

FINAL TECHNICAL REPORT

Klamath Hydroelectric Project
(FERC Project No. 2082)

Land Use, Visual, and Aesthetic Resources

PacifiCorp
Portland, Oregon

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CONTENTS

PREFACE.....	v
LIST OF ABBREVIATIONS AND ACRONYMS	vii
GLOSSARY.....	xix
1.0 INTRODUCTION.....	1-1
1.1 SCOPE OF WORK.....	1-1
1.2 OVERVIEW OF LAND USE RESOURCES	1-1
1.3 OVERVIEW OF VISUAL AND AESTHETIC RESOURCES	1-1
2.0 STUDY OF LAND USE AND ITS CONSISTENCY WITH AGENCY	
COMPREHENSIVE PLANS.....	2-1
2.1 DESCRIPTION AND PURPOSE	2-1
2.2 OBJECTIVES	2-1
2.3 RELICENSING RELEVANCE AND USE IN DECISIONMAKING	2-2
2.4 METHODS AND GEOGRAPHIC SCOPE	2-2
2.4.1 Inventory of Applicable Federal, State, and Local Plans.....	2-2
2.4.2 Generalized Inventory of Existing Land Uses	2-3
2.4.3 Review of Potential Conflicts with Existing or Proposed Land	
Use and Resource Management Plans and Programs	2-4
2.5 RELATIONSHIP TO REGULATORY REQUIREMENTS AND PLANS	2-4
2.6 TECHNICAL WORK GROUP COLLABORATION	2-4
2.7 STUDY OBSERVATIONS AND FINDINGS	2-5
2.7.1 Land Ownership, Management, and Use.....	2-5
2.7.2 Review of Land Use and Resource Management Plans	2-104
2.8 DISCUSSION.....	2-141
2.8.1 Characterization of Existing Conditions.....	2-141
2.8.2 Characterization of Future Conditions.....	2-142
3.0 INVENTORY, ANALYSIS, AND MANAGEMENT OF KLAMATH	
HYDROELECTRIC PROJECT ROADS	3-1
3.1 DESCRIPTION AND PURPOSE	3-1
3.2 OBJECTIVES	3-1
3.3 RELICENSING RELEVANCE AND USE IN DECISIONMAKING	3-2
3.4 METHODS AND GEOGRAPHIC SCOPE	3-2
3.4.1 Define Phases of Road Inventory Study Development.....	3-2
3.4.2 Identify Study Area.....	3-4
3.4.3 Map Road Types.....	3-4
3.4.4 Implement Technical Approach.....	3-4
3.4.5 Ensure Quality Control	3-4
3.4.6 Provide Study Status in Coordination with Agencies.....	3-5
3.5 RELATIONSHIP TO REGULATORY REQUIREMENTS AND PLANS	3-5
3.6 TECHNICAL WORK GROUP COLLABORATION	3-6
3.7 STUDY OBSERVATIONS AND FINDINGS	3-7
3.7.1 Project Roads Inventory Analysis.....	3-7
3.7.2 Project Roads Management	3-8

4.0 VISUAL AND AESTHETIC RESOURCE STUDY	4-1
4.1 DESCRIPTION AND PURPOSE	4-1
4.2 OBJECTIVES	4-1
4.3 RELICENSING RELEVANCE AND USE IN DECISIONMAKING	4-1
4.4 METHODS AND GEOGRAPHIC SCOPE	4-1
4.4.1 Identify Applicable Goals for Aesthetic and Scenic Quality	4-2
4.4.2 Describe the Visual Character of Project Facilities and Operations....	4-2
4.4.3 Assess the Effect of Project Facilities and Operations on Visual Quality	4-5
4.4.4 Identify Potential Conflicts with Existing and Proposed Visual and Aesthetic Management Goals	4-6
4.5 RELATIONSHIP TO REGULATORY REQUIREMENTS AND PLANS	4-6
4.6 TECHNICAL WORK GROUP COLLABORATION	4-6
4.7 STUDY OBSERVATIONS AND FINDINGS	4-7
4.7.1 Visual Character of Study Area and Project Facilities and Operations	4-7
4.7.2 Visual Assessment of Project Facilities and Operations.....	4-8
4.7.3 Review of Visual Resource Objectives, Policies, and Guidelines.....	4-51
4.7.4 Characterization of Existing Conditions	4-61
4.7.5 Characterization of Future Conditions.....	4-63
5.0 INFORMATION SOURCES	5-1

Appendices

2A	List of FERC-Recognized Plans and Other Relevant Plans Reviewed
3A	Data Dictionary for the Klamath Hydroelectric Project Road Inventory
3B	Definitions and Metadata for Inventory Features
3C	Draft Outline—Project Roads Management Inventory Analysis and Roads Management Report
4A	Visual Resource Photographs—Facilities
4B	Visual Resource Photographs—Operations

Tables

2.4-1	Agencies with jurisdiction over Project lands or Project-adjacent lands.....	2-3
2.7-1	Land use and resource management plan review and consistency summary.	2-109
3.4-1	Measured ranges for numeric type attributes.....	3-5
3.7-1	Mileage of roads and trails (preliminary 2002 data).....	3-7
3.7-2	Mileage of road surfaces (preliminary 2002 data).....	3-8
4.4-1	Key observation points (KOPs).....	4-3

Figures

2.7-1	Land ownership.....	2-7
2.7-2	Zoning.....	2-39
2.7-3	Existing land use.....	2-71
2.7-4	Floodplains.....	2-105
3.7-1	Road study.	3-9
4.7-1	Location of visual resource study KOPs.....	4-9

PREFACE

In the course of study and in the interim between the draft technical report and this final technical report, PacifiCorp made a few changes to the proposed Klamath Hydroelectric Project (Project). The newly proposed Project begins at the J.C. Boyle Development and continues downstream to the Iron Gate Development. The Spring Creek diversion is now included in the Fall Creek Development. The East Side, West Side, and Keno developments are no longer part of the Project. Keno dam will remain in operation, but is not included in the Federal Energy Regulatory Commission (FERC) Project because the development does not have generation facilities, and its operation does not substantially benefit generation at PacifiCorp's downstream hydroelectric developments.

LIST OF ABBREVIATIONS AND ACRONYMS

ACEC	Area of Critical Environmental Concern
ac-ft	acre-feet
ACHP	Advisory Council on Historic Preservation
ACS	Aquatic Conservation Strategy
AD	accretion/depletion
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
ADCP	Acoustic Doppler Current Profiler
AINW	Archaeological Investigations Northwest
AMS	accelerator mass spectrometry
ANOVA	analysis of variants
APE	area of potential effect
ARPA	Archaeological Resources Protection Act
ATV	all-terrain vehicle
AUM	animal unit month
AW	American Whitewater
AWG	Aquatics Work Group
BAOT	boats at one time
BIA	Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BMF	bedrock milling feature
BMTS	Bird Mortality Tracking System
BNRR	Burlington Northern Railroad
BO	Biological Opinion
BOD	biochemical oxygen demand
B.P.	before present
BSL	Bureau of Labor Statistics
BVNWR	Bear Valley National Wildlife Refuge
°C	degrees Centigrade
CALTRANS	California Department of Transportation

CCS	cryptocrystalline silicate
CDBW	California Department of Boating and Waterways
CDF	California Department of Finance
CDFG	California Department of Fish and Game
CDO	community development ordinance
CDP	census designated place
CDPR	California Department of Parks and Recreation
CDSOD	California Division of Safety of Dams
CDWR	California Department of Water Resources
CEII	Critical Energy Infrastructure Information
CES	constant effort stations
CFM	constant fractional marking
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHRIS	California Historical Resources Information System
CLBP	California Lentic Bioassessment Procedure
CLNP	Crater Lake National Park
cm	centimeter
cms	cubic meters per second
CNDDB	California Natural Diversity Database
COC	chain of custody
COPCO	California Oregon Power Company
CPRC	Center for Population Research and Census
CPUE	catch per unit effort
CRC	Confluence Research and Consulting
CRM	cultural resources management
CRWG	Cultural Resources Work Group
CS	culturally sensitive
CSBP	California Stream Bioassessment Procedure
<i>C shasta</i>	<i>Ceratomyxa shasta</i> (a fish disease)
CSWRCB	California State Water Resources Control Board
CWHR	California Wildlife Habitat Relations System
CWP	coarse woody debris

CWT	coded wire tag
DCA	detrended correspondence analysis
dbh	diameter at breast height
DO	dissolved oxygen
DTM	Digital Terrain Model
DTR	Draft Technical Report
EC	electrical conductivity; existing conditions
EDT	Ecosystem Diagnosis and Treatment, a fish production modeling program
E _H	redox potential
EIS	environmental impact statement
ELV	elevation
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPT	ephemeroptera, plecoptera, and trichoptera
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
ESU	evolutionarily significant unit
E/W	east/west
°F	degrees Fahrenheit
FEAM	Fishery Economic Assessment Model
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFA	Flood Frequency Analysis
FGDC	Federal Geographic Data Committee
FIC	field inventory corridor
FL	fork length
FLA	final license application
FLIR	forward-looking infrared
FLPMA	Federal Land Policy and Management Act
FLRMP	Forest Land and Resource Management Plan

FNF	Fremont National Forest
FPA	Federal Power Act
FPC	Federal Power Commission
FPD	fire protection district
fpm	feet per mile
fps	feet per second
FR	Federal Register
FSCD	First Stage Consultation Document
ft ²	square feet
ft-lb/s/ft ³	foot-pounds per second per cubic foot
FTR	Final Technical Report
FTS	fisheries technical subcommittee
FTU	formazin turbidity unit
FYLF	foothill yellow-legged frog
GDP	gross domestic product
GIS	geographic information system
GLO	General Land Office
GMU	grazing management unit
GPS	global positioning system
GSG	geomorphology subgroup
ha	hectare
HBI	Hilsenhoff Biotic Index
HDPE	high-density polyethylene
HEC	Hydrologic Engineering Center
HPMP	Historic Properties Management Plan
HRA	Historical Research Associates
HRWA	Horseshoe Ranch Wildlife Area
HSC	habitat suitability criteria
HSI	Habitat Stability Index
I-5	Interstate 5

I&E	interpretation and education
IFG	Instream Flow Group (now called U.S. Geological Survey [USGS] Aquatic Systems and Technology Application Group)
IFG-4	empirical log and log formula developed by the IFG
IFIM	instream flow incremental methodology
IK	inflatable kayak
IQR	interquartile range
KBAO	Klamath Basin Area Office
KBO	Klamath Bird Observatory
KCF	Klamath County Flycasters
KCSO	Klamath County Sheriff's Office
KFNWR	Klamath Forest National Wildlife Refuge
KFRA	Klamath Falls Resource Area
KFWTP	Klamath Falls Wastewater Treatment Plant
kHz	kilohertz
KlamRas	a fish production modeling program
km	kilometer
KMC	Klamath Mixed Conifer
KMZ	Klamath Management Zone
KNF	Klamath National Forest
KOP	key observation point
KRBFTF	Klamath River Basin Fisheries Task Force
KRITFWC	Klamath River Inter-Tribal Fish and Water Commission
KRP	Klamath River Project
KSD	Klamath Straits Drain
KSWR	Klamath State Wildlife Refuge
kV	kilovolt
kW	kilowatt
KWA	Klamath Wildlife Area
kWh	kilowatt-hour
LAC	limits of acceptable change
lb	pound

LBNM	Lava Beds National Monument
LDD3	Land Development Desktop 3
LKNWR	Lower Klamath National Wildlife Refuge
LRDC	Lost River Diversion Channel
LWCFA	Land and Water Conservation Fund Act
LWD	large woody debris
µg/L	microgram(s) per liter
µS/cm	microSiemen(s) per centimeter
m	meter
MANSQ	a channel conveyance method
MAR	mean annual runoff
MASCA	Museum Applied Science Center of Archaeology
mb	millibar
mgd	million gallon(s) per day
mg/L	milligram(s) per liter
MHO	Montane Hardwood Oak
MHOC	Montane Hardwood Oak-Conifer
MHOJ	Montane Hardwood Oak-Juniper
MHz	megahertz
mm	millimeter
MNI	minimum number of individuals
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MPS	Multiple Property Submission
m/s	meters per second
msl	mean sea level
mv	millivolt
MW	megawatt
MWh	megawatt-hour
NAD	North American Datum

NAGPRA	Native American Graves Protection and Repatriation Act
NCASI	National Council for Air and Stream Improvement
NCCP	Natural Community Conservation Planning
NCRWQCB	North Coast Regional Water Quality Control Board
NEC	New Earth Company
NEPA	National Environmental Policy Act
NGO	nongovernment organization
NHPA	National Historic Preservation Act
NISP	number of individual species
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRA	National Recreation Area
NRHP	National Register of Historic Places
NRPA	National Recreation and Parks Association
N/S	north/south
NTU	nephelometric turbidity unit
NWFP	Northwest Forest Plan
NWI	National Wetland Inventory
NWSRA	National Wild and Scenic Rivers Act
NWSRS	National Wild and Scenic Rivers Study
O&CR	Oregon and California Railroad
O&M	operations and maintenance
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ODWR	Oregon Department of Water Resources
OHP	Office of Historic Preservation
OHV	off-highway vehicle
ONHP	Oregon Natural Heritage Program

OPRD	Oregon Parks and Recreation Department
ORP	oxidation reduction potential
ORS	Oregon Revised Statute
ORV	outstanding remarkable value
OSMB	Oregon State Marine Board
OSSW	Oregon State Scenic Waterway
OSU	Oregon State University
OWRD	Oregon Water Resources Department
PA	Programmatic Agreement
PAH	polyaromatic hydrocarbon
PAOT	people at one time
PCB	polychlorinated biphenyl
PCR	polymerase chain reaction
PCT	Pacific Crest National Scenic Trail
PFMC	Pacific Fishery Management Council
PFO	Palustrine Forested Wetland
PG&E	Pacific Gas and Electric Company
PGT	Pacific Gas Transmission
ph	powerhouse
pH	hydrogen (ion) concentration
PHABSIM	Physical Habitat Simulation
PM&E	protection, mitigation, and enhancement
PPL	Pacific Power and Light
P-R	Pittman-Robertson [Act]
PRIA	Public Rangelands Improvement Act
PVC	polyvinyl chloride
PWC	personal watercraft
PWHMA	Pokegama Wildlife Habitat Management Area
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control

RA	resource area
rcy	radiocarbon years
RD	recreation day
RERP	Raptor Electrocutation Reduction Program
RFS	Riparian Focal Species
RHABSIM	River Habitat Simulation
RHJV	Riparian Habitat Joint Venture
RL	reporting limit
RM	Riparian Mixed Deciduous-Coniferous Habitat; river mile
RMA	recreation management area
RMP	resource management plan
ROD	record of decision
ROI	Rapid Ornithological Inventories
ROR	run-of-river
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
RRA	Redding Resource Area
RRMP	recreation resource management plan
RV	recreational vehicle
RVD	recreation visitor days
RWG	Recreation Work Group
S/C	side channel
SCORP	South Central Oregon Regional Partnership [as defined in the Land Use, Visual, and Aesthetic Resources FTR]
SCORP	Statewide Comprehensive Outdoor Recreation Plan [as defined in the Recreation Resources FTR]
SCR	sensitive cultural resources
SCS	Soil Conservation Service
SCWQCP	State of California Water Quality Control Plan
SF	steady flow
SHPO	State Historic Preservation Office
SIAM	System Impact Assessment Model
SL	standard length

SLOM	System Landscape Options Matrix
S/M	survey and manage
SMET	stream margin edge types
SMP	shoreline management plan
SOD	sediment oxygen demand
SONC	southern Oregon/northern California
SOP	standard operating procedure
SPC	specific conductance; split channels
spp.	species
SPRR	Southern Pacific Railroad
SR	state route
SRMA	Special Resource Management Area
SRNF	Six Rivers National Forest
SSD	South Suburban Sanitation District
STU	subsurface testing
SV	screening value
SWDU	Statements of Water Diversion and Use
SWG	socioeconomic work group
SWRCB	State Water Resources Control Board
SZF	stage-at-zero-flow
TAF	thousand acre-feet
TCL	traditional cultural landscape
TCP	traditional cultural properties
TCR	traditional cultural riverscape
TDG	total dissolved gas
TDML	total maximum daily load
TDS	total dissolved solids
TES	threatened, endangered, or sensitive
THPO	Tribal Heritage Preservation Officer
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TPLA	Topsy/Pokegama Landscape Analysis

TRPA	Thomas R. Payne and Associates
TRWG	Terrestrial Resources Work Group
TSS	total suspended solids
UGB	urban growth boundary
UKL	Upper Klamath Lake
UKNWR	Upper Klamath National Wildlife Refuge
U of O	University of Oregon
UPL	Utah Power and Light
URDC	Urban Research Development Corporation
USACE	U.S. Army Corp of Engineers
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	universal transverse Mercator
VAF	velocity adjustment factor
VAOT	vehicles at one time
VES	visual encounter survey
VQO	visual quality objective
VRM	visual resource management
VRMC II	visual resource management class II
WDF	Washington Department of Fisheries (renamed as WDFW in 1996)
WDFW	Washington Department of Fish and Wildlife
WNF	Winema National Forest
WOP I	without-Project I scenario
WOP II	without-Project II scenario
WQRRS	Water Quality for River-Reservoir Systems (a model)
WQS	Water Quality Standards

W&SR	Wild and Scenic River
WSE	water surface elevation
WSEL	water surface elevation
WTA	wild trout area
WTP	wild trout program
WUA	weighted usable area
XRF	x-ray fluorescence
YOY	young-of-the-year
YTHPO	Yurok Tribal Heritage Preservation Officer

GLOSSARY

Abandonment	The loss of water rights through nonuse.
Abutment	Part of a valley or canyon wall against which a dam is constructed. Right and left abutments are those on respective sides of an observer looking downstream.
Acre-foot	The amount of water required to cover 1 acre to a depth of 1 foot. An acre-foot equals 326,851 gallons or 43,560 cubic feet. This volume measurement is used to describe a quantity of storage in a reservoir.
Affecting	Means “will or may have an effect on,” as defined by 40 Code of Federal Regulations (CFR) 1508.3.
Afterbay	A channel for conducting water away from a power plant after it has passed through it.
Aggradation	The raising of a riverbed because of sediment deposited.
Allocation	The amount of water guaranteed to a jurisdiction under an agreement.
Alluvium	Sediments deposited by erosional processes, usually by streams.
Alternatives	A given agency’s duty is to consider “alternatives as they exist and are likely to exist” (CEQ No. 8, 1981). <u>Range of alternatives</u> Includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them. (40 CFR 1502.14) <u>Reasonable alternatives</u> Alternatives that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. (CEQ No. 2a, 1981) <u>No Action Alternative</u> 40 CFR 1502.14(d) requires the alternatives analysis in an environmental assessment (EA) or environmental impact statement (EIS) to “include the alternative of no action.” There are two distinct interpretations of “no action” that must be considered. The first situation addresses plans and continuing actions. The second is relative to where “no action” would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward (CEQ No. 3, 1981).

Anadromous	Type of fish that ascend rivers from the sea to spawn (lay their eggs). Fish that hatch in freshwater, migrate to the ocean, mature there, and return to freshwater to spawn. Salmon and steelhead are examples.
Annual operating plan	A yearly plan for operating reservoirs on the Columbia River. Such a plan is specifically required by the Columbia River Treaty and by the Pacific Northwest Coordination Agreement.
Approach velocities	Water velocities at or near the face of a fish screen.
Appropriate	To authorize the use of a quantity of water to an individual requesting it.
Appropriation	<u>Doctrine of Prior</u> With respect to water, refers to the system western states use to assign and distribute quantifiable amounts of water, in the form of water rights; system operates on a first-in-time, first-in-right basis. <u>Process Water</u> Refers to the system a state has established to issue and keep track of water rights. Applies only to states that have adopted the doctrine of prior appropriation of water rights.
Appropriative rights	Those rights to the use of water that result from the doctrine of prior appropriation of water rights.
Appurtenant	Existing as part of a broader property right. For instance, a surface water right may exist as part of the rights associated with ownership of land bordering a body of water.
Aquatic microphyte	A plant living in water, large enough to be seen with the naked eye.
Aquatic plants	Plants that grow in water either floating on the surface, growing up from the bottom of the body of water, or growing under the surface of the water.
Aquifer	A porous layer of rock that can hold water within it.
Arch dam	A dam construction method used in sites where the ratio of width to height between abutments is not great and where the foundation at the abutment is solid rock capable of resisting great forces. The arch provides resistance to movement. When combined with the weight of concrete (arch-gravity dam), both the weight and shape of the structure provide great resistance to the pressure of water.
Armored riverbed	A riverbed from which easily removed sediment has been eroded, leaving a surface of cobbles or boulders.

Attraction	Drawing fish to dam fishways or spillways through the use of water flows.
Augmentation (of streamflow)	Increasing streamflow under normal conditions, by releasing storage water from reservoirs.
Average megawatt (aMW)	The average amount of energy (in megawatts) supplied or demanded over a specified period of time; equivalent to the energy produced by the continuous operation of 1 megawatt of capacity over the specified period.
Average streamflow	The rate at which water passes a given point in a stream, usually expressed in cubic feet per second (cfs).
Bank	The margins or sides of a river. Banks are called right or left as viewed when facing in the direction of the flow.
Bank storage	Water that is absorbed and stored in the soil cover of the bed and banks of a watercourse and is returned to the watercourse in whole or in part as the water level falls.
Barrel	A liquid measure defined as 42 U.S. gallons.
Barrier	A physical block or impediment to the movement or migration of fish, such as a waterfall (natural barrier) or a dam (human-made barrier).
Base load	In a demand sense, a load that varies only slightly in level over a specified time period. In a supply sense, a plant that operates most efficiently at a relatively constant level of generation.
Base river flow	Also referred to as minimum flow. The minimum river flow required to sustain aquatic life. Often prescribed in Federal Energy Regulatory Commission (FERC) license articles.
Basin	A land area having a common outlet for its surface water runoff.
Beneficial use	Traditionally, the use of water for such utilitarian benefits as agriculture, mining, power development, and domestic water supply.
Benefit-cost analysis	An accounting framework designed to characterize the expected economic outcomes of a decision to allocate scarce economic resources, in the form of benefits and costs to each component part of the economy, and summed to determine whether or not total benefits exceed total costs.
Benefit-cost ratio	The ratio of the present value of the benefit stream to the present value of the project cost stream used in economic analysis.

Benthic region	The bottom of a body of water. This region supports the benthos, a type of life that not only lives on, but also contributes to the character of the bottom.
Benthos	The plant and animal life whose habitat is the bottom of a sea, lake, or river.
Best management practices	State-of-the-art practices that are efficient and effective, practical, economical, and environmentally sound.
Biome	An area that has a certain kind of community of plants and animals.
Biota	All the species of plants and animals occurring within a certain area.
Blackout	The disconnection of the source of electricity from all the electrical loads in a certain geographical area brought about by an emergency forced outage or other fault in the generation, transmission, or distribution system serving the area.
Blocked areas	Areas in the Columbia River Basin where hydroelectric projects have created permanent barriers to anadromous fish runs. These include the areas above Chief Joseph and Grand Coulee dams, the Hell's Canyon complex, and other smaller locations.
Bonneville Power Administration	The sole federal power marketing agency in the northwest and the region's major wholesaler of electricity. Created by Congress in 1937, Bonneville sells power to public and private utilities, direct service customers, and various public agencies in the states of Washington, Oregon, Idaho, Montana west of the Continental Divide (and parts of Montana east of the Divide), and smaller adjacent areas of California, Nevada, Utah, and Wyoming. The Northwest Power Act charges Bonneville with additional duties related to energy conservation, resource acquisition, and fish and wildlife.
Breach	A break or opening in a dam.
British thermal unit (Btu)	A standard unit for measuring the quantity of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit.
Brownout	The partial reduction of electrical voltages. A brownout results in lights dimming and motor-driven devices slowing down.
Bus	A conductor or group of conductors that serves as a common connection for two or more circuits. In power plants, bus work consists of the three rigid single-phase connectors that interconnect the generator and the step-up transformer(s).

Buttress dam	A dam consisting of a watertight upstream face supported at intervals on the downstream side by a series of buttresses. They are usually in the form of flat decks or multiple arches. Many were built in the 1930s.
Bypass reach	That section of a river from which water is removed to generate hydropower. Water is often diverted from the river at the dam, transported through channels or penstocks downstream, and released back in the river at the powerhouse. Bypass reaches can be as short as a few hundred feet to as long as several miles.
Bypass system	A channel or conduit in a dam that provides a route for fish to move through or around the dam without going through the turbine units.
Canal	A constructed open channel for transporting water.
Capacity	<p>The production level for which an electrical generating unit or other electrical apparatus is rated, either by the user or manufacturer. Capacity is also used synonymously with capability.</p> <ul style="list-style-type: none">• Dependable capacity—the load-carrying ability of a station or system under adverse conditions for a specified time period.• Installed capacity—the total manufacturer rated capacities of such kinds of equipment as turbines, generators, condensers, transformers, and other system components.• Peaking capacity—the maximum sustainable capacity of generating equipment intended for operation only during the hours of highest daily, weekly, or seasonal loads.• Reserve generating capacity—extra generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages.
Capillary Fringe	The unsaturated zone immediately above the water table containing water in direct contact with the water table.
Catadromous	Fish that mature in freshwater but migrate to seawater to spawn (lay their eggs). The American eel is an example.
Catchment	(1) The catching or collecting of water, especially rainfall. (2) A reservoir or other basin for catching water. (3) The water thus caught.
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. River, creek, run, and tributary are among the terms used to describe natural channels. Canal and floodway are among the terms used to describe artificial channels.

Check dam	A small dam constructed in a gully or other small watercourse to decrease the streamflow velocity, minimize channel erosion, promote deposition of sediment, and divert water from a channel.
Circuit breaker	Any switching device that is capable of closing or interrupting an electrical circuit.
Clean Water Act	Common name for the Federal Water Pollution Control Act, as amended. Its purpose is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters,” whether on public or private land. It authorizes the U.S. Environmental Protection Agency (EPA) to set water quality criteria for states to use to establish water quality standards.
Climatic year	The 12-month period used in collection of precipitation data. Climatic years begin July 1 and end the following June 30, and are designated by the calendar year in which the water year ends.
Code of Federal Regulations (CFR)	A compilation of the general and permanent rules of the executive departments and agencies of the federal government as published in the Federal Register. The Code is divided into 50 titles that represent broad areas subject to federal regulation. Title 18 contains the FERC regulations. FERC regulations are cited as 18 CFR (FERC).
Collection and bypass system	A system at a dam that collects and holds the fish approaching the dam for later transportation or moves them through or around the dam without going through the turbine units.
Computable General Equilibrium (CGE) Model	A general equilibrium mathematical representation of an economy; a formulation of the interrelationships of the various sectors of an economy that depends on well-functioning markets (no surplus or shortages) and where responses to market price changes are accounted for.
Conservation	The care and protection of natural resources. Also used in energy conservation management plans to describe increasing the efficiency of energy and water use, production, or distribution.
Consulting team	Scientific consultants retained by licensees. The consulting team serves as a source of scientific expertise to appropriate work groups.
Consumer surplus	The difference between the amount of money one would be willing to pay for a given quantity of a good or service and the price required by the market, hence the fullest measure of the benefit one receives from having or consuming the good or service.
Consumptive use	Nonreusable withdrawal of water where the water is evaporated, transpired by plants, incorporated into products or crops, or consumed by humans or animals.
Coordinated	The operation of two or more interconnected electrical systems to achieve

operation	greater reliability and economy. As applied to hydropower resources, the operation of a group of hydropower plants to obtain optimal power benefits with due consideration to all other uses.
Coordination	The practice by which two or more interconnected electric power systems augment the reliability of bulk electric power supply by establishing planning and operating standards; by exchanging pertinent information regarding additions, retirements, and modifications to the bulk electric power supply system; and by joint review of these changes to assure that they meet the predetermined standards.
Creek	A small stream of water which serves as the natural drainage course for a drainage basin of nominal or small size. The term is relative to size. Some creeks in a humid region might be called rivers if they occur in an arid region.
Crest	(1) The highest stage or level of a flood wave as it passes a point; (2) The top of a dam, dike, spillway, or weir, to which water must rise before passing over the structure.
Critical areas	Areas of ecological significance. This term is frequently used as a modifier to describe government programs that concentrate on the conservation and protection of natural resources that are fragile or sensitive to development, and that are of great importance in overall state efforts to conserve and protect the natural resource environment.
Cryptogam	Plant that reproduces by spores, not by flowers or seeds. For example, ferns.
Cubic feet per second (cfs)	A measurement of water flow representing 1 cubic foot of water (7.48 gallons) moving past a given point in 1 second. One cfs equals about 2 acre-feet per day.
Cumulative impact	The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7)
Cupules	Small (1 to 3 inches in diameter), round depressions that have been pecked into the surface of a rock with a hammerstone. They are typically ½ inch to 1 inch deep.
Cycling	Power plant operation to meet the intermediate portion of the load (9 to 14 hours per day).
Dam	A concrete or earthen barrier constructed across a river and designed to

	control water flow or create a reservoir.
Dam failure	Event characterized by the sudden, rapid, and uncontrolled release of impounded water because of a breach in the dam.
Dead storage	That part of a reservoir that lies beneath the elevation of the bottom of the dam's lowest outlet.
Decommissioning	The act of retiring or dismantling a dam.
Deflector screens/ diversion screens	Wire mesh screens placed at the point where water is diverted from a stream or river. The screens keep fish from entering the diversion channel or pipe.
Degradation	The lowering of a riverbed because of erosion.
Delta	An alluvial deposit, often in the shape of the Greek letter "delta," which is formed where a stream drops its debris load on entering a body of water (lake or ocean).
Demand	The rate at which electric energy is delivered to or by a system, part of a system, or a piece of equipment. It is expressed in kilowatts, kilovoltamperes, or other suitable units at a given instant or averaged over any designated period of time. The primary source of "demand" is the power-consuming equipment of the customers.
Descaling	A condition in which a fish has lost a certain percentage of scales.
Design head	The head at which the full gate of the turbine equals the manufacturer-rated generator capacity.
Designated	Given formal statutory recognition, as in a federal or state river system.
Dewatering	Elimination of water from a lake, river, stream, reservoir, or containment.
Dike	(1) (Engineering) An embankment to confine or control water, especially one built along the banks of a river to prevent overflow of lowlands; a levee; (2) A low wall that can act as a barrier to prevent a spill from spreading; (3) (Geology) A tabular body of igneous (formed by volcanic action) rock that cuts across the structure of adjacent rocks or cuts massive rocks.
Direct effects	Caused by the action and occurring at the same time and place.
Discharge	Volume of water released from a dam or powerhouse at a given time, usually expressed in cubic feet per second. Discharge is often used interchangeably with streamflow.
Discount rate	The rate at which future economic values are reduced to make them economically equivalent to today's value; a rate used to convert a future

value to present value.

Dissolved gas concentrations	The amount of chemicals normally occurring as gases, such as nitrogen and oxygen, that are held in solution in water, expressed in units such as milligrams of the gas per liter of liquid. Supersaturation occurs when these solutions exceed the saturation level of the water (beyond 100 percent).
Dissolved oxygen (DO)	The amount of oxygen in the water available to aquatic organisms measured in mg/L or percent saturation.
Diversion	The taking of water from a stream or other body of water into a canal, pipe, or other conduit.
Diversion dam	A barrier built to divert part or all of the water from a stream into a different course.
Docket	A formal record of a FERC proceeding. Dockets are available for inspection and copying by the public. Dockets for hydroelectric projects can be accessed through the FERC CIPS website.
Downstream slope	The slope or face of the dam away from the reservoir water. This slope requires some kind of protection from the erosive effects of rain or surface flow.
Draft	Release of water from a storage reservoir.
Drawdown	The lowering of a reservoir's surface elevation and water volume by releasing (spilling or generating) the reservoir's water at a rate that is greater than the rate of water flowing into the reservoir. Typically used for power generation, flood control, irrigation, or other water management activity.
Drift	The phenomenon of aquatic insects drifting downstream each evening.
Earthfill or earth dam	An embankment dam in which more than 50 percent of the total volume is formed of compacted, fine-grained material. A homogeneous earthen dam is constructed of similar earthen material throughout. This is the most common type of dam because its construction involves using materials in the natural state, requiring little processing.
Easement	Limited right of ownership of one's land conveyed by deed to another for a special purpose.
Ecological impact	The total effect of an environmental change, either natural or human-made, on the ecology of the area.
Ecology	The interrelationships of living things to one another and to their environment or the study of such interrelationships.

