduce erosion and road rutting, and protect riparian areas. This could include surfacing the existing campground access road and relocation of campsites. Provide non-motorized trail opportunities for campers to access fishing and swimming areas.

-Monitor dispersed camping and picnicking areas to determine if additional facility development or management actions are needed to reduce resource impacts.
-Construct a river-hiking trail system that would tie to the Pacific Crest Trail in the Cascade-Siskiyou National Monument. Improve hiking trails to access fishing sites and scouting white-water rafting rapids.
-Partner with landowners and stakeholders to do maintenance to main roads throughout the planning area and reduce OHV damage.
-Close unnecessary or duplicate roads to motorized vehicles and rehabilitate these roads.
-Pursue an intensive fuels management program throughout the planning area, with particular risk reduction focus on popular recreation areas, trails, and roads.
- Manage wildlife populations and habitats for visibility to public users. Artificial nest structures and watchable wildlife programs would maximize the viewing pleasure.
-Provide an active cultural environmental education and interpretation program for recreation users to reduce vandalism and encourage respect

Internal Review Process

Both the interdisciplinary team of specialists (ID Team) and the Sub-PAC committee have been involved in the Klamath River Plan scoping process and reviewed the significant issues and provided input in the development of the draft alternatives. The ID Team will prepare the analysis of alternatives for incorporation into the DEIS document. A preliminary review copy of the Draft EIS will be sent to the OR/WA and CA BLM State Offices, Interagency Review Group, and the PAC Subcommittee for review. Coordination with OR/WA Cartography (OR 957.2) will occur periodically to review map products. Review comments will be incorporated into an official copy of the Draft EIS.

7. Plan Preparation Schedule

Preparation of this river plan is intended to be about an 30-month process (started October, 2000). The plan is intended to be completed so that the management actions can be considered in the upcoming FERC relicensing (FERC) process for PacifiCorp facilities located within the river corridor. The following table presents estimated dates for completion of key task items.

SCHEDULE FOR RIVER PLAN

Klamath River ACEC/River Management Plan Environmental Impact Statement Post-Scoping Phase Timeframe for Completion	
	Item
April, 2001	Draft EIS Outline
May, 2001	Analysis of the Management Situation
May, 2001	Finalize Alternative Framework
May-June, 2001	Brief Redding, Medford Offices on PacifiCorp Land Tenure
June-August, 2001	Brief Klamath Falls Resource Area (KFRA) ID Team and District Office
July, 2001	Revision of Pre-Plan, Submitted to OSO, Redding RA
July, 2001	Brief PAC Sub-Committee on Pre-Plan
July-August, 2001	Meet County Commissioners if not at June PAC Sub-Committee Meeting to update on plan
July -August, 2001	Field Data Collection, identification of Alternative Actions
July-August, 2001	Field trips, river trips or meetings with KFRA ID Team, PAC Sub-Committee, Interagency Review Group
August, 2001	Brief Interagency Review Group (In conjunction with FERC Interagency Group)
August, 2001	Newsletter/Update to Public (Redding RA reviews prior to mailing)
September, 2001	Finalize Details of Alternatives
September, 2001	Brief Redding RA & OR and CA State Offices on River Plan on Alternatives (esp. Land Tenure)
October-December, 2001	Prepare ACEC/River Plan (Pre-) DEIS (includes monitoring plan)
January, 2002	Brief California Delegation – Herger's Staff, Siskiyou County Farm Bureau, etc. on river plan
January, 2002	Klamath Falls and Redding Resource Area Review of Pre-DEIS
February, 2002	Interagency Review Group and PAC Subcommittee Review of Pre-DEIS
February, 2002	PAC Sub-Committee & Oregon and California State Office Briefing on River Plan
February-March, 2002	OR & CA State Office review of ACEC/River Plan Pre-DEIS
April, 2002	Revise DEIS
April, 2002	Prepare contract for printing of DEIS
April, 2002	Prepare Federal Register Notice regarding DEIS available for public review
May, 2002	DRAFT EIS Published, sent to public for 90 day review period
Summer, 2002	Public meetings & Field Reviews on DEIS in Klamath Falls, OR and Yreka, CA.
August, 2002	DRAFT Comment Period Ends
September, 2002	Evaluate Public Comments
October-December, 2002	Prepare FEIS

November, 2002	PAC Sub-Committee and Interagency Review Group meetings on FEIS
December, 2002	Newsletter/Update to Public
January, 2003	BLM State Office and KFRA review of ACEC/River Plan Pre-FEIS
January-February, 2003	Finalize EIS w/Response to Comments
March, 2003	OR and CA BLM State Office Review of Final EIS
March, 2003	Prepare Federal Register Notice for FEIS notice for public review
March, 2003	Contract issued for printing of FEIS
April, 2003	Final EIS Published and distributed for public comment

8. A Public Participation Plan

A public participation plan, intended to provide opportunities for the public to meaningfully participate in and comment on the proposed Upper Klamath River Management Plan (CFR 43, Chapter II, 1610.2) and associated environmental impact statement, has been prepared. This plan would adhere to the CEQ 40 CFR and WSR manual requirements for public participation and outreach. Meetings would be held with OR/CA BLM staffs, local, state and other federal agencies and Native American Indian Tribes, the Klamath Provincial Advisory Committee, and Klamath and Siskiyou County Commissioners to share information on the proposed action throughout each major step of the analysis process. Many of the meetings have already occurred. The public participation plan is intended to address public involvement during the initial scoping phase which includes identification of planning issues, alternatives and work scopes for analysis of alternatives to be documented in a draft environmental impact statement (See Attachment 2). Newsletters or mailings to the public will be sent periodically to update them on the river plan. Newsletters and documents related to the river plan will be posted on the Lakeview District Web page.

9. Budget

Additional funds would be necessary to complete the preparation of this river plan. The funds requested would be for labor; all other funds for printing, data collection, Federal Register Notices, travel and support costs will be covered out of the Lakeview District base budget. PacifiCorp has committed to assist in funding a portion of the field data collection.

Term Positions	WM Needs/yr	Duration	Cost/ Year
Planner	12	FY02-03 (2yrs)	$ 60,000

There is a heavy planning workload for the Klamath Falls Resource Area staff for the next two years. The resource staff will be working on a FERC Relicensing effort, watershed assessments, Four Mile ACEC, and Prescribe Fire Programmatic Environmental Assessment, besides the

Klamath River Plan/EIS. The workload is more than the current resource area planner can handle. The addition of new planner would allow the completion of the river plan and other work, which is required of the staff and to maintain the timelines for the other important projects. The writer-editor currently working on the Lakeview Resource Management Plan would also provide support for the Klamath River Plan.

10. Attachments

$ Attachment 1 - List of Scoping Issues
$ Attachment 2 - Public Participation Plan
$ Attachment 3 - Draft Plan Outline with Timeline
$ Attachment 4 - List of ID Team and PAC Subcommittee Members

Attachment 1 - Scoping Issues

UPPER KLAMATH RIVER MANAGEMENT PLAN SCOPING ISSUES

The list of scoping issues below is based upon public and agency comments received during the scoping period that closed on January 31, 2001. The issues identified in these comments have been condensed and consolidated and are not all-inclusive. The issue statements are paraphrased as questions, often from numerous public comments and are not intended to be quotations. It is recognized that there are numerous sub-issues associated with the main issues. Some of these sub-issues, highlighted by bullets following the issue statement, may be helpful in developing alternatives. The issues and sub-issues will be addressed in the Environmental Impact Statement (EIS) and Record of Decision.

All issues addressed in the EIS will be analyzed for potential positive and negative effects, including:

$ on-site and off-site impacts (impacts occurring outside the project area or on private lands inside the project area);
$ direct, indirect and cumulative impacts;
$ short and long-term positive and negative impacts;
$ unavoidable adverse effects.

Finally, issues related to satisfying federal, state and local requirements and standards (e.g., threatened and endangered species, water quality, air quality) will automatically be analyzed even if not specifically listed as significant issues.

The following is a list of issues from scoping. Some issue statements include comments that are essentially quotes from public letters, while others are paraphrased to include similar comments from a number of different letters.

Issues marked with "<SI> " indicate that the issue and the underlying bullet statements have been recommended as Significant Issues by the interdisciplinary team. These significant issues serve primarily as the basis for developing and comparing alternatives. While the EIS will focus on these significant issues, all issues identified through scoping will be considered in the appropriate resource analyses.

WILD AND SCENIC RIVER SYSTEM AND AREA OF CRITICAL ENVIRONMENTAL CONCERN VALUES

How will the designated Scenic River Outstandingly Remarkable Values be maintained or enhanced? <SI>

How will the designated area of critical environmental concern values be maintained or enhanced? <SI>

SCENIC QUALITY

How will the visual quality to/from critical viewpoints within and outside of the river corridor be affected by management activities and use of the river and roads? <SI>

- Because of the unique features in the area, it should remain as is.
- Preserve, enhance, restore where possible.
- Include severe restrictions and limitations on all logging activities within view of the canyon rim when viewed in all directions from the highest points along the canyon rim.
- Scenic resources could be enhanced by removal of derelict wrecked autos off the upper end of Topsy Road.
- Restore the road leading to the "Salt Caves Dam site".
- Stabilization of river flows to a more natural regime would allow for establishment of riparian vegetation in the unsightly "intertidal zone" that currently affronts visitors at all but high flow periods.
- Foam and concentrated algae in the river degrade the scenic quality.
- Restoration of the canal emergency spillway will improve scenic conditions.

RECREATION ACTIVITIES (Also see Roads and Access, and PacifiCorp issues)

What is the appropriate carrying capacity for recreational uses within the river canyon? <SI>

- Recreation use, besides whitewater rafting, needs to be monitored more closely.
- There is more recreational use in the canyon than documented.
- Maintain current level of commercial rafting use.
- Plans need to consider the needs of private boaters as well as commercial outfitters.
- Need to assign limits with Tribal, State and other agency input.
- There should be no restrictions on whitewater rafting.
- A crowded put-in doesn't necessarily mean that there is a carrying capacity problem on the river.
- River use should be reduced or eliminated if there are not sufficient maintained toilet facilities for visitors.

What recreational uses are desired and how will they be impacted by management actions? <SI>

- Fishing, Hunting, Hiking and OHV use should be allowed.
- Minimal impact, non-consumptive recreation should be given priority over consumptive or high impact OHV or commercial uses.
- Foam and concentrated algae in the river degrade the recreational experience.
- Some recreational uses may not be compatible with this Wild and Scenic River system setting.