Ecosystem	The interacting system of a biological community and its nonliving environment.
Ecotone	Border between two biomes, where the plants and animals of those biomes mingle.
Ecotourism	Tourism that focuses on the enjoyment of wildlife and other ecological resources.
Effects	Effects and impacts as used in the Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations are synonymous. Effects are ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. (CEQ regulations, 40 CFR 1508.9)
Efficiency	The ratio of useful energy output to total energy input, usually expressed as a percent.
Effluent	Treated wastewater discharged from sewage treatment plants.
Electric Consumers Protection Act of 1986	The Electric Consumers Protection Act of 1986 (ECPA) brought about significant changes and imposed new requirements to both procedural and substantive aspects of project licensing and relicensing under the Federal Power Act (FPA). The FPA was amended to require FERC to give equal consideration to energy conservation, fish and wildlife protection, enhancement and preservation of recreational opportunities, and other aspects of environmental quality. These requirements are described in the discussion of the Federal Power Act below.
Electric magnetic field (EMF)	An electric or magnetic field, or a combination of the two, as in an electromagnetic wave.
Electric power system	Physically connected electric generating, transmission, and distribution facilities operated as a unit under one control.
Elevation	Height in feet above sea level.
Embankment	Fill material, usually earth or rock, placed with sloping sides and usually with length greater than height.
Embankment dam	A dam structure constructed of fill material, usually earth or rock, placed with sloping sides and usually with a length greater than its height.
Emergency Action	Predetermined plan of action for reducing the potential for property damage and loss of life in an area affected by a dam break or excessive

Plan (EAP)	spillway. Required for certain licensed FERC projects.
Eminent Domain	Governmental power to take private property for a public use, usually government acquisition of land for such purposes as parks, roads, schools, or public buildings.
Endangered Species	An animal, plant, or insect species whose numbers are so low, compared to historical levels, that it is in danger of extinction, and that is awarded protection under the federal Endangered Species Act. (See Public Law [P.L.] 93-205 for legal definition, Endangered Species Act, sec. 3(6).)
Energy	The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatt-hours, while heat energy is usually measured in British thermal units. Energy is measured in calories, joules, kilowatt-hours (kWh), BTUs, megawatt-hours (MW-hours), and average megawatts (MWs).
Energy conservation	The more efficient use of energy resources. Energy conservation seeks to reduce energy invested per unit of product output, service performed, or benefit received through waste reduction.
Energy content curves (ECC)	A set of curves that establishes limits on the amount of reservoir drawdown permitted to produce energy in excess of firm energy load carrying capability (FELCC).
Entrainment	The incidental trapping of fish and other aquatic organisms in the water—for example, used for cooling electrical power plants or in waters being diverted for irrigation or similar purposes.
Environment	The sum of all external conditions and influences affecting the life, development, and, ultimately, the survival of an organism.
Environmental Assessment	(a) A concise public document for which a federal agency is responsible that serves to: <ol style="list-style-type: none">1. Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact2. Aid an agency's compliance with the Act when no environmental impact statement is necessary3. Facilitate preparation of an environmental impact statement when one

is necessary

(b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted. (CEQ regulations, 40 CFR 1508.9)

Because the EA is a concise document, it should not contain long descriptions or detailed data that the agency may have gathered. Rather it should contain a brief discussion of the need for the proposal, alternatives to the proposal, the environmental impacts of the proposed action and alternatives, and a list of agencies and persons consulted. (40 CFR 1508.9(b))

Environmental Impact Statement	A detailed written statement as required by section 102(2)(C) of the National Environmental Policy Act. (CEQ regulations, 40 CFR 1508.10)
Ephemeral flow	When water flows in a channel only after precipitation.
Epilimnion	The surface area of a lake or reservoir.
Equal consideration	Does not mean treating all potential purposes equally or requiring that an equal amount of money be spent on each resource value, but it does mean that all values must be given the same level of reflection and thorough evaluation in determining that the project as licensed is best adapted. In balancing developmental and nondevelopmental objectives, the FERC will consider the relative value of the existing power generation, flood control, and other potential developmental objectives in relation to present and future needs for improved water quality, recreation, fish, wildlife, and other aspects of environmental quality.
Erosion	The wearing away of the land surface by wind or water. Erosion occurs naturally from weather or runoff but is often intensified by land-clearing practices.
Estuarine waters	Deepwater tidal habitats and tidal wetlands that are usually enclosed by land but have access to the ocean and are at least occasionally diluted by freshwater runoff from the land (such as bays, mouths of rivers, salt marshes, and lagoons).
Estuarine zone	The area near the coastline that consists of estuaries and coastal saltwater wetlands.
Estuary	The thin zone along a coastline where freshwater systems and rivers meet and mix with a salty ocean (such as a bay, mouth of a river, salt marsh, or lagoon).
Eutrophication	The process by which a body of water is enriched by nutrients.

Evaporation	The physical process by which a liquid (or a solid) is transformed to the gaseous state. In hydrology, evaporation is vaporization that takes place at a temperature below the boiling point.
Evapotranspiration	Water transmitted to the atmosphere by a combination of evaporation from the soil and transpiration from plants.
Face	The external surface of a structure, such as the surface of a dam.
Facilitator	An independent third party whose role is to help participants reach lasting agreement (among as many of participants as possible on as many issues as possible.) The facilitator can help participants to identify goals, identify issues, develop and maintain critical paths, accomplish creative problem solving, and resolve issues (facilitate and mediate as necessary).
Federal Emergency Management Agency (FEMA)	An agency of the federal government responsible for hazard mitigation. FEMA also administers the National Flood Insurance Program.
Federal Energy Regulatory Commission (FERC)	A quasi-judicial independent regulatory commission established in 1977 (replacing the Federal Power Commission) within the U.S. Department of Energy. FERC issues and regulates licenses for construction and operation of nonfederal hydroelectric projects and advises federal agencies on the merits of proposed federal multipurpose water development projects. FERC is composed of five commissioners appointed by the President. No more than three can be from any one political party.
Federal Power Act	<p>Enacted in 1920, the FPA, as amended in 1935, consists of three parts. The first part incorporated the Federal Water Power Act administered by the former Federal Power Commission. It confined FPC activities almost entirely to licensing nonfederal hydroelectric projects. With passage of the Public Utility Act, which added parts II and III, the Commission's jurisdiction was extended to include regulating the interstate transmission of electric energy and rates for its sale at wholesale in interstate commerce.</p> <p><u>Section 4(c)</u> Authorizes FERC to cooperate with state and federal agencies in its activities, and directs federal departments and agencies to furnish records and information to FERC when requested (16 U.S.C. 797 (c)).</p> <p><u>Section 4(e)</u> As stated in the act of March 3, 1921 (41 Stat. 1353)), authorizes FERC to issue licenses to citizens of the United States, or to any association of such citizens, or to any corporation organized under the laws of the United States or any State thereof, or to any State or municipality for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation and for the development, transmission, and utilization of</p>

power across, along, from or in any of the streams or other bodies of water over which Congress has jurisdiction under its authority to regulate commerce with foreign nations and among the several States, or upon any part of the public lands and reservations of the United States (including the Territories), or for the purpose of utilizing the surplus water or water power from any Government dam, except as herein provided: Provided, that licenses shall be issued within any reservation only after a finding by the Commission that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired, and shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation.

Section 10(a)

Under Section 10(a), FERC is required to ensure that a hydropower project is “best adapted” to a comprehensive plan for improving or developing a waterway or waterways, for the use or benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses (including irrigation, flood control, water supply, and recreational and other purposes)(16 U.S.C. 803(a)). To ensure a project is best adapted, under Section 10(a)(2), FERC must consider the extent to which the project is consistent with a comprehensive plan (where one exists) for improving, developing, or conserving a waterway or waterways affected by the project, and the recommendations of federal and state agencies exercising administration over relevant resources and recommendations of Indian tribes affected by the project. Section 10(a)(3) states that upon receipt of an application for a license, the Commission shall solicit recommendations from the agencies and Indian tribes charged with the authority to prepare comprehensive plans and exercising administration over flood control, navigation, irrigation, recreation, cultural and other relevant resources of the state in which the project is located, and the recommendations (including fish and wildlife recommendations) of Indian tribes affected by the project.

Section 10(j)

Under Section 10(j), in each hydropower license issued, FERC must include recommended conditions for the protection, mitigation and enhancement of fish and wildlife resources (16 U.S.C. 803(j)). Such conditions shall be based on recommendations received pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) from the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), and state fish and wildlife agencies. FERC must base license conditions on these agency recommendations unless it finds that the recommendations may be inconsistent with the purposes or requirements of the FPA or other applicable law. In cases where FERC and the agencies disagree on specific license conditions submitted under

10(j), these entities will attempt to resolve the inconsistency, giving due weight to the recommendation, expertise, and statutory responsibility of the federal or state resource agency in question. If a compromise cannot be reached and FERC decides to use its own recommendations, it must demonstrate that the agency recommendation is inconsistent with the FPA or other applicable laws and that FERC's recommended mitigation measures will adequately protect the fish and wildlife resources of concern.

In Order 533-A, issued November 22, 1991, FERC adopted a six-step consultation procedure:

Submittal of fish and wildlife recommendations supported by a statement of the agency's "understanding of the resource issues presented by the proposed facilities and the evidentiary basis for the recommended terms and conditions."

Clarification of recommendations.

FERC issues preliminary determination of any inconsistency with applicable law and provides a 45-day comment period.

Agency and other party respond to determination.

Meetings with agencies and affected parties. These meetings, with the exception of extraordinary circumstances, are to take place within 75 days of the date that FERC issues its preliminary determination of any inconsistency with applicable law (30 days after agency comment due).

Issuance of license, including terms and conditions.

Section 18

Under Section 18, FERC must provide for the construction, operation, and maintenance of any mandatory "fishway" prescribed by the Secretary of the Interior (through the U.S. Fish and Wildlife Service) or the Secretary of Commerce (through the National Marine Fisheries Service) for the safe and timely upstream and downstream passage of fish (16 U.S.C. 811). As with Section 4(e), the fishway conditions submitted by the relevant resource agency must be supported on the record before FERC with substantial evidence. FERC must include the Secretary's prescription for fishway as conditions in a license, if a license is issued.

This section applies to any project that may impact the life stages or passage of any fish species present in a project area and where a project may affect passage of a species planned for introduction in the area. Also applicable to fishway prescriptions in both upstream and downstream passage; not limited to anadromous or other migratory species. (P.L. 102-

486, 1701(b)(1992))

Federal project operators and regulators	Federal agencies that operate or regulate hydroelectric projects in the Columbia River basin. They include the Bonneville Power Administration, the Bureau of Indian Affairs, the Bureau of Reclamation, the U.S. Army Corps of Engineers, and FERC.
Fill dam	Any dam constructed of excavated natural materials or industrial wastes.
Final Order	A final ruling by FERC which terminates an action, decides some matter litigated by the parties, operates to divest some right, or completely disposes of the subject matter.
Finding of No Significant Impact (FONSI)	A document by a federal agency briefly presenting the reasons why an action, not otherwise excluded (Sec. 1508.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. It shall include the environmental assessment or a summary of it and shall note any other environmental documents related to it (Sec 1501.7(a)(5)). If the assessment is included, the finding need not repeat any of the discussion in the assessment but may incorporate it by reference. (CEQ regulations, 40 CFR 1508.13)
Firm energy	The amount of energy that can be generated given the region's worst historical water conditions. It is energy produced on a guaranteed basis.
Firm energy load carrying capability (FELCC)	Firm energy load carrying capability is the amount of energy the region's generating system, or an individual utility or project, can be called on to produce on a firm basis during actual operations. FELCC is made up of both hydro and nonhydro resources, including power purchases.
Fish and wildlife agencies	The U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the state agency in charge of administrative management over fish and wildlife resources of the state in which a proposed hydropower project is located. (FERC regulations, 18 CFR 4.30(b)(9)(i))
Fish and Wildlife Coordination Act (FWCA)	The Fish and Wildlife Coordination Act, as amended, requires federal agencies granting a license or permit for the control, impoundment, or modification of streams and waterbodies to first consult with the U. S. Department of the Interior, U.S. Fish and Wildlife Service, and the appropriate state fish agencies regarding conservation of these resources (16 U.S.C. 661-667e). Under the FWCA, the Secretary of the Interior is authorized to provide assistance to, and cooperate with federal, state, and public or private agencies and organizations in developing, protecting, and stocking all wildlife and their habitat; controlling losses from disease; minimizing damages from overabundant species; and carrying out other necessary measures. The act also provides that wildlife conservation receives equal consideration with other features of water resource devel-

opment through planning, development, maintenance, and coordination.

Under the requirements of the Electric Consumers Protection Act of 1986, (ECPA), FERC is directed to not only consult with the FWS and the state agencies but also to include in each license conditions for the protection, mitigation, and enhancement of fish and wildlife. Those conditions are to be based on recommendations received pursuant to the FWCA from the NMFS, the USFWS, and state fish and wildlife agencies.

Fish and wildlife recommendations	Recommendation designed to protect, mitigate damages to, or enhance any wild member of the animal kingdom, including any migratory or nonmigratory mammal, fish, bird, amphibian, reptile, mollusk, crustacean, or other invertebrate, whether or not bred, hatched, or born in captivity, and includes any egg or offspring thereof, related breeding or spawning grounds and habitat. A “fish and wildlife recommendation” includes a request for a study which cannot be completed prior to licensing, but does not include a request that the proposed project not be constructed or operated, a request for additional prelicensing studies or analysis or, as the term is used in 4.34(e)(2) and 4.34(f)(3), a recommendation for facilities, programs, or other measures to benefit recreation or tourism. (FERC regulations, 18 CFR 4.30(b)(9)(ii))
Fish flows	Artificially increased flows in the river system called for in the fish and wildlife program to quickly move the young fish down the river during their spring migration period. (See also water budget.)
Fish guidance efficiency (FGE)	The proportion of juvenile fish passing into the turbine intakes that are diverted away from the turbines and into bypass facilities.
Fish ladder	A structure that enables fish to swim upstream, either around or over a dam.
Fish passage	Features of a dam that enable fish to move around, through, or over a dam without harm. Typically an upstream fish ladder or a downstream bypass system.
Fish Passage Center	Part of the water budget program, the center plans and implements the annual smolt monitoring program; develops and implements flow and spill requests; and monitors and analyzes research results to assist in implementing the water budget. (See also water budget.)
Fish passage efficiency (FPE)	The proportion of juvenile fish passing a project through the spillway, sluiceway, or juvenile bypass system, as opposed to passing through the turbines.
Fish passage facilities	Features of a dam that enable fish to move around, through, or over without harm. Generally an upstream fish ladder or a downstream bypass system.

Fish passage managers	Located at the Fish Passage Center, the two fish passage managers are responsible for the specific planning, implementation, and monitoring activities of the center aimed at helping fish on their migratory routes in the Columbia River basin. One manager is designated by a majority of the federal and state fish and wildlife agencies, and the other manager is designated by a majority of the Columbia River basin Indian tribes. (See also Fish Passage Center.)
Fish screen	A screen across the turbine intake of a dam, designed to divert the fish into the bypass system.
Fishway	A device made up of a series of stepped pools, similar to a staircase, that enables adult fish to migrate up the river past dams.
Fixed drawdown period	The late summer and fall when the volume of the next spring runoff is not yet known, and reservoir operations are guided by fixed rule curve based on historical streamflow patterns.
Flash flood	A flood which follows within a few hours (usually less than 6 hours) of heavy or excessive rainfall. A dam or levee failure, or the sudden release of water impounded by an ice jam, is also considered a flash flood.
Flashboards	Temporary structures installed at the crest (top) of dams, gates, or spillways for the purpose of temporarily raising the water surface elevation, and hence the gross head of a hydroelectric generating plant, thus increasing power output. Normally, flashboards are removed either at the end of the water storage season or during periods of high streamflow, or for the purpose of temporarily increasing flood control.
Flood	The inundation of a normally dry area caused by high flow, or overflow of water in an established watercourse (such as a river, stream, or drainage ditch), or ponding of water at or near the point where the rain fell. This is a duration type event with a slower onset than flash flooding, normally greater than 6 hours.
Flood cropping	Farming dependent on the moisture and nutrients from floods.
Flood management	(1) Reducing risk by building dams or embankments or altering the river channel. (2) Reducing flood risk by actions such as discouraging flood-plain development, establishing flood warning systems, protecting urban areas, and allowing the most flood-prone areas to remain as wetlands.
Flood stage	Height at which a watercourse overtops its banks and begins to cause damage to any portion of the river valley. Flood stage is usually higher than or equal to bankfull stage.
Floodplain	The land area of a river valley that becomes inundated with water during a flood.

Floodwall	A long, narrow concrete, or masonry embankment usually built to protect land from flooding. If built of earth the structure is usually referred to as a levee. Floodwalls and levees confine streamflow within a specified area to prevent flooding.
Floodway	That portion of a natural floodplain that is regularly inundated during the normal annual flood cycles of a river or stream.
Floodway fringe	That portion of the natural floodplain that is above the floodway in elevation, but still floods during the highest of regular floods at a frequency of once every 1 to 5 years.
Flow	The volume of water passing a given point per unit of time.
Flow augmentation	Water released from a storage reservoir added to increase river flow, particularly to aid fish migration.
Flume	(1) A narrow gorge, usually with a stream flowing through it; (2) An open artificial channel or chute carrying a stream of water, as for furnishing power, conveying logs, or as a measuring device.
Forced outage	The occurrence of a component failure or other condition which requires that a unit be removed from service immediately, in contrast to a planned or scheduled outage.
Forebay	The impoundment immediately above (upstream from) a dam or hydroelectric plant intake structure. The term is applicable to all types of hydroelectric developments (storage, run-of-river, and pumped storage).
Forebay guidance net	A large net placed in the forebay of a dam to guide juvenile fish away from the powerhouse.
Fossil fuel plant	A plant using coal, oil, gas, or other fossil fuel as its source of energy.
Fossil fuels	Materials found in the earth's crust and formed from organic matter as a result of geological processes occurring over many millions of years. The conventional forms of energy in wide use today—coal, petroleum, and natural gas—are all fossil fuels.
Freedom of Information Act (FOIA)	Under FOIA, the public may request and obtain Commission documents that may otherwise be inaccessible. Certain internal working documents and other data may be exempt, under the law, from disclosure. Documents of other agencies may also be obtained under FOIA.
Free-flowing	Undammed and unchannelized, as defined by the National Wild and Scenic Rivers Act.
Fry	The brief transitional stage of recently hatched fish that spans from absorption of the yolk sac through several weeks of independent feeding.

Full pool	The maximum level of a reservoir under its established normal operating range.
Gallery	(1) A passageway within the body of a dam or abutment; hence the terms grouting gallery, inspection gallery, and drainage gallery; (2) A long and rather narrow hall, hence the following terms for a power plant: valve gallery, transformer gallery, and busbar gallery.
Gallons per minute (gpm)	A unit used to measure water flow.
Gas supersaturation	The overabundance of gases in turbulent water, such as at the base of a dam spillway. Can cause a fatal condition in fish similar to the bends.
Gaseous supersaturation	The condition of higher levels of dissolved gases in water owing to entrainment, pressure increases, or heating.
Gate	A device that is moved across a waterway from an external position to control or stop flow.
General equilibrium analysis	An economic analysis of a particular market where effects on related markets are fully accounted for.
Generation	(1) The process of producing electric energy by transforming other forms of energy; (2) the amount of electric energy produced, expressed in kilowatt-hours.
Generator	A machine that changes water power, steam power, or other kinds of mechanical energy into electricity.
Gigawatt (GW)	One billion watts.
Gigawatt-hour (Gwh)	One billion watt-hours.
Global warming	The possible result of an increase in atmospheric concentrations of carbon dioxide, methane, chlorofluorocarbons, and other “greenhouse gases” that trap additional heat in the atmosphere. The increase in greenhouse gases is caused by the combustion of fossil fuels (coal, petroleum, and natural gas), land use modification, and the release of agricultural and industrial gases into the atmosphere.
Gravity dam	A dam constructed of concrete or masonry that relies on its weight for stability.
Gravity feed system	A system that provides flow in a channel or conduit through the use of gravity.
Gross generation	The total amount of electric energy produced by a generating station or

stations, measured at the generator terminals.

Groundwater	Water within the earth that supplies wells and springs; water in the zone of saturation where all openings in rocks and soil are filled, the upper surface of which forms the water table. The supply of freshwater under the earth's surface in an aquifer or soil that forms the natural reservoir for human use.
Habitat	The sum total of environmental conditions of a specific place that is occupied by an organism, a population, or a community.
Hard water	A water quality parameter that indicates the level of alkaline salts, principally calcium and magnesium, and expressed as equivalent calcium carbonate. Hard water is commonly recognized by the increased quantities of soap, detergent, or shampoo necessary to raise a lather.
Head	The vertical height of water in a reservoir above the turbine. The more head, the more power that is exerted on the turbine by the force of gravity.
Headgate	The gate that controls water flow into irrigation canals and ditches. A watermaster regulates the headgates during water distribution and posts headgate notices declaring official regulations.
Head pond	The reservoir behind a run-of-river dam.
Headwaters	Streams at the source of a river.
Headworks	A flow control structure on an irrigation canal.
Horsepower	A unit for measuring the rate of work (or power) equivalent to 33,000 foot-pounds per minute or 746 watts.
Human environment	Interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See also effects.) (CEQ regulations, 40 CFR 1508.14)
Hydraulic head	The vertical distance between the surface of the reservoir and the surface of the river immediately downstream from the dam.
Hydro	Electric power produced by flowing water.
Hydroelectric energy	The production of electricity from kinetic energy in flowing water.
Hydroelectricity (hydroelectric power)	The production of electric power through use of the gravitational force of falling water.
Hydroelectric plant	A plant in which turbine generators are driven by falling water.

Hydrograph	A graph showing the water level (stage), discharge, or other property of a river volume with respect to time. For example, an annual hydrograph charts the varying river levels over the course of 1 year.
Hydrologic budget	An accounting of the inflow to, outflow from, and storage in, a hydrologic unit (such as a drainage basin, aquifer, soil zone, lake, reservoir, or irrigation project).
Hydrologic cycle	The natural pathway water follows as it changes between liquid, solid, and gaseous states.
Hydrology	The applied science concerned with the waters of the earth and their occurrences, distribution, and circulation through the unending hydrologic cycle of evaporation, transpiration, precipitation, infiltration, storage, and runoff.
Hydropower	The harnessing of flowing water to produce mechanical or electrical energy.
Hydropower system	The hydroelectric dams on the Columbia River and its tributaries.
Hypolimnion	Pertaining to the lower, colder portion of a lake, separated from the upper, warmer portion (epilimnion).
Impacts	See definition of effects.
Impoundment	A body of water, such as a pond, confined by a dam, dike, floodgate, or other barrier.
Indian tribe	In reference to a proposal to apply for a license or exemption for a hydropower project, an Indian tribe which is recognized by treaty with the United States, by federal statute, or by the U. S. Department of the Interior in its periodic listing of tribal governments in the Federal Register in accordance with 25 CFR 83.6(b), and whose legal rights as a tribe may be affected by the development and operation of the hydropower project proposed (as where the operation of the proposed project could interfere with the management and harvest of anadromous fish or where the project works would be located within the tribe's reservation). (FERC regulations, 18 CFR 4.30(b)(10))
Indirect effects	Effects that are caused by an action but occur later in time or farther removed in distance, yet are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. (CEQ regulations, 40 CFR 1508.8(b))
Inflow	Water that flows into a reservoir or forebay during a specified period.

Initial license	The first license issued for a water power project under either the Federal Water Power Act of 1920 or the Federal Power Act of 1935.
In-lieu energy	Energy provided by a reservoir owner instead of water to which a downstream party is entitled.
Input-output model	A special form of a general equilibrium mathematical representation of an economy; a formulation of the interrelationships of the various sectors of an economy that depends on well-functioning markets (no surplus or shortages) but where responses to market price changes are not accounted for.
Instream flow	The water flowing in a riverbed, which excludes water diverted from the river for human use.
Instream right	A water right in which water is kept in a stream and not removed and for which the legally required “beneficial use” is identified as fish and wildlife, riparian habitat, recreation, or some related protection.
Instream use	The use of water that does not require withdrawal or diversion from its natural watercourse; for example, the use of water for navigation, recreation, and support of fish and wildlife.
Intake	The entrance to a turbine at a dam, diversion works, or pumping station.
Intake traveling screens	See definition of turbine intake screens.
Interested parties	People or entities that are interested in the relicensing of a hydroelectric project. To the extent desired by an individual interested party, the interested parties will remain informed about and provide input regarding the relicensing process.
Interim spill	The spilling of water over a dam.
Interruptible demands	Those demands that, by contract, can be interrupted in the event of a capacity deficiency on the supplying system.
Intervenor	A person, institution, or organization admitted as a participant to a proceeding.
Inundation map	A map that delineates the areas that would be flooded by particular flood events.
Irrigation	The controlled application of water to arable lands to supply water requirements not satisfied by rainfall.
Just compensation	Payment for the full value of land or other property taken for public use by the government.

Juvenile	The early stage in the life cycle of anadromous fish when they migrate downstream to the ocean.
Juvenile transportation	Collecting migrating juvenile fish and transporting them around the dams using barges or trucks.
KAF	A thousand acre-feet, same as .504 thousand second-foot days.
kcfs	A measurement of water flow equivalent to 1,000 cubic feet of water passing a given point for an entire second.
kcfs-month	One kcfs-month is a flow of 1,000 cubic feet per second for 1 month or 0.0595 million acre-feet.
Key observation point (KOP)	An important location from which project facilities or operations are visible to the public, based on frequency of use and other factors.
Kilowatt (kW)	A unit of power equal to 1,000 watts or 1.3414 horsepower. It is a measure of electrical power or heat flow rate and equals 3,413 Btu per hour. An electric motor rated at 1 horsepower uses electric energy at a rate of about 3/4 kilowatt.
Kilowatt-hour (kWh)	1,000 watts of electrical energy, operating for 1 hour. Electrical energy is commonly sold by the kilowatt-hour.
Kjeldahl nitrogen	Organic nitrogen as determined by the Kjeldahl method, which entails quantitative analysis of organic compounds to determine nitrogen content by interaction with concentrated sulfuric acid; ammonia is distilled from the NH_4SO_4 formed.
KSFD	A volume of water equal to 1,000 cubic feet of water flowing past a point for an entire day. Same as 1.98 FAF.
Levee	A long, narrow, earthen embankment usually built to protect land from flooding. If built of concrete or masonry, the structure is referred to as a floodwall. Levees and floodwalls confine streamflow within a specified area to prevent flooding.
License	Authorization by FERC to construct, operate, and maintain nonfederal hydro projects for a period of up to 50 years.
Licensee	Any person, state, or municipality licensed under the provisions of section 4 of the Federal Power Act, and any assignee or successor in interest thereof. (Federal Power Act, Sec. 3 (5))
Littoral zone	The area on or near the shore of a body of water.
Live storage	That part of a reservoir that lies above the elevation of the bottom of the dam's lowest outlet.

Load	The amount of electric power or gas delivered or required at any point on a system. Load originates primarily at the energy consuming equipment of the customers.
Load factor	The ratio of average load to peak load for a specified period, usually expressed as a percentage.
Load factoring operation	A hydropower project operation that uses the generating equipment and reservoir impoundment capacity to store water and then provide power during daily, weekly, or seasonal periods of peak power demand.
Load shaping	The adjustment of storage releases so that generation and load are continuously in balance.
Lock	A chambered structure on a waterway closed off with gates for the purpose of raising or lowering the water level within the lock chamber so ships, boats, and tugs or barges can move from one elevation to another along the waterway.
Losing stream	A stream reach in which the water table adjacent to the stream is lower than the water surface in the stream, causing infiltration from the stream channel, recharging the groundwater aquifer, and decreasing the stream flow.
Low-head dam	A dam at which the water in the reservoir is not high above the turbine units.
MAF	Million acre-feet. The equivalent volume of water that will cover an area of 1 million acres to a depth of 1 foot. One MAF equals 1,000 KAF.
Mainstem	The principal river in a basin, as opposed to the tributary streams and smaller rivers that feed into it.
Mainstem passage	The movement of salmon and steelhead around or through the dams and reservoirs in the Columbia and Snake rivers.
Mainstem survival	The proportion of anadromous fish that survive passage through the dams and reservoirs while migrating in the Columbia and Snake rivers.
Maintenance expenses	That portion of operating expenses consisting of labor, materials, and other direct and indirect expenses incurred for preserving the operating efficiency or physical condition of utility plants used for power production, transmission, and distribution of energy.
Maintenance outage	The removal of a unit from service to perform work on specific components which could have been postponed past the next weekend.
Major hydro project	Those projects with a capacity greater than 1.5 megawatts (MW).
Mandatory	The authority of resource agencies to impose conditions on a FERC-

conditions	licensed project. See also the definition of Federal Power Act, where mandatory conditioning authority is identified in boldface at definitions of pertinent sections.
Mano	A stone used as the upper millstone for grinding foods by hand in a metate (see definition of metate).
Masonry dam	A dam constructed mainly of stone, brick, or concrete blocks that may or may not be joined with mortar. A dam having only a masonry facing should not be referred to as a masonry dam.
Mean annual flood	The arithmetic mean of the highest peak discharge during each year of record.
Mechanical bypass systems	See definition of bypass system.
Megawatt	A unit of electrical power equal to 1 million watts or 1 thousand kilowatts. A megawatt will typically serve about 1,000 people. The Dalles Dam produces an average of about 1,000 megawatts.
Megawatt-hour (MWh)	A unit of electrical energy that equals 1 megawatt of power used for 1 hour.
Metate	A stone with a concave upper surface used as the bottom millstone for grinding foods.
Microcatchments	Small basins used to collect rainwater.
Mid-Columbia dams	Dams owned by the mid-Columbia Public Utility Districts. They include Wells, Rocky Reach, Rock Island, Wanapum and Priest Rapids dams.
Mid-Columbia Public Utility Districts (PUDs)	Public Utility District No. 1 of Grant County, Public Utility District No. 2 of Chelan County, and Public Utility District No. 1 of Douglas County.
Mill	A monetary cost and billing unit used by utilities; it is equal to 1/1,000 of the U.S. dollar (equivalent to 1/10 of one cent).
Minimum flow	The minimum river flow sufficient to support fish and other aquatic life, to minimize pollution, or to maintain other instream uses such as recreation and navigation.. Often required at a hydroelectric dam as a condition of the dam owner's operating license.
Minimum operating pool	The lowest water level of an impoundment at which navigation locks can still operate.
Mitigation	The act of alleviating or making less severe. Generally refers to efforts to alleviate the impacts of hydropower development to the Columbia Basins

salmon and steelhead runs.

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments. (CEQ regulations, 40 CFR 1508.20)

Mitigation measures

A. Mitigation measures discussed in a NEPA document must cover the range of impacts of the proposal. Mitigation measures must be considered even for impacts that by themselves would not be considered “significant.” Once the proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not “significant”) must be considered, and mitigation measures must be developed where it is feasible to do so. (40 CFR 1502.14(f), 1502.16(h), 1508.14)

B. All relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies, and thus would not be committed as part of the Records of Decision (RODs) of these agencies (40 CFR 1502.16(h), 1502.2(c)). This will serve to alert agencies or officials who can implement these extra measures, and will encourage them to do so (46 FR 18032).

Monitor

To systematically and repeatedly measure conditions in order to track changes.

Mortality

The number of fish lost or the rate of loss.

Multipurpose dam

A barrier constructed for two or more purposes such as storage, flood control, navigation, power generation, or recreation.

Multipurpose reservoir

A reservoir that can be used for more than one purpose, such as flood control, hydroelectric power development, and recreation.

Navigability

The ability of a body of water to be traveled by water craft.

Navigable Waters

Those parts of streams or other bodies of water over which Congress has jurisdiction to regulate commerce with foreign nations and among the

several states, and which either in their natural or improved condition notwithstanding interruptions between the navigable parts of such streams or waters by falls, shallows, or rapids compelling land carriage, are used or suitable for use for the transportation of persons or property in interstate or foreign commerce, including therein all such interrupting falls, shallows, or rapids, together with such other parts of streams as shall have been authorized by Congress for improvement by the United States or shall have been recommended to Congress for such improvement after investigation under its authority. (Federal Power Act, Sec. 3(8))

NEPA	National Environmental Policy Act, as amended (42 U.S.C. 4321, et. seq.).
Net environmental benefit analysis	An assessment of the impact of an economic decision on flow of ecological services provided by natural resources.
New license	Any license, except an annual license issued under section 15 of the Federal Power Act, for a water power project that is issued after the initial license for that project. (FERC regulations – 18 CFR 4.30(b)(19))
Nitrogen supersaturation	A condition of water in which the concentration of dissolved nitrogen exceeds the saturation level of water. Excess nitrogen can harm the circulatory system of fish.
Nondegradation	A term in the Clean Water Act that indicates a standard of water quality for which certain water bodies are to be managed so as to prevent any degradation.
Nonpoint Source Pollution	A term in the Clean Water Act also called “polluted runoff,” water pollution produced by diffuse land-use activities. Occurs when runoff carries fertilizer, animal wastes, and other pollution into rivers, streams, lakes, reservoirs, and other bodies of water.
Northwest Power Act	The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (16 U.S.C. 839 et seq.), which authorized the creation of the Northwest Power Planning Council and directed it to develop this program to protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat on the Columbia River and its tributaries.
Northwest Power Pool Coordinating Group	An operating group made up of Bonneville Power Administration, the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, and public and private generating utilities in the northwest. One of the group’s functions is administering the Pacific Northwest Coordination Agreement.
Nutrient cycling	Circulation or exchange of elements such as nitrogen and carbon between nonliving and living portions of the environment.