How can existing use, and potential increases in use, be managed to protect the values in the river corridor? <SI>

- With increasing recreational use of the river, nearby recreation site use may increase as well.
- Recreation use is booming, people want to experience the great outdoors whether it is camping, fishing, rafting, or etc.
- Rafting of the river must remain a strictly controlled activity.

- From State Line to Copco, rafters are starting to take out at other areas on private land. This should be stopped.
- Put-in and take-out should only be allowed at designated locations, and these can include private lands if there is an agreement and the site is maintained.
- Any conflicts between river-runners and other recreationists is more likely to be competition for camp sites. Adequate opportunities for dispersed camping along the river and within the canyon should minimize that problem.
- Day trips have less impact than overnight trips.
- Camping is great and I would hate to see a limitation on two-day (overnight) raft trips.
- Camping by non-natives should be restricted to BLM designated campsites (Protect Native American Traditional Use Areas).
- Camping should be restricted to designated sites to reduce impacts to cultural sites.
- Outfitter-guides (rafters) should be required to provide toilet facilities for their customers?
- Litter from recreational use must be tightly monitored.
- Need to implement a *Pack-It-In/Pack-It-Out* policy for litter.
- Need to emphasize the use of *Leave No Trace* techniques with both commercial outfitters and the general recreating public.

Specifically, how will OHV use be managed? <SI>

- No OHV use should be allowed off-roads.
- OHV (off-highway vehicle) use should not be eliminated.
- OHV use should be strictly banned within the canyon area due to its destructive nature and abuse to house pits and ceremonial areas.
- No OHV recreation should be allowed in the canyon or maybe allow OHV recreation if a permit process to restrict use was established.
- Use of ATV's and OHV's, indeed all vehicles, should be confined to maintained roads or trails to avoid damage to soil and vegetative resources and reduce harassment to wildlife and recreational users.
- Continue to deny access to the Salt Caves area.

What level of patrols or BLM presence is needed to protect the resources and provide for safety of users? <SI>

- More vigilant patrols in canyon during peak usage period, May through September.
- Have law enforcement phone numbers posted.
- The river from J.C. Boyle Powerhouse to Copco Reservoir should be kept open to the public for recreation and tourism.
- Law enforcement personnel are to be allowed to patrol in all areas to protect the canyon and its values, and consultation with tribal patrols should be maintained for assistance in protecting cultural sites.
- BLM needs to have a plan that encourages and facilitates enforcement, rather than a plan which inherently eludes enforcement.
- The plan should stipulate that when funding is unavailable, vehicle access to these sensitive or otherwise improperly regulated areas will have to be closed.
- Possibly provide a joint use law enforcement officer residence.
- BLM presence needs to be consistent with the objectives of the Semi-primitive Motorized Recreational Opportunity Spectrum designation in the canyon.

How will use of firearms be managed within the river corridor? <SI>

- Restrict Firearm use.
- Firearm use in the vicinity of other recreation uses in the canyon may not be compatible.
- Do not restrict firearms.
- No firearm use during rafting season- May through September.
- More law enforcement is needed.
- Not opposed to legal hunting, but discharge of firearms seems to be random and indiscriminate and surely ruins ones enjoyment of the area.

RECREATION FACILITIES

What are the types and numbers of existing or new recreational sites needed in the canyon? <SI>

- No further development should occur in the canyon.
- More restrooms and campgrounds are needed.
- A real bathroom is needed at the Freedom Site (Stateline) and Frain Ranch.
- At Frain Ranch, a simpler vault toilet could be less costly to build and repair.
- Keep low maintenance (semi-primitive) facilities and don't substantially upgrade facilities.
- A parking lot at the old PPL housing site needs to be developed with a path to the put-in.
- Don't expand recreation facilities if you can't keep existing facilities going.
- Designated camping areas would preserve the area's ecosystem.
- Development should focus on adding and improving campsites. I support a minimum 100-foot non-development corridor (buffer), measured from the high-water line, for facility development.
- The fewer facilities the better. If any other facilities are needed, limit them to porta-potties and concrete and steel barbeque pits.
- Allow river users to utilize Access #6 as a take-out and put-in option.
- There is a need for toilet facilities at Frain Ranch, on one side of the river or both.
- There is room for additional campsites at the BLM Campground; those additional sites are probably needed and appropriate.
- Toilet facilities should be maintained at the BLM CG and the Frain Ranch area in addition to the BLM "put-in and take-out."
- To facilitate recreational use for visitors not in a "boat", new trails to and along the river in appropriate locations would be assets to the area. Such trails would be most useful in the canyon between the Frain Ranch area and the state line where it is largely inaccessible except via water.
- A trail along each side of the river between Copco and HWY 66 at the Klamath River encouraging backpacking would be desirable.
- Provide new trails for fishing access, especially in the "Bypass Reach".
- Don't build new trails or roads.
- Can plans for a Stateline boat ramp be implemented?
- There may be a need for group size campsites?
- Determine the proper management of dispersed primitive campsites.
- Any new trail building needs consultation with Tribes.

Is there a need for additional signs and interpretive facilities in the canyon? (Also see Cultural issues) <SI>

- Determine what the appropriate level of regulatory signage is for the canyon.
- BLM should provide an interpretive sign at the beginning and end of Topsy Road and at

popular sites.
- Topsy Road and adjacent historic sites (stage stops) should be acknowledged with the appropriate signs and interpretation, including the Frain Ranch and school.

How will facilities (on public and private land) be maintained? <SI>
- Recreational facilities need to be maintained.
- The restrooms at Frain Ranch should not be locked.
- Close campgrounds around old Frain Ranch (assumed this is for dispersed camp sites).
- Explain why the toilet at Frain Ranch is closed.

Outfitters should pay to help maintain facilities for their customers along the river.

ROADS AND ACCESS

What is the appropriate transportation system for the river corridor including roads, bridges and trails? <SI>
- Transportation management must be directed to benefit the ecological, social and economic values in the area in a way that integrates or balances all values.
- Consider helicopter logging and other low impact options with minimal road development to perform projects to reduce fuel loading.
- Do not develop any more roads or make the existing roads better.
- No new roads are to be built.
- New, unobtrusive roads may be appropriate to access the river, campsites or other resources.
- Provision of a new bridge at the old "Burned Bridge" site would be an asset to the area that would provide better seasonal access to the Frain Ranch area and provide for a loop road through the canyon facilitating the enjoyment of its scenic and historical attributes.
- Opportunities for other bridge replacements (i.e., J.C. Boyle dam and Stateline) should be considered.
- There are open and closed roads that may provide opportunities for non-motorized use.
- The Topsy Grade should be left open for those to hike, bike, or provide access by motor vehicles.
- Access for existing wildlife hunting opportunities should not be affected.
- Maintain access to cultural resource gathering areas for tribal gatherers. The Tribe(s) should be contacted prior to closing roads to see if they have any concerns about road blockage.

Are road closures necessary to protect resource values? <SI>
- Inappropriate and unnecessary roads should be closed and restored to natural conditions.
- Using boulders and tank traps to close roads really does not work very well.
- Work with user groups if plans are made to close roads.
- In considering any road closures, please consider the impacts to PacifiCorp's ability to access and maintain hydroelectric project facilities and transmission lines that are in place.
- Limited closure of roads that do not provide access for recreation should occur.
- Support judicious road closures along with an active program to restore old and abandoned roads to their natural state.

What road system improvements or maintenance will be needed to accommodate existing, or potential traffic increases, and to ensure safety? <SI>
- Improve the access road to Take-out #6.
- The two main access roads should be maintained in passable condition. Appropriate spur

roads should be maintained similarly where they are useful for accessing the river or campsites.

- Maybe slightly improve the roads to Frain Ranch and the raft launch site. Leave most of the rest of the roads in their existing conditions with little to no maintenance.
- Extensive road improvements and on-going maintenance is needed for Topsy Road and North side river access road.
- No paving of the existing roads.
- The Topsy Road should be improved to stop resource damage that is presently occurring.
- Road maintenance agreements need to be developed for roads (e.g., Topsy) that have multiple ownership or administration.
- Topsy road, Stateline access road and North side river road need maintained.
- At a minimum the Topsy road should be gated and closed in winter and during wet weather. To stop excessive soil erosion and resource damage, this should include possible road closures during the hunting season.
- With the improvement of existing roads in the area, response time to a fire situation could be greatly enhanced.
- Improve stream crossings in the Stateline and Frain Ranch areas?

How will access to the river's edge be managed? <SI>

- Access to the river should be maintained.
- Fishing access should be maintained.
- Fishing access should be expanded, especially on private land.
- Access should be limited to the existing roads.
- Adequate access and camping opportunities should be provided and maintained to support enjoyment of these resources.
- Determine which roads should be opened for access to the river shoreline.
- The road to Frain Ranch should be blocked at Robbers Rock.

CULTURAL RESOURCES/PREHISTORIC SITES

Will archaeological resources in the area be directly or indirectly affected by existing, or increased, access and use? <SI>

- Conflicts are occurring where recreation use is affecting cultural sites.
- There are hundreds of Native American cultural sites, and a fair number of historical sites, along the Klamath River that should be protected.
- There are over 115 Shasta Cultural sites within the study area. Many of the sites such as those at Frain Ranch and the State Line Takeout, are being impacted to the point of destruction.
- The Klamath River Canyon is part of the Klamath Tribes aboriginal territory and they are concerned that sites not be impacted.
- Cultural sites exist in Segment 1 that should be considered in the plan.
- Cultural sites are affected by fluctuating river flows.
- Road access to, and camping in areas with cultural sites accelerates damage to the sites.

How will cultural sites be managed and protected? <SI>

- Sites should be managed cooperatively with interested Native American Tribes.
- There is disagreement on how different Tribes want the sites managed.
- There is disagreement on which Tribes currently and historically used the sites.

- The Klamath Tribes are only interested in protection and stabilization of sites in place.
- There may be direct conflict between the Shasta and Klamath Tribes over management of cultural resources in the canyon.
- The Klamath Tribes are not in favor of public tours of prehistoric cultural sites in the canyon.
- Suggest that the Shasta and Klamath meet on cultural management issues in the canyon.
- Locations of sensitive sites should be on a need-to-know basis.
- A complete inventory of all sites on both public and private or corporate ownership land must be done (including the east side of the river between Frain Ranch and the put-in).
- Heavily damaged sites may be strongly considered for detailed archeological study and excavation to recover what information that may yet remain to provide a more complete historical picture of past use.
- Cultural site protection should be higher priority than recreation use. All prehistoric sites must be protected at all costs regardless of ownership.
- It is vital to protect and even improve cultural sites.
- Protect cultural sites at all cost – purchase land where sites exist on private land.
- The BLM should propose solutions to the private landowners and work with them to stop the destruction of cultural sites.
- Plant poison oak around the Rain Rock to help prevent vandalism.
- Include cultural site interpretation in the management plan.
- Discuss the role that outfitters should or should not have in interpretation of, or "pointing out" cultural and historic sites to their clients.
- Signs should be used to educate and warn people about taking artifacts and destroying cultural sites. They need to describe the Antiquities Act and reference "penalty of law" for disturbance.
- Place signs on fences around sites to warn people of the need to protect the sites.
- Sites can be marked with warnings posted of the religious values to the native cultures with notices of fines for desecration.
- On-site monitor(s) or manager(s) would be effective in protecting sites.
- Cover sites with cloth and soil and then plant vegetation or turn into a parking lot so their presence is not obvious.
- Do not publish information on cultural sites that may increase the likelihood of the general public finding the sites.
- Create an educational program to teach respect for the sites; include lessons in grade school, local history course at Klamath Community College.
- Not sure education will foster respect unless it is geared toward younger generations.
- Have a meeting between the Shasta Nation and the off-road vehicle group would help educate the guides so that they can pass on the correct information to their guests and also avoid sensitive locations.
- Help protect sensitive sites. Maybe a course in local culture would be a good idea for rafting companies and other groups who use the area. Cultural resource information should be shared through a brochure, supplemented by a web page, to foster respect for the sites.
- Tours would increase public appreciation and may lead to protection.
- The Shasta Tribes should be amenable to sharing knowledge of some of their sites and ceremonies to selected groups.
- Collecting of artifacts by rafters and other members of the public must stop.
- There are several cultural sites within the river's corridor from the Keno dam downstream to the Put-In for the rafters. This stretch of the river corridor is not included in your scoping plan (Segment 1 should be expanded).

- The boundary of River Segment 3 should be expanded to include rim to rim (like Segment 2) for cultural resource issues.
- The sites at Fishing Access #6 need to be tested to determine their significance. This area may serve to relieve impacts on other upstream cultural sites.
- Cultural sites are being impacted by flooding caused by spills from the dams.

NATIVE AMERICAN TRADITIONAL USES

How will traditional cultural uses of the upper Klamath River management area be affected by the proposed activities? <SI>

- Keep open to Native Americans.
- Allowance of subsistence hunting and gathering by tribal members is imperative.
- We have long practiced our traditional hunting, fishing and gathering activities utilizing the methods of our ancestors and we fully intend on continuing this practice.
- The canyon should be open to traditional uses but other uses should not be curtailed or eliminated.
- Native Americans can post the time when they hold their ceremonies and alert public users to the fact and either redirect use or limit it so that the ceremonies would not be disturbed.
- Allow uses to continue: religion, hunt, fish, gather/teach.
- Areas of traditional tribal use for cultural and ceremonial activities should be identified and have limited or reduced access to non-tribal members.
- Access to the prehistoric hunting areas must be limited to foot travel only: no horses, bikes, ATV's, OHV's, etc.
- The Shasta Nation is interested in a modest expansion of the traditional subsistence used by the tribal members to provide food and materials for traditional cultural use.
- Use of wildlife resources by tribal members shall be tightly controlled and strictly enforced. Anti-poaching patrols will be added.
- Expand traditional tribal cultural activities to educate and improve communication and cooperation for joint management of the Klamath River system between the Shasta Nation and BLM.
- The boundary of river Segment 2 should be expanded to include the lithisol meadows in Section 1 on USGS map. These were traditional root gathering areas.
- Basketry materials in riparian areas along the river, are affected by upstream management.
- Flood releases are also impacting other resources such as riparian areas containing basketry materials.
- Fish harvest is adversely affected by water flows.
- The cultural section needs to be broadened to include all traditional lifeways. For example, fish are central to ceremonies, so if the fish are affected, tribal ceremonies are affected.

HISTORIC SITES

How will historic sites/structures be managed? <SI>

- The historic sites in the canyon were important to the settlement of Klamath County and should be interpreted.
- Maintain and keep up historic sites.
- I would like to see some of the old cabins and the sites like the schoolhouse at Frain Ranch and the Way Ranch at least stabilized. You would not suffer from a lack of manpower if you asked various organizations for help in doing these tasks.

- Historic landmarks should be kept open to the public as a source of heritage and beauty.
- It is probably not necessary, nor practical, to restore or maintain the remains of structures but to try to avoid vandalism of these resources.
- Bullet-proof interpretive signs should be provided at historic sites.
- If we can't have signs in the canyon because of vandals, then use brochures, self-guided tours or guided tours for groups when requested.

How can sites be protected from vandalism? <SI>
- More law enforcement is needed.
- More presence by people – not necessarily law enforcement -- is needed.
- Sites should be protected but not at the expense of those who enjoy other sites along the Topsy Grade.
- Sites can be marked with warnings posted of the historic values with notices of fines for desecration.
- Historic sites previously located by the Klamath County Historic Landmark Commission should be relocated and mapped.

WATERSHED VALUES

What will be the effect of proposed activities on water quality? <SI>
- Induced residential, commercial and industrial growth can adversely affect water quality.
- Baseline water quality and trends should be studied in the planning process.
- Use volunteer groups to do stewardship projects.

Can water quality (natural condition) be improved? <SI>
- The entire Klamath River has been listed as "water quality limited".
- Water requirements and habitat protection to meet water quality standards and protect beneficial uses must be a priority.
- Water quality needs improved most of all.
- Poor water quality led to a major outbreak of *Columnaris* that resulted in hundreds of thousands of fish and aquatic organisms dying in the river.
- Foam is also at nuisance levels and it impairs the visitor's water contact experience, whether as a boater, fisher, or swimmer.
- Restoration or reconstruction of PacifiCorp's canal emergency spillway could reduce excessive erosion and sedimentation.
- Floods bring sedimentation from logging practices. Big sediment loads clog the mouths of downstream creeks where fish try to retreat during bad river water conditions.

Will the proposed action conform to management direction for Riparian Reserves and Aquatic Conservation Strategy objectives? <SI>
- Consider the feasibility of adding large woody debris to the riparian and shoreline area to improve channel stability and function.
- Reestablishment of a healthy and diverse riparian community is important to meet Aquatic Conservation Strategy objectives.
- Improve riparian habitat by streamside willow planting and bank stability improvement projects.

What are the impacts of proposed management actions on water quantity and river flows? <SI>

- The management plan must address the issue of water flows necessary to meet not only WSRA objectives, but also those of the Endangered Species Act.
- The plan must address what water is needed to fulfill the purpose of outstanding and remarkable value protection.
- Higher and more uniform flows will better achieve the outstanding and remarkable characteristics of the river both for the fish as well as improving the whitewater rafting experience with the Wild Scenic River designation.
- Pursue river flows that optimize river rafting opportunities.

WILDLIFE AND FISHERIES

How will wildlife, including threatened and endangered species, sensitive species, other species of concern, and the habitats of these species be affected by proposed management activities and recreation use? <SI>

- Protect T, E, and S species including bald eagles, peregrine falcons, shortnose and Lost River suckers, redband trout, Townsends big-eared bat, and other State or Federally listed species and their habitat.
- The impact of any developmental project and consumptive recreational use should be assessed as to its impacts on bird migration in the canyon.
- Studies should also be conducted to assess other species-specific connectivity functions and needs.
- As humans move in, wildlife moves out, so don't let any more humans move in.
- Poaching occurs in the canyon.

How does existing management of the area affect fish, and how will the trout fishery be managed? (See also PacifiCorp issues). <SI>

- The excellent trout fishery should be maintained.
- Things should not be restored to conditions prior to 1850 just to benefit the fisheries.
- Although fisheries are a resource, so is power and recreation. One should not take precedence over the other. The fish have survived many years of the powerhouse releases and will continue to survive.
- If the flows are less haphazard and more planned the recreational users of the water can co-exist with the fisheries.
- A more stable, natural flow regime would provide for increased, but manageable, angler use and provide for improved conditions for the trout population.
- Wherever and whenever fish ladders/screens can be employed to project fish species, they should be implemented.
- With more stable, seasonal flows, the stream's productivity would improve and I would expect the redband trout population to increase in both fish number and average size.
- Irregular ramping creates fish "stranding ponds" which has a negative effect on the brood stock.
- Fish size – It appears that native trout do not grow to similar sizes as they do in comparable size and type streams especially at sites downstream of the J.C. Boyle Powerhouse). There are larger fish in the Bypass reach (River Segment 1).
- Although the planning area is within the historical range of coho and steelhead, these fish were not in the area at the time of Scenic River designation.

- What are the affects of hatchery fish on wild stock?
- The Pacific Lamprey should be able to survive above the dams.
- Suggest that the BLM do a study on possible genetic relations between the Red Band and Steelhead, as well as the Pacific and Brook Lamprey.
- This stretch of the river may once again provide habitat for anadromous fisheries; adequate fish passage may be needed.

How will wildlife habitat management affect other resource values? <SI>
- Limit wildlife enhancement projects so they don't restrict other uses.

FIRE AND FUELS

What is the current fire suppression strategy? <SI>
- Wildfire needs to be quickly controlled to prevent loss of the scenic value of the canyon.

What type and level of fuel treatments are necessary to protect resource values? <SI>
- Use prescribed fire and low impact logging to reduce fuel loads.
- Selective, careful, and thoughtful use of fire is a positive way to restore the former riparian seral stage to that of the pre-contact period.
- There is a need for fuel reduction treatments in the river canyon area.
- The CDF (California Department of Forestry) would be a willing partner in fuels treatment proposals with BLM and USFS.
- Control the fuel load through selective logging, controlled burns and control of slash on both public and private lands.
- Management should allow for activities that will reduce the risk of fire to a natural range of variability.
- Fuels treatment should incorporate all landowners in the canyon, with both public and private parties in agreement and collaborating.