Nutrients	Animal, vegetable, or mineral substance that sustains individual organisms and ecosystems.
Off-highway vehicle (OHV)	A vehicle commonly used for traversing terrain other than paved roads.
Off-peak energy	Electric energy supplied during periods of relatively low system demands.
Off-peak hours	Period of relatively low demand for electrical energy, as specified by the supplier (such as the middle of the night).
On-peak energy	Electric energy supplied during periods of relatively high system demands.
Operating year	The 12-month period from August 1 through July 31.
Opportunity costs	The value of the opportunity foregone by the chosen economic decision, such as the value of the job given up (foregone) when choosing one's current job.
Original cost	The cost of the property at the time it was first placed in public service.
Outage	<p>The period during which a generating unit, transmission line, or other facility is out of service.</p> <ul style="list-style-type: none">• Forced outage—the shutdown of a generating unit, transmission line, or other facility, for emergency reasons• Scheduled outage—the shutdown of a generating unit, transmission line, or other facility, for inspection or maintenance, in accordance with an advance schedule
Outflow	The water that is released from a project during the specified period.
Overdraft	Pumping of groundwater for consumptive use in excess of safe yield.
Oviposition	Egg laying; egg deposition; egg dropping. Typically used in reference to a specific behavioral trait or adaptation that a species employs when depositing its eggs.
Pacific Northwest Utilities Conference Committee (PNUCC)	A group formed by Pacific Northwest utilities officials in order to coordinate policy on Pacific Northwest power supply issues and activities. PNUCC lacks contractual authority, but it plays a major role in regional power planning through its Policy; Steering; Fish and Wildlife; and Lawyers committees, and the Technical Coordination Group. PNUCC publishes the Northwest Regional Forecast, containing information on regional loads and resources.
Paedomorphic	Characteristic of certain amphibians: becoming sexually mature and active in the aquatic (larval) form before metamorphosing into the

	terrestrial (adult) form.
Partial equilibrium analysis	An economic analysis of a particular market where effects on related markets are ignored.
Participants	Individuals or parties who have chosen to be actively involved in the relicensing process (by participating at meetings, working to collaboratively develop solutions, providing written comments, or otherwise providing input). Includes PacifiCorp, FERC, state and federal resource agencies, Indian tribes, and nongovernmental organizations actively involved in the filing activities for the project.
Passage	The movement of migratory fish through, around, or over dams, reservoirs, and other obstructions in a stream or river.
Peak flow	Refers to a specific period of time when the discharge of a stream or river is at its highest point.
Peak load	The maximum demand for electrical power that determines the generating capacity required by a public utility.
Peaking facilities	Hydroelectric plants that typically increase project discharge to maximize generation during highest electric demand.
Penstock	A conduit used to convey water under pressure to the turbines of a hydroelectric plant.
Perennial flow	Year-round flow
Permeability	The ability of a material to transmit water through its pores when subjected to pressure.
Petroglyph	A carving or inscription on a rock.
Pictograph	An ancient or prehistoric drawing or painting on a rock wall.
Plant	A station at which are located prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, or nuclear energy into electric energy.
Plant factor	The ratio of the average load on the plant for the period of time considered to be the aggregate rating of all the generating equipment installed in the plant.
Pluvial	In hydrology, anything that is brought about directly by precipitation.
Point source pollution	Pollution into bodies of water from specific discharge points such as sewer outfalls or industrial-waste pipes.

Potable water	Water of a quality suitable for drinking.
Power	The rate at which work is done. The rate at which energy is transferred. The watt is a typical unit of power measured in units of work per unit of time.
Power peaking	The generation of electricity to meet maximum instantaneous power requirements; usually refers to daily peaks.
Powerhouse	A primary part of a hydroelectric dam where the turbines and generators are housed and where power is produced by falling water rotating turbine blades.
Prefiling consultation process	Includes activities performed in order to address FERC and other statutory and regulatory requirements in preparing the Applications for New Licenses. The prefiling period continues until the formal filing of the applications with the FERC.
Probable maximum flood	The largest flood considered reasonably possible at a site as a result of meteorological and hydrological conditions.
Producer surplus	The difference between the amount of money it would cost to produce a given quantity of a good or service and the price available in the market; hence, the fullest measure of the benefit one receives from producing the good or service.
Production (electric)	Act or process of producing electrical energy from other forms of energy; also, the amount of electrical energy produced expressed in kilowatt-hours.
Production expenses	Costs incurred in the production of electric power and conforming to the accounting requirements of the Operation and Maintenance Expense Accounts of the FERC Uniform System of Accounts.
Productivity	The quality of creating something of value.
Project outflow	The volume of water per unit of time released from a project.
Protection, Mitigation, and Enhancement (PM&E) measures	PM&E measures will be expressed in the new license in Articles that define the affected resources and describe measures to be taken during the term of the new license.
Public lands	Lands and interest in lands owned by the United States that are subject to private appropriation and disposal under public land laws. It shall not include "reservations," as hereinafter defined. (Federal Power Act, Sec. 3(1))
Public review file	The formal written record of the prefiling consultation process.

Public trust doctrine	A legal, court-developed doctrine by which a state can hold and manage all lands in state ownership (including the lands underlying navigable waters) in trust for the citizens of that state.
Public utility	A private business organization, subject to government regulation, that provides an essential commodity or service, such as water, electricity, transportation, or communications, to the public.
Public utility district (PUD)	A government unit established by voters of a district to supply electric or other utility service.
Pumped storage plant	<p>A hydroelectric power plant that generates electric energy to meet peak load by using water pumped up into an elevated storage reservoir during off-peak periods. Often associated with nuclear power plants or other generating facilities that have a high base load of power that cannot be fully used in off-peak periods.</p> <p>Pumped storage facilities allow storage of part of this excess power (less power needed to pump the water to the upper reservoir).</p>
Quantification	Defining the amount and timing of a water right.
Rainwater Harvesting	A farming technique that conserves water by collecting rainwater run-off behind earth or rock embankments in small basins.
Ramping	The process by which streamflows are gradually increased or decreased to protect streambeds and stream life from erosion and downstream flushing.
Ramping rate	The maximum allowable rate of change in outflow from a power plant. The ramping rate is established to prevent undesirable effects resulting from rapid changes in loading or, in the case of hydroelectric plants, discharge.
Rating	A manufacturer's guaranteed performance of a machine, transmission line, or other such equipment, based on design features and test data. The rating will specify such limits as load voltage, temperature, and frequency. The rating is generally printed on a nameplate attached to equipment and is commonly referred to as the nameplate rating or nameplate capacity.
Reach	The distance between two specific points outlining a portion of a stream or river.
Recharge	To add water to an aquifer; also, the water added to an aquifer.
Regional Economic Impact Analysis	Economic analysis of individual economic regions, such as a county, city, or metropolitan area, made up of all the individual sectors of the economy, and accounting for the interrelationships among the sectors.

Regulated river	A river whose natural flow pattern is altered by a dam or dams.
Regulations	FERC carries out its regulatory functions, including procedures and practice, through rulemaking and adjudication. Under rulemaking, the Commission may propose a general rule or regulation change. By law, it must issue a notice of the proposed rule and a request for comments in the Federal Register, and publish any final decision. Alternatively, the Commission considers, on a case-by-case basis, applications submitted by regulated companies. If there is an objection to a particular proposal and a settlement cannot be reached, the proposal must, by law, be presented at a hearing presided over by an agency administrative law judge. A decision by a judge may be adopted, modified, or reversed by the Commission. An aggrieved party may petition for a rehearing, and may appeal a decision to the United States Court of Appeals and ultimately, to the United States Supreme Court.
Reliability	The probability that a device will function without failure during a specified time period or amount of usage.
Relicensing	The administrative proceeding in which FERC, in consultation with other federal and state agencies, decides whether and on what terms to issue a new license for an existing hydroelectric project at the expiration of the original license.
Reregulating facility	A dam and reservoir, located downstream from a hydroelectric peaking plant, with sufficient storage capacity to store the widely fluctuating discharges from the peaking plant and to release them in a relatively uniform manner downstream.
Reregulation	Storing erratic discharges of water from an upstream hydroelectric plant and releasing them uniformly from a downstream plant.
Reservation	National forest, tribal lands within Indian reservations, military reservations, and other lands and interests in lands owned by the United States, and withdrawn, reserved, or withheld from private appropriation and disposal under the public land laws; also lands and interests in lands acquired and held for any public purposes; but shall not include national monuments or national parks. (Federal Power Act, Sec. 3.(2) 16 U.S.C. 796.2)
Reservation of water right	At the state level, the reservation of a water right means that the state declares its authority to stop certain water diversions in the event that a river runs dangerously low.
Reservoir	A body of water collected in an artificial lake behind a dam and used for the storage, regulation, and control of water.
Resident fish	Fish species that reside in freshwater throughout their lives.

Resource agency	A federal, state, or interstate agency exercising administration over the areas of flood control, navigation, irrigation, recreation, fish and wildlife, water resource management (including water rights), or cultural or other relevant resources of the state or states in which a project is or will be located. (FERC regulations, 18 CFR 4.30(b)(27))
Riffles	Shallow, turbulent portions of a stream or river.
Riparian	Pertaining to a river (for example, the riparian zone).
Riparian habitat	The habitat found on streambanks and riverbanks, where semiaquatic and terrestrial organisms mingle.
Riparian zone	The habitat found on stream banks and river banks, where semiaquatic and terrestrial organisms mingle.
Riparian-use doctrine	Legal rights belonging to the owner of land bordering on a given stream. The riparian owner is entitled to the reasonable use of the water in the bordered stream provided that use does not unreasonably diminish the rights of downstream users.
River	A natural stream of water emptying into an ocean, lake, or another river.
River basin	The total area drained by a river and its tributaries.
River left	Left bank when facing downstream.
River mouth	The place where a river ends by flowing into another body of water such as a lake, ocean, or another river.
River right	Right bank when facing downstream.
Riverine ecosystem	The zone of biological and environmental influence of a river and its floodplain.
Rockfill dam	An embankment dam in which more than 50 percent of the total volume consists of compacted or dumped pervious natural or crushed rock.
Rolled-fill dam	An embankment dam of earth or rock in which the material is placed in layers and compacted by using rollers or rolling equipment.
Rule curves	Water levels, represented graphically as curves, that guide reservoir operations.

Rulemaking	The authority delegated to administrative agencies by Congress to make rules that have the force of law. Frequently, statutory laws passed by Congress that express broad terms of a policy and are implemented more specifically by administrative rules, regulations, and practices.
Runner	The rotating part of a turbine.
Runoff	Water in excess of what can be absorbed by the ground and which runs off the land into streams, rivers, or lakes.
Run-of-river	Hydroelectric facilities whose operation cannot be regulated for more than a few hours from storage at or above the site, but are controlled mainly by the volume of water flowing in the stream. These volumes must be used as they occur or be wasted.
Safe yield	The rate of surface water diversion or groundwater extraction from a basin for consumptive use over an indefinite period of time. Such a yield can be maintained without producing negative effects.
Salinization	The accumulation of salt in soil or water to a harmful level.
Scenic river	Defined in the National Wild and Scenic Rivers Act as “those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.”
Sector analysis	Economic analysis of individual components or sectors of the economy, such as agriculture, commercial fishing, or municipal water supply services.
Sediment	Particles of material that are transported and deposited by water, wind, or ice.
Sediment flushing	A method of reservoir operation in which the reservoir is temporarily lowered so that fast-flowing water can erode accumulated sediments on the reservoir bed.
Sediment load	The amount of sediment carried by a river.
Sediment sluicing	A method of reservoir operation in which the reservoir is lowered at the start of the flood season, speeding the movement of water through the reservoir and hence reducing its capacity to trap sediment.
Selective withdrawal structures	Devices which permit releases from a reservoir over a wide range of depths, temperatures, or water quality.

Service list	In FERC terms, this is the official list of parties to a proceeding once a formal filing has been made.
Settlement agreement	FERC encourages applicants to prepare and file settlement agreements. Most measures in settlement agreements are included in license articles; however, FERC cannot include measures that are in conflict with the Federal Power Act or other federal statutes.
Shaping	The scheduling and operation of generating resources to meet seasonal and hourly load variations.
Silt	Sediment composed of particles between 0.004 millimeters (mm) and 0.06 mm in diameter.
Sluice	A structure with a gate for stopping or regulating flow of water.
Sluiceway	An open channel inside a dam designed to collect and divert ice and trash in the river (e.g., logs) before they get into the turbine units and cause damage. (On several of the Columbia River dams, ice and trash sluiceways are being used as, or converted into, fish bypass systems.)
Smolt	A juvenile salmon or steelhead migrating to the ocean and undergoing physiological changes to adapt its body from a freshwater to a saltwater environment.
Socioeconomic analysis	Analysis of the provision of public goods and services such as public schools, roads, and other government services that contribute to the economic well-being of the community, and of equity considerations in the distribution of economic benefits among various classes of people.
Spawning	The releasing and fertilizing of eggs by fish.
Specific yield	The fraction of the saturated bulk volume consisting of water which will drain by gravity when the water table drops.
Spill	Water passed over a dam without going through turbines to produce electricity. Spills can be forced, when there is no storage capability and flows exceed turbine capacity, or they can be planned—for example, during a powerhouse maintenance event.
Spillway	The channel or passageway around or over a dam through which excess water is released or “spilled” past the dam without going through the turbines. A spillway is a safety valve for a dam and, as such, must be capable of discharging major floods without damaging the dam, while maintaining the reservoir level below some predetermined maximum level.

Spillway crest elevation	The point at which the reservoir behind a dam is level with the top of the dam's spillway.
Spinning reserves	The unused capacity in an electric system in generator units that are not in operation but can be called on for immediate use in case of system problems or sudden load changes.
Standby reserves	The unused capacity in an electric system in machines that are not in operation but are available for immediate use if required.
Station use	Energy used in a generating plant for the production of electricity. It includes energy consumed for plant light, power, and auxiliaries regardless of whether such energy is produced at the plant or comes from another source.
Storage	The volume of water in a reservoir at a given time.
Storage plant	A hydroelectric plant with reservoir storage capacity for power use.
Storage reservoir	A reservoir that has space for retaining water—from springtime snowmelts, for example. Retained water is released as necessary for various uses, including power production, fish passage, irrigation, and navigation.
Stratification	Thermal layering of water in lakes and streams. Lakes usually have three zones of varying temperature: epilimnion (top layer); metalimnion or thermocline (middle layer of rapid temperature change); and hypolimnion (bottom layer).
Stream adjudication	A judicial process to determine the extent and priority of the rights of all persons to use water in a river system.
Streambed	The channel or bottom of a river or stream.
Stream reach	A specific portion of the length of a stream.
Streamflow	The rate at which water passes a given point in a stream, usually expressed in cubic feet per second. This term is often used interchangeably with discharge.
Subimpoundment	An isolated body of water created by a dike within a reservoir or lake.
Submersible traveling screen	A wire mesh screen that acts like a conveyor belt when installed in the intakes of turbines at dams guiding and transporting juvenile fish into bypass channels.
Substation	An assemblage of equipment for the purposes of switching, changing, or regulating the voltage of electricity.

Supersaturation	See definition of dissolved gas concentrations.
Surface water	Water on the earth's surface exposed to the atmosphere as rivers, lakes, streams, and the oceans.
Tailrace	A pipe or channel through which water is returned from the powerhouse into a river or other receiving water.
Tailwater	The water surface immediately downstream from a dam or hydroelectric power plant.
Tainter gate	A spillway gate whose face is a section of a cylinder. The cylinder rotates on a horizontal axis downstream of the gate. With this design, the gate can be closed using its own weight.
Taking	The transfer of dominion or control of property from a private owner to the government against his or her consent.
Talus	Rock rubble at the bottom of slope or cliff.
Thermal pollution	A human-caused change in water temperature that results in damage to aquatic life.
Threatened species	Any species that has the potential of becoming endangered in the near future (See Endangered Species Act, P.L. 93-205 for legal definition, sec. 3(20)).
Transmission	The movement or transfer of electric energy over an interconnected group of lines and associated equipment. The movement or transfer occurs between points of supply and points at which the energy is transformed for delivery to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.
Trap and haul program	A program to collect fish at a given point, transport them to a different point, and release them.
Tributary	A stream or river that flows into another stream or river and contributes water to it.
Turbidity	A measure of the extent to which light passing through water is reduced owing to suspended materials.
Turbine	A machine for generating rotary mechanical power from the energy in a stream of fluid (such as water, steam, or hot gas). Turbines convert the kinetic energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

Turbine intake screens	Large screens, which may have moving or nonmoving parts, designed to be placed in a dam's turbine intake at an angle to deflect juvenile fish from the intakes into a bypass system.
Uncontracted water	A volume of water in a storage reservoir that is not assigned for other purposes, such as irrigation.
Underflow	Groundwater flow within a streambed below a surface stream.
Velocity barrier	A physical structure, such as a barrier dam or floating weir, built in the tailrace of a hydroelectric powerhouse, which blocks the tailrace from further adult salmon or steelhead migration to prevent physical injury or migration delay.
Wasteway	An open ditch or canal that discharges excess irrigation water or power plant effluent into the river channel.
Water banking	An administrative system for renting surplus water.
Water budget	A provision of the Columbia River Basin Fish and Wildlife Program that calls for increasing Columbia and Snake river flows during the spring fish migration with the intent of increasing downstream survival of migrating juvenile salmon and steelhead.
Water demand	The amount of water used over a period of time at a given price.
Water quality	The condition of water as determined by measurements of such factors as suspended solids, acidity, turbidity, dissolved oxygen, and temperature, and by the presence of organic matter or pollution chemicals.
Water quality criteria	The levels of pollutants that affect the suitability of water for a given use. Generally, water use classification includes public water supply; recreation; propagation of fish and other aquatic life; and agricultural and industrial use.
Water quality standard	Water quality standards are numeric criteria or narrative statements used to address: (1) the beneficial uses that water resources provide to people and the environment; (2) allowable concentrations of specific pollution or pollutants in a waterbody, established to protect the beneficial uses; (3) narrative statements of unacceptable conditions in and on the water; and (4) provisions for antidegradation of existing high-quality or unique waters.

Water rights	Priority claims to water. A legal right to use a specific amount of water from a natural or artificial body of surface water for general or specific purposes such as irrigation, mining, power, domestic use, or instream flow. In western states, water rights are based on the principle “first in time, first in right,” meaning older claims take precedence over newer ones.
Water table	The upper level that groundwater reaches in an aquifer, or the surface of groundwater.
Water year	The 12-month period for which the U.S. Geological Survey (USGS) reports surface water supplies. Water years begin October 1 and end the following September 30, and are designated by the calendar year in which the water year ends.
Watercourse	A natural stream channel that, depending on the season, may or may not contain water.
Watershed	All the land drained by a given river and its tributaries. An entire drainage basin including all living and nonliving components of the system.
Watt	<p>A measure of the rate at which energy is produced, exchanged, or consumed. The rate of energy transfer is equivalent to 1 ampere of current flowing at 1 volt at unity power factor.</p> <ul style="list-style-type: none">• Ampere—the unit of measurement of electrical current produced in a circuit by 1 volt acting through a resistance of 1 ohm• Ohm—the unit of measurement of electrical resistance. The resistance of a circuit in which a potential difference of 1 volt produces a current of 1 ampere.• Volt—the unit of measurement of voltage, electrical force, or pressure. The electrical force that, if steadily applied to a circuit with a resistance of 1 ohm, will produce a current of 1 ampere.
Weir	(1) A low dam built across a stream to raise the upstream water level. Called a fixed-crest weir when uncontrolled. Other types of weirs include broad-crested, sharp-crested, drowned, and submerged; (2) A structure built across a stream or channel for the purpose of measuring flow (measuring or gauging weir).
Wetland	An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances supports, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (U.S. Army Corps of Engineers and EPA definition). Wetlands must have the following three attributes: (1) at least periodically, the land supports predominately hydrophytes; (2) the

substrate is predominately undrained hydric soil; and (3) the substrate is on soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Wild and Scenic Rivers Act	1968 federal law (Public Law 90-542) establishing and setting forth the procedure for including outstanding river segments in a national system of free-flowing, protected rivers.
Wild River	Defined in the National Wild and Scenic Rivers Act as “those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, within watersheds or shorelines essentially primitive and water unpolluted. These represent vestiges of primitive America.”
Winter’s Doctrine	A legal document arising from the case “Winters v. U.S., U.S. Supreme Court, 1908, 207 US 564,” that holds that, upon the creation of a federal reservation on the public domain, the reservation has appurtenant to it the right to divert as much water from streams within or bordering it as is necessary to serve the purposes for which the reservation was created.

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1.0 INTRODUCTION

1.1 SCOPE OF WORK

This Final Technical Report (FTR) documents the methods, observations, and findings of the land use and visual and aesthetic resources study to provide technical support for the relicensing application for the PacifiCorp Klamath Hydroelectric Project (Project). The Project is located on the Upper Klamath River in southern Oregon and northern California.

Drafts of the study plan were submitted for public review in fall 2001, winter 2001, and spring 2002, and revised to address stakeholder comments.

The Project consists of seven mainstem hydroelectric facilities on the Upper Klamath River and one tributary facility on Fall Creek. The Project is owned and operated by PacifiCorp under a single license (No. 2082) issued in 1956 by the Federal Energy Regulatory Commission (FERC). The existing FERC license expires March 1, 2006.

This report documents the results of the land use and visual and aesthetic resources studies conducted through October 2003. Any changes in the final study plan are noted in the methods section.

The information in this report provides the foundation for the development of Exhibit E (Environmental Report) of the FERC relicensing application. This FTR is not intended to assess the impacts of the Project or recommend protection, mitigation, and enhancement (PM&E) measures. Its purpose is to serve as a reference to help agencies, tribes, and interested parties understand Project operations as they relate to land use and visual resource issues.

1.2 OVERVIEW OF LAND USE RESOURCES

The land use study subtasks are as follows:

- Review agency land use plans, zoning requirements, and land use-related resource management plans for consistency with the Project.
- Prepare land use maps documenting generalized existing land uses, zoning, land ownership, wetlands, and floodplains within the existing FERC boundary and ¼ mile buffer area; conduct field work to confirm generalized existing land uses.
- Perform inventory and analysis of Project-related roads.

1.3 OVERVIEW OF VISUAL AND AESTHETIC RESOURCES

The visual and aesthetic resource study subtasks are as follows:

- Identify applicable goals for aesthetic and scenic quality.
- Describe the visual character of Project facilities and operations.
- Assess the effect of Project facilities and operations on visual quality.
- Identify potential conflicts with existing and proposed visual and aesthetic management goals.

2.0 STUDY OF LAND USE AND ITS CONSISTENCY WITH AGENCY COMPREHENSIVE PLANS

2.1 DESCRIPTION AND PURPOSE

Land use and resource management plans provide information on current and future land uses and on the consistency of those uses with existing local and regional zoning or planning requirements and resource management goals and objectives. Existing land uses in the area of the Project include agriculture and livestock grazing, timber production, hydroelectric generation and distribution, residential development, and recreation. For the purpose of this study, land use is considered to be uses related to human (or human-directed) interactions with the natural and built environment (for example, wildlife use is addressed in the wildlife study rather than in this study).

The Project is located on lands owned by PacifiCorp, the U.S. Bureau of Land Management (BLM), and a few private owners. The U.S. Forest Service (USFS) also owns several parcels outside the existing FERC boundary but near the Project around Copco reservoir. The study area consists of lands within the existing FERC Project boundary (and generally ¼ mile beyond it to provide context) and includes PacifiCorp facilities and operations on the Klamath River from Link River in the city of Klamath Falls, Oregon, to just below Iron Gate dam in unincorporated Siskiyou County, California. Project facilities include those used for hydroelectric production (dams and powerhouses) and distribution, and ancillary facilities (fish hatcheries and river recreation areas).

The purpose of the land use study is to develop a baseline of land use information and to assess the consistency of the Project with applicable agency land use plans, zoning requirements, and land-use-related resource management plan goals and objectives. The results of this study will be used to assist the development and implementation of a land use/shoreline management plan for the Project.

2.2 OBJECTIVES

The land use study is intended to answer the following key questions:

- Is the Project consistent with agency land use and resource management plans, policies, programs, and zoning requirements?
- What are the potential conflicts between land use and resource management plans and existing or proposed Project land uses?
- If land use conflicts are identified, what measures are appropriate to mitigate for land use impacts?

In order to answer the key questions, this study is targeted to address the following objectives:

- Describe and document existing land uses.

- Describe and map zoning and land use plan designations, and land use-related resource management plan areas.

2.3 RELICENSING RELEVANCE AND USE IN DECISIONMAKING

The Project includes a number of facilities located on lands under the jurisdiction of many different agencies. The land use study evaluates whether the Project is consistent with applicable agency land use and resource management plans and programs. If conflicts or inconsistencies are identified, further analysis will be conducted to determine if actions to resolve inconsistencies are warranted.

2.4 METHODS AND GEOGRAPHIC SCOPE

PacifiCorp conducted a land use study for the Project consisting of a description of existing development and land use on land within the FERC Project boundary and ¼ mile beyond it; a review and summary of applicable local and regional land use and resource management plans, zoning regulations, or requirements; and identification of wetlands and floodplains from existing inventories and maps within the FERC Project boundary and ¼ mile beyond it. The study also evaluated the consistency of the Project with federal, state, regional, and local land use ordinances and resource management plans, and identifies the potential for incompatibility. The general geographic scope of this study is limited to those lands within the FERC Project boundary. In addition, land uses designated for adjacent lands within ¼ mile of the FERC boundary were to be reviewed for potential conflicts where Project operations currently appear to affect the lands.

Three land use study subtasks were conducted:

- Inventory of applicable federal, state, and local plans
- Generalized inventory of existing land uses
- Review of potential conflicts with existing or proposed land use and resource management plans and programs

The Spring Creek diversion, which is located in Jackson County, Oregon, is not analyzed in this document. If needed, relevant analysis and other information will be provided in supplementary documents.

2.4.1 Inventory of Applicable Federal, State, and Local Plans

The published plans of federal, state, and local agencies in the Project area were inventoried and reviewed. The review includes the FERC list of approved comprehensive plans as well as other relevant plans not on the current FERC list. Agencies with applicable plans are listed in Table 2.4-1.

Table 2.4-1. Agencies with jurisdiction over Project lands or Project-adjacent lands.

Level of Government	Agency with Land Use/Land Management Jurisdiction
Federal	Bureau of Land Management (Klamath Falls, Medford District, and Redding Resource Areas) Bureau of Reclamation Forest Service (Klamath National Forest) National Park Service (Upper Klamath River)
State	Oregon Department of Agriculture (Lost River Subbasin) Oregon Department of Fish and Wildlife (Klamath Wildlife Area) Oregon Department of Land Conservation and Development (Statewide Planning Goals implemented by local jurisdictions) Oregon Parks and Recreation Department
County	Klamath County, Oregon (Planning and Zoning) Siskiyou County, California (Planning and Zoning)
City	City of Klamath Falls, Oregon (Planning and Zoning)

For each plan, land use requirements and land-use-related resource management goals and objectives relevant to the Project and its lands have been reviewed. As needed, agencies have been contacted to understand potential changes to land use or new plans that may affect the Project.

2.4.1.1 Federal Energy Regulatory Commission List of Comprehensive Plans

The FERC Revised List of Comprehensive Plans (FERC, 2002) was reviewed and all applicable plans were identified. Land use and general resource management plans that were potentially applicable to the Project study area (lands within the FERC Project boundary and ¼ mile beyond) are shown in Appendix 2A and reviewed in Section 2.7.2.2. Plans on the FERC list that address specific resources (e.g., fisheries, wildlife, and recreation) are addressed by other resource-specific FTRs.

2.4.1.2 Other Relevant Plans

A number of other land use and resource management plans that are not on the FERC Revised List of Comprehensive Plans were identified and were determined to be relevant to land use or resource management in the Project area. These plans are listed in Appendix 2A and discussed in Section 2.7.2.2.

2.4.2 Generalized Inventory of Existing Land Uses

Generalized land uses within the FERC Project boundary and ¼ mile beyond it were identified and mapped. This was accomplished through a review of recent aerial photography from PacifiCorp, discussions with PacifiCorp's Lands Department, a review of zoning maps, and a windshield survey reconnaissance in September 2002 of portions of the Project that are accessible from public roads and property. Floodplains were identified from existing Federal Emergency Management Act (FEMA) maps. Wetlands were identified as part of the Terrestrial Resources Final Technical Report. The products of this subtask include a text description and geographic information system (GIS) maps.

2.4.3 Review of Potential Conflicts with Existing or Proposed Land Use and Resource Management Plans and Programs

After inventorying land uses and land use plans, areas of potential conflict were identified between the Project as it currently exists and is operated. This was accomplished by reviewing each plan and related policies or goals and comparing the plan to existing Project facilities and operations.

2.5 RELATIONSHIP TO REGULATORY REQUIREMENTS AND PLANS

The agencies with jurisdiction over Project lands and adjacent lands listed in Table 2.4-1 are those agencies that would be anticipated to have regulations or other requirements related to land use in the Project area. In the event that conflicts between Project land uses and land use regulations or policy are identified, potential measures to further evaluate or eliminate the conflict will be provided.

2.6 TECHNICAL WORK GROUP COLLABORATION

Between December 2001 and November 2003, the recreation work group met numerous times to review and discuss the land use, visual resources, and recreation study plans. The meetings and outcomes as related to land use and visual resources are summarized as follows:

- **December 13, 2001.** The purpose of this meeting was to review the proposed land use and visual resources study plans. The group heard the purpose of the study, study area, existing information, and hopeful outcomes of the studies.
- **January 16, 2002.** The meeting was convened to afford an opportunity for those parties interested in land use and visual resources to provide comments on proposed study plans. The purpose of each study was reviewed and meeting attendees had the chance to ask questions. The group was informed that there would be opportunity for additional commenting at future work group meetings.
- **July 9, 2002.** Discussion on land use and visual resources took place within the Recreation Work Group meeting. PacifiCorp provided updates on revisions to the study plans based on group member feedback. The group approved the study plans to go to the plenary for approval.
- **August 8, 2002.** Study plans were approved by plenary.
- **September 2002-November 2003.** Interim results and potential enhancement measures were discussed at monthly recreation work group meetings.

For further information about the collaborative effort, see Appendix E-1A in the license application.

2.7 STUDY OBSERVATIONS AND FINDINGS

2.7.1 Land Ownership, Management, and Use

2.7.1.1 Ownership

Land ownership in the land use study area (1/4 mile beyond the FERC boundary) is shown in Figure 2.7-1, Land Ownership. The figure identifies lands owned by PacifiCorp as well as major holdings by the BLM and USFS. The primary purpose of the ownership figure is to show how the holdings of government agencies, for which there are applicable plans, policies, or regulations governing use or management, relate geographically to the Project. The primary government land owners are BLM and USFS. The states of Oregon and California and the local agencies—the city of Klamath Falls and Klamath and Siskiyou Counties—do not have significant land holdings in the area. Although a lack of available data precludes mapping the holding of private owners other than PacifiCorp, these lands are generally outside the scope of this study.

2.7.1.2 Management

City, county, state, and federal agencies have land and resource management authority in the Project area. These agencies are listed in Table 2.4-1 and described below.

City and County

City and county agencies exercise their land use authority through comprehensive plans and ordinances, including zoning. The city of Klamath Falls (Oregon), Klamath County (Oregon), and Siskiyou County (California) are the three agencies with zoning authority in the Project area. Zoning designations are illustrated in Figure 2.7-2, Zoning. The applicable plans of these agencies are described below. The city and county agencies generally do not own the lands but have planning and zoning authority over them.

State and Federal

The relevant state agencies with land management responsibilities are the Oregon Department of Agriculture (ODA), Oregon Department of Fish and Wildlife (ODFW) (owns and manages the Klamath State Wildlife Area south of Klamath Falls), and the Oregon Department of Land Conservation and Development. The federal agencies are BLM (Klamath Falls Resource Area [KFRA; Oregon], Medford District [Oregon], and Redding Resource Area [California]); USFS (Klamath National Forest [California]) and U.S. Bureau of Reclamation. The Oregon Parks and Recreation Department has management responsibilities on the Klamath River. These agencies own or manage land in the study area. Relevant plans and requirements are reviewed below.

2.7.1.3 Use

Existing generalized land uses within the FERC boundary and 1/4 mile beyond it are shown in Figure 2.7-3, Existing Land Use. The purpose of this map is to provide an overview of the land uses in the study area; it is not intended to identify land management or policy direction. Where multiple uses occur in the same area, an attempt was made to classify the land by the predominant use. The following generalized uses are illustrated:

- Agriculture/Grazing (generally intensive agricultural uses such as cropland or pasture; may include grazing lands)
- Industrial/Undeveloped (lands currently in industrial use or vacant but zoned industrial; used only in the city of Klamath Falls)
- Urban (fully developed, incorporated lands; used only in the city of Klamath Falls)
- Open Space and Conservation (general category for undeveloped lands not in active use; may include timber production, some grazing, developed and dispersed recreational uses in some locations; generally excludes residential)
- Residential (low-density rural residential, except for city of Klamath Falls which is higher-density)
- Hydro Operations Lands (lands used primarily for PacifiCorp hydroelectric operations facilities or maintenance activities)
- Recreation Lands (designated recreational sites)

Within the city of Klamath Falls, the primary land uses in the study area are open space and conservation, residential, industrial/undeveloped, and agriculture. Klamath Falls contains the only land in the study area classified as “urban.” This use represents a portion of the downtown.

All land within the study area classified as “industrial/undeveloped” is also located within or near the city of Klamath Falls. Although zoned industrial, some portions of these lands are in agricultural uses or otherwise undeveloped. For this reason, “undeveloped” was added to this land use classification. (“Hydro operations lands” also could be considered industrial, but because of their importance to this analysis, they are assigned their own use category.)

Outside of Klamath Falls, the other residential clusters occur in and around the community of Keno and the Keno Recreation Area, and along portions of Copco reservoir. The proposed Iron Gate Estates subdivision east of Iron Gate reservoir is undeveloped and is generally not in residential use except for isolated residences outside of the study area.

Figure 2.7-1 Land ownership
(11x17) Tile 1 of 16 Front

Figure 2.7-1 (11x17) Tile 1 of 16 Back

Figure 2.7-1: Land Ownership (11x17) Front of Tile 2 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 2 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 3 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 3 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 4 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 4 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 5 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 5 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 6 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 6 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 7 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 7 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 8 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 8 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 9 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 9 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 10 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 10 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 11 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 11 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 12 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 12 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 13 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 13 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 14 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 14 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 15 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 15 of 16

Figure 2.7-1: Land Ownership (11x17) Front of Tile 16 of 16

Figure 2.7-1: Land Ownership (11x17) Back of Tile 16 of 16

Figure 2.7-2 Zoning

(11x17) Front of Tile 1 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 1 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 2 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 2 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 3 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 3 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 4 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 4 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 5 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 5 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 6 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 6 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 7 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 7 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 8 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 8 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 9 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 9 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 10 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 10 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 11 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 11 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 12 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 12 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 13 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 13 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 14 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 14 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 15 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 15 of 16

Figure 2.7-2: Zoning (11x17) Front of Tile 16 of 16

Figure 2.7-2: Zoning (11x17) Back of Tile 16 of 16

Figure 2.7-3 Existing land use
(11x17) Front of Tile 1 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 1 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 2 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 2 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 3 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 3 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 4 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 4 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 5 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 5 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 6 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 6 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 7 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 7 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 8 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 8 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 9 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 9 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 10 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 10 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 11 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 11 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 12 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 12 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 13 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 13 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 14 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 14 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 15 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 15 of 16

Figure 2.7-3: Existing Land Use (11x17) Front of Tile 16 of 16

Figure 2.7-3: Existing Land Use (11x17) Back of Tile 16 of 16

Between Klamath Falls and Keno Recreation Area, much of the land on the east side of the river (river left) is classified as “open space and conservation,” consistent with its designation as the Klamath State Wildlife Area. On the west side (river right) in this area, most of the land is in irrigated agricultural use.