VEGETATION AND BIOLOGICAL DIVERSITY

How will vegetation be managed in the short and long-terms, including removal or control of exotic or noxious weed species? (See also watershed - riparian issues). <SI>
- Emphasis should be placed on maintaining the canyon's black and white oak woodland habitats which occur here at the eastern extent range.
- "Restoration" projects should be geared to restoring and maintaining these habitats, but without logging larger diameter juniper and conifers that have survived in the canyon for over a century.
- There are invasive weeds (like star thistle) that are existing within the river corridors that compete with native vegetation and habitat for animals and plants.
- Remove all noxious weeds.
- Non-native noxious weeds are to be eliminated by intensive management practices, native noxious species may require control measures as well.
- No chemicals should be used to control noxious weeds.
- If foreign insects are used to control noxious weeds, then ensure that studies have been done to understand what effects those releases will have on the environment and that the insects will not get out of control.
- While there is no discussion of the possibility for pesticide or other herbicide use, Oregon

Natural Resources Council and the Klamath Forest Alliance would be highly critical of any such future plans.
- BLM needs to first evaluate before recommending any particular controls, how cattle and other ground disturbing activities can be eliminated to minimize the chance of further noxious weed species' reestablishment or spread.
- Firewood cutting should be allowed in the canyon.

What are the effects on rare or special habitats, such as springs, seeps, wallows, meadows, talus, and old-growth?
- Guidelines need to be developed to protect this unique geological area.

How will the Unmapped LSR (District Designated Reserve) in the Topsy area be affected by proposed management activities within the canyon?

BLM needs to assess the impact of any planned development activities or ongoing human disturbances on the key connectivity functions of the Siskiyou Crest, Klamath River Canyon and Southern Cascades Landscape Corridors.

AIR QUALITY

What effects will proposed management, including fuel treatment, have on air quality? <SI>
- From prescribed fires, smoke will degrade air quality. Smoke contains multiple chemical compounds and particulate matter. Describe the impacts of the planned prescribe fires on air quality and visibility.
- Wildland and prescribed fires need to be conducted consistent with the Federal Clean Air Act.
- A smoke management program must be presented.
- Class I airsheds and Wild and Scenic Rivers should be considered sensitive areas (receptors) that you need to identify and avoid when evaluating environment impacts.
- Air quality monitoring must be completed.

LAND TENURE/OWNERSHIP

Will land tenure (ownership) be altered in the area? <SI>
- There are opportunities to develop new/different recreational sites if private lands are acquired in the canyon.
- Acquire additional private lands within the river corridor in exchange for BLM lands elsewhere.
- The BLM or Forest Service need to purchase the Frain Ranch private land section. PacifiCorp potentially has lands that they are interested in disposing.
- PacifiCorp may want to acquire public land where they are permitted to operate existing facilities.
- Acquire land through purchase/condemnation to distribute recreation use.
- Acquire land to prevent housing near Canyon rim.
- Acquire old Beswick hotel site and hot spring for future recreation development.
- Propose to adjust the power withdrawal at the old housing site below powerhouse so the site can be used for public recreation.

- Given the uncertain future of private lands within the canyon, particularly in the Frain Ranch area, it would be prudent and appropriate to try to get those lands into public ownership to maintain future public use.

How will Klamath County and Siskiyou County "No Net gain" policies affect potential land tenure adjustments?

- Acquisition of private land in California by BLM is of concern to Siskiyou County.
- There may be interest by certain Tribes in acquiring land in the California portion of the river corridor.

SOCIO-ECONOMICS

What are the impacts, including induced effects, upon the local and regional economies, from potential changes in Land Tenure/Ownership? <SI>

How will the economic viability and operations of existing permitted outfitters and guides be affected with proposed management? <SI>

- The Upper Klamath provides rafting and kayaking. Many commercial outfitters rely on this resource for livelihood. This stimulates commerce in an area with little else to live on.
- Releases from J.C. Boyle Powerhouse make possible boating recreational opportunities for thousands of people each season.

What will be the socioeconomic impacts from management activities to surrounding landowners, private companies and the local community? <SI>

- Socioeconomic analysis should also consider power production, private timber land, grazing, etc.
- Evaluate the impact of the whitewater business on the health of the regional economies within Oregon and California?
- The deleterious water quality effects have caused an economic impact to downstream residents and visitors in the Klamath Basin. Your plan and EIS must discuss the economics of impairment and, conversely, the economics of restoration and meeting CWA objectives.
- Your plan should include an economic section that determines the economic benefits that would come if water quality were improved to meet Clean Water Act required standards.
- Improved trout population and riparian condition would support much more angler use that would contribute to the local economies.
- Rafting has few benefits to the local (Klamath Falls) economy.

What will be the effects on Indian tribes, and minority and low-income populations?

- Identify tribal assets (i.e., procured rights and the fiduciary responsibility that the federal government has for tribes). <SI>
- Discuss environmental justice issues, proposals that disproportionately affect minorities and those who are economically disadvantage. (Executive Order 12898 (*Federal Actions to Address Environmental Justice In Minority Populations and Low-Income Populations*) issued on February 11, 1994.)

PACIFICORP'S POWER GENERATING FACILITIES

How does existing or future operation of power generation facilities affect recreation

management of the area? (Also see recreation activities issues). <SI>

- Releases from J.C. Boyle Powerhouse should be consistent and predictable for increased enjoyment of the natural resources that flourish in the river canyon.
- To what extent will the plan address water releases from the J.C. Boyle powerhouse to meet recreation demand?
- Minimum flows (1500cfs or >) need to be maintained to sustain the 20 year old rafting industry.
- Daily and timely releases are crucial for rafting, such as 10am releases Friday through Monday, and 11am releases Tuesday through Thursday.
- Disruptive peaking flows largely restrict trout habitat.
- Flow ramping affects fish habitat.
- Determine the optimum level of water releases for fishing.
- Determine the optimum level of water releases for rafting.

How does PacifiCorp's operation of power generating facilities affect the river ecosystem? <SI>

- PacifiCorp's operation negatively affects water quality and quantity?
- Erosion of river banks from the raising and lowering of the river (from the power plant operation is a concern.
- Dumping of water from the emergency spillway at the J.C. Boyle's canal tunnel entrance is causing excessive erosion and sedimentation.

What are PacifiCorp's plans for maintaining, upgrading, or expanding their facilities within the plan area? <SI>

- No new power lines or other obtrusive developments should be allowed within the river management corridor.
- Describe the level of maintenance of roads, recreation sites, power lines and bridges that PacifiCorp proposes.
- PacifiCorp stated that they are not planning to expand power generation to Keno dam.
- It is rumored that PacifiCorp is planning to add another generating unit to J.C. Boyle dam, and retrofitting Keno dam and other dams.

How will this plan affect PacifiCorp's Operations in the planning area? <SI>

- The plan should not affect PacifiCorp's ability to operate and maintain existing transmission right-of-ways.
- The plan should recognize right-of-ways as utility corridors in accordance with Section 503 of the Federal Land Management and Policy Act.
- It is not clear to ODEQ how and if the new KRMP and EIS may direct or motivate PacifiCorp to modify management and/or operation of it's hydroelectric facilities or lands such that water quality may be affected.

How will this plan affect the FERC relicensing process for PacifiCorp's facilities? <SI>

PRIVATE LAND

What are the effects on private land within the canyon from management of BLM land? (See also recreational, cultural resource and PacifiCorp Issues). <SI>

- Risks to PacifiCorp due to injury, harm or damages to persons or property are greatly

increased when the public is encouraged to recreate on our property.
- PacifiCorp has incurred substantial costs as a result of damages caused by the public's use of PacifiCorp property, it's recreation sites and trespass along the river.

What role does the State of Oregon have in management of private lands within the River canyon? <SI>

How can the Federal government ensure adequate recreational access to the river if it doesn't own the land? <SI>

How can the Federal government allow recreational use (for example boater take-out at Frain ranch) if it doesn't own the land? <SI>
- What is the liability to the government or the private landowner if use originating on public land is allowed to continue on private land.

What are the effects on private property owners within the canyon? <SI>
- Discuss the effects of proposed management direction on private property rights.
- Will management restrict private landowners ability to develop their private land?
- Describe why and how private lands would be acquired within the planning area boundaries.

What are PacifiCorp's plans for managing land not associated with power generation within the planning area? <SI>
- PacifiCorp is concerned that the recreation planning for the area take into account the potential recreation development resources and values associated with PacifiCorp property and not limit the potential for development or sale.
- Water rights add considerable value to private property in the river corridor and should be recognized and protected.
- Impacts of plan objectives or recommended actions to the value of PacifiCorp's land holdings or the Company's continued ability to manage these lands, including financial implications, need to be addressed in the proposed management plan.
- What are the options to "trade-off" management of different lands in the canyon, for example, PacifiCorp owns Frain Ranch, but BLM spends more time there?

GRAZING

What effect does grazing have on management of the river corridor? <SI>
- Grazing must be restrictive and tightly controlled.
- Analyze how many AUMs are allowed on both public and private land and what impact that has on other resources?
- Grazing and potential control of invasive weeds is contributing to non-attainment of water quality standards.
- The Klamath Forest Alliance and Oregon Natural Resources Council do not believe grazing on BLM lands which are the subject of this plan are compatible with maintenance of the Klamath River's outstanding and remarkable values.
- Livestock grazing has no place in maintaining the natural environmental conditions that support the native species.
- The Pokegama wild horse herd needs to be considered in your planning.

CUMULATIVE IMPACTS

What are the cumulative effects that could occur with implementing the proposed management plan? (Also see other resource related issues). <SI>

- Adverse effects that may result downstream as a result of implementing this management plan need to be analyzed.
- Cumulative effects need to be considered; including issuing permits for federal land use, that results in negative impacts occurring on private land.
- Fuels management can have negative cumulative effects on air quality.
- Cumulative effects to cultural resources result from recreational use in the canyon.
- OHV use can cause impacts to many other resources and these cumulative effects need to be addressed.
- Discuss any effects to land above J.C. Boyle dam.

OTHER ISSUES

What is the process for determining management of the River corridor? <SI>

- Involve public and private organizations in development of the plan.
- It is possible that beneficial actions for one ORV (Outstandingly Remarkable Value) could be in conflict with another.
- Expand the scope of your analysis to be assure that activities proposed are consistent with both the requirement of Section 10 and 12 of the federal Wild Scenic Rivers Act.
- The planning area boundary needs to be expanded to include rim-to-rim management throughout the length of the planning area.
- Include the river between the Keno dam and the J.C. Boyle dam (the Shasta Nation requests the inclusion of this short but pristine section for protection of resources).
- Clarify the role the State of Oregon has in management of public and private lands within the River canyon?

What "baseline" condition will be considered for the analysis?

- Baseline should assume hydroelectric power generation since 1958 and ranching activities since the late 1800s.

The Klamath River Plan Process needs strong representation on the subcommittee of the Klamath PAC from the outfitter, recreation and visitor bureau communities.

How does this process relate to other planning activities in the basin? <SI>

- Describe the potential implications of the proposed action on the Bureau of Reclamation (BOR) Klamath River Anadromous Fish Restoration and Operation Plan (an attempt to address flow, water quality, and Endangered Species Act issues); FERC relicensing; and total Maximum Daily Load (TMDL) development.
- State how all four actions (i.e., BLM/River Management, FERC relicensing, BOR Operations; EPA/State TMDLs) would or could interact to maximize the environmental benefits for the River while addressing the purpose and need of the Federal action.
- As a partner in the Klamath TMDL process, BLM will be expected to develop and implement a Water Quality Management Plan for lands under it's jurisdiction including those lands being considered under the KRMP and EIS.
- Describe the effects of increasing Upper Klamath Lake storage capacity.

BLM should identify problems in the upper Klamath basin that adversely affect downstream (Lower Klamath River) Wild and Scenic River values.

What management is proposed for Salt Caves? <SI>
- If revived, the Salt Caves Project will affect river management.
- Describe how the Cave management plan relates to this proposed river plan.

Attachment 2

Public Participation Plan

Preparation Plan - Attachment 2 Rev. October, 2001

Upper Klamath River Management Plan
Environmental Impact Statement
Public Participation and Consultation Activities

This plan is intended to provide opportunities for the public to meaningfully participate in and comment on the proposed Upper Klamath River Management Plan (CFR 43, Chapter II, 1610.2) and associated environmental impact statement. Meetings will be held to share information on the proposed action throughout each major step of the analysis process. In addition information may be provided on a public access web site and through occasional public mailings. This document is intended to address public involvement during the initial scoping phase which includes identification of planning issues, alternatives and work scopes for analysis of alternatives to be documented in a draft environmental impact statement. . This plan would adhere to the CEQ 40 CFR, BLM Manual 1614, and Wild and Scenic River manual requirements for public participation and outreach

Consultation Meetings
Klamath Tribes Executive Committee, Chiloquin, OR (Numerous meetings)
Shasta Nation, Quartz Valley, CA (Numerous meetings)
Shasta Nation, Yreka, CA*
Shasta Nation, MacDoel, CA*
Fish and Wildlife Service Consultation, Klamath Falls, OR (Numerous meetings)
Hupa, Karuk, and Yurok Tribes

Public Meetings/Open Houses
Open House, Klamath Falls, OR
Open House, Yreka, CA

Coordination Meetings
Klamath Provisional Advisory Committee (PAC)
Upper Klamath Basin subcommittee of the PAC (Numerous meetings)
Interagency Review Group (Numerous meetings)
PacifiCorp
Redding Resource Area
Medford District
Lakeview District
Oregon State Office, BLM
California State Office, BLM
Klamath National Forest

Informational Meetings
Recreation Working Group
Service Clubs, Klamath Falls, Klamath Falls, OR (Potential)
Klamath River Outfitters Assn., Klamath Falls, OR (Potential)
Klamath Four Runners, Klamath Falls, OR (Potential)
Sierra Club - Klamath Chapter, Klamath Falls, OR (Potential)

Audubon Society - Klamath Chapter, Klamath Falls, OR (Potential)

Federal Register Notices and Media Contacts

Notice of Intent
Notice of Availability for DEIS and public meeting dates
Notice of Availability for FEIS and public meeting dates

Media Contacts

Yreka Sisikyou Daily News (Newspaper)
Klamath Falls Herald and News (Newspaper)
Redding Searchlight (Newspaper)
Eureka, California (Newspaper)
Eureka Television Stations
Klamath Falls Television Stations
Medford Television Stations
Redding Television Stations
Yreka Television Stations
Klamath Falls Radio Stations
Medford Radio Stations
Yreka Radio Stations
Eureka Radio Stations

Other Sources of Information

Lakeview District, KFRA Web Site

* These groups are not part of a Federally Recognized Tribe, but have requested to be involved with the process so they will receive similar information as the existing recognized tribes.

Attachment 3

Draft River Management Plan Outline

Klamath River Management Plan
EIS Outline
10/16/01

Chapter 1 - Introduction
Background Information and Description of the Planning Area
Purpose and Need for the Plan
The Planning Process
Public Involvement
Compliance with Existing Management Plans
- ACEC
- National Wild and Scenic River Segment
- Oregon Scenic Waterway Segment

Description of Why Outstandingly Remarkable and ACEC Values Were Designated
- Recreation
- Wildlife
- Fish
- Pre-Historic
- Historic
- Scenic Quality
- Native American Traditional Use

Chapter 2 - Affected Environment
General Setting
- Physiography
- Geology
  - Minerals
  - Soils
- Land Ownership
- Existing Rights
- Regional/Local Access

Socioeconomics
Air Quality
Water Resources
- Beneficial Uses
- Energy Generation
- Water Rights
- Stream flows
- Water Quality

Vegetation/Plant Communities
- Survey and Manage Species
- Range Resources

Grazing Allotments
Range Condition
Pokegama Wild Horse Herd
Forest Management
Noxious Weeds
Fire Management
Aquatic and Terrestrial Habitat
Terrestrial Species
Birds
Mammals
Herptiles
Aquatic Species
Aquatic Habitat
Redband Trout of the Klamath River
Lost River and Shortnose Suckers
Other Species
Management of Fishery Resources
Recreation
Scenery
Whitewater Boating
Fishing
Hunting
Camping
Recreation Sites/Facilities
Cultural Resources/Traditional Uses
Prehistoric
Historic
Native American Traditional Uses

Chapter 3 – Desired Future Conditions, Issues and Alternatives
Desired Future Conditions of the River Corridors
Issues
Wild and Scenic River and ACEC values
Scenic Quality
Recreational Use/Activities (Including Recreational Carrying Capacity)
Recreation Facility Development
Roads/Access
Cultural Resources/Traditional Uses/Historic Sites
Water Resources/Watershed Values
Wildlife and Fisheries
Fire and Fuels Management
Vegetation and Biological Diversity
Air Quality
Land Ownership/Land Tenure/Private Lands
Socioeconomics

Energy Generation Facilities
Private Land
Grazing
Cumulative Impacts
Other Issues

Alternatives
- Alternative 1 – Existing Management (No Action Alternative)
- Alternative 2 – Enhancement/Improvement of Values (Resources and Opportunities)
- Alternative 3 – Natural Resource Enhancement/Restoration/Preservation
- Alternative 4 – Expand Human Use Opportunities

Chapter 4 - Oregon State Scenic Waterways Administrative Rules
- Oregon Scenic Waterways Program
  - Program Goals
  - Scenic Waterways Classification
- Proposed Land Management Rules
- Management Recommendations for the Upper Klamath River Scenic Waterway

Chapter 5 - Environmental Consequences

Chapter 6 - Implementation
- Strategies, Roles, and Interagency Responsibilities
  - Land Acquisitions/exchanges
  - Administration/management of river corridor
  - Cost Estimates
- Monitoring and Evaluation
  - Data Collection
  - Evaluation Strategy

Chapter 7- Consultation and Coordination
- BLM Management
- BLM Review and Consultation
- Support Services
- Agencies and Organizations Contacted or Consulted
- Business, organizations, and agencies to whom copies of the DEIS were sent
- Individuals, businesses, organizations, and agencies who submitted comments on the DEIS

Appendices
- Salt Caves Management Plan
- Species List for Birds, Mammals, and Herptiles
- Species List for Fish
- Species List for Plants
- Recreation Survey Results
- Scenic Quality Analysis Results
- Air Quality Management Plan

Attachment 4

Upper Klamath River Interdisplinary Team Members
And
The Upper Klamath Basin Subcommittee of the Klamath Provincial Advisory Committee Members

Klamath River Core Interdisplinary Team Members

Larry Frazier	Team Leader
Don Hoffheins	Planner
Maple Taylor	Writer-Editor
Gayle Sitter	Wildlife Biologist
Scott Snedaker	Fisheries Biologist
Scott Senter	Outdoor Recreation Planner
Grant Weidenbach	Klamath River Ranger
Michelle Durant	Archeologist
John Olthoff	Law Enforcement Officer
Mike Limb	GIS Specialist
Bill Lindsey	Range Conservationist
Bill Johnson	Forester
Mike Turaski	Hydrologist
Jan Houck	Oregon Parks and Recreation Dept., Recreation Planner

The Upper Klamath Basin Subcommittee of the Klamath Provincial Advisory Committee

Teri Raml	BLM, Klamath Falls Resource Area, Field Manager
Steve West	Klamath County Commissioner
Joan Smith	Siskiyou County Commissioner
Jim DePree	Natural Resource Assistant for the Siskiyou County Commissioners (alternate for Joan Smith)
Bill Hunt	Oregon Department of Forestry
Steve Lewis	US Fish and Wildlife Service
Bob Davis	Bureau of Reclamation
Alice Kilham	Representing Other Interests
Louis Randall	Representing Other Interests
Marilyn Livingston	Representing other interests (alternate for Louis Randall)
Pat McMillian	Representing Recreation/Tourism Interests
Ed Kupillas	Representing Forest Products Industry

UPPER KLAMATH RIVER MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT
SCOPING REPORT

A. INTRODUCTION

1. PURPOSE OF THIS REPORT

This report summarizes the results of Scoping for the Upper Klamath River Management Plan Environmental Impact Statement (EIS). A Scoping process is used to determine the scope of the environmental analysis to be completed. Early in the NEPA (National Environmental Policy Act) process the analysis team identifies (1) the issues to be addressed, (2) Significant Issues to be used in the formulation of alternatives, (3) alternatives to the proposed action, and (4) the depth and scope of the analysis.

This initial Scoping Report details the first three products of the scoping phase of the Upper Klamath River Management Plan EIS. These products include:

- Scoping Issues identified in public and agency comments received during the scoping period;
- Significant Issues that serve as the basis for developing and comparing alternatives;
- Range of Alternatives (conceptual), including alternatives considered but eliminated from detailed analysis and alternatives considered in detail;

2. SUMMARY OF THE SCOPING PROCESS

The scoping process for the Upper Klamath River Management Plan EIS began in December 2000 with legal advertisement, mailing a Scoping Document to interested groups and individuals, and notice in the Federal Register of the initiation of the EIS process. At the close of the initial scoping period on January 31, 2001, 36 written responses (including comments documented at two scoping meetings) had been received. Individual comments within these have been consolidated into 57 different issue statements addressing 15 topic areas.