Downstream of Keno Recreation Area, the majority of the land is classified as “open space and conservation.” By definition, this category includes other dispersed, undeveloped uses including timber production, limited grazing, and developed and dispersed recreation areas. There are a number of hydro operations lands and recreation lands in this area, but few other developed uses. Irrigated pasture lands in the alluvial terraces adjacent to the Klamath River upstream from Copco reservoir are identified as being in agricultural use.

2.7.1.4 Wetlands and Floodplains

The Project area includes limited wetlands and FEMA-defined floodplains. Applicable wetland and floodplain policies contained in land use and resource management plans are identified in Section 2.7.2.3 of this study.

Wetlands

Wetlands are illustrated and discussed in the Terrestrial Resources Final Technical Report. As shown in the maps in that report, the size and distribution of palustrine wetlands vary considerably by location within the Project area. Relatively large shoreline wetland areas are present along Lake Ewauna and the Keno reservoir up to the area of Keno dam. Downstream of Keno dam, as the river channel narrow, the wetland areas are smaller and much less frequent. A number of wetlands are present in and around the upper end of J.C. Boyle reservoir. From J.C. Boyle dam until Copco and Iron Gate reservoirs few wetlands are present, as this section of river is narrow with steep banks. On Copco and Iron Gate reservoirs, wetland areas are generally small and relatively infrequent.

Floodplains

Floodplains in the Project area are illustrated in Figure 2.7-4, Floodplains. Their characteristics are summarized below. Because of the sparse development adjacent to the Klamath River in the Project area and the low population density, only limited determination and mapping of floodplains has been conducted in the Project area. In the upper river area around Lake Ewauna and Keno, the floodplains are relatively broad, in keeping with the wide nature of the river channel and associated wetland areas. Because much of the rest of the river corridor is contained in a relatively narrow canyon, floodplain areas are generally confined to the river channel itself. Exceptions include the reservoirs and also the agricultural lands adjacent to the river upriver of Copco reservoir.

Klamath County. FEMA floodplain mapping has been conducted only for the city of Klamath Falls, the incorporated portion of the county. The FEMA flood hazard maps for Klamath Falls show the Klamath River and Lake Ewauna as Zone A (within the 100-year floodplain), and the adjacent lands as Zone B (within the 500-year floodplain) and Zone C (outside the 500-year floodplain). The remainder of the Project area in Klamath County has not been mapped by FEMA for flood hazard.

Siskiyou County. According to the FEMA flood hazard maps for Siskiyou County, FEMA has not conducted detailed flood hazard mapping in the Project area. The maps indicate that the Klamath River has been designated as Zone A (within the 100-year floodplain), as determined by approximate methods of analysis. No hydraulic analyses have been performed, and no base flood elevations are available for this area.

2.7.2 Review of Land Use and Resource Management Plans

2.7.2.1 Inventory of Applicable Federal, State, and Local Plans

Potentially applicable federal, state, and local plans were identified through consultation with and comments from relevant project and agency staff and through review of FERC's April 2002 list of comprehensive plans (FERC, 2002). The plans reviewed are classified below according to whether or not they are on the FERC list.

To facilitate the review and analysis of applicable plans, a matrix listing all potentially applicable plans and policies was developed (see Table 2.7-1: Land Use and Resource Management Plan Review and Consistency Summary). The plan review process was tracked and guided by the matrix, which includes questions to screen plans that may not apply to the Project area or may not be otherwise applicable. The table summarizes plans on the FERC list and other relevant plans and includes the following information:

- Plan Name
- FERC list (yes/no)
- Geographic Area Covered
- Geographic Area Applicable? (If no see Notes)
- Plan Applicable? (If no see Notes)
- Land Use/Resource Management Element
- Relevance to Project
- Project Consistency
- Notes

2.7.2.2 Review of Potential Conflicts with Existing or Proposed Land Use and Resource Management Plans and Programs

FERC-Recognized Plans

There are 108 plans listed on FERC's April 2002 (FERC, 2002) list of comprehensive plans that address lands within the state of Oregon, 48 that address lands within the state of California, and 23 that are either generic to the United States or that address lands within both California and Oregon. Of the 179 plans, eight were identified as relevant to the Project. The remaining plans on FERC's list are specific to geographic locations not affected by the Project, do not address land use or resource management policy, or are not relevant to the Project. The eight relevant plans are discussed below.

Figure 2.7-4 Floodplains
(11x17) Front of page 1 of 2

Figure 2.7-4: Floodplains (11x17) Back of page 1 of 2

Figure 2.7-4: Floodplains (11x17) Front of page 2 of 2

Figure 2.7-4: Floodplains (11x17) Back of page 2 of 2

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
CALIFORNIA								
Bureau of Land Management. 1993. Redding Resource Management Plan and Record of Decision.	Yes	Redding, California, Resource Area, Siskiyou County, California	Yes	Yes	The plan identifies all public lands for retention and lands available for disposal from federal management.	Within the plan's Klamath Management Area, the Upper Klamath River is named as a resource with the following objectives: (1) maintain scenic quality; (2) improve riparian vegetation; (3) protect cultural resources; and (4) improve nonmotorized recreation opportunities. The plan also seeks to transfer four parcels from the Klamath National Forest to the BLM.	The Klamath Hydroelectric Project (Project) is consistent with this plan. The continued operation of Project facilities would not affect resource objectives, and plan initiatives to improve riparian vegetation could occur with the existing Project facilities in place. The transfer of land would not affect the Project.	
Bureau of Land Management. 2003. Proposed Plan Amendment to the Redding Resource Management Plan and Environmental Assessment for the Horseshoe Ranch Wildlife Area.	No	Redding, California, Resource Area, Siskiyou County, California	Yes	No	Only property contiguous to the Horseshoe Ranch Wildlife Area (HRWA) boundary that meets criteria for deer winter range habitat quality and manageability would be considered by the U.S. Bureau of Land Management (BLM) for acquisition from willing sellers.	While PacifiCorp owns property contiguous with the Proposed Amendment boundary, that property is identified as having low forage and cover values for deer habitat, and may not meet the criteria for acquisition.	The HRWA is adjacent to the Project area on the HRWA's eastern boundary. None of the alternatives presented would affect this boundary or bring the HRWA closer to any Project facilities without a plan for maintenance action and public review opportunity.	
Forest Service. 1994. Klamath National Forest Environmental Impact Statement/Land and Resource Management Plan.	No	Klamath National Forest, California	Yes	No	Not applicable	Not applicable	Not applicable	The relevant data used to analyze alternatives in the Klamath National Forest Environmental Impact Statement (EIS) were incorporated into the Resource Management Plan (RMP), summarized below.
Forest Service. 1994. Klamath National Forest Land and Resource Management Plan.	No	Klamath National Forest, California	Yes	Yes	Programmatic management direction is found in two sources: the forest-wide standards and guidelines and the specific management areas. The four categories of forest-wide goals vary in the level of conservation and allowable amount of forest product production.	None of the Project facilities are located on land addressed by this plan. The closest area is a section near the east end of Copco Lake that is designated as a late-successional reserve. This area is managed to protect and enhance habitat for late-successional and old-growth-related species.	Because none of the Project facilities conflict with the management direction provided by the plan, the Project is consistent with the plan. No additional actions are proposed by the Project that would affect forest conservation or production in or near lands addressed by this plan.	
Forest Service. 1995. Six Rivers National Forest Land and Resource Management Plan.	No	Six Rivers National Forest, California	No	No	Not applicable	Not applicable	Not applicable	Although the Klamath River flows through Six Rivers National Forest before it reaches the Pacific Ocean, the forest is located about 60 miles down river from the lower terminus of the Project study area. The plan is not geographically relevant to the Project.

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
Klamath River Basin Fisheries Task Force. 1991. Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program.	No	Lower Klamath River, California	Yes	No	Not applicable	Not applicable	Not applicable	This plan is primarily related to fisheries issues that are beyond the scope of this land use review. Fisheries issues related to the Project are addressed elsewhere in the license application.
Siskiyou County. 1973. General Plan of Siskiyou County, California.	No	Siskiyou County, California (unincorporated area)	Yes	Yes	Land use policies are developed by allowing the physical environment to determine the appropriate future land use pattern. The preservation of recreational and scenic lands is also emphasized.	The General Plan guides land use policy within a large section of the Project area. Two hydroelectric reservoirs, Copco and Iron Gate, provide water surfaces for recreation and are surrounded by recreational lands. Outside of these areas, FERC land along the Klamath River is devoted to open space and agricultural uses.	Existing Project facilities are consistent with the policies outlined for each environmentally sensitive area, including surface hydrology areas, in which hydroelectric power facilities are one of the few uses allowed. Because no additional facilities are proposed as a part of the Project, the Project also is consistent with the agricultural and open space policies.	
Siskiyou County. 1994. Siskiyou County Zoning Ordinance.	No	Siskiyou County, California (unincorporated area)	Yes	Yes	The Zoning Code has no land use element per se, but applies to all land use in general by regulating allowable uses throughout Klamath County.	Hydroelectric facilities are subject to local review in part through the zoning code. The Project area is located in three zones—AG-1 (Prime Agricultural), AG-2 (Non-Prime Agricultural), and RR (Rural Residential Agricultural).	Public utility facilities are a conditional use in each of the three zones in the Project area. All of the Project facilities are consistent with the zoning through conditional use permits. No additional facilities are proposed as a part of this Project.	
OREGON								
Bureau of Land Management. 1990. Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study.	Yes	Upper Klamath River (Oregon and California) from just below J.C. Boyle dam to just above Copco reservoir	Yes	No	BLM determined Segments 2 and 3 of the Klamath River eligible for inclusion in the Wild and Scenic system. Both segments meet the criteria for a <i>scenic</i> classification but not the criteria for a <i>wild</i> classification.	Not applicable	Not applicable	This document is not a resource management plan and it does not constitute a recommendation by the BLM regarding congressional designation of the Upper Klamath River.
Bureau of Land Management. 1994. Klamath Falls Resource Area Resource Management Plan and Environmental Impact Statement.	Yes	Klamath Falls, Oregon, Resource Area (Lakeview District)	Yes	No	Not applicable	Not applicable	Not applicable	The information presented in the proposed RMP/EIS was finalized in the Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary.
Bureau of Land Management. 1994. Medford District Proposed Resource Management Plan/Environmental Impact Statement.	Yes	Medford, Oregon, District— including Ashland Resource Area	No	No	Not applicable	Not applicable	Not applicable	The information presented in the proposed RMP/EIS was finalized in the Medford District RMP/Record of Decision.

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
Bureau of Land Management. 1995. Jenny Creek Watershed Assessment and Analysis.	No	Jackson and Klamath Counties, Oregon, Siskiyou County, California (Medford District)	Yes	No	Not applicable	Not applicable	Not applicable	The southern tip of the Jenny Creek Watershed is within FERC property. Jenny Creek empties into the Iron Gate reservoir. None of the recommendations made within the assessment are specific to the Project area or any Project facilities.
Bureau of Land Management. 1995. Medford District Record of Decision and Resource Management Plan.	Yes	Medford, Oregon, District—including Ashland Resource Area	No	No	Not applicable	Not applicable	Not applicable	The Spring Creek diversion facility is located in Jackson County within the Medford RMP area. Otherwise, the Project study area is completely outside of the RMP planning area.
Bureau of Land Management. 1995. Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary.	Yes	Klamath Falls, Oregon, Resource Area (Lakeview District)	Yes	Yes	The RMP responds to the need for a healthy forest ecosystem and a sustainable supply of forest products. BLM will use ecological, economic, social, and managerial principles to achieve healthy and sustainable natural systems and maintain the health of aquatic ecosystems. The rangeland program summary identifies resource concerns for each grazing allotment.	Eleven miles of the Klamath River, from the J.C. Boyle powerhouse to the state border, are designated as a protected Special Area. This area is not available for new hydroelectric development. There are several recreational sites along the Klamath River and several trails. Within the Klamath River Complex Special Resource Management Area (SRMA), the plan supports the cooperative management agreement with PacifiCorp for coordinated recreation trail and facility development.	The Project does not propose any new hydroelectric developments; therefore, the continued operation of the hydroelectric facilities is consistent with the Special Area designation along the Klamath River. Outside of the Special Area, the operation of the Project's facilities would not preclude effective ecosystem management in the plan area's forest and agricultural lands. The Project would not be in conflict with the existing or proposed recreational opportunities in the RMP.	
Bureau of Land Management. 2001. Klamath Falls Resource Area—Annual Program Summary.	Yes	Klamath Falls, Oregon, Resource Area (Lakeview District)	Yes	No				This document is not a resource management plan and does not provide additional direction related to use of lands in the Klamath Falls Resource Area. However, future actions related to the Project will be monitored for consistency and reported in future program summaries.
Bureau of Land Management. 2000. Klamath-Iron Gate Watershed Analysis—Version 1.1.	No	Jackson County, Oregon, and Siskiyou County, California Ashland Resource Area (Medford District)	Yes	No				This analysis includes recommendations that address grazing, economic development, and recreation and are geared towards maintaining agricultural, timber, and recreational resources without compromising ecological integrity. However, the recommendations do not relate directly to the Project.

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
Bureau of Land Management. 2002. Klamath Falls Resource Area Planning Update.	No	Klamath Falls, Oregon, Resource Area	Yes	No				The primary purpose of the planning update is to inform the public about activities and projects in the Klamath Falls Resource Area. It also seeks to collect comments from those affected by the programs. The document does not provide recommendations or policies.
City of Klamath Falls. 1981. City of Klamath Falls Comprehensive Plan.	No	Klamath Falls, Oregon, urban growth boundary	Yes	Yes	Goals in the Land section emphasize the preservation of agricultural and forest lands. Upper Klamath Lake and Lake Ewauna are areas of critical scenic concern. Land along these water bodies is targeted for recreational opportunities such as park development and the creation or maintenance of trails.	Because of the Project's location, it most directly affects recreational land and the water associated with the Link River and Lake Ewauna. Several policies address this stretch of land, stressing its importance to the community.	No agricultural or forest lands would be consumed by the Project. PacifiCorp's ownership of land along the major waterways in Klamath Falls provides passive recreational opportunities consistent with the plan. For these reasons the Project is consistent with this plan.	
City of Klamath Falls. 2000. City of Klamath Falls Community Development Ordinance.	No	Klamath Falls, Oregon, urban growth boundary	Yes	Yes	Chapter 12 describes each of the City's zones and overlay areas. The code contains several different zones, grouped into common land uses. Allowable uses in each zone are provided in matrix format.	The East Side and West Side powerhouses are both within Public Facility zones. The FERC boundary stretches along the river and Lake Ewauna south through and out of the city's urban growth boundary (UGB), crossing Industrial, Special Reserve, Single-Family Residential and General Commercial zones.	Public utilities are permitted outright in the Public Facility zone; the West Side powerhouse and Link River dam are consistent. The East Side powerhouse is in a Special Reserve Zone, where public utilities are conditional uses. The powerhouse is allowed in the zone by condition and is consistent with the plan.	
City of Klamath Falls. 2000. Parks, Recreation and Open Space Master Plan.	No	Klamath Falls, Oregon, urban growth boundary	Yes	Yes	The plan's objectives include developing park facilities and providing a variety of hiking, biking, and riding experiences. Coordinating efforts between public and private agencies is strongly encouraged.	Various policies and objectives of the plan apply to the portion of the Project located within the city UGB, including the Link River, Lake Ewauna, and the Klamath River south to the UGB.	PacifiCorp's ownership of land along the major waterways in Klamath Falls provides several passive recreational opportunities consistent with the plan. The Project is consistent with the plan because it would not interfere with the implementation of the recreational opportunities discussed in this plan.	
Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part I—Comprehensive Plan, Polices.	No	Klamath County, Oregon (unincorporated area)	Yes	Yes	The Land Use Element describes the county's ten land use designations, which are further broken down into implementing zones. Conservation of agricultural and forest lands is advocated by the plan, as well as the preservation of open space and scenic rivers. All land uses were allowed as a conforming or nonconforming use at the time the plan was approved.	Project facilities are scattered through Klamath County, including the Keno dam, the J.C. Boyle dam and powerhouse, and several recreation sites. No policies relate directly to the Project or its facilities, although the protection of wilderness habitat and riparian areas is a common theme within the plan, and much of the Project area within the county is in the wilderness.	The Project area is nearly all forest lands, and the Project's land uses are grandfathered in by the provisions of the plan. No additional facilities are proposed as a part of the Project that could interfere with riparian areas; therefore, the Project is consistent with the plan.	

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part III—Land Development Code.	No	Klamath County, Oregon (unincorporated area)	Yes	Yes	The Land Development Code does not have a land use element per se, but applies to all land uses in general by regulating allowable uses throughout the county.	Project facilities are scattered through Klamath County. The Project area is located in two zones—Forestry and Forestry/Range. The purpose of the Forestry zone is to protect forest ecosystems; the Forestry/Range zone is used to promote the management and conservation of lands of mixed farm and forest use.	Public utility facilities are either permitted or conditional uses (depending on the facility type) in each of the zones in the Project area. All of the Project facilities are consistent with the zoning through conditional use permits. No additional facilities are proposed as a part of this Project.	
Klamath Headwaters Agricultural Water Quality Advisory Committee. 2002. Agricultural Water Quality Management Area Plan: Klamath Headwaters, excluding Lost River.	No	Klamath County, Oregon (Klamath headwaters subbasin)	Yes	Yes	The plan's goal is "to prevent and control potential water pollution from agricultural activities and to achieve water quality standards." The plan's objectives are divided into three categories: 1) improved water quality; 2) education and public involvement; and 3) funding.	The plan generally covers the Klamath River south of Keno to the state line and also Lake Ewauna within the Project area. Strategies to control pollution mostly target agricultural lands and practices. The most prominent strategy involves the management of a high-quality riparian buffer along channel slopes to act as a sediment trap.	FERC lands along the Klamath River south of Keno are in current use as open space. The Project proposes no additional facilities and no changes in the open space. Therefore, the existing natural open space along the river will remain as a riparian corridor in accordance with this plan.	
Klamath Soil and Water Conservation District. 1990. Spencer Creek Watershed Coordinated Resource Management Plan. July 26, 1990.	No	Klamath County, Oregon (Spencer Creek Watershed, including Miners and Clover Creek)	Yes	Yes	Land use objectives include maintaining livestock grazing and timber production and maintaining or enhancing riparian zones within the watershed to improve water quality and reduce erosion. Recreational opportunities should be provided on public lands within the watershed.	Spencer Creek is just upstream from J.C. Boyle reservoir. Project lands addressed by the plan are currently used as open space and are zoned for forestry uses.	FERC land near Spencer Creek is used primarily for grazing and open space. Because no new Project facilities are proposed, the function of these lands would not change, consistent with the plan. The presence of J.C. Boyle reservoir provides recreational opportunities within the watershed.	
Oregon Department of Agriculture. 2001. Lost River Subbasin Agricultural Water Quality Management Area Plan.	No	Klamath County, Oregon, and Siskiyou County, California (Lost River subbasin)	Yes	Yes	The goal of the plan is to prevent and control water pollution from agricultural activities. The plan has two objectives: (1) maximize the beneficial effects of agricultural irrigation, and (2) increase awareness of water quality concerns.	The plan applies to agricultural land uses on the Klamath River from Link River dam downstream to Keno dam (including Lake Ewauna).	Existing uses on PacifiCorp land in this area are hydropower production and outdoor recreation and do not include agricultural activities. For this reason, the Project is consistent with this plan.	
Oregon Department of Fish and Wildlife. Undated. Klamath Wildlife Area—Mission and Goals.	No	Klamath Wildlife Area, southeast of Klamath Falls	Yes	Yes	The plan targets the provision of animal habitat and opportunities for recreational harvest of game and wildlife viewing.	The Klamath Wildlife Area is adjacent to the Klamath River, southeast of the city of Klamath Falls. The FERC boundary is at the shoreline of the river in this area, and land to the east is used as open space and zoned for open space and conservation.	The Project proposes no additions or expansions that would prevent the protection and maintenance of waterfowl and other game in the wildlife area, and therefore is consistent with the plan.	

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
South Central Oregon Regional Partnership. 1999. South Central Oregon Regional Partnership Strategic Plan.	No	Klamath and Lake Counties, Oregon	Yes	Yes	This is an economic development plan, with occasional mention of land use and resource management.	The plan is geographically relevant, but does not contain specific goals and objectives that relate to the Project. The plan includes a strategy to encourage land development projects, minimize traffic congestion, and maintain environmental quality and beauty.	The policies relate to future land development actions. No such actions are proposed as part of the Project. Any such actions would need to comply with county land development requirements, which are consistent with these statements.	
South Central Oregon Regional Partnership. 2001. South Central Oregon Consolidated Economic Development Strategy and Regional Investment Plan 2001-2003.	No	Klamath and Lake Counties, Oregon	Yes	Yes	This is an economic development plan, with occasional mention of land use and resource management.	The plan is geographically relevant, but does not contain specific goals and objectives that relate to the Project. It includes several general policies, goals, and objectives, which are generally relevant to land management and use.	The policies relate to future land development actions. No such actions are proposed as part of the Project. Any such actions would need to comply with county land development requirements, which are consistent with these statements.	
UNITED STATES								
Bureau of Land Management. 2003. Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments.	No	Upper Klamath River – Oregon and California	Yes	Yes	The Draft EIS considers four alternative land use allocations and land tenures. Alternative 1 (No Action) would not change existing land allocation or designations. Alternatives 2, 3, and 4 would expand the existing Area of Critical Environmental Concern (ACEC) to include all of the river canyon within the Redding Resource Area. Alternatives 2, 3, and 4 would also expand the Upper Klamath River Management Area, BLM would seek to increase public land holdings within alternative project area boundaries.	The proposed expansion of the ACEC under Alternatives 2, 3, and 4 would apply to the Project area from approximately J.C. Boyle dam to J.C. Boyle powerhouse. The expansion of the planning area lands for the Upper Klamath River Management Plan would not include any Project facilities. The acquisition of nonfederal lands would not affect Project facilities because BLM would only seek the acquisition of undeveloped lands.	The continued operation of Project facilities would not be inconsistent with any land use decision by BLM that would follow from the proposed alternatives.	The Draft EIS is not a decision document and does not govern activities in the Project area. It will become a decision document when it is finalized. Actions evaluated in the Draft EIS will not be applicable to the Project until an alternative is selected and a Record of Decision approved.
Bureau of Land Management. 2002. Cascade-Siskiyou National Monument Draft Resource Management Plan and Environmental Impact Statement.	No	Southeast area of Jackson County, Oregon	No	No	Not applicable	Not applicable	Not applicable	The Spring Creek diversion project is located within the Monument boundary. Otherwise, there is no direct geographic relationship between the draft RMP/EIS and the Project.

Table 2.7-1. Land use and resource management plan review and consistency summary.

Plan Name	FERC List	Geographic Area Covered	Geographic Area Applicable? (If No, see notes)	Plan Applicable? (If No, see notes)	Land Use/Resource Management Element	Relevance to Project	Project Consistency	Notes
Bureau of Reclamation. 2002. Klamath Project Long-term Operations Plan Environmental Impact Statement—Preliminary Alternatives.	No	Klamath River Basin—Oregon and California	Yes	See notes				As of June 2003, the EIS process and development of alternatives was stalled owing to Endangered Species Act issues. As of that time, a new Notice of Intent was being submitted with plans to conduct a new scoping and alternatives development process.
Forest Service. Bureau of Land Management. 1994. Standards and guidelines for management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. [AKA NW Forest Plan]	Yes	Pacific Northwest westside forests	Yes	Yes	The 24.4 million acres of federally-administered lands within the range of the northern spotted owl are allocated to one of the six designated areas. Lands are also allocated to one of three watershed categories. Designations and categories place management requirements or emphasis on activities in those areas with the goal of protecting the northern spotted owl and its habitat.	Corners of parcels of land managed by this plan are nearly adjacent to the Klamath River, including Administratively Withdrawn Areas and Late-Successional Reserves. Administratively Withdrawn Areas are excluded from timber harvest. The objective of Late-Successional Reserves is to protect and enhance conditions of late-successional and old-growth-forest ecosystems.	The continued operation of Project facilities would not affect the preservation of late-successional and old-growth-forest ecosystems. The presence of Project facilities does not increase the likelihood of silvicultural activities in the area. Any future Project activities would be reviewed on a case-by-case basis as mandated by the plan (under Late-Successional Reserves). For these reasons, the Project is consistent with the plan.	
Forest Service. Bureau of Land Management. 2000. Interior Columbia Basin Final Environmental Impact Statement/Proposed Decision.	No	Interior Columbia basin	No	No	Not applicable	Not applicable	Not applicable	The plan does not apply to the Project area. Although the northeast portion of the Project is within the planning boundary for the EIS, none of the lands called out for management under the EIS are near the Project area. There are no management policies contained by the EIS that involve Project facilities. In addition, because a final Record of Decision was never issued for the document, it is not considered officially adopted.
National Park Service. 1994. Klamath Wild and Scenic River Eligibility Report and Environmental Assessment.	No	Upper Klamath River in Oregon (Oregon state scenic waterway)	Yes	No	Not applicable	Not applicable	Not applicable	This document was prepared in response to the request by the state of Oregon to the U.S. Secretary of the Interior in April 1993 that the Upper Klamath River be designated as a national wild and scenic river. It concludes that the river should be designated as scenic. However, it is not a policy document or a resource management plan.

California

1. Bureau of Land Management. 1993. Redding Resource Management Plan and Record of Decision. Department of the Interior, Ukiah, California. June 1993. 55 pp.

Summary. The resource management plan (RMP) is a 15-year strategy addressing where and how the Bureau of Land Management will administer public lands under its jurisdiction within the Redding Resource Area. This document provides guidance for managing public lands throughout Butte and Tehama Counties as well as the majority of Shasta, Siskiyou, and Trinity Counties. The RMP focuses on four planning issues: land tenure adjustment (where BLM should provide long-term federal stewardship); recreation management (where and what mixture of recreation activities should be encouraged or discouraged); access (the ability of public users to physically access their public lands); and forest management (where should forest management be allowed given existing restrictions and changing land ownership). The Record of Decision (ROD) records the decisions made by the BLM in the Proposed Resource Management Plan/ Environmental Impact Statement (RMP/EIS).

Land Use/Resource Management Element. The RMP identifies all public lands for retention and consolidation and lands available for disposal from federal management. When fully implemented, the pattern of BLM public land ownership will change from more than 1,000 scattered parcels to a few manageable blocks of public land. This strategy will be accomplished principally through land exchanges with the private sector and some transfers of jurisdiction with other agencies and organizations.

Relevance to Project. The plan has seven management areas. The Klamath Management Area spans the northernmost portion of the Redding Resource Area and includes the Klamath River from the state border south to the end of the Project. Within the Klamath Management Area, the Upper Klamath River is named as a resource with the following 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 semiprivate nonmotorized recreation opportunities. The RMP also seeks the administrative transfer of four parcels totaling approximately 520 acres from the Klamath National Forest to the BLM along the Upper Klamath River.

Project Consistency. The continued operation of Project facilities would not affect the scenic quality of the river corridor or cultural resources along the river. Initiatives to improve the condition of the riparian vegetation could occur with the existing Project facilities in place. Iron Gate reservoir and Copco reservoir provide opportunities for nonmotorized recreation. The transfer of land from the Klamath National Forest to the BLM would not affect the continued operation of Project facilities. For these reasons, the Project is consistent with this plan.

Oregon

1. Bureau of Land Management. 1990. Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River study. Department of the Interior, Klamath Falls, Oregon. March 1990. 131 pp. and appendices.

Summary. This report evaluates the eligibility, classification, and suitability of the Upper Klamath River for designation as a component of the National Wild and Scenic Rivers System (NWSRS). The study portion of the river was divided into three segments. Segment 1 begins just below J.C. Boyle dam and ends at the J.C. Boyle powerhouse (river mile [RM] 224.5 to 220.3).

Segment 2 begins at the powerhouse and ends at the Oregon-California state line (RM 220.3 to 209.3). Segment 3 begins at the state line and ends at the slackwater of Copco reservoir (RM 209.3 to 204).

Land Use/Resource Management Element. The BLM determined Segment 1 ineligible for inclusion in the system because of significant modification of the waterway and major continuous diversion. Segments 2 and 3 were determined eligible for inclusion in the Wild and Scenic system. The outstanding remarkable values (ORVs) in Segment 2 are recreation, fish, wildlife, historic, prehistoric, and scenic resource values, and Native American traditional use of the Klamath River Canyon. In Segment 3, ORVs are recreation, fish, wildlife, historic, and scenic resources. Both Segments 2 and 3 meet or exceed the criteria for a *scenic* classification, but do not meet the criteria for a *wild* classification.

Relevance to Project. This document provides key background information used in future eligibility studies and management plans for the river. However, the document is not a resource management plan and it does not constitute a recommendation by the BLM regarding congressional designation of the Upper Klamath River. For these reasons, this document is not further assessed for relation to land use and management in the Project area.

Project Consistency. For the reasons provided above, the issue of Project consistency is not relevant to this plan.

2. Bureau of Land Management. 1994. Klamath Falls Resource Area Resource Management Plan and Environmental Impact Statement. Department of the Interior, Klamath Falls, Oregon. September 1994. Three volumes and maps.

The information presented in the proposed RMP/EIS was finalized in the Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary discussed in Item 5 below.

3. Bureau of Land Management. 1994. Medford District Proposed Resource Management Plan/Environmental Impact Statement. Department of the Interior, Medford, Oregon. October 1994. Three volumes and maps.

The information presented in the proposed RMP/EIS was finalized in the Medford district RMP/ROD, discussed below.

4. Bureau of Land Management. 1995. Medford District Record of Decision and Resource Management Plan. Department of the Interior, Medford, Oregon. June 1995. 248 pp. and maps.

This document records the decision on a preferred alternative analyzed in the Medford district proposed RMP/EIS. The Medford district proposed RMP/EIS includes lands in Coos, Curry, Douglas, Jackson, and Josephine Counties in Oregon. The Project study area is completely outside of the area addressed by this document. Although land management policies in the Medford district could indirectly affect downstream resources (e.g., water quality), no relation exists between the RMP and the land uses within the Project study area. For these reasons, this plan is not relevant to the Project.

The Spring Creek diversion facility is located in Jackson County, Oregon, within the Medford RMP area. This facility will be analyzed as part of a supplement to the license application, as relevant.

5. Bureau of Land Management. 1995. Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary. Department of the Interior, Klamath Falls, Oregon. June 1995. 86 pp. Appendices and maps.

Summary. This is a consolidated document that includes the rangeland program summary, the ROD, and the Klamath Falls Resource Area Resource Management Plan. The ROD approves the Bureau of Land Management's decisions for managing 212,000 acres in Klamath County. It documents the approval and adoption of the proposed RMP, as described in the Klamath Falls Resource Area Proposed Resource Management Plan/Final Environmental Impact Statement. The purpose of the rangeland program summary is to inform interested parties of the implementation of the rangeland program for the KFRA. Also, the rangeland program summary provides a tracking mechanism between the KFRA ROD on the RMP and grazing decisions to be issued in the future.

Land Use/Resource Management Element. The ROD formally states the adoption of the RMP, declaring that it responds to the need for a healthy forest ecosystem and a sustainable supply of forest products. Lands administered by the BLM will be managed to maintain healthy, functioning ecosystems from which a sustainable production of natural resources can be provided. This involves the use of ecological, economic, social, and managerial principles to achieve healthy and sustainable natural systems. The RMP is also based on an aquatic conservation strategy that was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The rangeland program summary identifies resource conflicts and concerns for each grazing allotment.

Relevance to Project. The KFRA surrounds the city of Klamath Falls and extends south to the Oregon-California border. Eleven miles of the Klamath River, from the J.C. Boyle powerhouse to the Oregon-California border, are designated as a Special Area needing protection. This area is not available for new hydroelectric development, among other restrictions. The Klamath River is also within two RMP land use allocation resource plans—visual quality and recreation. Sections of the river are classified as Class III (Klamath Falls to J.C. Boyle powerhouse) and Class II (J.C. Boyle powerhouse to state line). Class III lands must partially retain the existing character of the landscape while Class II areas must retain the existing character of the landscape. Several recreational sites along the Klamath River are mentioned in the plan, including Topsy Recreation Site, the Klamath River Put-In, Klamath River BLM Campground, the Klamath River Complex Special Recreation Management Area (SRMA), as well as several trails. The RMP seeks to provide a wide range of developed and dispersed recreation opportunities that contribute to meeting the Project recreation demand. Within the Klamath River Complex SRMA, the plan supports the cooperative management agreement with PacifiCorp Power for coordinated recreation trail and facility development.

Project Consistency. PacifiCorp does not propose any additional hydroelectric developments for the Project at this time; therefore, the continued operation of the hydroelectric facilities is consistent with the Special Area designation along the Klamath River. Outside of the Special Area, the operation of the Project's facilities would not preclude effective ecosystem

management in the plan area's forest and agricultural lands. Visually, the Project's facilities are located in areas that are generally more developed than the surrounding lands and are in character with their surroundings. The relicensing of these facilities will retain the character of these landscapes. The continued operation of the facilities associated with the Project would not be in conflict with the existing or proposed recreational opportunities in the RMP, and would continue to be guided by the cooperative management agreement. The continued operation of Project recreation sites is consistent with the recreation objectives of the plan. No conflicts or concerns specific to the operation of the Project's facilities were identified by the rangeland program summary.

6. Bureau of Land Management. 2001. Klamath Falls Resource Area—Annual Program Summary. Department of the Interior, Klamath Falls, Oregon. August 2002. 185 pp.

Summary. The program summary is designed to report to the public, and local, state, and federal agencies a broad overview of activities and accomplishments for the past fiscal year. It is a requirement of the Klamath Falls Resource Area Record of Decision and Resource Management Plan. The Annual Program Summary addresses the accomplishments of the KFRA and provides information concerning the KFRA budget, timber receipt collections, and payments to Klamath County. The results of the 2001 Annual Program Summary show that the KFRA is fully and successfully implementing the Northwest Forest Plan. The 2001 Annual Program Summary complies with the results and findings of implementation monitoring for the past fiscal year.

Land Use/Resource Management Element. Management of the Upper Klamath River Area of Critical Environmental Concern was shifted into the management plan for wild and scenic river values within the State of Oregon Wild and Scenic River/State Scenic Waterway Plan. Visual quality management classes were used in the review of five major projects, none related to the Klamath Project. Activities in the area were compatible with recreation goals.

Relevance to Project. The KFRA surrounds the city of Klamath Falls and extends south to the Oregon-California border, encompassing several Project facilities. Monitoring results in the KFRA found full compliance with management action/direction in all of the land use allocations and resource programs identified for monitoring in the plan. Monitoring results also found full compliance in 87 of the 88 implementation monitoring questions contained in the plan (the exception regarding soil compaction in timber harvesting areas).

Project Consistency. This document is not a resource management plan and does not provide additional direction in terms of the appropriate use of lands in the KFRA. For this reason, the issue of Project consistency is not relevant to this program summary. However, any future actions will be monitored for consistency and reported in future program summaries.

California/Oregon

1. Forest Service. Bureau of Land Management. 1994. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest-Related Species Within the Range of the Northern Spotted Owl. [NW Forest Plan.] Department of Agriculture, Department of Interior. Washington, DC. April 13, 1994. 144 pp.

Summary. The NW Forest Plan presents a combination of land allocations managed primarily to protect and enhance habitat for late-successional and old-growth forest-related species, and standards and guidelines for the management of the land allocations. It takes an ecosystem

management approach to forest management, with support from scientific evidence, that balances protection of native species and riparian areas with the support of local and regional economic needs. These standards and guidelines apply to lands administered by USFS and BLM within the range of the northern spotted owl.

Land Use/Resource Management Element. The 24.4 million acres of USFS, BLM, and other federally-administered lands within the range of the northern spotted owl are allocated to one of the following six designated areas or to the category “Matrix”: Congressionally Reserved Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Areas, Administratively Withdrawn Areas, and Riparian Reserves. The matrix consists of those federal lands outside the six designated categories. Lands are also allocated to one of three watershed categories—Tier 1 Key Watersheds, Tier 2 Key Watersheds, or non-Key Watersheds. Watershed designations overlay portions of all six categories of designated areas and matrix, and place additional management requirements or emphasis on activities in those areas.

Relevance to Project. Part of the Project near the east end of Copco Lake is roughly 250 feet away from land managed by this plan. Corners of parcels of land managed by the NW Forest Plan are nearly adjacent to the Klamath River. Administratively Withdrawn land exists south of the lake and to the northwest of Klamath River at its confluence with Shovel Creek. These lands are also Adaptive Management Areas. Late Successional Reserves exist south of the Klamath River, east of the Administratively Withdrawn lands.

Administratively Withdrawn Areas are identified in current forest and district plans or draft plan preferred alternatives and include recreation and visual areas, back country, and other areas that are excluded from planned or scheduled timber harvest. These areas are subject to the standards and guidelines in their respective plans or the standards and guidelines common to the land allocations featured in this plan, whichever are more restrictive.

Adaptive Management Areas are landscape units designed to encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives. Management activities in the Adaptive Management Areas will be conducted to achieve the objectives described in the standards and guidelines of the underlying designation.

The objective of late-successional reserves is to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for their related species, including the northern spotted owl. These reserves are designed to maintain a functional and interacting ecosystem. Restrictions in these areas target the amount of allowed timber harvesting and fire suppression. In general, nonsilvicultural activities that are neutral or beneficial to the creation and maintenance of late-successional habitat are allowed. New development proposals that address public needs such as power lines, pipelines, or other public works projects will be reviewed on a case-by-case basis and may be approved when adverse effects can be minimized and mitigated.

Project Consistency. The continued operation of Project facilities would not affect the maintenance and preservation of late-successional and old-growth forest ecosystems. The presence of Project facilities does not increase the likelihood of silvicultural activities in the area. The Project does not propose the construction of any new facilities; any future activities would be reviewed on a case-by-case basis as mandated by the plan (in late-successional reserves). For these reasons, the Project is consistent with the NW Forest Plan.

Other Relevant Resource Plans

The land use and resource management plans discussed below are not on the FERC List of Comprehensive Plans, but were determined to be potentially relevant to land use or resource management in the Project area. Upon review, a number of the plans were determined not to be relevant to the Project. The reasons for conclusions regarding relevance are discussed below and also are summarized in Table 2.7-1: Land Use and Resource Management Plan Review and Consistency Summary.

California

1. Bureau of Land Management. 2003. Proposed Plan Amendment to the Redding RMP and Environmental Assessment for the Horseshoe Ranch Wildlife Area. Department of the Interior, Redding, California. May 2003. 84 pp.

This document presents the proposed amendment to the Redding RMP and the Horseshoe Ranch Wildlife Area (HRWA) and an environmental assessment of the three alternative amendments, including the proposed amendment (Alternative 2). The proposed amendment states that the HRWA boundary will coincide with the California Department of Fish and Game (CDFG) administrative boundary, plus an area to the west. Only property contiguous to the HRWA boundary that meets criteria for deer winter range habitat quality and manageability would be considered by BLM for acquisition from willing sellers. While PacifiCorp owns property contiguous with the proposed amendment boundary, that property is identified as having low forage and cover values for deer habitat and may not meet the criteria for acquisition. The addition of contiguous land to the HRWA will require a maintenance action plan and environmental assessment which include public participation. Because the proposed amendment does not directly affect the Project, this document has not been considered further.

2. Forest Service. 1994. Klamath National Forest Environmental Impact Statement/Land and Resource Management Plan. Department of Agriculture, Yreka, California. 1994. Two volumes.

The relevant data used to analyze alternatives in the Klamath National Forest EIS were incorporated into the RMP, summarized below. The EIS is not a policy document, and for these reasons is not analyzed further here.

3. Forest Service. 1994. Klamath National Forest Land and Resource Management Plan. Department of Agriculture, Yreka, California. 1994. One volume and maps.

Summary. The purpose of the plan is to coordinate and disclose programmatic management direction for the Klamath National Forest. This direction will provide for multiple uses and the sustained yield of goods and services from the National Forest System in a manner that maximizes long-term net public benefits in an environmentally sound manner. The plan sets forth the preferred alternative for managing the land and resources of the Klamath National Forest. It establishes the management direction and associated long-range goals and objectives for the forest; specifies the standards, timing, and vicinity of the practices necessary to achieve that direction; and establishes the monitoring and evaluation requirements needed to ensure that the direction is carried out.

Land Use/Resource Management Element. Programmatic management direction is found in two sources: the forest-wide standards and guidelines and the specific management areas. The four categories of forest-wide goals are sustainability, environmental health and community stability, active stewardship, and participative management. These goals differ in the level of conservation and allowable amount of forest product production. Management areas are based on a hierarchical ecosystem approach that looks at the ecoregion, subregion, watershed, and site to provide direction on management activities.

Relevance to Project. None of the Project facilities are located on land covered by this plan. The closest area is a section near the east end of Copco Lake that is designated as a late-successional reserve. This area is managed to protect and enhance habitat for late-successional and old-growth-related species. This area is also identified as a Partial Retention Visual Quality Objective area. Visual guidelines are relative to views to the area, and therefore would be unaffected by the Project. The Klamath River and three of its tributaries in the Klamath National Forest (Scott River, Salmon River, and Wooley Creek) make up 200 miles of the National Wild and Scenic River System. However, these three tributaries connect to the Klamath River southwest of the Project area.

Project Consistency. Because none of the Project facilities conflict with the management direction provided by the plan, the Project is consistent with the plan. No additional actions are proposed by the Project that would affect forest conservation or production in or near lands addressed by this plan.

4. Forest Service. 1995. Six Rivers National Forest Land and Resource Management Plan. Department of Agriculture. Eureka, California. 1995.

Although the Klamath River flows through Six Rivers National Forest before it reaches the Pacific Ocean, the forest is located about 60 miles down river from the lower terminus of the Project study area. Thus, the plan is not geographically relevant to the Project.

5. Klamath River Basin Fisheries Task Force. 1991. Long-Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program. Klamath River Basin Fisheries Task Force with assistance from William M. Kier Associates. January 1991. Available: <<http://endeavor.des.ucdavis.edu/kris/BIBLIO/KLPCOVER.HTM>>. Accessed May 16, 2002.

This long-range plan for the Klamath Restoration Program updates the 1985 Klamath River Basin Fisheries Resource Plan and redirects its emphases. The plan provides goals and objectives for dealing with fish and habitat protection, management, and restoration, and policies to be used for guiding Task Force actions. Since the Task Force does not have any regulatory powers of its own to protect habitat (though individual member agencies do), Task Force members are encouraged to support and promote cooperative approaches, information collection activities, and local decision-making and problem-solving. The contents of this plan are primarily related to fisheries issues and are beyond the scope of this land use review. As a result, the plan is not addressed further here. Fisheries issues related to the Project are addressed in the Fish Resources Final Technical Report.

6. Siskiyou County. 1973. General Plan of Siskiyou County, California. Siskiyou County Planning Department, Yreka, California. Adopted June 1973.

Summary. The General Plan includes separate elements that were adopted over the course of several years, mostly in the early 1970s. This is the most recent document available. Elements cover a range of topics including land use, noise, conservation, energy, seismic safety, geothermal energy, and housing among others.

Land Use/Resource Management Element. The primary goal of the land use/circulation element of the General Plan is to allow the physical environment to determine the appropriate future land use pattern that will develop in Siskiyou County. Allowable land uses have been determined by generating a series of overlay maps identifying development constraint areas. The land use policies and activity effect matrix are to be used together in the evaluation of projects.

The General Plan's open space element supplies policies for any area of land or water, essentially unimproved and devoted to open space use. This includes recreational lands, scenic lands, natural resources, and natural resource lands. The objectives of the plan are the protection and preservation of these lands. This element details the amount of open space in the county, who owns it, and makes a conclusion as to the sufficiency of the amount of open space.

The conservation element makes recommendations for preserving and maintaining scenic lands in Siskiyou County. This document recognizes that because of the county's rural and mountainous setting, nearly all of its lands are scenic. It is the objective of the county to conserve and protect its land resources through flood plain zoning, subdivision regulations, and its Open Space and Recreation Plans.

Relevance to Project. The General Plan guides land use policy within a large section of the Project area. Two hydroelectric reservoirs, Copco and Iron Gate, provide water surfaces for recreation of 1,300 acres and 1,740 acres, respectively. In addition, Iron Gate reservoir is surrounded by recreational lands affording camp and picnic sites to a total area of 3,800 acres. Outside of these areas, FERC land along the Klamath River is devoted to open space and agricultural uses.

Project Consistency. The Project area exists in erosion hazard, septic tank limitation, steep slope, water quality, surface hydrology, flood hazard, critical deer wintering, and wildfire hazard areas. Existing Project facilities are consistent with the policies outlined for each hazard area, including surface hydrology areas, in which hydroelectric power facilities are one of the few uses allowed. Any new facilities would need to be consistent with applicable policies.

Siskiyou County relies on its zoning program to ensure consistency with its Open Space Plan. See the discussion under number 7 below for the Project's consistency with Siskiyou County zoning.

None of the recommendations made in the conservation element specifically apply to the Project. Zoning and building regulations designed to preserve the scenic areas of the county would be applied to any future uses of Project lands. Because no additional facilities are proposed as a part of the Project, agricultural and open space uses along the Klamath River would continue within the Project area.

7. Siskiyou County. 1994. Siskiyou County Zoning Ordinance. Siskiyou County Planning Department, Yreka, California. June 1994.

Summary. The Siskiyou County Zoning Ordinance guides land development in unincorporated portions of Siskiyou County. Zones are grouped by six main uses, including residential, commercial, industrial, agricultural, timberland, and open space.

Land Use/Resource Management Element. The Zoning Code has no particular land use element per se, but applies to all land use in general by regulating allowable land uses throughout the county.

Relevance to Project. Hydroelectric facilities are subject to local review in part through the zoning code. Existing facilities are either consistent with the current zoning or grandfathered outdated zones.

The Project area is located in three agricultural zones: AG-1 (Prime Agricultural), AG-2 (Non-Prime Agricultural), and RR (Rural Residential Agricultural). Most of the Project area is AG-2. AG-1 zones are located in isolated pockets on the east side of the river. RR zones hug the southern shore of Copco Lake; no Project facilities are located in the RR zone.

The AG-2 district is intended to provide an area where general agricultural activities and agriculturally related activities can occur. The AG-1 district classification is intended to be applied to land areas that are used or are suitable for use for intensive agricultural production. Such areas are designated as “prime” on the County General Plan. The RR district is intended to provide an area where rural residential uses can be compatibly mixed with commercial agricultural activities.

Project Consistency. Public utility facilities are a conditional use in each of the three zones in the Project area. All of the Project facilities are consistent with the zoning through conditional use permits. No additional facilities are proposed as a part of this Project.

Oregon

1. Bureau of Land Management. 1995. Jenny Creek Watershed Assessment and Analysis. Department of the Interior, Medford, Oregon. February 1995.

Summary. In accordance with the ROD for the watershed’s Supplemental EIS, a watershed analysis must be completed before management activities can be planned and carried out. The Jenny Creek Watershed Assessment and Analysis includes a description of the watershed, its natural and cultural features, and the beneficial uses and values found there. It then incorporates these data into a discussion of environmental processes and their relative importance in achieving future desired conditions.

Land Use/Resource Management Element. The assessment makes recommendations regarding management of the watershed as well as for activities such as silviculture and recreation. Recommendations focus on improving the ecosystem while still maintaining commercial and recreational natural resource practices.

Relevance to Project. A portion of the Jenny Creek Watershed is within the FERC boundary. Jenny Creek empties into the Iron Gate reservoir. None of the recommendations made within the assessment are specific to the Project area or any Project facilities.

Project Consistency. The recommendations made in this assessment do not relate directly to the Project. For this reason, the issue of Project consistency is not relevant to this program summary.

2. Bureau of Land Management. 2000. Klamath-Iron Gate Watershed Analysis—Version 1.1. Department of the Interior, Medford, Oregon. January 2000.

Summary. This document is intended to guide subsequent project planning and decisionmaking in the Klamath-Iron Gate Watershed. The Klamath-Iron Gate Watershed Analysis documents conditions and interrelationships of ecosystem components for the analysis area. It describes the dominant features and physical, biological, and social processes within the watershed. The document compares prehistorical (before 1850) and historical (reference) conditions with current ecosystem conditions and discusses the development of current conditions and future trends. It also ranks management objectives and recommendations for BLM-administered lands as high, medium, or low priority, and directs development of a landscape plan for BLM-administered lands.

Land Use/Resource Management Element. None of the recommendations are specific to land use in general, although some address rights-of-way, grazing, economic development, and recreation. These recommendations generally are geared towards maintaining agricultural/timber/recreational resources without compromising ecological integrity.

Relevance to Project. The Iron Gate reservoir and the Klamath River to Copco dam No. 1 are contained completely within the Klamath-Iron Gate Watershed. Most of the FERC land in this area is in open space use. None of the recommendations made within the assessment are specific to the Project area or any Project facilities.

Project Consistency. The recommendations made in this assessment do not relate directly to the Project. For this reason, the issue of Project consistency is not relevant to this program summary. The operation of the Project would not preclude these recommendations from being implemented.

3. Bureau of Land Management. 2002. Klamath Falls Resource Area Planning Update. Department of the Interior, Klamath Falls, Oregon. May 2002.

The primary purpose of the planning update is to inform the public about activities and projects in the KFRA. Written by the area field manager, it also seeks to collect ideas and comments from those affected by the programs on the resource area. The document does not provide recommendations or policies and therefore is not further considered in this land use analysis.

4. City of Klamath Falls. 1981. Comprehensive Plan. Planning Department, Department of Public Services, City of Klamath Falls, Oregon. Adopted April 20, 1981.

Summary. The Comprehensive Plan for Klamath Falls considers all the facets that are important to individuals and to the community as a whole. The community of Klamath Falls is analyzed from the perspective of natural resources, community resources, public facilities and services, and community development. The interrelationships of all aspects of the community are considered, and an integrated holistic view is expressed in the policies.

Land Use/Resource Management Element. The Land, Water, Wildlife, Open Spaces and Scenic Areas, and Recreation sections all address land uses within the city. Goals in the Land section emphasize the preservation of agricultural and forest lands and the promotion of high-quality resources and visual environments. The quality of water resources also is a substantial theme in the Water section, including policies supporting clean up efforts in Upper Klamath Lake and Lake Ewauna. These are also areas of critical scenic concern; several policies in the Open Spaces and Scenic Areas section deal with the preservation of the scenic value of Upper Klamath Lake, Link River, and Lake Ewauna. Land along these water bodies also is targeted for recreational opportunities. According to the plan's policies, such opportunities could range from park development to the creation or maintenance of trails.

Relevance to Project. Because of the Project's location, it most directly affects recreational land and the water associated with the Link River and Lake Ewauna. Several policies from a variety of elements target this stretch of land, stressing its importance to the community. Although growing electrical demands and the need to add transmission to PacifiCorp's substation are identified within the plan as concerns, the goals and policies listed in the Energy section do not relate to future energy-related construction projects.

Project Consistency. No agricultural or forest lands currently are affected by the operation of the Project, and agricultural and forestry practices. PacifiCorp's ownership of land along the major waterways in Klamath Falls provides passive recreational opportunities consistent with the plan. For these reasons, the Project is consistent with this plan. The Project should not preclude the city of Klamath Falls from pursuing its park, open space, and trail proposals.

5. City of Klamath Falls. 2000. Community Development Ordinance. Planning Department, City of Klamath Falls, Oregon. May 2000.

Summary. The Community Development Ordinance (CDO) consists of Chapters 10 through 14 of the city's Code. The CDO is the law that regulates all land development within the city limits. The various chapters outline the city's permitting processes, land use regulations (including permitted uses within zones), and development site standards.

Land Use/Resource Management Element. Chapter 12 in the CDO describes each of the city's zones and overlay areas. The code contains several different zones, grouped into common land uses such as residential, planned unit development, and downtown business, among many others. Allowable uses in each zone are provided in matrix format. Further land use restrictions are outlined in the development site standards in Chapter 14.

Relevance to Project. The East Side and West Side powerhouses are both within the city of Klamath Falls along the Link River. In addition, the existing FERC boundary stretches along the river and Lake Ewauna south through and out of the city's urban growth boundary (UGB). The powerhouses are located in Public Facility zones, while the existing FERC boundary also includes Industrial, Special Reserve, Single Family Residential, and General Commercial lands. The 14,000 Airport Overlay zone (restricting building heights) also exists on the east side of the Klamath River. This includes the southerly portion of Lake Ewauna to the Klamath Falls UGB.

Project Consistency. Public utilities are permitted outright in the Public Facility zone. The Link River dam and the West Side powerhouse are in the Public Facility zone and are therefore consistent with the zoning. The East Side powerhouse is in a Special Reserve Zone, where public

utilities are conditional uses. Because the powerhouse has previously been allowed in the zone by condition, its operation is consistent with the plan. The zones covering the remainder of the FERC lands have varying restrictions on allowable public facilities; however, no additional facilities are proposed as a part of this Project. A small part of the FERC land at the southern end is in a General Commercial zone. Near Keno reservoir (Lake Ewauna), most of the FERC land is in a Public Facility zone, while the rest is Industrial. Any future public facility developments would be subject to the current standards contained in the codes as well as the site development standards (particularly those regarding floodplains).

6. City of Klamath Falls. 2000. Parks, Recreation and Open Space Master Plan. Planning Department, City of Klamath Falls, Oregon. May 1, 2000.

Summary. The purpose of this plan is to: (1) provide policy guidance regarding the provision of parks and recreation services, (2) document the community's existing park and recreation resources, including those outside of the city's management, and (3) facilitate the evaluation of park and recreation needs during the land use planning process. This plan addresses Oregon Statewide Planning Goal 5, Open Space and Natural Resources, and Goal 8, Recreation Needs. The plan serves as an element to the Klamath Falls Comprehensive Plan, allowing city planning staff to enforce the plan, ensuring logical park acquisition and development within the community through development permits. The plan assesses the need for park and recreation facilities, establishes policies and guidelines for park planning and development, and identifies general locations of future parks, trails, open space areas, and other recreation facilities.

Land Use/Resource Management Element. The plan's objectives involve developing needed park facilities that serve all age groups and providing a variety of enjoyable hiking, biking, and riding experiences. Park acquisition, development, and rehabilitation efforts should be concentrated on sites larger than 1 acre. Coordinating efforts between public and private agencies is strongly encouraged through the policies. However, adjacent public and private properties should have reasonable protection of their own property through fencing or limitations on park or trail use.

Relevance to Project. Various policies and objectives of the plan apply to the portion of the Project located within the city of Klamath Falls UGB, including Link River, Lake Ewauna, and the Klamath River south to the UGB. The presence of the East Side and West Side powerhouses near the Link River and defined open space increases the likelihood that recreational facilities could be developed nearby. Relevant parks include:

- Moore Park (existing 435-acre park of mostly open space at the southern tip of Upper Klamath Lake; a master plan is proposed)
- The proposed Lake Ewauna Access (proposed access for fishing, boat launching, and marina facilities on the west bank)
- Veteran's Memorial Park (existing 3.3 acres Special Use Area near downtown; has several proposals in and adjacent to the park that will affect its size, design, and use)
- Putnam's Point (existing 2.56 acres water-access site at the head of the Link River)

- The proposed Lake Ewauna/Klamath River Open Space (predominantly waterfront property on the east side of the Klamath River from immediately south of the Modoc property to the South Side Bypass and headwaters on the Klamath River)
- East Link River Trail (proposed 1.5 miles from Veteran's Park north along the east side of the Link River)
- Link River Nature Trail (existing 1.5-mile unpaved trail from Favell Museum to Fremont Bridge; maintained by PacifiCorp)
- Wing Watcher Trail (1.1-mile paved trail from the west side of the Link River at Veteran's Park to the south along Highway 97)
- Exercise Path at Moore Park Marina (0.3-mile paved path between Marina I and II)

Project Consistency. New recreational facilities and any future expansions of the Project must be compatible with one another. PacifiCorp's ownership of land along the major waterways in Klamath Falls provides both active and passive recreational opportunities consistent with the plan. These opportunities do not currently compromise the operation of the Project facilities. The operation of the Project does not preclude the city of Klamath Falls from pursuing its park, open space, and trail proposals. The Project is consistent with the plan because it would not interfere with the implementation of the recreational opportunities discussed in the plan.

7. Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part I—Comprehensive Plan, Policies. Klamath County Planning Department, Klamath Falls, Oregon. Adopted November 25, 1981. Latest revision September 8, 1999.

Summary. Klamath County's Comprehensive Plan has three parts—the policies (discussed here), the atlas, and the land development code (discussed below). The goals and objectives in Part 1 of the plan are recommended as a broad framework for future planning and development within the county. County objectives are integrated with Oregon's Statewide Planning Goals, prepared by the Department of Land Conservation and Development.

Land Use/Resource Management Element. The land use element describes the county's ten land use designations, which are further broken down into implementing zones. Residential, commercial, industrial, forestry, and agricultural are all primary designations. Conservation of agricultural and forest lands is advocated by the plan, as well as the preservation of open space and scenic rivers. All land uses are allowed as a conforming or nonconforming use at the time the plan was written and approved.

Relevance to Project. Project facilities are scattered through Klamath County, including the Keno dam, the J.C. Boyle dam and powerhouse, and several recreation sites. No policies relate directly to the Project or its facilities, although the protection of wilderness habitat and riparian areas is a common theme within the plan, and much of the Project area within the county is in the wilderness. Policy 4 in the County Economy section calls for increased storage of irrigation water in the Upper Klamath Lake system in part to provide for hydroelectric power generation, thereby reducing dependence on fossil fuels.

Project Consistency. The Project area is nearly all forest lands, and the Project's land uses are grandfathered in by the provisions of the plan. To the degree that the FERC land remains undeveloped, wildlife habitat and riparian areas would be protected. No additional facilities are currently proposed as a part of the Project that could interfere with riparian areas; therefore, the Project is consistent with the Plan.

8. Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part III—Land Development Code. Klamath County Planning Department, Klamath Falls, Oregon. Adopted November 25, 1981. Latest revision September 8, 1999.

Summary. The Klamath County Land Development Code guides land development in unincorporated portions of Klamath County. Zones are grouped by main uses, including residential, commercial, industrial, exclusive farm use, forestry, and open space and conservation.

Land Use/Resource Management Element. The Land Development Code has no particular land use element per se, but applies to all land uses in general by regulating allowable uses throughout the county.

Relevance to Project. Project facilities are scattered through Klamath County, including the Keno dam, and the J.C. Boyle dam and powerhouse hydroelectric facilities. They are subject to local review in part through the zoning code. Existing facilities are either consistent with the current zoning or grandfathered into outdated zones.

The Project area is located in two zones—Forestry and Forestry/Range. The purpose of the Forestry zone is to protect forest ecosystems, and to safeguard those sectors of the economy dependent on forest ecosystems, by conserving the forested land base and forest resources, and by allowing for environmentally sound and economically efficient forest practices. The Forestry/Range zone is used to promote the management and conservation of lands of mixed farm and forest use. The productive potential of these lands is considered to be less than that of Forestry-zoned lands.

Project Consistency. Public utility facilities are either permitted or conditional uses (depending on the facility type) in each of the zones in the Project area. All of the Project facilities are consistent with the zoning through conditional use permits. No additional facilities are proposed as a part of this Project.

9. Klamath Headwaters Agricultural Water Quality Advisory Committee. 2002. Agricultural Water Quality Management Area Plan: Klamath Headwaters, Excluding Lost River. Draft Version 9, May 13, 2002.

Summary. This plan provides guidance for addressing agricultural water quality issues in the Klamath Headwaters basin. The purpose of the plan is to identify strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, and monitoring. The plan applies to all nonfederal and nontribal sovereign agricultural, rural, and forest lands drained by the Klamath River and its tributaries outside of the Lost River. The principal water bodies addressed by the plan are:

- Klamath and Agency Lakes

- Williamson River
- Wood River, Seven Mile, and minor streams on the west side of the lake
- Lake Ewauna and the Klamath River within Oregon
- Spencer Creek, Jenny Creek, Cottonwood Creek, and Beaver Creek
- Major wetlands and Sycan Marsh, Klamath Forest National Wildlife Refuge, and Upper Klamath National Wildlife Refuge

Land Use/Resource Management Element. The plan's goal is "to prevent and control potential water pollution from agricultural activities and to achieve water quality standards." The plan's objectives are divided into three categories: (1) improved water quality (control pollution as close to the source as possible, promote improvement of health of aquatic ecosystem, promote water use efficiency); (2) education and public involvement (describe existing water quality issues, promote education regarding water quality in the Klamath Basin, identify conditions related to agricultural management activities that adversely affect water quality, identify management practices leading to improvement of water quality); and (3) funding (identify sources of funding for the ground project and to implement the plan).

The plan contains four voluntary strategies to achieve the goals and objectives. Although the plan itself is not enforceable, a number of regulatory measures are also described as a possible implementation strategy in the event that enforcement by the Oregon Department of Agriculture (ODA) is necessary to gain compliance with unacceptable conditions.

Relevance to Project. The plan generally covers the Klamath River south of Keno to the state line and also Lake Ewana within the Project area. Point and nonpoint sources of pollution in the area include runoff and erosion from agricultural and forest lands, eroding stream banks, and runoff from roads and urban areas. Strategies to control pollution generally target agricultural lands and practices; however, some strategies are applicable to all lands. The most prominent of these strategies involves the management of a high-quality riparian buffer along channel slopes to act as a sediment trap.

Project Consistency. FERC lands along the Klamath River south of Keno are in current use as open space. The Project proposes no additional facilities and no changes in the open space land along this stretch of the Klamath River. Therefore, the natural open space that currently exists along the river will remain intact and can act as a riparian corridor in accordance with this plan.

10. Klamath Soil and Water Conservation District. 1990. Spencer Creek Watershed Coordinated Resource Management Plan. July 26, 1990.

Summary. This plan focuses on the Spencer Creek watershed, placing an emphasis on livestock, transportation, stream fisheries, recreation, forestry, and tree management. General problems within the watershed are identified, and guidance for addressing them is outlined in the form of "decisions" for each of the areas of emphasis. The plan concludes with a list of action items to aid implementation.

Land Use/Resource Management Element. Land use objectives include maintaining livestock grazing and timber production and maintaining or enhancing riparian zones within the watershed to improve water quality and reduce erosion. Recreational opportunities should be provided on public lands within the watershed. Campgrounds, natural areas, and winter sports areas are the preferred types of recreational amenities.

Relevance to Project. Spencer Creek is just upstream from J.C. Boyle reservoir. Project lands addressed by the plan are currently used as open space and are zoned for forestry uses.

Project Consistency. The natural resource value of grazing and timber lands must be maintained in accordance with the plan. FERC land near Spencer Creek is used primarily for this purpose. Since no expansion of Project facilities is proposed by the Project, the function of these lands would not change. The presence of J.C. Boyle reservoir provides recreational opportunities to the watershed, which are noted as lacking.

11. Oregon Department of Agriculture. 2001. Lost River Sub-basin Agricultural Water Quality Management Area Plan. March 22, 2001.

Summary. The plan applies to agricultural activities on all agricultural, rural, and forest lands within the Lost River Subbasin Agricultural Water Quality Management Area that are not owned by the federal government and are not Tribal Trust Lands. The purpose of the plan is to identify strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, and monitoring. The plan itself is voluntary, although as part of its implementation strategy the plan references ODA Area Rules, which are enforceable by ODA.

Land Use/Resource Management Element. The goal of the plan is to “prevent and control water pollution from agricultural activities and achieve water quality standards to protect beneficial uses in the Lost River Subbasin Water Quality Management Area.” The plan has two objectives: (1) maximize the beneficial effects of agricultural irrigation and grazing practices on bacteria loads, nutrients, and water temperature, while acknowledging that background water quality is limited as a result of influences such as hot springs, channelization, and phosphorus from volcanic soils, and (2) increase awareness of water quality concerns beyond the realm of this area plan or the responsibility of the private landowner, including:

- Natural background conditions (geothermal springs, nutrients, algae)
- Fluctuation of flow in the Lost River (Bureau of Reclamation)
- Commingled waters (Lost River and Klamath River)
- Interstate waters (Oregon and California)
- High water temperatures correlated with solar radiation and high ambient temperature
- Lack of streambank shade on wide channelized streams and impoundments
- Unusual weather
- Urban and suburban runoff

The primary strategy to achieve the objectives is voluntary prevention and control of agricultural pollution, with ODA enforcement of area rules only when reasonable attempts at voluntary solutions have failed. Landowners are encouraged to develop management systems to address problems on their own or to develop voluntary conservation plans with assistance from appropriate agencies or consultants.

Relevance to Project. The plan applies to the following water bodies:

- Klamath River from Link River dam downstream to Keno dam (including Lake Ewauna)
- Oregon portions of the Lost River and its tributaries
- Swan Lake valley, a naturally closed subbasin northeast of Klamath Falls

The Klamath River portion of the planning area is relevant to the Project.

Project Consistency. From Link River dam to the southern limit of the Klamath Falls UGB, no agricultural uses are present. PacifiCorp land in this area is adjacent to the Link River and is zoned for public use. Between the southern limit of the Klamath Falls UGB and just before Keno dam, much of the land within ¼ mile of the Klamath River has an “exclusive farm use cropland/grazing” designation, and existing land use is a mixture of these uses. PacifiCorp owns no land in this area. In the vicinity of Keno dam, where PacifiCorp does own land, the zoning is rural residential. Existing land uses on this PacifiCorp land are hydropower production and outdoor recreation and do not include agricultural activities. For these reasons, the Project is determined to be consistent with this plan.

12. Oregon Department of Fish and Wildlife. Undated. Klamath Wildlife Area—Mission and Goals. Oregon Department of Fish and Wildlife, Klamath Wildlife Area, Klamath Falls, Oregon. Available:
<<http://www.dfw.state.or.us/ODFWhtml/AgencyOrganization/WildlifeDiv/KlamathWA.html>>. Accessed May 2002.

Summary. The Klamath Wildlife Area is a state-managed wildlife area located in south-central Oregon six miles south and east of Klamath Falls. The area was purchased with funds under the Pittman-Robertson (P-R) Act. This act requires that land purchased with P-R funds be continuously managed for the purposes for which it was required, consistent with the purposes of the act. The lands comprising the Klamath Wildlife Area were purchased to prevent drainage of their extensive wetlands, and to provide public access for wildlife-oriented recreation. The area is managed to provide diverse wildlife habitat, with emphasis on waterfowl and other wetland-dependent wildlife, and to provide public access for wildlife-oriented recreation.