An Interdisciplinary Team (IDT), an Interagency Review Group, and the Upper Klamath Basin Subcommittee of the Klamath Provisional Advisory Committee (PAC Subcommittee) have been established and have assisted in identifying significant issues and a range of alternatives to assess in the EIS. The IDT consists of specialists from the Klamath Falls Resource Area and other BLM offices, and is responsible for day-to-day project management. The Interagency Review Group is composed of representatives of Tribal, federal, state and local government agencies involved or interested in the project. The purpose of the Review Group is to foster communication among agencies and provide early identification of needed information to facilitate permitting processes.

<u>Scoping activities included:</u>

- Scoping Document mailed to 225 people or businesses on a project mailing list.
- News Releases and Notification in the Federal Register.
- Public scoping meetings on January 16, 2001 in Yreka, California, and January 17, 2001 in Klamath Falls, Oregon.
- Interagency Review Group scoping meetings on December 13, 2000.
- Upper Klamath Basin Subcommittee meetings on September 27 and December 8, 2000, and January 5, 2001.
- Government-to-government consultations with the Klamath Tribes and briefings with Tribal staff.
- Briefings with local and regional organizations, recreation groups, and community groups.
- Briefings with the BLM Oregon State Office, and Lakeview District and Redding District staffs.

B. SCOPING ISSUES

The list of scoping issues below is based upon public and agency comments received during the scoping period that closed on January 31, 2001. The issues identified in these comments have been condensed and consolidated and are not all inclusive. The issue statements are paraphrased as questions, often from numerous public comments and are not intended to be quotations. It is recognized that there are numerous sub-issues associated with the main issues. Some of these sub-issues, highlighted by bullets following the issue statement, may be helpful in developing alternatives. Not all issues and sub-issues will be addressed in the Environmental Impact Statement (EIS) and Record of Decision (see discussion later on Significant Issues).

All issues addressed in the EIS will be analyzed for potential positive and negative effects, including:

- on-site and off-site impacts (impacts occurring outside the project area and on private lands inside the project area);
- direct, indirect and cumulative impacts;
- short and long-term positive and negative impacts;
- unavoidable adverse effects.

The following pages include a list of issues, with specific public statements, from initial scoping.

RECREATION FACILITIES

What are the types and numbers of developed sites needed in the canyon?
- No further development should occur in the canyon.
- More restrooms and campgrounds are needed.
- A simpler vault toilet could beless costly to build and repair.
- Keep low maintenance (semi-primitive) facilities and don't substantially upgrade facilities.
- A parking lot at the old PPL housing site needs to be developed with a path to the put-in.
- Why are we expanding recreation facilities sincewe can't keep existing facilities going?
- Designated camping areas would preserve the area's ecosystem.
- Development should focus on adding and improving campsites. I support a minimum 100 foot non-development corridor (buffer), measured from the high-water line, for facility development.
- The fewer facilities the better. If any other facilities are needed, limit them to porta-potties and concrete and steel barbeque pits.
- Allow river users to utilize Access #6 as a take-out and put-inoption.
- There is a need for toilet facilities at Frain Ranch, on one side of the river or both.
- Possibly provide a joint use law enforcement officer residence.
- There is room for additional campsites at the BLM Campground; those additional sites are probably needed and appropriate.
- Toilet facilities should be maintained at the BLM CG and the Frain Ranch area in addition to the BLM "put-in and take-out."
- To facilitate recreational use for visitors not in a "boat", new trails to and along the river in appropriate locations would be assets to the area. Such trails would be most useful in the canyon between the Frain Ranch area and the state line where it is largely inaccessible except via water.
- A trail along each side of the river between Copco and HWY 66 at the Klamath River encouraging backpacking would be desirable.
- Don't build new trails or roads.

How will facilities (on public and private land) be maintained?
- Recreational facilities need to be maintained.
- The restrooms at Frain Ranch should not be locked.
- Close campgrounds around old Frain Ranch.
- Explain why the toilet at Frain Ranch is closed.

RECREATION ACTIVITIES

What is the appropriate recreational carrying capacity for the river?
- Use needs to be monitored more closely.
- Maintain current level of commercial rafting use.
- Guidelines need to be developed to protect this unique geological area.
- With increasing recreational use of the river, nearby recreation site use may increase as well.
- Need to assign limits with Tribal input.
- There should be no restrictions on whitewater rafting.
- A crowded put-in doesn't necessarily mean that there is a carrying capacity problem.

What recreational uses will be proposed?

- Recreation use is booming, people are wanting to experience the great outdoors whether it is camping, fishing, rafting, or etc.
- Fishing, Hunting, Hiking and OHV use should be allowed.
- Camping by non-natives should be restricted to BLM designated camping grounds.
- Minimal impact, non-consumptive recreation should be given priority over consumptive or high impact OHV or commercial uses.

How can existing and potential increases in uses be managed to protect the values in the river corridor?

- There is more use than documented.
- Litter from recreational use must be tightly monitored.
- Rafting of the river must remain a strictly controlled activity.
- Any conflicts between river-runners and otherrecreationists is more likely to be competition for camp sites. Adequate opportunities for dispersed camping along the river and within the canyon should minimize that problem.

How will recreation activities be managed?

- More vigilant patrols in canyon during peak usage period, may through September.
- Have law enforcement phone numbers posted.
- The river from J.C. Boyle Powerhouse to Copco Reservoir should be kept open to the public for recreation and tourism.
- Law enforcement personnel are to be allowed to patrol in all areas to protect the canyon and its values, and consultation with tribal patrols should be maintained for assistance in protecting cultural sites.
- BLM needs to have a plan that encourages and facilitates enforcement, rather than a plan which inherently eludes enforcement.
- The plan should stipulate that when funding is unavailable, vehicle access to these sensitive or otherwise improperly regulated areas will have to be closed.
- Day tripshave less impact than overnight trips.
- Camping is great and I would hate to see a limitation on two-day (overnight) raft trips.

Specifically, how will OHV use be managed?

- No OHV use should be allowed off-roads.
- OHV use to be banned within 1 mile of Canyon rim in Oregon-California
- OHV (off-highway vehicle) use should not be eliminated.
- OHV use should be strictly banned within the canyon area due to its destructive nature and abuse to house pits and ceremonial areas.
- Use of ATV's and ORV's, indeed all vehicles, should be confined to maintained roads to avoid damage to soil and vegetative resources and reduce harassment to wildlife and recreational users.
- Continue to deny access to Salt Caves.

Will existing wildlife hunting opportunities be affected?

- Wildlifehunting opportunities should be maintained. No hunting in canyon in summer months.
- Recreational hunting can be allowed but the Shasta Council must be involved in the setting of reasons, bag limits, etc.

How will use of firearms be managed within the river corridor?

- Restrict Firearm use.
- Do not restrict firearms.

- No firearm use during rafting season- Maythrough September.
- More law enforcement is needed.
- Not opposed to legal hunting, but discharge of firearms seems to be random and indiscriminate and surely ruins ones enjoyment of the area.
-

ROADS AND ACCESS

What is the appropriate transportation system for the river corridor?

- Limited closure of roads that do not provide access for recreation should occur.
- Consider helicopter logging and other low impact options with minimal road development to perform projects to reduce fuel loading.
- I support judicious road closures along with an active program to restore old and abandoned roads to their natural state.
- I definitely don't want to see any more roads developed or the existing roads made better.
- Work with user groups if plans are made to close roads.
- Using boulders and tank traps to close roads really do not work very well.
- In considering any road closures, please consider the impacts to PacifiCorp's ability toaccess and maintain hydroelectric project facilities and transmission lines that are in place.
- The two main access roads should be maintained in passable condition. Appropriate spur roads should be maintained similarly where they are useful for accessing the river or campsites.
- Inappropriate and unnecessary roads should be closed and restored to natural conditions.
- New, unobtrusive roads may be appropriate to access the river, campsites or other resources.
- Provision of a new bridge at the old "Burned Bridge" site would be an asset to the area that would provide better seasonal access to the Frain Ranch area and provide for a loop road through the canyon facilitating the enjoyment of its scenic and historical attributes.
- No new roads are to be built.
- Eliminate and ban use of OHV, 4-wheelers, motorcycles, etc. in all areas within 1 mile of the canyon rim edge on both sides of the river.
- Transportation management must be directed to benefit the ecological, social and economic values in the area in a way that integrates or balances all values.

What road system improvements will be needed to accommodate existing or potential traffic increases and to ensure safety?

- Improve access road to Take-out #6.
- Maybe slightly improve the roads to Frain Ranch and the raft launch site. Leave most of the rest of the roads in their existing conditions with little to no maintenance.
- Extensive road improvements and on-going maintenance is needed for Topsy Road and North side river access road.
- No paving of the existing roads.
- The Topsy Road should be improved to stop resource damage that is presently occurring.

What road maintenance needs can be expected and how will they be financed?

- Topsy road, Stateline access road and North side river road need maintained.
- At a minimum this road should be gated and closed in winter and during wet weather. To stop excessive soil erosion and resource damage, this should include possible road closures during the hunting season.

- The Topsy Grade should be left open for those to hike, bike, or provide access by motor vehicles.
- With the improvement of existing roads in the area, response time to a fire situation could be greatly enhanced.
- How can you deal with stream crossings (in the Stateline area)?

How will access to the river be managed?

- Access tothe river should be maintained.
- Fishing access should be maintained.
- Fishing access should be expanded, especially on private land.
- Access should be limited to the existing roads.
- Adequate access and camping opportunities should be provided and maintained to support enjoyment of these resources.
- Use of roads by tribal members for cultural, religious, and ceremonial purposes must remain unrestricted. Keys to the locked gates for access to the lower river areas must be provided to the Shasta Nation tribal council at the earliest convenient date.
- From State Line to Copco, rafters are starting to take out at other areas on private land. How can this be stopped?

CULTURAL RESOURCES/PREHISTORIC SITES

Will archaeological resources in the area be directly or indirectly affected by existing or increased access and use?

- There are conflicts between recreation activities and cultural site protection.
- There are hundreds of Native American cultural sites, and a fair number of historical sites, along the Klamath River.
- There are over 115 Shasta Cultural sites within the study area. Many of the sites such as Frain Ranch and the State Line Takeout, are being impacted to the point of destruction.

How will cultural sites be managed?

- Cover sites with cloth and soil and then plant vegetation or turn into a parking lot so their presence is not obvious.
- Plant poison oak around the Rain Rock.
- Sites should be managed cooperatively with interested native American Tribes.
- There is disagreement on how different Tribes want the sites managed.
- There is disagreement on which Tribes currently and historically used the sites.
- Locations of sensitive sites should be on a need to know basis.
- A complete inventory of all sites on both public and private or corporate ownership land must be done (including the east side of the river between Frain Ranch and the put-in).
- Heavily damaged sites may be strongly considered for detailed archeological study and excavation to recover what information that may yet remain to provide a more complete historical picture of my people.
- All prehistoric sites must be protected at all costs regardless of ownership.
- Will the BLM propose solutions to the private landowners to work with them to stop the destruction of cultural sites?