Land Use/Resource Management Element. The goals of the plan target the provision of animal habitat, particularly for waterfowl that use the basin as a staging area along the Pacific flyway. Providing opportunities for recreational harvest of game and wildlife viewing is another goal.

Relevance to Project. The Klamath Wildlife Area is adjacent to the Klamath River, southeast of the city of Klamath Falls. The FERC boundary is at the shoreline of the river in this area, and land to the east is used as open space and zoned for open space/conservation.

Project Consistency. The Project proposes no additions that would prevent the protection and maintenance of waterfowl and other game within the wildlife area. The Project has no facilities near the Klamath Wildlife Area. Waterfowl would be able to continue to use the area for staging as they currently do.

13. South Central Oregon Regional Partnership (SCORP). 1999. South Central Oregon Regional Partnership Strategic Plan. Lake and Klamath Counties, Oregon. Available:
<<http://www.sobusi.com/scorp>>. Accessed: November 2000.

Summary. The SCORP plan applies to Lake and Klamath Counties, Oregon. The plan describes goals for economic development; education and training; infrastructure; capacity building; housing, health, and human services; public safety and emergency response; community amenities; and natural resources.

Land Use/Resource Management Element. The community amenities goal includes the following strategy: “Encourage land development projects to accommodate community goals such as minimizing traffic congestion and maintaining environmental quality and beauty.” Natural resource objectives include supporting ecologically sound forest and range management and general natural resource conservation and enhancement.

Relevance to Project. Although the community amenities and natural resources goals relate to land use, neither provides any specific policies or actions that relate to Project facilities or operations. The Project does not include any proposed land development projects. Any such projects would need to comply with county land development requirements, which are consistent with the strategy above.

Project Consistency. Because this document relates to future land development actions, the Project is consistent with the plan. Because any future land development actions related to the Project would be required to be consistent with applicable county requirements, such actions also would be consistent with this plan.

14. South Central Oregon Regional Partnership. 2001. South Central Oregon Consolidated Economic Development Strategy and Regional Investment Plan 2001-2003. Lake and Klamath Counties, Oregon. Available: <<http://www.sobusi.com/scorp>>. Accessed: May 2002.

Summary. This plan was developed to guide funding programs for south central Oregon, including Klamath County. The plan incorporates the regional vision and goals identified by SCORP in its strategic plan.

Land Use/Resource Management Element. The plan includes the following policies, goals, and objectives that are generally relevant to land management and use:

- Support coordinated land-use and transportation planning for the Highway 140 corridor.
- Coordinate county recreation management objectives with USFS, BLM, and the state of Oregon, as the Winema and Fremont National Forests consolidate their management programs.
- Create model partnerships between land management agencies, local communities, private landowners, and other stakeholders that support ecologically sound forest and range management and can contribute to the economic vitality of local communities.
- Provide physical infrastructure to entice and support new industry and commerce, and to support the expansion of existing industry and commerce. The region is faced with a shrinking supply of industrial land and an inability to provide transportation services, basic infrastructure, and telecommunication capability to new and existing sites.
- Promote compact development within UGBs to minimize the costs of providing public services and infrastructure and to protect resource land outside urban growth boundaries.

Relevance to Project. These policy statements generally relate to future land development actions. No such actions are proposed as part of the Project. Any such actions would need to comply with county land development requirements, which are consistent with these statements.

Project Consistency. Because this document relates to future land development actions, the Project is consistent with the plan. Because any future land development actions related to the Project would be required to be consistent with applicable county requirements, such actions also would be consistent with this plan.

Federal

1. Bureau of Land Management. 2002. Cascade-Siskiyou National Monument Draft Resource Management Plan and Environmental Impact Statement. Department of the Interior, Medford, Oregon. Two volumes. May 2002.

Summary. The Cascade-Siskiyou National Monument is located in southeastern Jackson County, Oregon. The draft RMP document describes four alternatives for the Monument which vary by management approach: A) No Action; B) Primitive, Hands-Off Approach; C) Moderate, Active Management; D) Intense, Active Management. Alternative C is the preferred alternative.

Land Use/Resource Management Element. Alternatives are analyzed and compared for their approaches to vegetation management; collection of special forest products; transportation system; nonmechanized recreation; recreational animal stock use; visitor facilities; and linear rights-of-way.

Relevance to Project. The Spring Creek diversion is located within the Monument boundary. As relevant, analysis of this facility will be included in supplemental documents.

Otherwise, the Cascade-Siskiyou National Monument boundary is more than 2 miles from the remainder of the Project. Although land management policies in the Monument could indirectly affect downstream resources (e.g., water quality), the plan does not include land use or land management proposals that apply to land uses beyond the boundary of the monument. Except for the Spring Creek diversion, there is no relation between the alternatives being considered for management of the monument and the land uses within the Project study area.

Project Consistency. For the reasons provided above, the issue of Project consistency is not relevant to this plan.

2. Bureau of Land Management. 2003. Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments. Department of the Interior, Bureau of Land Management, Lakeview District Office, Lakeview, Oregon.

Summary. The Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments outlines management options and environmental consequences for managing lands administered by BLM in southern Oregon and northern California along the Upper Klamath River system. The proposed amendments would apply to both the Redding and Klamath Falls Resource Area Management Plans. Also proposed are classifications and rules affecting all nonfederal lands within the designated Oregon State Scenic Waterway. The Draft EIS evaluates four alternatives: 1) No Action; 2) Improvement of Resources and Opportunities; 3) Natural Resource Enhancement/Restoration (the preferred

alternative); and 4) Expand Human Use Opportunities. The Draft EIS is not a decision document but provides the basis for making the following land use plan level decisions:

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

Land Use/Resource Management Element. The Draft EIS does not include a specific land use element but rather contains a number of resource-specific elements (e.g., recreation, roads and access, vegetation and soils). While these elements can be defined broadly as related to land use, they correspond to other resource-specific elements of the FERC relicensing process and therefore are not addressed here. Instead, this section addresses plan elements that relate to land use allocations and land tenure.

The four alternatives propose differing land use allocations and land tenure. Alternative 1 (No Action) would not change existing land allocation or designations. Alternatives 2, 3, and 4 would expand the existing ACEC (Klamath River Canyon from rim to rim extending from J.C. Boyle powerhouse south to the Oregon/California state line) from the J.C. Boyle powerhouse north to the J.C. Boyle dam. An ACEC designation indicates where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, scenic values; fish or wildlife resources; or other natural systems or process; or to protect human life and safety from natural hazards. Alternatives 2, 3, and 4 would also expand the Upper Klamath River Management Area, located in California, by 2,119 acres, 7,885 acres, and 5,462 acres, respectively. This expansion would increase the scope of BLM management activities as defined by the four alternatives. Within the proposed alternative project boundaries, BLM would seek to increase public land holdings through retention of public lands and the acquisition of nonfederal lands by exchange, purchase, or donation.

Relevance to Project. The proposed expansion of the ACEC under Alternatives 2, 3, and 4 would apply to the Project area from approximately the J.C. Boyle dam to the J.C. Boyle powerhouse. The expansion of the planning area lands for the Upper Klamath River Management Plan would not include any Project facilities. The acquisition of nonfederal lands would not affect Project facilities because BLM would only seek the acquisition of undeveloped lands.

Project Consistency. The continued operation of Project facilities would not be inconsistent with any land use decisions undertaken by the BLM pursuant to the proposed alternatives.

3. Bureau of Reclamation. 2000. Klamath Project Long-Term Operations Plan Environmental Impact Statement—Preliminary Alternatives. Department of the Interior, Bureau of Reclamation, Klamath Basin Area Office, Klamath Falls, Oregon. September 2000.

USBR recently released a new Notice of Intent with plans to conduct a new scoping and alternatives development process subsequently. For timing reasons, it is not included in this FTR.

4. Forest Service. Bureau of Land Management. 2000. Interior Columbia Basin Final Environmental Impact Statement. Department of Agriculture and Department of the Interior. Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington, and Boise, Idaho. December 2000.

The plan does not apply to the Project area. Although the northeast portion of the Project is within the planning boundary for the EIS, none of the lands called out for management under the EIS are near the Project area. There are no management policies contained by the EIS that involve Project facilities. In addition, because a final ROD was never issued for the document, it is not considered officially adopted.

5. National Park Service. 1994. Klamath Wild and Scenic River Eligibility Report and Environmental Assessment. Department of Interior, Seattle, Washington. August 1994. 108 pages.

This document was prepared in response to the request by the state of Oregon to the Secretary of the Interior in April 1993 that the Upper Klamath River be designated as a national wild and scenic river. The report provides documentation that the river is eligible for designation and also assesses environmental impacts of the designation as required by the National Environmental Policy Act (NEPA). This report finds that all requirements of section 2(a)(ii) of the National Wild and Scenic Rivers Act and Department of Interior guidelines have been met and recommends that the state of Oregon's application for wild and scenic river designation for the Upper Klamath River be approved. The recommended designation extends from immediately downstream of the J.C. Boyle powerhouse (RM 220.3) to the Oregon-California border (RM 209.3). The river is recommended for designation as a National Scenic River. Because this is not a policy document for managing the river, it is not analyzed further for relation to the Project.

2.7.2.3 Wetland and Floodplain Policies

Wetlands and floodplains in the Project area are subject to the regulations of federal, state, and local jurisdictions. Applicable wetland and floodplain policies contained in land use and resource management plans are reviewed in this section. Additional relevant polices and compliance related to wetlands are reviewed in the Terrestrial Resources Final Technical Report. The majority of the policies below apply to new development and would be applicable only if new Project facilities were proposed.

California

1. Siskiyou County. 1973. General Plan of Siskiyou County, California. Siskiyou County Planning Department, Yreka, California. Adopted June 1973.

Wetland/Floodplain Management Policies. The county's general plan has two policies that address development near and/or within floodplains:

- Land Use Element, Policy 22—No development may be allowed within the designated floodways, and any development proven to be outside the designated floodway and within

the 100-year flood hazard boundary shall be in accordance with the requirements of the county's floodplain management ordinance.

- Land Use Element, Policy 24—Public or quasi-public uses only may be permitted if the requirements of Policy 22 have been met.

Relevance and Project Consistency. As a permitted facility in Siskiyou County, the Project is in compliance with these policies. Any new Project facilities would need to be constructed and operated in compliance with these policies. However, no new facilities are proposed.

Oregon

1. Bureau of Land Management. 1995. Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary. Department of the Interior, Klamath Falls, Oregon. June 1995. 86 pp. Appendices and maps.

Wetland/Floodplain Management Policies. The resource management plan has several related policies, primarily regarding wetlands. These policies include:

- **Floodplains.** Water Management Action—Protect floodplains and wetlands in accordance with Executive Orders 11988 and 11990 (see summary under Federal below).
- **Wetlands.** Water Management Action—Emphasize, in accordance with the Riparian-Wetland Initiative for the 1990s, the following in management of riparian-wetland areas: protection of riparian-wetland areas and associated uplands; rehabilitation and maintenance of riparian-wetland areas; and partnership and cooperative rehabilitation and management of riparian-wetland areas.

Relevance and Project Consistency. The KFRA RMP applies to BLM lands in this area. The continued operation of the facilities associated with the Project would not preclude the protection and rehabilitation of riparian and wetland areas. See also discussion above under land use and resource management plans and in the Terrestrial Resources Final Technical Report.

2. Bureau of Land Management. 1995. Jenny Creek Watershed Assessment and Analysis. Department of the Interior, Medford, Oregon. February 1995.

Wetland/Floodplain Management Policies. One policy in this plan indirectly relates to development in floodplains:

- Watershed 1. Improve aquatic ecosystem health and resiliency by restoring stream floodplains, and try to develop a long-term water management plan that restores flushing flows to Jenny Creek without introducing exotics from the reservoir.

Relevance and Project Consistency. The southern tip of the Jenny Creek watershed is within the FERC boundary. Jenny Creek empties into the Iron Gate reservoir. The continued operation of the Project does not preclude efforts to restore stream floodplains on Jenny Creek.

3. City of Klamath Falls. 1981. Comprehensive Plan. Planning Department, Department of Public Services, City of Klamath Falls, Oregon. Adopted April 20, 1981.

Wetland/Floodplain Management Policies. The Klamath Falls Comprehensive Plan contains three floodplain policies:

- Policy 30—Development in floodplains will be inversely proportional to the proximity to the floodplain channel, i.e., lowest density occurring on lands nearest the channel.
- Policy 31—All lands designated as areas of floodplain will be urbanized only in accordance with an adopted floodplain management program.
- Policy 242—Areas within identified floodplains will be limited to agriculture, forestry, parks, recreation, open space, and limited storage uses, unless adequate safeguards are provided to protect life and property involved in other uses.

Relevance and Project Consistency. As a permitted facility in the city of Klamath Falls, the Project is in compliance with these policies. Any new Project facilities would need to be constructed and operated in compliance with these policies.

4. City of Klamath Falls. 2000. Community Development Ordinance. Planning Department, City of Klamath Falls, Oregon. May 2000.

Wetland/Floodplain Management Policies. The city's CDO includes the following policies on development in floodplains:

- Section 12.555—The provisions of Sections 12.550 to 12.595 shall apply to all areas of special flood hazard as identified by the Federal Insurance Administration in a scientific and engineering report entitled, "The Flood Insurance Study for the City of Klamath Falls," dated December 5, 1984, as amended, with accompanying Flood Insurance Rate Maps, as amended, are hereby adopted by reference and declared to be a part of this ordinance.
- Section 12.555—Prior to making a decision on the proposed Flood Hazard Permit, the Director shall analyze the following criteria and incorporate such analysis in his decision: ... (3) That the proposed development, when combined with other existing uses and potentially allowed development, will not increase the water surface elevation of the base flood more than one foot above the established base flood elevation at any point in the flood hazard area; (4) That the proposed development does not adversely affect the flood carrying capacity of the area of special flood hazard or that flood damage mitigation measures required as a condition of the Flood Hazard Permit. For the purposes of Sections 12.550 to 12.595, "adversely affect: shall mean quantifiable damage to adjacent properties due to rises in flood stages attributed to physical changes on the channel and adjacent overbank areas.
- Section 14.225(1)—A public facility in a Floodplain Hazard Overlay Zone shall be designed, located, and constructed to minimize or eliminate flood damages.

Relevance and Project Consistency. As a permitted facility in the city of Klamath Falls, the Project is in compliance with these policies. Any new Project facilities would need to be constructed and operated in compliance with these policies. However, no new facilities are proposed.

5. Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part I – Comprehensive Plan, Policies. Klamath County Planning Department, Klamath Falls, Oregon. Adopted November 25, 1981. Latest revision September 8, 1999.

Wetland/Floodplain Management Policies. Klamath County’s Comprehensive Plan protects wetlands through the use of its Significant Resource Overlay, as described in the implementing actions of Goal 5, Policy 12:

- Goal 5, Policy 12. The county shall protect significant big game winter ranges and other significant wildlife habitat.
 - Implementation 1. The Significant Resource Overlay shall be applied to big game winter ranges, the antelope range north of Bly, and the significant wetland areas.
 - Implementation 5. Other wildlife habitat is protected by the riparian setback around wetland areas and the Significant Resource Overlay applied to significant wetland areas.

Relevance and Project Consistency. As a permitted facility in Klamath County, the Project is in compliance with these policies. Any new Project facilities would need to be constructed and operated in compliance with these policies. However, no new facilities are proposed.

6. Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part III – Land Development Code. Klamath County Planning Department, Klamath Falls, Oregon. Adopted November 25, 1981. Latest revision September 8, 1999.

Wetland/Floodplain Management Policies. Wetlands and floodplains are addressed as follows in two articles of the county’s Land Development Code:

- Article 57—Significant Resource Overlay—For preserving significant natural and cultural resources, addressing the economic, social, environmental and energy consequences of conflicting uses upon significant natural and cultural resources, and permitting development in a manner that does not adversely impact identified resource values. See Article 57.060 for General Review Criteria.
- Article 59—Flood Hazard Overlay—For developing areas that are subject to flooding, erosion, or similar hazards, in order to avoid or reduce losses to life and property. Existing uses are exempt under 59.070, expansions and alterations must adhere to standards in 59.090 and 59.110.

Relevance and Project Consistency. As a permitted facility in Klamath County, the Project is in compliance with these policies. Any new Project facilities would need to be constructed and operated in compliance with these policies. However, no new facilities are proposed.

7. Klamath Headwaters Agricultural Water Quality Advisory Committee. 2002. Agricultural Water Quality Management Area Plan: Klamath Headwaters, excluding Lost River. Draft Version 9, May 13, 2002.

Wetland/Floodplain Management Policies. The headwaters plan contains the following strategy regarding wetlands:

- Strategy 1.C.—Implement successful practices for stream bank stabilization, reduction in high summer water temperatures, restoration and enhancement of wetlands and riparian areas, and avoid adverse fish habitat modification.

Relevance and Project Consistency. The plan generally applies to the Klamath River south of Keno to the state line and also Keno reservoir within the Project area. The continued operation of the Project does not preclude efforts to restore and enhance wetlands on the Klamath River in this area.

Federal

None of the plan or policy documents relevant to the Project and prepared by federal government offices contain applicable wetland or floodplain policies. However, the following Executive Orders apply to the Project.

1. Executive Order 11988: Floodplain Management (May 24, 1977).

This Executive Order applies to federal agencies and requires them to consider and minimize impacts to floodplains associated with federal actions. The Order's stated purpose is "to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative."

2. Executive Order 11990: Protection of Wetlands (May 24, 1977).

This executive order applies to federal agencies and requires them to consider and minimize impacts to wetlands associated with federal actions. The Order's stated purpose is "to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative."

Relevance and Project Consistency. The executive orders are implemented through local regulations and permits governing regulated activities. By definition, the Project is consistent with these orders. Any new development that would impact wetlands or floodplains would need to be reviewed by local agencies to assure consistency.

2.8 DISCUSSION

2.8.1 Characterization of Existing Conditions

Review of applicable land use and resource management plans did not identify any conflicts between the plans and existing Project facilities. Some Project facilities, most of which have been in place for many years, are consistent with current zoning. This is true throughout Siskiyou County and in parts of the city of Klamath Falls. Other Project facilities, such as those in Klamath County and parts of Klamath Falls, are allowed as conditional uses. Project facilities are consistent with agency resource management plans (e.g., BLM), primarily because no new facilities are proposed and the plans were developed with the general understanding that the Project facilities already existed and would continue to operate. Several of the Project facilities help ensure consistency with plan provisions by providing areas for passive recreation (e.g., open

space) or active recreation (e.g., reservoirs). These land uses are called for within the plans. For example, Project lands along the Klamath River in the city of Klamath Falls provide passive recreational opportunities consistent with the city's Comprehensive Plan. The operation of the Project does not interfere with other land use activities, such as forestry or agriculture, that figure prominently in the goals of many of the applicable plans. A number of the federal plans reviewed did not apply directly to the Project. The main exception to this was the Northwest Forest Plan. The continued operation of Project facilities would not affect the preservation of late-successional and old-growth forest ecosystems covered by this plan.

2.8.2 Characterization of Future Conditions

Conditions with respect to existing Project land uses and consistency with applicable plans are not expected to change in the near future. Changes to Project facilities, including any that might result as part of the relicensing process, would need to be reviewed for consistency with applicable plans. Such new actions or facilities could, by definition or impact, raise potential conflicts with plans.

3.0 INVENTORY, ANALYSIS, AND MANAGEMENT OF KLAMATH HYDROELECTRIC PROJECT ROADS

3.1 DESCRIPTION AND PURPOSE

PacifiCorp owns and operates the Project. The Project consists of seven developments on the Klamath River: East Side, West Side, Keno, J.C. Boyle, Copco No. 1 and Copco No. 2, Iron Gate, and one on Fall Creek, a tributary to the Klamath River. A number of different types of facilities are required to maintain and operate the Project. In addition, a number of facilities and lands have been developed or acquired as mitigation under the current FERC license (FERC license No. 2082) for the Project. They include recreation sites and fish hatchery facilities. Project facilities and associated lands are spread across Klamath County in Oregon and Siskiyou County in California.

To effectively operate and maintain these Project facilities and lands, PacifiCorp maintains or has rights to a network of access roads and associated culverts, bridges, gates, and signs. The public uses much of this road network for access to the Project reservoirs. Public off-highway vehicle (OHV) use on Project and surrounding non-Project lands has resulted in some rutted OHV roads. These roads are a source of potential land management and water quality concern.

The Project road network and its corresponding operational and public use has the potential to affect water quality, historic and cultural resources, and fish and general wildlife within surrounding lands and waters, including those listed under the Endangered Species Act (ESA) as threatened or endangered.

As such, there are two primary purposes of this study. The first purpose of this study is to systematically inventory roads, trails, culverts, bridges, cattle crossings guards, gates, and vehicle use areas (e.g., staging and storage areas, quarries, OHV roads) within the Project using global positioning system (GPS) technology. During this inventory, potential erosion areas and fish-related impacts are also to be documented. The second purpose is to provide a comprehensive summary and analysis and associated GIS map set of the data collected during the inventory that will include a roads management component. The roads inventory can be used to document the management activities and responsibilities of transportation facilities in the Project area.

[PacifiCorp conducted the roads inventory in 2002 and the data are currently being reviewed and analyzed. The analysis and management components of this study will be completed as a post-Final License Application submittal during the first half of 2004.]

3.2 OBJECTIVES

The primary objectives of this study are as follows:

- Locate and map PacifiCorp and other public and private roads used in the operation of the Project.
- Identify and map the road and stream crossing conditions that may potentially adversely affect water quality and aquatic, historical, cultural, and terrestrial resources.

- Provide a summary and analysis of the road inventory data.
- Identify road and bridge management activities, monitoring activities, and cost-sharing responsibilities for Project-related transportation facilities.

The inventory was guided by the data classifications provided in the data dictionary attached as Appendix 3A. The inventory was completed using GPS technology and researchers operating from OHVs or all-terrain vehicles (ATVs).

3.3 RELICENSING RELEVANCE AND USE IN DECISIONMAKING

The information obtained from this inventory will be used to help identify road locations, maintenance conditions, and associated use impacts. It also will assist in the development of potential mitigation alternatives to help control adverse impacts and will provide valuable information for the development of future transportation and road maintenance plans and resource management plans in the area.

3.4 METHODS AND GEOGRAPHIC SCOPE

Specific subtasks related to the initial roads inventory conducted in 2002 are as follows:

- Define Phases of Road Inventory Study Development
- Identify Study Area
- Map Road Types
- Implement Technical Approach
- Ensure Quality Control
- Provide Study Status in Coordination with Agencies

3.4.1 Define Phases of Road Inventory Study Development

The initial roads inventory conducted in 2002 consisted of two phases:

1) Phase I: Coordinate Data and Technical Approach. This phase consisted of the following steps:

- A) Compile PacifiCorp's existing Klamath roads (centerline) GPS information obtained from BLM, USFS, and Klamath and Siskiyou Counties; digital orthophotos; and U.S. Geological Survey (USGS) maps into a master digital database.
- B) Refine road coverage to ensure that the road data meet study plan assumptions and data requirements.
- C) Determine inventory methods and hardware and software requirements.
- D) Acquire identified hardware and software.

- 2) **Phase II: Identify Data Collection Strategy and Implement Data Collection.** This phase consisted of the following steps:
- A) Develop data dictionary and metadata definitions based on data collection objectives and the dictionary used by BLM for completion of the Upper Klamath River Management Plan (BLM, 2003).
 - B) Implement team training. Team training of PacifiCorp Property Agents and GIS staff were conducted in Portland to ensure an understanding of the equipment and software being used and the elements of the data dictionary being developed. In addition, a day was spent with BLM GIS staff to learn from their experience in doing similar mapping for the Upper Klamath River Management Plan and the Spencer Creek watershed.
 - C) Develop a geographically based field work plan. This step involved the completion of a written work plan and schedule for completing the data inventory based on evaluation of the type of data collected, geographic study area, site feature locations, climate constraints, accessibility, physical constraints, and project schedule. The field work plan incorporated an understanding of road networks, geographic and geologic constraints, type and location of PacifiCorp operational facilities, and other GIS mapped data. The plan was used to enhance the knowledge base of PacifiCorp field operations staff and to coordinate schedules and obtain access to PacifiCorp land and facilities. It also laid out the schedule and team geographic assignments for data collection.
 - D) Complete feature locating and recording. This primary step involved the field location and recording of all features identified in the data dictionary. Teams using GPS units and OHV or ATV vehicles accomplished this mapping. Each road or trail was driven or in some cases walked to capture the approximate centerline of the feature. The physical measurement (tape, pace) of menu and numeric attribute types was accomplished using laser range finders and other methods to the tolerances identified in Table 3.4-1 for menu and numeric attribute types.
 - E) **Post-Process the Data Collected.** This step involved the post-processing of data collected to ensure that it adhered to Federal Geographic Data Committee (FGDC) geospatial positioning accuracy standards (Doc. FGDC-STD-007.3-1998). Newly acquired metadata were submitted in the format outlined by FGDC (Doc. FGDC STD 001-1998). Data were provided in the Environmental Systems Research Institute (ESRI) shape file format. Feature locations were collected in WGS84 coordinates and projected to universal transverse Mercator (UTM), Zone 10, meters, NAD83.
 - F) **Incorporate Data into GIS Database for Application to other Studies.** This step involved the incorporation of the data collected into the Project GIS database. The data were made available for use in other studies and for the development of future PM&E measures as well as resource and land

management plans. Maps presenting the road data collected were prepared as required for relicensing reports and studies.

3.4.2 Identify Study Area

The study areas for the area-wide road network and the road inventory are defined as follows:

- **Area-Wide Road Network.** Existing road locations and classifications were compiled in the Phase 1 Inventory for an area at least 5 miles outside of the FERC boundary. GPS or the most accurate data from USGS, Klamath County, Siskiyou County, BLM, USFS, PacifiCorp, and other sources were used.
- **Road Inventory Study Area.** The roads surveyed for water quality- and fisheries-related impacts were those located on PacifiCorp Project lands or within ¼ mile of the FERC Project boundaries, whichever were more prevalent. Preliminary FERC Project boundaries were used where FERC boundaries have not been adequately defined or where operation use has ceased. Also included were the few public and private roads required for operations access to Project hydro facilities, and to recreation facilities where there was potential for water quality or fishery impacts.

3.4.3 Map Road Types

The roads mapped are listed in the data dictionary (Appendix 3A) and road and metadata definitions (Appendix 3B). Roads as defined include all paved, surface, OHV, and recognizable or defined foot trails.

3.4.4 Implement Technical Approach

Two two-person teams of PacifiCorp staff performed the study. The teams used Trimble Pathfinder PRO XRS GPS units running Asset Surveyor software to locate road geographic positions (up to 3.5 feet in accuracy) and to capture associated data. The ESRI ARCPAD Version 5.1 software was used to provide laptop computer information and real-time mapping capability. All data were collected using GPS technology for items specified in accordance with the data dictionary (Appendix 3A) and road condition definitions and metadata (Appendix 3B). All data were provided in ESRI shape file format.

3.4.5 Ensure Quality Control

PacifiCorp GIS staff and the project manager performed quality control of all submitted data, and requested corrections in those cases where there were inconsistencies with the Spatial Accuracy (Doc. FGDC-STD-007.3-1998 and Doc. FGDC-STD-001-1998).

Attribute dimensions for point features (bridge, culvert, gate, and ford) were not measured using GPS. Tolerances correspond with the physical measurements (tape, pace, laser finder) of menu and numeric attribute types. Menu type attributes did not deviate from inspected values. Numeric type attributes were within the inspectors' measured ranges indicated in Table 3.4-1.

Table 3.4-1. Measured ranges for numeric type attributes.

Bridge	Culvert
Length: $\pm 3 - 5$ feet	Length: ± 3 foot
Width: $\pm 3 - 5$ feet	Diameter: No Deviation
	Number: Actual Count (No Deviation)
	Inlet Fill Height: ± 1 foot
	Outlet Water Drop Height: ± 1 foot
	Percent Plugged: ± 10 percent

Note: All dimensions were measured in feet. For point features, the center of the feature was identified as a point using the Global Positioning System (GPS) and the length of the feature was recorded in notes. For example, the approximate position of the midpoint of a rut was identified using GPS, and the total length of the rut was measured with a range finder and recorded.

3.4.6 Provide Study Status in Coordination with Agencies

To complete the study before winter conditions in 2002 eliminated access, PacifiCorp proceeded with Phase I and II work. The study was coordinated with BLM and the Siskiyou and Klamath County Public Works Departments. The results of the study were provided to the departments in exchange for their data and cooperation.

PacifiCorp completed the centerline mapping of PacifiCorp facilities and roads committed to Project operations in 2000. Much of this information was collected through GPS surveys. However, some information was collected using less accurate methods such as scanning or digitizing maps, digitizing orthophotos, and incorporating databases established by others with varying degrees of accuracy. In particular, PacifiCorp has included the GPS road survey data collected by Siskiyou County for county roads and GPS road survey information completed by BLM for the Klamath Wild and Scenic River corridor and the Upper Klamath River Area of Critical Environmental Concern in Oregon and California. PacifiCorp's GPS facility inventory completed in 2000 was done primarily to identify the location of facilities. It did not capture any use and condition information or the associated environmental impact-related attributes.

Other road information acquired from BLM, USFS, and the counties was evaluated to determine if it is more accurate or complete than PacifiCorp's existing coverage.

PacifiCorp also coordinated with BLM about the road mapping that BLM was completing as part of the Upper Klamath River Management Plan road inventory. PacifiCorp contributed to this effort to capture road data on PacifiCorp land found within the BLM planning area but outside the FERC Project boundary. PacifiCorp reviewed the data dictionary being used for this inventory and participated in a GPS survey to see how it was being applied. The scope and methods of BLM's effort have been incorporated into this study.

3.5 RELATIONSHIP TO REGULATORY REQUIREMENTS AND PLANS

In follow-up to the Phase 1 and 2 road inventory conducted in 2002, the inventory data and GIS maps will be reviewed and summarized. This task will be completed in 2004 following the filing

of the Final License Application in February 2004. The summary and analysis of the roads inventory data will include appropriate tables and GIS map sets. Following this task, Project-related road management activities will be defined, including road and bridge management activities, monitoring activities, and cost-sharing responsibilities for Project-related transportation facilities. A summary of the roads inventory data and road management activities will be presented in report format (see Appendix 3C).

The road inventory and analysis provides information useful in determining potential impacts resulting from (1) authorized and unauthorized road and trail use on PacifiCorp lands, and (2) operational use of roads used to access PacifiCorp facilities and lands. This information is needed to satisfy FERC regulatory requirements, particularly those associated with NEPA. The information collected is also needed to determine consistency with other county and federal land use plans and programs, and potential mitigation that may be required. Relevant land use plans may include those of the Lakeview, Medford, and Redding districts or field offices of BLM, as well as the Klamath National Forest. Additionally, when completed as a post-Final License Application submittal, the inventory and analysis is intended to meet the objectives of FERC, PacifiCorp, and BLM for the management and cost-sharing responsibilities of Project-related transportation facilities.

3.6 TECHNICAL WORK GROUP COLLABORATION

Between December 2001 and November 2003, the recreation work group met numerous times to review and discuss the land use, visual resources, and recreation study plans. The meetings and outcomes as related to land use and visual resources are summarized as follows:

- **December 13, 2001.** The purpose of this meeting was to review the proposed land use and visual resources study plans. The group heard the purpose of the study, study area, existing information, and hopeful outcomes of the studies.
- **January 16, 2002.** The meeting was convened to afford an opportunity for those parties interested in land use and visual resources to provide comments on proposed study plans. The purpose of each study was reviewed and meeting attendees had the chance to ask questions. The group was informed that there would be opportunity for additional comments at future work group meetings.
- **July 9, 2002.** Discussion on land use and visual resources took place within the Recreation Work Group meeting. PacifiCorp provided updates on revisions to the study plans based on group member feedback. The group approved the study plans to go to the plenary for approval.
- **August 8, 2002.** Study plans were approved by the relicensing plenary group.
- **September 2002-November 2003.** Interim results and potential enhancement measures were discussed at monthly recreation work group meetings.

For further information about the collaborative effort, see Appendix E-1A in the license application.

3.7 STUDY OBSERVATIONS AND FINDINGS

[This section will be completed in 2004 and incorporated into a separate report (see Appendix 3C). This report will expand on the text below to include results from the summary and analysis of the road inventory as well as GIS data analysis and tabulation. It will also provide a summary interpretation and evaluation of the inventory for the primary purpose of characterizing existing conditions. The report will present tables similar to those shown in this section (for example, Table 3.7-1, Mileage of roads and trails) and provide a summary text narrative of these tables. It is anticipated that these data will include the following variables for the overall road network and each road segment: name, length, ownership, and condition.]

3.7.1 Project Roads Inventory Analysis

Tile 1 of Figure 3.7-1 provides a legend for the mapped line and point features located on Tiles 2 through 19, which illustrate the locations of the road types and data dictionary line and point features (intersections, closed roads, road hazards, ends of roads, gated roads, road signs, bridges, culverts, fords, road erosion points, resource damage areas, ruts, ponding areas, slides, and erosion mitigation or hydrological features). Table 3.7-1 summarizes preliminary 2002 inventory data, including the miles of roads, OHV trails, and hiking trails inventoried. Mileages are totaled for crossings of public and private land within the study area, and for PacifiCorp property within the study area. Table 3.7-2 summarizes preliminary 2002 data, including the miles of road surface materials inventoried within the study area. Pavement, crushed rock, cinder, native soil, herbaceous vegetation, brush, and small trees (less than 4 feet tall) were the surface types mapped for roads on public, private, and PacifiCorp land.

Table 3.7-1. Mileage of roads and trails (preliminary 2002 data).

Road Type	Study Area Mileage	Public Land Mileage	Private Land Mileage	PacifiCorp Land Mileage	Unknown Land Mileage
Roads	233	39.2	116.6	71.5	5.7
Off-Highway Vehicles	14.3	3.8	5.7	4.8	0
Trails	5.7	1.2	2.9	1.6	0
Totals	25.3	44.2	125.2	77.9	5.7

Table 3.7-2. Mileage of road surfaces (preliminary 2002 data).

Road Surface	Study Area Mileage	Public Land Mileage	Private Land Mileage	PacifiCorp Land Mileage	Unknown Land Mileage
Paved	51.2	4.8	34.2	10.6	1.6
Crushed rock	86.8	19.9	37	27.3	2.6
Cinder	4.6	.9	1.2	2.5	0
Native soil	71	11.9	29.7	28.2	1.2
Herbaceous vegetation	7.1	2.4	1.8	2.9	0
Brush	.8	0	.8	0	0
Trees (less than 4 feet tall)	0	0	0	0	0
Unknown	31.5	4.3	20.5	6.4	.3
Totals	253	44.2	125.2	77.9	5.7

3.7.2 Project Roads Management

[Project roads management will be defined in a report (Appendix 3C) to be completed in 2004. This report will include items such as proposed road and bridge management activities, monitoring activities, and cost-sharing responsibilities, as well as GIS map sets and Excel tables summarizing these and other items. Probable trends in conditions within the Project area will be described. The report will include data discussions that will assist in addressing study objectives and key questions.]

Figure 3.7-1. Road study.

11 x 17

Tile 1 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 1 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 2 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 2 of 19

back

Figure 3.7-1. Road study.

11 x 17

Tile 3 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 3 of 19

back

Figure 3.7-1. Road study.

11 x 17

Tile 4 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 4 of 19

back

Figure 3.7-1. Road study.

11 x 17

Tile 5 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 5 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 6 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 6 of 19

back

Figure 3.7-1. Road study.

11 x 17

Tile 7 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 7 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 8 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 8 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 9 of 19

front

Figure 3.7-1. Road study.

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Tile 9 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 10 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 10 of 19

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Figure 3.7-1. Road study.

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Tile 11 of 19

front

Figure 3.7-1. Road study.

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Tile 11 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 12 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 12 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 13 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 13 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 14 of 19

front

Figure 3.7-1. Road study.

11 x 17

Tile 14 of 19

[back](#)

Figure 3.7-1. Road study.

11 x 17

Tile 15 of 19

front

Figure 3.7-1. Road study.

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Tile 15 of 19

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Figure 3.7-1. Road study.

11 x 17

Tile 16 of 19

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Figure 3.7-1. Road study.

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Figure 3.7-1. Road study.

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Tile 17 of 19

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Figure 3.7-1. Road study.

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Figure 3.7-1. Road study.

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Tile 18 of 19

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Figure 3.7-1. Road study.

11 x 17

Tile 18 of 19

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Figure 3.7-1. Road study.

11 x 17

Tile 19 of 19

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Figure 3.7-1. Road study.

11 x 17

Tile 19 of 19

[back](#)

4.0 VISUAL AND AESTHETIC RESOURCE STUDY

4.1 DESCRIPTION AND PURPOSE

The visual and aesthetic resource study documents the visual character of the existing Project facilities and evaluates the visual effect of Project features and operations within the context of the local landscape character and relevant visual resource management plans. The purpose of the study is to ensure optimal visual compatibility between Project facilities and operations (existing and proposed) and the socially valued character and integrity of the natural scenery. If adverse visual impacts are identified, potential PM&E measures may be identified to lessen these impacts.

4.2 OBJECTIVES

This study was conducted to help answer the following key questions:

- What is the effect of Project facilities and operations on scenic quality as viewed from key observation points (KOPs)?
- Are the Project facilities and operations consistent with visual and aesthetic management goals of applicable federal, state, and local plans?

To answer the key questions, the following objectives were identified:

- Identify applicable management plans and goals related to visual/aesthetic resources and scenic quality.
- Identify KOPs and describe and photo-document the visual character of key Project facilities in relation to the local landscape context as viewed by the public from the KOPs.
- Identify KOPs and photo-document the effect of Project operations on reservoir pool levels and river flows as viewed by the public from the KOPs.

4.3 RELICENSING RELEVANCE AND USE IN DECISIONMAKING

This study evaluates whether specific Project facilities and operations (e.g., flow regimes) could conflict with (1) the existing visual character of the area, and (2) existing relevant visual or scenic resource management plans. Such plans include the BLM visual resource management goals for portions of the Project within BLM lands and other applicable plans of federal, state, or local agencies.

4.4 METHODS AND GEOGRAPHIC SCOPE

The visual resource study includes four subtasks:

- Describe the visual character of Project facilities and operations.
- Assess the effect of Project facilities and operations on visual quality.
- Identify applicable goals for aesthetic and scenic quality.
- Identify potential conflicts with existing and proposed visual and aesthetic management goals.

The study area for the visual resources study includes PacifiCorp facilities and operations on the Klamath River from Link River in the city of Klamath Falls, Oregon, to just below Iron Gate dam (Iron Gate fish hatchery) in unincorporated Siskiyou County, California. Project facilities include those used for hydroelectric production (dams and powerhouses) and transmission, and ancillary facilities (fish hatcheries and river and reservoir recreation areas). Project operations include the effect of Project facilities on reservoir levels and river flows. The study area for reservoirs and river reaches is limited to riparian and shoreline areas along the riverbanks, canyon walls, or reservoirs. Non-Project transmission lines or other facilities are addressed only to the extent that they incidentally fall within the viewsheds or KOPs for the Project facilities.

During the relicensing process, PacifiCorp received agency comment letters requesting a visual analysis of flows at nine KOPs downstream of Iron Gate dam. Flows released from Iron Gate dam are set through USBR and National Oceanic and Atmospheric Administration (NOAA) Fisheries ESA consultation for coho salmon. For this reason, the USBR-ESA process is the primary factor in determining visual flow conditions below Iron Gate dam. It is anticipated that the Iron Gate minimum flow determined through the ESA consultation process will be incorporated into the new FERC license. However, to help describe visual resource conditions below the Project, PacifiCorp has documented river flows at the following three KOPs below the Project boundary at Iron Gate dam:

- Klamathon Bridge River Access
- Collier Rest Area
- Tree of Heaven River Access

The Spring Creek diversion, located in Jackson County, Oregon, is not analyzed in this document. Relevant analysis and other information will be provided in supplementary documents, as needed.

4.4.1 Identify Applicable Goals for Aesthetic and Scenic Quality

In conjunction with the land use plan inventory task, PacifiCorp has identified applicable aesthetic and scenic quality goals of relevant local, state, and federal management plans and reviewed them for relevance to Project facilities and operations. In addition, PacifiCorp consulted with appropriate agencies to identify additional goals or proposed modifications to the existing plans. Both BLM and USFS visual management classifications were reviewed as appropriate.

4.4.2 Describe the Visual Character of Project Facilities and Operations

This analysis focuses on Project facilities and operations in relation to reservoirs and affected river reaches. To document the visual character of Project facilities and operations, color photographs were taken of each of the key Project facilities as viewed from KOPs. The KOPs were selected from public access and use areas on land to reflect typical viewsheds for people recreating in the river reach or reservoirs or viewing the river reach from developed vistas. During the relicensing process, PacifiCorp has provided information on proposed KOPs to BLM and other interested agencies for their review and comment.

KOPs are listed in Table 4.4-1. The KOPs are divided into those representing Project facilities (e.g., dams or powerhouses) that are not influenced by water levels and those representing

Project operations (e.g., river reach or reservoir) that are influenced by water levels. KOPs for river reaches were sited to reflect the diversity of scenic resources of the river reach and include potential scenic overlooks being considered by BLM. The KOPs include locations within key river reaches that may be affected by operational and seasonal flows, including the Link River, Klamath River below Keno dam (Keno reach), Klamath River below J.C. Boyle dam (Boyle bypass and Hell’s Corner reaches), Fall Creek below the diversion, and Klamath River below Copco No. 2 dam (Copco No. 2 bypass). One KOP is located immediately below Iron Gate dam near the fish hatchery, and three additional KOPs are located below the Iron Gate hatchery as described above.

To illustrate the range of flows for each river-reach KOP, photographs were taken during approximate high, medium, and low flow periods as relevant. Changes in flow result from both seasonal changes and Project operations. Upstream and downstream views were photographed for each river-reach KOP where possible. For KOPs with a view of Project reservoirs, approximate high pool and low pool conditions are documented as relevant. Photographs of the KOPs are presented and discussed in Section 4.7.2.

Table 4.4-1. Key observation points (KOPs).

KOP Number and Name	Project Facility (KOP is not influenced by water levels)	Project Operations (KOP is influenced by water levels)
Link River Reach		
LR1: Link River Nature Trail	X	
LR2: Link River Dam	X	
LR3: Link River Falls		X
LR4: East Side Powerhouse	X	
LR5: West Side Powerhouse	X	
LR6: Link River Transmission Line	X	
Keno Reach		
K1: Keno Reservoir from Veteran’s Memorial Park		X ¹
K2: Keno Reservoir from Keno Recreation Area		X ¹
K3: Keno Dam		X
K4: Klamath River from Fishing Access Road		X
K5: J.C. Boyle Reservoir from Pioneer Park East	X	
K6: J.C. Boyle Reservoir from Pioneer Park West	X	
K7: J.C. Boyle Reservoir from Topsy Recreation Area	X	
Boyle Bypass Reach		
BB1: J.C. Boyle Dam from Dam Access Road	X	
BB2: Klamath River from Bridge Below J.C. Boyle Dam		X
BB3: Outflow from J.C. Boyle Dam from Access Road		X
BB4: J.C. Boyle Bypass Reach View #1 from Access Road		X
BB5: J.C. Boyle Bypass Reach View #2 from Access Road		X

Table 4.4-1. Key observation points (KOPs).

KOP Number and Name	Project Facility (KOP is not influenced by water levels)	Project Operations (KOP is influenced by water levels)
BB6: J.C. Boyle Bypass Reach View #3 from Access Road		X
BB7: J.C. Boyle Bypass Reach View #4 from Access Road		X
BB8: J.C. Boyle Powerhouse and Penstocks	X	
BB9: J.C. Boyle Powerhouse and Transmission Line	X	
Hell's Corner Reach		
HC1: Klamath River from Boater Access below J.C. Boyle Powerhouse		X
HC2: Topsy Grade Road Potential Overlook #1		X ²
HC3: Topsy Grade Road Potential Overlook #2		X ²
HC4: Topsy Grade Road Potential Overlook #3		X ²
HC5: Klamath River from Frain Ranch Boater Access		X
HC6: Klamath River (Caldera Rapids) from Frain Ranch		X
HC7: Klamath River from Stateline Takeout		X
HC8: Klamath River from Fishing Access #5 (Ager-Beswick Road)		X
Copco Reach		
C1: Copco Reservoir from Mallard Cove Recreation Area		X
C2: Copco Reservoir from Copco Cove Recreation Area		X
C3: Copco No. 1 Dam and Powerhouse	X	
C4: Copco No. 2 Dam	X	
C5: Copco No. 2 Forebay from Copco No. 2 Dam		X ¹
C6: Copco No. 2 Powerhouse	X	
C7: Copco Transmission Line	X	
Fall Creek		
FC1: Fall Creek Recreation Area and Trail	X	
FC2: Fall Creek Fish Hatchery	X	
FC3: Fall Creek from Hatchery Trail		X ¹
FC4: Fall Creek Powerhouse	X	
FC5: Fall Creek Transmission Line	X	
Iron Gate Reach		
IG1: Jenny Creek from Jenny Creek Recreation Area		X ¹
IG2: Iron Gate Reservoir from Wanaka Springs Recreation Area		X
IG3: Iron Gate Reservoir from Camp Creek Recreation Area		X
IG4: Iron Gate Reservoir from Juniper Point Recreation Area		X
IG5: Iron Gate Reservoir from Mirror Cove Recreation Area		X
IG6: Iron Gate Reservoir from Overlook Point Recreation Area		X
IG7: Iron Gate Reservoir from Long Gulch Recreation Area		X
IG8: Iron Gate Transmission Line	X	

Table 4.4-1. Key observation points (KOPs).

KOP Number and Name	Project Facility (KOP is not influenced by water levels)	Project Operations (KOP is influenced by water levels)
IG9: Iron Gate Dam and Powerhouse	X	
IG10: Iron Gate Fish Hatchery and Fish Ladder	X	
IG11: Bogus Creek from Viewpoint at Iron Gate Fish Hatchery		X ¹
IG12: Klamath River from Iron Gate Hatchery River Access		X
Below Iron Gate		
BG1: Klamath River from Access Below Klamathon Bridge		X
BG2: Klamath River from Collier Rest Area Overlook/Interpretive Area		X
BG3: Klamath River from Tree of Heaven River Access Boat Ramp		X

¹ While the views from these KOPs are not influenced by Project operations, they are discussed in Section 4.7.2.2 with KOPs of other water features that are influenced by Project operations.

² Although this view potentially could be influenced by changes in water level or flows, field work indicated that its location is too distant from the river for such a change to be visible.

4.4.3 Assess the Effect of Project Facilities and Operations on Visual Quality

Based on the photographs and other available information, the existing visual character of the Project and its immediate surroundings are characterized and described using BLM visual resource management (VRM) methodology (BLM, 2001a) as a general guide. Assessment of the visual compatibility of the Project facilities with the existing landscape is based on the BLM visual management criteria (BLM, 2001b).

It was agreed with stakeholders that at locations where national forest lands were adjacent to the river, visual compatibility of the Project facilities with the existing landscape would be based on the USFS Scenery Management System (Scenic Integrity Objectives). In addition, BLM and USFS visual management classifications would be cross-referenced as appropriate and the effects of the facilities on visual conditions from identified KOPs would be evaluated. However, because only one KOP (BG3) was located on national forest lands, the USFS Scenery Management System was not used for this analysis.

The review of the visual character of the Wild and Scenic reach of the Upper Klamath River has been coordinated with BLM and OPRD staff involved in the development of the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments (BLM, 2003). Visual classes of this area have previously been mapped in the BLM Klamath Falls Resource Area Management Plan as Visual Resource Management Class II (VRMC II) from Klamath Falls to J.C. Boyle dam downstream to the state line (BLM, 1994). Under the Wild and Scenic designation, water flows through the Upper Klamath River Canyon contribute to the scenic value of the resource.

Changes in visual character resulting from changes in flows are characterized primarily through descriptions of the physical changes that affect the visual environment (e.g., characterizing,

documenting, and quantifying changes in exposed shoreline/wetted channel, water level, or water appearance), rather than through a subjective interpretation of the user experience. (The user experience [e.g., recreational users] is described in the Recreation Resources Final Technical Report.) Other attributes of visual character such as abundance, distribution, and health of vegetation; presence and visibility of fish; and flow influences on beaches, rapids, and pools are studied in other resource sections of the license application.

4.4.4 Identify Potential Conflicts with Existing and Proposed Visual and Aesthetic Management Goals

This subtask evaluates whether existing and proposed Project facilities and flow regimes resulting from Project operations are consistent with the visual and aesthetic management goals of relevant plans.

4.5 RELATIONSHIP TO REGULATORY REQUIREMENTS AND PLANS

Relevant visual resource management plans were identified. These are listed in Section 5.0, Information Sources. Also, the relationships of applicable plans to Project facilities and operations were identified. As part of comparing visual effects of Project facilities and operations to applicable plans, this study identifies the specific nature of any conflicts between facilities or operations and the plans. This discussion in turn will facilitate the identification of subsequent methods to protect, mitigate, or enhance the Project to reduce or eliminate any such conflicts.

4.6 TECHNICAL WORK GROUP COLLABORATION

Between December 2001 and November 2003, the recreation work group met numerous times to review and discuss the land use, visual resources, and recreation study plans. The meetings and outcomes as related to land use and visual resources are summarized as follows:

- **December 13, 2001.** The purpose of this meeting was to review the proposed land use and visual resources study plans. The group heard the purpose of the study, study area, existing information, and hopeful outcomes of the studies.
- **January 16, 2002.** The meeting was convened to afford an opportunity for those parties interested in land use and visual resources to provide comments on proposed study plans. The purpose of each study was reviewed and meeting attendees had the chance to ask questions. The group was informed that there would be opportunity for additional commenting at future work group meetings.
- **July 9, 2002.** Discussion on land use and visual resources took place within the Recreation Work Group meeting. PacifiCorp provided updates on revisions to the study plans based on group member feedback. The group approved the study plans to go to the plenary for approval.
- **August 8, 2002.** Study plans were approved by plenary.
- **September 2002-November 2003.** Interim results and potential enhancement measures were discussed at monthly recreation work group meetings.

For further information about the collaborative effort, see Appendix E-1A in the license application.

4.7 STUDY OBSERVATIONS AND FINDINGS

Initial field work for the visual/aesthetics resources study was conducted in mid-September 2002 in conjunction with controlled flow studies planned for Project facilities at that time. The controlled flows allowed for collection of data (i.e., photo-documentation of KOPs) at a range of water levels and hence visual conditions. Project facilities also were documented at this time. Additional field work to document low pool levels in Copco and Iron Gate reservoirs was conducted in January 2003. High flow conditions were documented in a number of locations in May and October 2003. The locations of the proposed KOPs are shown in Figure 4.7-1.

4.7.1 Visual Character of Study Area and Project Facilities and Operations

4.7.1.1 Study Area

The study area for the visual resources study includes key Project facilities (such as recreation sites) and reaches of the Klamath River affected by Project operations. The study area begins at Link River in Klamath Falls in Klamath County, Oregon, and continues downstream to Iron Gate dam in Siskiyou County, California. The visual character of the study area varies considerably by location, from the urban area at Link River in the city of Klamath Falls to the rural area around Keno to the undisturbed character of the canyon below J.C. Boyle dam.

The topographic characteristics of the Project area vary widely from east to west. Along the eastern edge, the Klamath River borders remnants of the geologic basin and range formation of central Oregon. Here the river flows through a broad flat valley that gradually transitions to a narrow channel as it traverses the low rolling ridges of the Cascade Mountains. In the central section of the Project, upstream of J.C. Boyle dam, the topography changes dramatically, dropping rapidly into a 1,000-foot deep river canyon. The ruggedness of the terrain exemplifies the surrounding landscape, where nearby mountain peaks often reach 5,000 feet in elevation. Less than 5 miles downstream, the canyon and neighboring ridges gradually become flatter and wider as the river flows southwesterly across the state line and into Copco reservoir. Here, along the western edge, the topography surrounding Copco and Iron Gate reservoirs is open and rolling.

The Upper Klamath River canyon represents a transition from a mountainous to a desert landscape as it crosses the Cascade Mountains. The steep-walled canyon is the predominant visual element in the region. The river enhances the visual variety within the canyon. As it flows through the deep gorge, it changes from slack, slow-flowing water in the wider areas to a rushing torrent of cascading whitewater. This variety of flow enhances the Klamath River's scenic value. The area's remoteness and steep topography provide visitors with a natural and uncrowded aesthetic experience not usually available at the more popular national parks, monuments, and rivers in the region.

4.7.1.2 Project Facilities and Operations

The primary Project facilities include dams, powerhouses, penstocks, transmission lines and support structures, roads, and recreation areas and facilities. As shown and described below, the

visual character of the facilities ranges from those that blend with the surrounding landscape to those that are more visible or incongruous.

Project operations are relevant to visual resources with respect to changes in river flows or reservoir elevations. These fluctuations depend on a number of factors, including operational issues and seasonal water flows. As described in Section 4.7.2, Project operations result in changes to the visual character of the reservoirs and river reaches in terms of criteria such as the width of the wetted channel and the visibility of exposed shoreline.

4.7.2 Visual Assessment of Project Facilities and Operations

This study addresses the visibility of key Project facilities and operations from typical public viewing locations. KOPs were identified to represent these locations. The views selected for analysis are not comprehensive, but rather represent typical and representative views for members of the public viewing Project facilities, the river reaches, and reservoirs from developed vistas and roads in the Project area.

For the purpose of this assessment, Project *facilities* and Project *operations* are treated differently. Project facilities include power generation and transmission equipment and recreation sites. Each facility KOP is limited to one photograph illustrating representative conditions. Project operations include effects of the Project on flows and water levels in the Klamath River and reservoirs, respectively. Multiple photographs were taken at river reach and reservoir KOPs to illustrate the different visual conditions that result from the influence of seasonal conditions and Project operations on water levels.

Photographs were taken of the KOPs during field work in September 2002, January 2003, May 2003, and October 2003. In each case, analog photographs were taken using a Nikon N90s camera equipped with a Nikon 28- to 85-millimeter (mm) zoom lens. Automatic settings were used except for focal length, which was adjusted in the field as needed. Unless otherwise indicated, a 50-mm focal length was used to best approximate the perspective of a human viewer. The camera was hand held and all photographs were taken at the photographer's eye level, about 6 feet above the ground. To ensure consistency, all photographs were taken by the same photographer. Film was Fujicolor Super HQ 35 mm, 200 ASA. The photographs were developed using automated equipment and the negatives scanned to computer for digital representation. The resulting images were not electronically manipulated after development. The date, time, and weather conditions were noted for each photograph.

4.7.2.1 Project Facilities (KOPs Not Influenced by Water Levels or Flows)

In its RMPs, BLM identifies visual resource management classifications (VRMCs). These classifications identify the acceptable level of change to the landscape. Project facilities fall under three BLM RMPs—the Klamath Falls Resource Area RMP, the Medford District RMP, and the Redding District RMP. Although the Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments (BLM, April 2003) was reviewed as part of this study (see Section 4.7.3), it is not a decision document and does not govern activities in the Project area. It will become a decision document when it is finalized.

Figure 4.7-1 Location of visual resource study KOPs
(11x17) Front of Tile 1 of 14

Figure 4.7-1 (11x17) Back of Tile 1 of 14

Figure 4.7-1 (11x17) Front of Tile 2 of 14

Figure 4.7-1 (11x17) Back of Tile 2 of 14

Figure 4.7-1 (11x17) Front of Tile 3 of 14

Figure 4.7-1 (11x17) Back of Tile 3 of 14

Figure 4.7-1 (11x17) Front of Tile 4 of 14

Figure 4.7-1 (11x17) Back of Tile 4 of 14

Figure 4.7-1 (11x17) Front of Tile 5 of 14

Figure 4.7-1 (11x17) Back of Tile 5 of 14

Figure 4.7-1 (11x17) Front of Tile 6 of 14

Figure 4.7-1 (11x17) Back of Tile 6 of 14

Figure 4.7-1 (11x17) Front of Tile 7 of 14

Figure 4.7-1 (11x17) Back of Tile 7 of 14

Figure 4.7-1 (11x17) Front of Tile 8 of 14

Figure 4.7-1 (11x17) Back of Tile 8 of 14

Figure 4.7-1 (11x17) Front of Tile 9 of 14

Figure 4.7-1 (11x17) Back of Tile 9 of 14

Figure 4.7-1 (11x17) Front of Tile 10 of 14

Figure 4.7-1 (11x17) Back of Tile 10 of 14

Figure 4.7-1 (11x17) Front of Tile 11 of 14

Figure 4.7-1 (11x17) Back of Tile 11 of 14

Figure 4.7-1 (11x17) Front of Tile 12 of 14

Figure 4.7-1 (11x17) Back of Tile 12 of 14

Figure 4.7-1 (11x17) Front of Tile 13 of 14

Figure 4.7-1 (11x17) Back of Tile 13 of 14

Figure 4.7-1 (11x17) Front of Tile 14 of 14

Figure 4.7-1 (11x17) Back of Tile 14 of 14

The Spring Creek diversion facility is located in Jackson County, Oregon, within the Medford District RMP area. This facility will be analyzed as part of a supplement to the license application, as relevant.

The objectives of the applicable BLM VRMCs are as follows:

- Class II: Retain the existing character of the landscape. The level of change to the characteristic landscape should be low relative to the existing character of the landscape. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- Class III: Partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate relative to the existing character of the landscape. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

BLM has developed a procedure to determine the level of change a proposed action will have on the landscape. The identified level of change can then be compared to the applicable VRMC to ascertain whether or not the change is consistent with the objectives of the VRMC. This procedure is presented in BLM Manual 8341 and is referred to as the Visual Resource Contrast Rating process. The process has five steps:

1. Obtain project description.
2. Identify VRM objectives.
3. Select KOPs.
4. Prepare visual simulations.
5. Complete contrast rating.

Not all of these steps are directly applicable to this analysis because the Project facilities already exist. Also, with the exception of any mitigation or enhancement measures that may be proposed, no changes to the facilities or the surrounding landscape are proposed. Steps 1 through 3 have been completed, as described in Section 4.4. In lieu of Step 4, “prepare visual simulations,” photographs of the existing facilities were taken from the KOPs. The photographs for the KOPs are presented in Appendices 4A (facilities) and 4B (operations) and locations identified in Figure 4.7-1. Step 5 has been modified as described in the next paragraph.

Step 5 consists of providing information to complete the visual contrast rating worksheet to document basic information about the KOP (Section A of the worksheet), to describe the characteristics of the existing landscape (Section B) and those of the proposed action (Section C), and to assess the contrast between the two (Section D). Because the proposed facilities already exist, Sections C and D of the worksheet do not apply. The rating process has been completed through Section B. Section B describes the landscape according to the form, line, color, and texture of three elements—land/water, vegetation, and structures. The description of the landscape provides an indication of how well the structure fits into the natural surroundings. Because the facilities already exist and predate the RMPs, a level of change is not

identified. Instead, the VRMC is indicated to place the description of the facility in the context of its surroundings and the BLM visual resource management objectives.

Link River Reach

LR1: Link River Nature Trail. This view of the Link River Nature Trail lacks elements to attract the viewer's interest and distinguish it from other areas. The trail, the small rise, and the hillside behind it to the left, and the small hill to the right create vertical lines that converge toward the horizon. The horizon is interrupted by a low hillside that, when combined with the converging hillsides, creates the feeling of a trough. The colors range from the dirt gray of the trail to the straw brown and mid-range greens of the vegetation. The color and location of the vegetation create a patchy texture. Telephone poles dot the landscape as subtle accents that follow the line of the trail. The transmission tower is visible in the view, but its location above and to the right of the viewer's line of sight minimizes its impact on the view.

The Link River Nature Trail is located in a Class III area, where non-native elements may attract attention but should not dominate the view. The trail itself blends with the landscape and does not dominate the view. Although the telephone poles and electric transmission tower also are apparent in the landscape, they are not the focus of the viewer's visual experience from this location.

LR2: Link River Dam. The Link River dam is owned by USBR and is not a Project facility under FERC jurisdiction. As such, the visual impacts of this dam have not been analyzed. The dam was photographed for context as part of the inventory of facilities.

LR4: East Side Powerhouse. The view of the East Side powerhouse is visually interesting. The view is primarily composed of three horizontal elements: the blue sky, the brown hillside, and the green trees. Each element is distinguished from the other by its dominant color. Nestled between the hillside and the trees are a large iron tank and the powerhouse. The powerhouse is almost obscured by the trees from this view, but its unusual geometry (a small pyramid atop a large cube) is identifiable next to the cylindrical tank. The strong geometry of these structures sets them apart from the natural features of the surroundings. These structures provide a focal point to the view and make it distinct from nearby views of brown hills and green trees.

The East Side powerhouse is located in a Class III area, which means that non-native elements may attract attention, but they should not dominate the view. The powerhouse and tank are clearly visible and stand out in this otherwise natural setting. However, because of their distance from the viewer and relative size in comparison with the other elements, they do not dominate the view.

LR5: West Side Powerhouse. The West Side powerhouse is immediately adjacent to the Link River Nature Trail and is clearly visible from this KOP. The powder blue of the structures contrasts with the surrounding browns and greens. While the trail and the parallel structures create strong diagonal elements in the scene, the many vertical and horizontal lines of the structures, fences, and overhead power lines occur at varying angles, heights, and directions, creating a visual mixture that is not visually harmonious.

The West Side powerhouse is located in a Class III area. Non-native elements in Class III areas may attract attention, but should not dominate the view. From this location, the West Side

powerhouse is dominant. However, this is largely dependent on the close proximity of the viewer. From a distance, the plant would not be dominant.

LR6: Link River Transmission Line. The Link River transmission line, shown at the left side of the photograph, consists of the line itself and its supporting poles and structures. The strong vertical and horizontal elements of the transmission line contrast sharply with the natural forms of the vegetation in the foreground and background. However, there are other elements of the built environment in this view, including a high-power transmission line and support tower and several building structures. Together, these elements create a view that is a mixture of natural and built elements.

The Link River transmission line is located in a Class III area. Non-native elements in Class III areas may attract attention but should not dominate the view. The transmission line is consistent with this description.

Keno

K3: Keno Dam from Access Road at Keno Recreation Area. This view is composed of five elements: the grass at the reservoir's edge, the water, the dam, the brown hillside, and the green hillside. The lighting conditions at the time the photograph was taken give the water and the dam similar hues, minimizing the distinction between the two. The distinction between the water and the dam is further minimized by the dam's low profile in relation to other visual elements and by its location across the base of the brown hillside. The regularly spaced, light gray geometric features across the length of the dam cause it to stand out in the landscape. However, the color and textures of the native landscape—the bright green grass, the shiny reflection of the water, and green and brown vegetated hillside—are equally dominant features of this view.

Keno dam is located in a Class III area, where non-native elements may attract attention, but they should not dominate the view. The dam attracts attention, but its color, low profile, and horizontal lines similar to the water line minimize its presence in the landscape. It does not dominate the view.

J.C. Boyle Bypass

BB1: J.C. Boyle Dam. This view of the J.C. Boyle dam and associated structures has linear horizontal forms and curving forms. The linear horizontal forms are seen in the dark green hillside at the top of the background and the light brown hillside and dam structure in front of it. The dam and the top of the hillside are the same height and create a strong horizontal line. This line is interrupted by the vertical operations structure to the right of the view. In the middle ground, the horizontal form is divided by the dam's retaining wall and the river. Because the retaining wall follows the form of the river and mirrors the bend on the right, it blends in with the curving forms of the riverbanks in the foreground. The focus of the foreground view is the motion of the river as it discharges from the dam. Although the dam is visible, it is located toward the background of the view.

The J.C. Boyle dam is located in a Class II area, which means that non-native elements should not attract the attention of the viewer. The dam and the retaining wall are quite visible in the landscape. Even though the dam's position at the same height of the hillside and in the

background of the view keeps it from dominating the other features, it attracts the attention of the viewer.

BB8: J.C. Boyle Powerhouse and Penstocks. This view of J.C. Boyle powerhouse has a strong focal point—the penstock and the powerhouse. The penstock and the powerhouse stand out because of their color, strong lines, and location in the landscape. The light color of the penstock stands out from the rust-colored soil and dark green trees around it. The topography of the area creates a bowl and the penstock crosses through the middle of the bowl, creating a strong vertical element. The viewer's eye is drawn down the penstock to the powerhouse, which sits at the base of the bowl. The river in front of the powerhouse flowing toward the viewer continues the vertical element in the center of the view. The other facilities at the powerhouse, the electrical transformers to the left and the building to the right, are visible but less noticeable.

The J.C. Boyle powerhouse is located in a Class II area, where non-native elements should not attract the attention of the casual observer. The J.C. Boyle powerhouse penstock draws the attention of the viewer. Given the powerhouse's relatively small size in relation to its surroundings, the powerhouse would be less apparent if the penstock was not present or was less noticeable.

BB9: J.C. Boyle Powerhouse and Transmission Line. The purpose of KOP BB9 is to analyze the visual effects of the powerhouse and the transmission line from this location.

From this location, the J.C. Boyle powerhouse stands out as a result of its color, strong lines, and location in the landscape. The powerhouse is located in a Class II area, where non-native elements should not attract the attention of the casual observer. Because of its coloration and relative size from this close-up view, the J.C. Boyle powerhouse clearly attracts the attention of the viewer. (See additional discussion of the powerhouse under KOP BB8, above.)

The transmission line at this location consists of both the electrical lines and the wooden support structures. The electrical lines are visible against the trees, dry grasses, and rocks as they travel up the hillside on the left side of the view, and contrast with the colors, forms, and lines of the natural setting. Near the top of the hill, the lines become less distinct because of their relatively small size. The light conditions at the time this photograph was taken make it difficult to see the color and form of the vertical wooden poles at the crest of the hill. The viewer's distance from these lines also minimizes their visibility. The transmission line at the J.C. Boyle powerhouse is located in a Class II area, where non-native elements should not attract the attention of the casual observer. The transmission line is a non-native element that attracts the viewer's attention, but is only moderately visible from this perspective.

Copco

C3: Copco No. 1 Dam and Powerhouse. In this view, the Copco powerhouse is the most prominent feature, and the dam is visible in the background. The powerhouse has an angular geometry and flat surfaces that contrast with the form and texture of the surrounding landscape, which are sloping, craggy hillsides. The brown of the powerhouse differs from the natural browns around it, which have more gray and orange tones. Like the powerhouse, the Copco No.1 dam has a regular geometric pattern, created by the spill gates, and continuous straight lines, created by the road and power poles. These patterns and lines are not found in the natural setting. The dam's location interrupts the natural line of the hillside.

The Copco No. 1 dam and powerhouse are located in a Class III area. This area may have a moderate level of change that at least partially retains the existing character of the landscape. Non-native elements may attract attention, but should not dominate the view of the casual observer. From this view, the powerhouse is the predominant feature, which combined with the dam alters the character of their setting. However, because a view at such close proximity to the powerhouse is not generally available to the average viewer, the impact of dam and powerhouse are minimized.

C4: Copco No. 2 Dam. The Copco No. 2 dam is apparent in the view. However, it is not the feature that captures the viewer's attention. The major elements of the view are the undulating curves of the green treetops in the middleground and the canyon wall behind it. The loose gray rocks along the hillside are positioned in a pattern that mirrors that of the treetops. While the dam is clearly an element of the built environment different from the natural forms around it, its low profile and subdued gray color help minimize its presence in the view.