How can cultural sites be protected?

- It is vital to protect and even improve these sites.

- Do not publish information on cultural sites that may increase the likelihood of the general public finding the sites.
- Place signs on fences to protect.
- Create an educational program toteach respect for the sites; include lessons in grade school, local history course at Klamath Community College.
- Have a meeting between the Shasta Nation and the off-road vehicle group.
- Cultural resource information should be shared through a brochure, supplemented by a web page, to foster respect for the sites.
- Tours would increase public appreciation and may lead to protection.
- I would hope that the Shasta Tribes would also be amenable to sharing knowledge of some of their sites to selected groups.
- Sites canbe marked with warnings posted of the religious values to the native cultures with notices of fines for desecration.
- Cultural site protection should be higher priority then recreation use.
- Protect at all cost/purchase land where sites exist from private.
- Collecting of artifacts by rafters and other members of the public must stop.
- There are several cultural sites within the river's corridor from the Keno Fish Ladder downstream to the Put-In for the rafters. I am concerned that this stretch of the river corridor is not included in your scoping plan.
- Help protect sensitive sites. Maybe a course in local culture would be a good idea for rafting companies and other groups who use the area.

TRADITIONAL USES

How will traditional cultural uses of the Upper Klamath River management area be affected by the proposed activities?

- Keep open to Native Americans.
- The canyon should be open to traditional uses but other uses should not be curtailed or eliminated.
- Native Americans can post the time when they hold their ceremonies and alert public users to the fact and either redirect use or limit it so that the ceremonies would not be disturbed.
- Allow uses to continue: religion, hunt, fish, gather/teach.
- Allow expanded use of wildlife and fish.
- Allowance of substance hunting and gathering by tribal members is imperative.
- Areas of traditional tribal use for cultural and ceremonial activities should be identified and have limited or reduced access to non-tribal members.
- Access to the prehistoric hunting areas must be limited to foot travel only: no horses, bikes, ATV's. OHV's, etc.
- We have long practiced our traditional hunting, fishing and gathering activities utilizing the methods of our ancestors and we fully intend on continuing this practice.
- The published interest and historic use of the Klamath River is overstated and exaggerated by the Klamath Tribes.
- The Shasta Nation is interested in a modest expansion of the traditional subsistence used by the tribal members to provide food and materials for traditional cultural use.
- May necessitate a small reduction in the late archery and controlled limited entry seasons by the

general public. Proposed tribal use will exceed current season lengths but not he overall harvest levels to insure healthy populations.

- Use of wildlife resources by tribal members shall be tightly controlled and strictly enforced. Anti-poaching patrols will be added.
- Expand traditional tribal cultural activities to educate and improve communication and cooperation for joint management of the Klamath River system between the Shasta Nation and BLM.

HISTORIC SITES

How will historic sites/structures be managed?

- The historic sites in the canyon were important to the settlement of Klamath County and should be interpreted.
- Maintain and keep up.
- Bullet-proof interpretive signs should be provided at historic sites.
- If we can't have signs in the canyon because of vandals, then use brochures, self-guided tours or guided tours for groups when requested.
- I would like to see some of the old cabins and the sites like the schoolhouse at Frain Ranch and the Way Ranch at least stabilized. You would not suffer from a lack of manpower if you asked various organizations for help in doing these tasks.
- Historic landmarks should be kept open to the public as a source of heritage and beauty.
- Topsy Road and adjacent historic sites (stage stops) should be acknowledged with the appropriate signs and interpretation, including the Frain Ranch and school.
- It is probably not necessary, nor practical, to restore or maintain the remains of structures but to try to avoid vandalism of these resources.

How can sites be protected from vandalism?

- More law enforcement is needed.
- More presence by people –not necessarily law enforcement -- is needed.
- Sites should be protected but not at the expense of those to enjoy other sites along the Topsy Grade.
- Sites can be marked with warnings posted of the historic values with notices of fines for desecration.

WATERSHED VALUES

What will be the effect of proposed activities on water quality?

- Induced residential, commercial and industrial growth can adversely affect water quality.
- Baseline water quality and trends should be studied in the planning process.
- Use volunteer groups to do stewardship projects.

Can water quality (natural condition) be improved?

- The entire Klamath River has been listed as 303(d), "water quality limited" river.
- Water requirements and habitat protection to meet water quality standards and protect beneficial uses must be a priority.
- Water quality needs improved most of all.
- Poor water quality led to a major outbreak of *Columnaris* that resulted in hundreds of thousands of fish and aquatic organisms dying in the river.

- Foam is also at nuisance levels and it impairs the visitor's water contact experience, whether as a boater, fisher, or swimmer.

Will the proposed action conform to management direction for Riparian Reserves and Aquatic Conservation Strategy objectives?

What are the impacts on water quantity and river flows?

- The management plan must address the issue of water flows necessary to meet not only WSRA objectives but those of the Endangered Species Act.
- Plan must address what water is need to fulfill the purpose of outstanding and remarkable value protection.
- Higher and more uniform flows will better achieve the outstanding andremarkable characteristics of the river both for the fish as well as improving the whitewater rafting experience with the Wild Scenic River designation.

WILDLIFE AND FISHERIES

How will threatened and endangered species, sensitive species, other species of concern, and the habitats of these species be affected, including bald eagles, peregrine falcons, shortnose and Lost River suckers, redband trout, and C-3 survey and manage species identified in the Northwest Forest Plan?

What will be the effects of management and use on other wildlife that use the area?

- As humans move in, wildlife moves out, so don't let any more humans move in.
- Predatory animal control will be aggressively pursued on cougar, bears, and coyotes within our ancestral lands to aid the wildlife populations. Traditional methods of predator control do include baiting and the use of dogs.
- Poaching occurs in the canyon.

How will wildlife habitat and habitat connectivity be affected?

- The impact of any developmental project and consumptive recreational use should be assessed as to its impacts on bird migration in the canyon.
- Studies should also be conducted to assess other species specific connectivity functions and needs.
- Special attention to connectivity functions for large predators, include wolverine and Pacific Fisher is also needed.
- Limit wildlife enhancement projects.

How will the trout fishery be managed?

- The excellent trout fishery should be maintained.
- Things should not be restored to conditions prior to 1850 just to benefit the fisheries.
- Although fisheries are a resource, so is power and recreation. One should not take precedence over the other. The fish have survived many years of the powerhouses releases and will continue to survive.
- If the flows are less haphazard and more planned the recreational users of the water can co-exist with the fisheries.
- Recreational catch and release of the fishery should be terminated permanently as the 10-30% mortality loss associated with this wanton waste type of recreational fishery is not acceptable to the

Shasta people.

- Restrictions on the use of bait must be ended as this method is both a recreational and traditional use.
- A more stable, natural flow regime would provide for increased, but manageable, angler use and provide for improved conditions for the trout population.

How does management of the area affect fish size (especially at sites downstream of the J.C. Boyle Powerhouse)?

- Wherever and whenever fish ladders/screens can be employed to project fish species, they should be implemented.
- With more stable, seasonal flows, the stream's productivity would improve and I would expect the redband trout population to increase in both fish number and average size.
- Increase base minimum fish flows from the dam.
- Fish size – It appears that native trout do not grow to similar sizes as they do in comparable size and type streams. There are larger fish in the Bypass reach (River Segment 1).

Will reintroduction of salmon be proposed and how will it be accomplished?

- Although the planning area is within the historical range of coho and steelhead, these fish were not in the area at the time of Scenic River designation.
- Restore anadromous fish passage.
- Restoration of the river ecosystem to its former productivity through fish passage is also a non-negotiable point. Technology exists to restore fish passage by the dams or the dams must be removed.

VEGETATION AND BIOLOGICAL DIVERSITY

How will vegetation be managed in the short and long-terms, including fuels treatment, vegetation removal, and exotic or weed species management?

- There are invasive weeds (like star thistle) that exist within the river corridors that compete with native vegetation and habitat for animals and plants.
- Remove all noxious weeds.
- Selective, careful, and thoughtful use of fire is a positive way to restore the former riparian seral stage to that of the pre-contact period.
- Non-native noxious weeds are to be eliminated by intensive management practices, native noxious species may require control measures as well.
- Emphasis should be placed on maintaining the canyon's black and white oak woodland habitats, which occur here at the eastern extent range.
- "Restoration" projects should be geared to restoring and maintaining these habitats, but without logging larger diameter juniper and conifers that have survived in the canyon for over a century.
- While there is no discussion of the possibility for pesticide or other herbicide use, ONRC and KFA would be highly critical of any such future plans.
- BLM needs to first evaluate before recommending any particular controls, how cattle and other ground disturbing activities can be eliminated to minimize the chance of further noxious weed species' reestablishment or spread.
- Firewood use should be allowed in the canyon.

What type and level of fuel treatments are necessary to protect resource values?

- I support use of prescribed fire and low impact logging to reduce fuel loads.
- There is a need for fuel reduction treatments in the river canyon area.
- The CDF (California Department of Forestry) would be a willing partner in fuels treatment proposals with BLM and USFS.
- Control the fuel load through selective logging, controlled burns and control of slash on both public and private lands.
- Management should allow for activities that will reduce the risk of fire to a natural range of variability.

What are the effects on rare or special habitats, such as springs, seeps, wallows, meadows, talus, and old-growth?

How will the Unmapped LSR in the Topsy area be affected by proposed management activities?

How does PacifiCorp's operation of power generating facilities affect the river ecosystem?

SCENIC QUALITY

How will the visual quality to/from critical viewpoints within and outside of the river corridor be affected by management activities and use of the river and roads?

- Because of the unique features in the area, it should remain as is.
- Preserve, enhance, restore where possible.
- Include severe restrictions and limitations on all logging activities within view of the canyon rim when viewed in-all directions from the highest points along the canyon rim.
- Scenic resources could be enhanced by removal of derelict wrecked autos off the upper end of Topsy Rd., restoration of the "Salt Caves Dam site" lurking over the Caldera, and stabilization of river flows to a more natural regime which would allow for establishment of riparian vegetation in the unsightly "intertidal zone" that currently affronts visitors at all but high flow periods.

AIR QUALITY

What effects will proposed fuel treatment have on air quality?

- Wildland and prescribed fires need to be conducted consistent with the Federal Clean Air Act.
- From prescribed fires, smoke will degrade air quality. Smoke contains multiple chemical compounds and particulate matter. Describe the impacts of the planned prescribe fires on air quality and visibility.

What are the potential air pollution impacts on Class I and II airsheds and sensitive areas?

- Class I airsheds and Wild and Scenic Rivers should be considered sensitive areas (receptors) that you need to identify and avoid when evaluating environment impacts.
- A smoke management program must be presented.
- Air quality monitoring must be completed.

LAND TENURE/OWNERSHIP

Will land tenure (ownership) be altered in the area?

- Acquire additional private lands within the river corridor in exchangefor BLM lands elsewhere.

- The BLM or Forest Service need to purchase the Frain Ranch private land section. PacifiCorp potentially has lands that they are interested in disposing.
- PacifiCorp may want to acquire public land where they are permitted to operate existing facilities.
- Acquire land throughpurchase/condemnation to distribute recreation use.
- Acquire land to prevent housing near Canyon rim.
- Condemnation procedures should be used to acquire lands within the one mile area extending away from each rim to preserve the scenic values for future generations.
- Given the uncertain future of private lands within the canyon, particularly in the Frain Ranch area, it would be prudent and appropriate to try to get those lands into public ownership to maintain future public use.
- Acquire critical lands by purchase, trades, or use of condemnation. Shasta Nation may include land acquired for trust purposes into the joint management efforts of the canyon and restoration of key cultural village sites used for ceremonial and religious purposes.
- No housing or construction of any kind to occur near the canyon to prevent development, urban sprawl and subsequent permanent damage to the area. Prevention can occur by purchase, litigation, or condemnation procedures to protect the wild and scenic values.

Are there options to "trade-off" management of different lands in the canyon, for example Frain Ranch since PacifiCorp owns it but BLM spends more time there?

How will Oregon and California "No Net gain" laws affect potential land tenure adjustments?

- Acquisition of private land in the area on the California side by BLM is an issue we have a concern with.
- We also understand that there may be interest by certain Tribes in acquiring land in the area.

SOCIO-ECONOMICS

What are the impacts, including induced effects, upon the local and regional economies, from potential changes in Land Tenure/Ownership?

How will the economic viability and operations of existing permitted outfitters and guides be affected with proposed management?

- The Upper Klamath provides rafting and kayaking. Many commercial outfitters rely on this resource for livelihood. This stimulates commerce in an area with little else to live on.
- The current releases from J. Boyle Powerhouse make possible recreational opportunities for thousands of people each season.

What will be the socioeconomic impacts of resource use to surrounding landowners, private companies and the local community?

- What account has been made to evaluate the impact of the whitewater business on the health of the regional economies within Oregon and California?
- The deleterious water quality effects have caused an economic impact to downstream residents and visitors in the Klamath Basis. Your plan and EIS must discuss the economics of impairment and, conversely, the economics of restoration and meeting CWA objectives.
- Your plan should include an economic section that determines the economic benefits that would come if water quality were improved to meet Clean Water Act required standards.
- Improved trout population andriparian condition would support much more angler use that would contribute to the local economies.

What will be the effects on Indian tribes, and minority and low-income populations?

- Identify tribal assets (i.e., procuredrights and the fiduciary responsibility that the federal government has for tribes).
- Discuss environmental justice issues, proposals that disproportionately affect minorities and those who are economically disadvantage. (Executive Order 12898 (*Federal Actions to Address Environmental Justice In Minority Populations and Low-Income Populations*) issued on February 11, 1994.)

PACIFICORP'S POWER GENERATING FACILITIES AND PRIVATE LAND

How does or will operation of existing power generation facilities affect management of the area?

- Releases from J.C. Boyle Powerhouse should be consistent and predictable for increased enjoyment of the natural resources that flourish in the river canyon.
- To what extent will the plan address water releases from the J.C. Boyle powerhouse to meet recreation demand?
- Minimum flows (1500 cfs or greater) need to be maintained to sustain the 20 year old rafting industry.
- Daily and timely releases are crucial for rafting, such as 10 AM releases Friday through Monday, and 11 AM releases Tuesday through Thursday.
- BLM should advocate first and foremost that PacifiCorp's relicensing results in the operation of the hydro facilities in a way that assures optimum salmonid fish passage and survival in Klamath River.
- Disruptive peaking flows largely restrict trout habitat.
- Flow ramping –how does this affect fish habitat?

How does PacifiCorp's operation affect water quality and quantity?

- How can we stop the erosion of river banks from the raising and lowering of the river (from the power plant)?

What are PacifiCorp's plans for maintaining, upgrading, or expanding their facilities within the plan area?

- No new power lines or other obtrusive developments should be allowed within the river management corridor.
- Can the dams be removed from the river?

How will this plan affect PacifiCorp's Operations in the planning area?

- the plan should not affect PacifiCorp's ability to operate and maintain existing transmission right-of-ways.
- The plan should recognize right-of-ways as utility corridors in accordance with Section 503 of the Federal Land Management and Policy Act.
- It is not clear to ODEQ how and if the new KRMP and EIS may direct or motivate PacifiCorp to modify management and/or operation of it's hydroelectric facilities or lands such that water quality may be affected.

What are PacifiCorp's plans for managing land not associated with power generation within the planning area?

- PacifiCorp has incurred substantial costs as a result of damages caused by the public's use of PacifiCorp property, it's recreation sites and trespass along the river.

- Risks to PacifiCorp due to injury, harm or damages to persons or property are greatly increased when the public is encouraged to recreate on our property.
- PacifiCorp is concerned that the recreation planning for the area take into account the potential recreation development resources and values associated with PacifiCorp property and not limit their potential for development or sale.
- .Water rights add considerable value to private property in the river corridor and should be recognized and protected
- Impacts of plan objectives or recommended actions to the value of PacifiCorp's land holdings or the Company's continued ability to manage these lands, including financial implications, need to be addressed in the proposed management plan.

OTHER ISSUES

What is the process for determining management of the River corridor?

- Involve public and private organizations in development of the plan.
- It is possible that beneficial actions for one ORV (Outstandingly Remarkable Value) could be in conflict with another.
- Expand the scope of your analysis to be assure that activities proposed are consistent with both the requirement of Section 10 and 12 of the federal Wild Scenic Rivers Act.

Will the current planning process revisit the status of other segments of the river.

- Include a recommendation and action steps to gain Congressional approval for Wild and Scenic designation in California.
- Segments 1 and 3 should be designated as a Wild and Scenic River.
- Include the river between the Keno dam and the J.C. Boyle dam (the Shasta notion requests the inclusion of this short but pristine section for protection of resources).

What "baseline" condition will be considered for the analysis?

- Baseline should assume hydroelectric power generation since 1958 and ranching activities since the late 1800s.

The Klamath River Plan Process needs strong representation on the subcommittee of the Klamath PAC from the outfitter, recreation and visitor bureau communities.

The BLM should identify problems in the upper Klamath River Management Plan that adversely affect downstream WSRA values.

How does this process relate to other planning activities in the basin?

- BLM's upcoming plan should not defer to independent TMDLs that are being developed for each state but should recommend the development of an interstate TMDL.
- Describe the potential implications of the proposed action on the Bureau of Reclamation (BOR) Klamath River Anadromous Fish Restoration and Operation Plan (an attempt to address flow, water quality, and Endangered Species Act issues); FERC relicensing; and total Maximum Daily Load (TMDL) development.
- State how all four actions(i.e., BLM/River Management, FERC relicensing, BOR Operations; EPA/State TMDLS) would or could interact to maximize the environmental benefits for the River while addressing the purpose and need of the Federal action.
- As a partner in the Klamath TMDL process, BLM will be expected to develop and implement a Water Quality Management Plan (WQMP) for lands under it's jurisdiction. Including those lands

being considered under the KRMP and EIS.

How will this plan affect the FERC relicensing efforts?

- PacifiCorp is currently only analyzing the effects of their permitted facilities and not the surrounding environment.
- Pacific Power's West Side and East Side Projects (above Section 1) need to be analyzed because there are no fish screens. BLM could bring influence to bear on FERC relicensing of either of these facilities.
- Although the Jenny Creek dam is outside of the immediate purview of this proposed management plan, the Klamath Falls Resource Area BLM should take the initiative in accomplishing removal of the diversion dam in cooperation with the landowners and the Redding BLM.

What effect does grazing have on management of the river corridor?

- Grazing must be restrictive and tightly controlled.
- Grazing and potential control of invasive weeds is contributing to non-attainment of water quality standards.
- KFA and ONRC does not believe grazing on BLM lands which are the subject of this plan are compatible with maintenance of the Klamath River's outstanding and remarkable values.
- Livestock grazing has no place in maintaining the natural environmental conditions that support the native species.

What is the status of the Salt Caves Project and will it affect river management?

C. SIGNIFICANT ISSUES FOR DEVELOPING AND COMPARING ALTERNATIVES

NEPA requires federal agencies to focus analysis and documentation on the significant issues related to a proposed action. The Interdisciplinary Team (IDT), Interagency Review Group, and the PAC Subcommittee, has identified the following as the significant issues associated with management of the river corridor. These significant issues serve primarily as the basis for developing and comparing alternatives. While the EIS will focus on these significant issues, all issues identified through scoping will be considered in the various resource analyses.

Finally, issues related to satisfying federal, state and local requirements and standards (e.g., threatened and endangered species, water quality, air quality) will automatically be analyzed even if not specifically listed as significant issues.

D. RANGE OF ALTERNATIVES

1. ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

None to date.

2. ALTERNATIVES CONSIDERED IN DETAIL

With input from the Interagency Review Group and the PAC Subcommittee, the Interdisciplinary Team will develop alternatives for approval by the Decision Maker. This initial scoping report only identifies conceptual alternatives that are designed to meet specific resource objectives. These alternatives may change both by title and content by the time they are finalized.

ALTERNATIVE 1: No Action - No change from the direction in the existing Klamath Falls and Redding Resource Area Management Plans.

ALTERNATIVE 2: Resource Restoration Emphasis - Protect and Enhance Resource Values within the River Corridor with an emphasis for natural resource restoration and cultural site protection.

ALTERNATIVE 3: Resource Utilization Emphasis - Protect and Enhance Resource Values within the River Corridor with an emphasis on maintenance and expansion of recreation use up to the maximum acceptable carrying capacity.

ALTERNATIVE 4: Resource Utilization and Restoration - Protect and Enhance Resource Values within the River Corridor with an emphasis for utilizing resources for recreation, including interpreting wildlife and cultural resources, while restoring resources to more natural conditions.