Copco No. 2 dam is located in a Class III area, where non-native elements should not dominate the view of the casual observer. Even though the appearance of the dam is unlike the other visual elements of the view, it fits into the scene by running parallel with the line of the river as it falls over the hillside and by crossing relatively low over the river at the base of the trees. Because the dam does not conflict with the other forms in the view, it does not draw the viewer's attention away from the vista opening up in the background and does not dominate the view of the casual observer.

C6: Copco No. 2 Powerhouse. The Copco No. 2 powerhouse and the electrical substation in front of it are the main features of this view. The electrical substation has a multiplicity of angles and forms, creating a visual chaos that is compounded by the powerhouse visible in the background. The powerhouse has its own set of lines and angles that are not harmonious with the transfer station. The strong lines and geometric forms of the powerhouse and electrical transfer station contrast with the nonlinear forms of the rock formation near the facilities. The facilities' light-tone colors and smooth textures also contrast with the medium-tone colors of rough textures of the grasses and rock. The large rock formation of the natural setting fades into the background from this view that is so close to the powerhouse.

The Copco No. 2 powerhouse is located in a Class III area, where non-native elements may attract attention, but should not dominate. The powerhouse and electrical substation dominate this view.

C7: Copco Transmission Line. The facility in this view consists of the electrical transmission line itself and the associated wooden support structures. In the light conditions at the time this photograph was taken, the electrical lines fade into the sky and are barely visible. The vertical wooden poles contrast sharply with the natural forms both in color and in form. The natural forms in this view consist of grasses and coniferous trees, which have softer and less vertical lines.

The Copco transmission line is located in a Class III area where it may attract attention, but should not dominate the view. The transmission poles compete with the expanse of grass and sky for the viewer's attention and do not dominate the view.

Fall Creek

FC1: Fall Creek Recreation Area and Trail. The foreground of FC1 is a rock-lined path heading towards a stand of trees and bushes in the background. This path and adjacent plantings are vertical elements in the scene. The stand of trees creates a green horizontal backdrop. Located between the path and the trees are picnic facilities as well as tanks associated with the Fall Creek fish hatchery. The tanks contrast with their surroundings because of their bright white color, strong geometry, smooth texture, and placement in the landscape, such as at odd angles or as a focal point. However, the tanks and the picnic facilities are small features in comparison to the surrounding natural landscape.

The Fall Creek recreation area and trail is located in a Class III area, where non-native elements may attract attraction but should not dominate the view. The tanks and picnic facilities attract attention, but their small size in relation to the surrounding vegetation minimizes their presence.

FC2: Fall Creek Fish Hatchery. This view of the Fall Creek fish hatchery has three main elements: the horizontal expanse of gravel in the foreground, the diagonal ponds of the hatchery in the middleground, and the vertical trees in the background. The rectangular shape of the fish ponds and the handrails around them contrast with the nonlinear shapes of the surrounding vegetation and rocks on the hillside. The cement edges of the ponds have weathered over time, so instead of being one uniform color, they are mottled with the yellow and dark hues found in nearby vegetation. Although these features are clearly non-native, they are small in comparison to the surrounding landscape.

The Fall Creek fish hatchery is located in a Class III area, where non-native elements may attract attention, but should not dominate the view. The ponds are very apparent in the view, but because of their low profile, muted colors, and small size, they do not dominate the view.

FC4: Fall Creek Powerhouse. The view of the Fall Creek powerhouse has two main elements: the two adjacent powerhouse structures in the middleground and the tan hillside in the background. Although the powerhouse is clearly a non-native element in this view, its muted gray color and the brown colors of the associated power poles help reduce its visual impact. At the same time, the gray color provides a noticeable contrast to the natural browns and greens of the natural background.

The Fall Creek powerhouse is located in a Class III area, where non-native elements may attract attention, but should not dominate the view. The powerhouse structures are very apparent and dominate the view from this location. However, because this KOP is located off of the road from which most viewers would see the powerhouse, its degree of dominance for the average viewer is less.

FC5: Fall Creek Transmission Line. The facility in this view consists of the electrical transmission line itself and the associated wooden support structures. In the light conditions at the time this photograph was taken, the electrical lines fade into the sky and are barely visible. The vertical wooden poles contrast sharply with the natural forms both in color and in form, although one of the pole structures is partially obscured by vegetation. The natural forms in this view consist of grasses and coniferous and deciduous trees, which have softer and less vertical lines. The unpaved road in the foreground introduces another non-native element into the view, which distracts the viewer's attention from the transmission line itself.

The Fall Creek transmission line is located in Class III area, where non-native elements may attract attention, but should not dominate the view. Although the wooden support structures for the transmission line contrast with their surroundings, they do not dominate the view, given the presence of the unpaved road in the foreground.

Iron Gate

IG8: Iron Gate Transmission Line. The facility in this view consists of the electrical transmission lines and the associated wooden support structures. In the light conditions at the time this photograph was taken, the electrical lines are visible against the sky and vegetation in the background, and their strong horizontal element stands out. The large number of transmission lines at this location makes them stand out more. The vertical wooden poles contrast with the natural forms although the color blends well with the darker browns and greens of the grasses and trees. From this view on the road, the transmission line is dominant. However, the experience of the average viewer at this location would be from a moving vehicle, and the view would be of short duration.

The Iron Gate transmission line is in a Class III area, where non-native elements may attract the attention of a viewer, but they should not dominate the view. Even though the scale of the transmission lines is not dominant in this setting, the transmission poles are a focal point of the view. However, because the average viewer at this location would be in a moving vehicle, the transmission line would dominate the view for a short period of time.

IG9: Iron Gate Dam and Powerhouse from Iron Gate Fish Hatchery. This view of the Iron Gate dam and powerhouse includes picnic tables, transmission poles and lines, equipment, cyclone fences, and a penstock. Without these elements, the view would be composed of two gently sloping hillsides connected by an expanse of red rocks. Instead, the viewer sees a mixture of elements of the built and natural environment that have little relationship to each other in terms of line, color, or form. Despite this clutter, the dam itself blends into the natural red and brown colors of the rock and grasses adjacent to it. Also, the powerhouse sits quite low in this view and so it is not a dominant element. Although the powerhouse and related facilities are clearly visible in the background, it is the elements of the foreground (picnic tables, fence, poles) that create the most visual disarray.

The Iron Gate dam and powerhouse are located in a Class III area, where non-native elements may attract attention, but should not dominate the view. The non-native elements are distracting, but no one element is dominant. The powerhouse and related facilities are relatively less visible given their position in the background and the earthfill dam color blends with the canyon walls.

IG10: Iron Gate Fish Hatchery. The hatchery and fish ladder in this view are located at the base of a hillside characterized by deep greens, dense textures, and no linear or angular features. The hatchery has opposite qualities: bright colors, strong angles, and smooth surfaces. Given its position in the foreground, the hatchery area dominates the view from this observation point. Because the structures are relatively low to ground, their visual impact is decreased.

The Iron Gate fish hatchery is located in a Class III area, where non-native elements may attract attention, but should not dominate the view. The hatchery and ladder contrast with their setting and attract the attention of the viewer. However, because the structures are low to the ground, their overall visual impact is minimal, especially from a distance.

4.7.2.2 Project Operations (KOPs Influenced by Water Levels or Flows)

Water flows in the river reaches and water levels in Project reservoirs are influenced by seasonal changes and by Project operations. The effects these changes have on the views of the river reaches from KOPs are described below for periods of low, medium, and high flows. This range of flows is illustrated through photographs of each KOP, which are presented in Appendix 4B. Both upstream and downstream views are shown for the river flow analyses. For KOPs with a view of Project reservoirs, high pool and low pool conditions are documented as relevant. The photographs at different water levels are then compared to describe in relative terms the observed differences and effects on visual quality.

Link River Reach

LR3: Link River Falls. The photograph of LR3 was taken on May 20, 2003, at a relatively low flow of 540 cubic feet per second (cfs). Because this KOP was identified relatively late in the study period and because of the dry water years during the study period, only one flow level was available for documentation. (If available, a medium flow in this location would be about 700 cfs and a high flow from 1,500 to 2,000 cfs.) At low flow conditions, large rocks and hydraulic expression are readily apparent in the upstream view of the river. In the downstream view, the hydraulic expression is less apparent but large rocks are visible in the foreground. This flow is relatively common during the year. At higher flows, the rocks and hydraulic expression would be less visible and the channel would be more swollen in appearance.

Keno Reach

Keno Reservoir. Photographic documentation of reservoir levels at the Keno reservoir was conducted in September 2002 while the reservoir was at an average pool level (approximately 4,085 feet above mean sea level [msl]). Because the elevations vary relatively little throughout the yearly seasons or as part of Project operations, the views from the KOPs also would change very little. For this reason, the Keno reservoir KOPs for this reach (K1 and K2) were documented only once. Although Keno reservoir is not influenced by flows resulting from Project operations, KOPs at this reservoir have been included here to document existing conditions.

The photographs of K1, Keno reservoir from Veteran's Memorial Park, were taken on September 12, 2002, at approximately 4,085 feet above msl. The view is dominated by a large expanse of flat blue water. Along most of the shoreline, shrubs and grasses border the reservoir; dirt and rocks are not visible from this view.

The photographs of K2, Keno reservoir from Keno Recreation Area, were taken on September 16, 2002, at approximately 4,085 feet above msl. The view is of still, relatively shallow water, made more obvious by the vegetation growing from the lake bottom. The water level of the reservoir meets the grasses and other vegetation along the shoreline. Only large rocks are visible above the water.

K4: Klamath River from Fishing Access Road. The photographs of K4 were taken on September 15, 2002, and May 20, 2003, at low (~455 cfs) and medium (~1,065 cfs) flow conditions. (High flow conditions did not occur during the study period because of the dry water year.) At low flow, in the upstream view, the river appears fast-flowing based on the large amount of hydraulic

expression in the foreground and middleground. Few rocks are visible in the wetted channel; however, rocks are visible on the opposite riverbank. In the downstream view, the movement of the river is less visible in part because of the light's reflection on the water. Rocks are visible along the riverbank and midstream in the middleground of the view. At medium flow conditions in the upstream view, the river appears swollen in midstream and fewer rocks are visible in the channel particularly towards the far bank. In the foreground, the river has greater hydraulic expression similar to the downstream view. At the time of medium flow conditions, vegetation along the river has died away, giving the appearance that water level is lower because more rocks are visible along the edges of the channel.

J.C. Boyle Reservoir

Low and high pool conditions were documented from three KOPs on the J.C. Boyle reservoir:

- K5: J.C. Boyle reservoir from Pioneer Park East
- K6: J.C. Boyle reservoir from Pioneer Park West
- K7: J.C. Boyle reservoir from Topsy Recreation Area

A review of the conditions documented in the photographs indicates that the effects of the different flow levels are similar at all three of the KOPs for this reservoir. For this reason, they are described together. The photographs for these three KOPs were taken on September 16, 2002, and May 20 and 21, 2003, at 3,791 feet above msl and 3,792 feet above msl, respectively. Although the differences between low and high pool levels are not great owing to the relatively small change in water level, some differences are visible. At all three KOPs, the low pool view is of an open expanse of relatively flat water with light green vegetation growing up from the lake bottom. At K5, vegetation grows near the water's edge and a small area of dirt is exposed. At K6, the reservoir's shoreline is primarily a short, steep rock face. At some locations, vegetation also is present among the rocks. KOP K7 looks toward J.C. Boyle dam. Much of the shoreline opposite the viewer is an area that has been disturbed as part of the dam and stands out from the rest of the view. At high pool conditions, the light green vegetation is no longer apparent from any of the KOPs. This is likely due to the season in which the photos were taken rather than reservoir elevation. At K5, less of the shoreline and reservoir bottom is visible. The increase in water level is most evident at K6, where only the very top of a submerged tree is visible.

To more completely document the range of flows that occur in the J.C. Boyle reservoir, additional photos were taken during a maintenance drawdown on February 10, 2003. These photos, which were taken on the upper pool of the reservoir, are shown on the page following KOP K7. Reservoir elevation on this date was 3,789 feet above msl. As is clear from the photos, very little water remains in the reservoir and the dominant element in these two views is the dark-colored, exposed lake bottom. The blue water is a minor element in the background of the photo, especially in View 2. These conditions are uncommon but occur occasionally during maintenance events.

Boyle Bypass Reach

BB2: Klamath River from Bridge Below J.C. Boyle Dam. The photographs of BB2 were taken on September 15, 16, and 17, 2002, at low (~100 cfs), medium (~775 cfs), and high (~1,350 cfs) flow conditions. The views of the river vary, depending on the level of flow. Under low flow conditions, the upstream view of the river is dominated by the grasses and brush in the right

middleground and the left foreground. As the flows increase, the wetted channel increases and less vegetation is visible. The course of the river in the background becomes more apparent and the viewer's attention is drawn to the movement of the water. A similar transformation occurs to the downstream view as the flow level increases, although there is less hydraulic expression than with the upstream view. The low flow view presents a textured and complex landscape, while the high flow view provides a scene with fewer elements but more movement.

BB3: Outflow from J.C. Boyle Dam from Access Road. The photographs of BB3 were taken on September 16 and 17, 2002, and on October 7, 2003. These photographs show a low flow of about 100 cfs, a medium flow of about 750 cfs, and a high flow of about 1,350 cfs. In the low-flow photo, more of the surrounding and underlying landscape is apparent than at the higher flow levels. For example, more of the dam retaining wall is apparent to the viewer because it is not obscured by spray, and less of it is darkened by the river, which heightens its contrast with the river rocks along its base. In addition, more vegetation and rocks are apparent in the width of the wetted channel at low flows, and the tiers of the riverbed are visible as water exits the dam and turns toward the viewer. The river channel is comparatively narrow. With medium flows, the wetted portion of the channel widens and deepens. Shallow areas along the riverbank are no longer slower moving green pools of water, but have become faster moving white areas with far fewer rocks visible. The difference between the high flow and the medium flow is similar except that the river does not appear wider so much as deeper. As the flows increase, the river's movement and white color become more dominant in the landscape. The composition of the view changes from low flow to medium flow as the river becomes a dominant feature in the middle of the foreground view.

BB4: J.C. Boyle Bypass Reach View #1 from Access Road. The photographs of BB4 were taken on September 15, 16, and 17, 2002, at low (~325 cfs), medium (~700 cfs), and high (~1,575 cfs) flow conditions. From this distance, the level of flow alters the view of the river reach only slightly. As the flows increase, the wetted channel increases and less vegetation and fewer rocks are visible within the channel. These changes do not affect the composition of the view except that, with the higher flows, the river becomes slightly more dominant in the foreground. The lack of perceived change at different flow levels is the result in large part of the distance of the viewer from the river and the presence of other dominant elements in this view.

BB5: J.C. Boyle Bypass Reach View #2 from Access Road. The photographs of BB5 were taken on September 15 and 17, 2002, at low (~325 cfs), medium (~700 cfs), and high (~1,575 cfs) flow conditions. From this KOP, the level of flow does not noticeably alter the upstream view. (The river is not visible downstream from this location.) As would be expected, when the flows increase, the amount of wetted channel increases and less vegetation is visible. This is most apparent in the middleground of the view, where the curves of the riverbanks flatten as the flows increase. Without a direct comparison of the views like the photographs shown for this analysis, a viewer would be unlikely to notice a difference in flow levels from one visit to the next.

BB6: J.C. Boyle Bypass Reach View #3 from Access Road. The photographs of BB6 were taken on September 15, 16, and 17, 2002, at low (~325 cfs), medium (~1,000 cfs), and high (~1,575 cfs) flow conditions. Like BB5, the change in flow levels does not affect the composition of the view. With low flow conditions, more rocks are visible in the wetted channel, more vegetation is visible along the riverbanks, and the river appears flatter. As the flows increase, fewer rocks are visible in the wetted channel and there is greater hydraulic expression.

The view of the river is more dramatic under the high flow conditions, and more of the river is apparent in the background, particularly for the downstream view.

BB7: J.C. Boyle Bypass Reach View #4 from Access Road. The photographs of BB7 were taken on September 15, 16, and 17, 2002, at low (~325 cfs), medium (~700 cfs), and high (~1,575 cfs) flow conditions. The changes in flow levels cause only minor changes to the appearance of the river. Those changes are similar to the changes described above for KOP BB6.

Hell's Corner Reach

River flows were documented at five KOPs in the Hell's Corner reach on September 13, 2002, and October 7 and 8, 2003.

The flows were approximately 350 cfs (low flow), 1,700 cfs (medium flow), and 2,800 cfs (high flow). The five KOPs used to assess the visual impact of varying river flows in the Hell's Corner reach are:

- HC1: Klamath River from Boater Access below J.C. Boyle powerhouse
- HC5: Klamath River from Frain Ranch Boater Access
- HC6: Klamath River (Caldera Rapids) from Frain Ranch
- HC7: Klamath River from Stateline Takeout
- HC8: Klamath River from Fishing Access #5 (Ager Beswick/Topsy Grade Road)

A review of the conditions documented in the photographs indicates that the effects of the different flow levels are similar at all five of the KOPs for this reach. For this reason, they are described together. At lower flows, significantly more vegetation is visible along the riverbank and more rocks are visible within the wetted channel and along the river's edges. As the flows increase, less vegetation and fewer rocks are visible and hydraulic expression is greater. The composition of the views changes slightly as the coarse textures created by the rocks and vegetation in the low flow views are replaced with the finer textures of water in the high flow views. Similarly, the higher flows exhibit more white colors associated with the foaming water whereas there are more dark colors associated with rocks in the low flows. At high flows the view is more uniform in that the additional colors resulting from the exposed rocks at low flow are much less visible. The viewer's experience of the scene is not more pleasant at one flow level than another. Three other KOPs were considered in the Hell's Corner reach:

- HC2: Topsy Grade Road Potential Overlook #1
- HC3: Topsy Grade Road Potential Overlook #2
- HC4: Topsy Grade Road Potential Overlook #3

These three KOPs are all views of the Klamath River from potential overlook points on Topsy Grade Road high above the river. Because they are similar, they are grouped together for discussion. Example photographs for HC3 and HC4 are provided to show upstream and downstream views. (No photograph is available from HC2.)

The views from HC3 show the river curving through the bottom of a valley. The side of the valley in the foreground appears primarily green, covered with trees and shrubs. On the opposite side of the valley, the trees are mostly clustered near the river and become sparser farther up the valley's slope, where sandy brown is the main color. Also visible is an unpaved road that

parallels the river's edge. The upstream view from HC4 is similar to the view from HC3. The downstream view opens up to an unlimited view of the valley. This expansive view of the valley is the focal point for this KOP. Because of the distance from the river, the view from these KOPs does not vary with river flows and they were not analyzed further.

Copco Reach

C1: Copco Reservoir from Mallard Cove Recreation Area. The photographs of C1 were taken on September 13, 2002, and January 26, 2003, at approximately 2,604.7 feet above msl and approximately 2,602.9 feet above msl, respectively. During high pool conditions, the shoreline gently slopes toward the reservoir and a very small strip of the near-shore lake bottom is exposed. Three docks extend into the water (one is blocked from view by a boat). During low flow conditions, only one of these docks extends over the water because the amount of exposed lake bottom has increased. (Note: The amount of exposed lake bottom is exaggerated in the photograph at low pool conditions because of the reflection on the water.) The visual quality of the KOP is somewhat lower during low pool conditions because of the increased area of exposed shoreline.

C2: Copco Reservoir from Copco Cove Recreation Area. The photographs of C2 were taken on September 14, 2002, and January 26, 2003, at approximately 2,604.7 feet above msl and approximately 2,602.9 feet above msl, respectively. The distance from the viewer to the shoreline makes it difficult to distinguish any visual differences between high and low pool conditions. At some locations along the shoreline it is possible to see a greater amount of exposed near-shore lake bottom during low pool conditions than during high pool conditions. However, these differences are subtle and do not affect the overall visual quality of this view.

To more completely document the range of flows that occur in the Copco reservoir, additional photos were taken during a maintenance drawdown on February 6, 2003. These photos, which were taken on the north side of the reservoir near the mouth of Beaver Creek, are shown on the page following KOP C2. Reservoir elevation on this date was 2,599 feet above msl. As is clear from the photos, significantly less water remains in the reservoir and the dark colored exposed lake bottom competes with the water surface for dominance. In View 2, the blue water is a minor element in the background of the photo. These conditions are uncommon but occur occasionally during maintenance.

C5: Copco No. 2 Forebay from Copco No. 2 Dam. The photographs of C5 were taken on September 14, 2002. Although the forebay is not influenced by Project operations, photographs were taken to document existing conditions at this location. The foreground and middleground of the upstream view are dominated by flat water. The opposite bank in the background is mostly lined with trees and shrubs; a few large rocks are also visible. The only hydraulic expression is shallow ripples. In the downstream view, however, larger rocks line the shore and overhanging trees obscure the view farther downstream.

Fall Creek

FC3: Fall Creek from Hatchery Trail. The photograph of FC3 was taken on May 21, 2003. Fall Creek is spring fed and is not influenced by Project operations but was photographed to document existing conditions. The upstream view of FC3 at low flow shows an oblique view of a narrow waterfall cascading down a slope with a lot of hydraulic expression. As the waterfall

turns toward the viewer, the hydraulic expression diminishes. The downstream view shows a shallow wetted channel with exposed rocks and overhanging vegetation.

Iron Gate Reach

IG1: Jenny Creek from Jenny Creek Recreation Area. The photograph of IG1 was taken on September 14, 2002. From this KOP, changes in flow do not noticeably alter the view of the creek and only one view is presented to document existing conditions. The creek is smooth during average flow conditions and reflects the vegetation overhanging the creek banks. No rocks are visible.

Iron Gate Reservoir. Low and high pool conditions were documented at six KOPs on the Iron Gate reservoir. The photographs documenting those conditions were taken on September 14, 2002, at a high pool level of approximately 2,326.6 feet above msl and a low pool level of approximately 2,323.5 feet above msl on January 26, 2003. The six KOPs are as follows:

- IG2: Iron Gate reservoir from Wanaka Springs Recreation Area
- IG3: Iron Gate reservoir from Camp Creek Recreation Area
- IG4: Iron Gate reservoir from Juniper Point Recreation Area
- IG5: Iron Gate reservoir from Mirror Cove Recreation Area
- IG6: Iron Gate reservoir from Overlook Point Recreation Area
- IG7: Iron Gate reservoir from Long Gulch Recreation Area

At high pool, conditions are similar at all of the recreation areas—little to none of the lake bottom is exposed at the shoreline. At low pool, conditions vary slightly depending on the location. In several of the views, greater areas of near-shore lake bottom are exposed. On average, these areas are estimated to extend about 5 to 10 feet horizontally from the location of the high pool shoreline. At KOP IG7, a sandbar is exposed; at IG2, accumulated driftwood is visible along the shore.

The visual quality of the reservoir is lowest when its surface is at low pool. This change in visual quality is most apparent to the viewer in the near shore area. As the viewer looks toward the far shore, the changes are less obvious, diminishing the degree of visual quality change.

The difference in visual quality between low and high pool conditions is exacerbated during the seasons in which they occur. Typically, low pool levels occur during the winter, when trees have lost their leaves and grasses along the shoreline have died away or lost their color, making the landscape appear monotone and sparse and any exposed shoreline more obvious. Visual quality is highest when the reservoir is at full or near-full pool, commonly during the late spring and summer months, when vegetation is more extensive and colorful.

IG11: Bogus Creek from Viewpoint at Iron Gate Fish Hatchery. The photographs of IG11 were taken on September 14, 2002, at a flow of approximately 38 cfs. The flows in Bogus Creek are not influenced by Project operations; however, it has been included to document existing conditions. The heavy vegetation along Bogus Creek in this location largely obscures the river creek from view, in particular the downstream view. While a few rocks are visible along the edge of the channel, vegetation is dominant. In the upstream view, a narrow wetted channel is visible with moderate hydraulic expression from rocks in the creek.

IG12: Klamath River from Iron Gate Hatchery River Access. The photographs of IG12 were taken on September 14, 2002, October 7, 2003, and May 21, 2003, at low (762 cfs), medium (1,350 cfs), and high (1,767 cfs) flow conditions. These flows represent a common range experienced at this location. Higher flows up to 2,500 or 3,000 cfs occasionally occur in this location during runoff periods or during wet water years. Because of dry conditions, no flows of this magnitude occurred during the study period. At all flow conditions, the river is mostly flat with little hydraulic expression. No rocks are exposed within the channel; however, they are apparent along the riverbank. While vegetation is present up to the river's edge and in many places hangs over the channel during lower flow conditions, vegetation is not visible at the river's edge during higher flow conditions. At high flow conditions, the rocks exposed at the river's edge during low and medium conditions are no longer visible and the shoreline is composed of a gravel area instead.

Below Iron Gate

KOPs BG1, BG2, and BG3 are outside of the Project area. The conditions at these KOPs have been documented at the request of the USFS, which has management responsibilities for them as part of the Lower Klamath Wild and Scenic River (W&SR). The river flows at these KOPs are influenced by the release of water from the Iron Gate dam, which is operated by PacifiCorp, but USBR in consultation with NOAA Fisheries sets the levels of the released flows.

All three KOPs are located on a stretch of the Klamath River classified as Recreational under the W&SR designation. Only BG3 is located in an area addressed by a management plan, specifically the Klamath National Forest Land and Resource Management Plan (USFS, 1994). The Klamath Forest Plan Visual Quality Objective (VQO) map designates the goal for BG3 as "Retention" (those areas within ½ mile of the Wild and Scenic River corridor). Under the Retention VQO, no noticeable deviations from the existing landscape character are allowed. BG1 and BG2 are both located on private lands where no VQO applies.

The landscape being viewed is a river. The visual elements of a river are the wetted channel, which is characterized by moving water, and the riverbanks, which are characterized by soil, rock, and vegetation. The noticeable deviations between low, medium, and high flows at BG1, BG2, and BG3 are limited to the varying amounts of visible rocks, vegetation, and hydraulic expression. The character of the river landscape does not change with the varying flow levels.

The flows at BG1, BG2, and BG3 were taken on September 14, 2002, October 7, 2003, and May 21, 2003, at low (762 cfs), medium (1,350 cfs), and high (1,767 cfs) flow conditions. These flows represent a common range experienced at this location. Higher flows up to 2,500 or 3,000 cfs occasionally occur in this location during runoff periods or during wet water years. Because of dry conditions, no flows of this magnitude occurred during the study period.

BG1: Klamath River from Access Below Klamathon Bridge. At low flow, the river is generally flat with little hydraulic expression. A few rocks are exposed along the riverbank and within the channel. In the upstream view, a stand of trees and bushes has grown up in the middle of the channel. Vegetation is also present along the river's edge. In some places trees and bushes hang over the channel, while in other locations grasses extend up from the shoreline. At high flow conditions, slightly more hydraulic expression is visible than at medium flow. Less vegetation is visible in the middle of the channel in the upstream view and along the river bank in the downstream view.

BG2: Klamath River from Collier Rest Area Overlook/Interpretive Area. Differences in flow are not highly visible from this location. At low flow, there is little hydraulic expression and the river bottom is visible. A few rocks in the channel reach above the water line. Trees on both riverbanks have taken root and stretch out over the river, partially obscuring the view of the river from this KOP. As the flows increase, rocks become less visible and the water becomes more flat. At high flow, the water appears more turbid than at lower flows.

BG3: Klamath River from Tree of Heaven River Access Boat Ramp. At low flow, there is little hydraulic expression, the river bottom is visible through the water, and algae is present on the water's surface. Some portions of the riverbank are lined with tall grasses, while others are lined with bushes. As flows increase, the grasses along the river bank become inundated in the downstream view and are covered by water to greater height in the upstream view. The water also appears more turbid at high flow and more placid at lower flows.

4.7.3 Review of Visual Resource Objectives, Policies, and Guidelines

4.7.3.1 Inventory of Applicable Plans and Programs

Potentially applicable federal, state, and local plans were identified through consultation with and comments from relevant project and agency staff and through review of FERC's April 2002 list of comprehensive plans (FERC, 2002). These plans have been reviewed to identify visual resource management objectives, policies, and guidelines relevant to the Project and to describe the Project's consistency with them. Of the comprehensive list of plans reviewed as part of the land use study (see Section 2.7.2), the following plans and regulations, as grouped geographically, were identified as having policies potentially relevant to the Project:

- California
 - Redding Resource Management Plan and Record of Decision, Bureau of Land Management
 - Proposed Plan Amendment to the Redding RMP and Environmental Assessment for the Horseshoe Ranch Wildlife Area, Bureau of Land Management.
 - Klamath National Forest Land and Resource Management Plan, U.S. Forest Service
 - General Plan of Siskiyou County, Siskiyou County Planning Department
 - Siskiyou County Zoning Ordinance, Siskiyou County Planning Department
- Oregon
 - Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary, Bureau of Land Management
 - Medford District Record of Decision and Resource Management Plan, Bureau of Land Management
 - Final Eligibility and Suitability Report for the Upper Klamath Wild and Scenic River Study, Bureau of Land Management

- Klamath River Scenic Waterway Rules (OAR 736-040-0053(1)), Oregon Parks and Recreation Department
- City of Klamath Falls Comprehensive Plan, City of Klamath Falls Planning Department
- City of Klamath Falls Community Development Ordinance, City of Klamath Falls Planning Department
- City of Klamath Falls Parks, Recreation and Open Space Master Plan, City of Klamath Falls Planning Department
- Comprehensive Plan for Klamath County, Oregon. Part I—Comprehensive Plan, Policies, Klamath County Planning Department
- Comprehensive Plan for Klamath County, Oregon. Part III—Land Development Code, Klamath County Planning Department
- California/Oregon
 - Klamath Wild and Scenic River Eligibility Report and Environmental Assessment, National Park Service
 - Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments, Bureau of Land Management.

4.7.3.2 Compliance with Applicable Plans and Programs

The identified plans and relevant policies and guidelines are summarized below, along with conclusions regarding relevance to and consistency with the Project.

California

1. Bureau of Land Management. 1993. Redding Resource Management Plan and Record of Decision. Department of the Interior, Ukiah, California. June 1993. 55 pp.

See Section 2.7.2.2 for a summary of the plan and ROD.

Visual Resource Management Element. All BLM management actions must conform with the objectives of the assigned VRM Class. VRM prescriptions, however, are limited to only those areas assigned VRM Class I and Class II (out of four total classes). Visual resource management within designated wilderness and wilderness study areas must conform with the protection of wilderness values including scenic quality. Within the Klamath Management Area, in the Klamath River, two policies focus on maintaining the scenic quality of the Upper Klamath River corridor and maintaining the scenic quality of Jenny Creek.

Relevance to Project. The plan has seven management areas. The Klamath Management Area spans the northernmost portion of the Redding Resource Area, and includes the Klamath River from the state border south to the end of the Project. Within the Klamath Management Area, the Upper Klamath River is named as a resource with the following 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 semiprivate nonmotorized recreation opportunities.

Project Consistency. Project facilities predate the preparation and adoption of the Redding District RMP. As such, Project facilities were already a part of the landscape when that plan was prepared. Additionally, with the exception of a few small isolated parcels on the Copco and Iron Gate reservoir shorelines, none of the Project facilities are on lands managed by the Redding District BLM. The consistency of the Project's facilities with the RMP's VRMC guidelines is therefore not applicable because no modifications are proposed to those facilities and there is no corresponding level of change.

The visual assessment of Project facilities and operations in Section 4.7.2 addresses the visual quality of each facility in terms of the BLM VRM objectives. However, because the facilities already exist and predate the RMP, a level of change is not identified. Instead, the VRMC is indicated to place the description of the facility in the context of its surroundings and the BLM visual resource management objectives. The Project is consistent with the RMP because it does not alter the existing visual quality of resources addressed by the plan.

2. Bureau of Land Management. 2003. Proposed Plan Amendment to the Redding RMP and Environmental Assessment for the Horseshoe Ranch Wildlife Area. Department of the Interior, Bureau of Land Management, Redding, California. May 2003. 84 pp.

See Section 2.7.2.2 for a summary of the plan. The Horseshoe Ranch Wildlife Area is adjacent to the Project area on the HRWA's eastern boundary. The Proposed Amendment would not affect this boundary or bring the HRWA closer to any Project facilities. Only property contiguous to the HRWA boundary that meets criteria for deer winter range habitat quality and manageability would be considered by BLM for acquisition from willing sellers. While PacifiCorp owns property contiguous with the Proposed Amendment boundary, that property is identified as having low forage and cover values for deer habitat. The Proposed Amendment does not address visual resources. Based on this evidence, no further analysis has been performed.

3. Forest Service. 1994. Klamath National Forest land and resource management plan. Department of Agriculture, Yreka, California. 1994. One volume and maps.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. Conservation of the naturally established scenic character of the forest environment is the primary goal of visual management. Five Inventoried and Adopted VQOs are used as visual yardsticks to evaluate both Project impacts and forest-level effects of planning alternatives. The VQOs are Preservation, Retention, Partial Retention, Modification, and Maximum Modification. Policies contained within the plan emphasize the need for the forest to meet the established VQOs, particularly as seen from communities, high-use recreation areas, and major roads and trails. The VQOs are minimum conditions to be achieved as soon as possible in all management areas and within 3 years for all VQOs except Preservation and Maximum Modification, which must be met immediately. Facilities and developments, such as roads, trails, campground facilities, structures, signs, and interpretive stations, are not required to meet the Management Area VQOs when viewed in the immediate foreground (300 feet).

Relevance to Project. None of the Project facilities are located on land covered by this plan. The closest area is a section near the east end of Copco Lake. This area is identified as a Partial Retention VQO area. These areas may show evidence of management activities, but are visually

subordinate to the characteristic landscape in form, line, color, or texture of landscape elements. Views from visually important roads and trails appear forested and provide a nearly natural-looking landscape.

Project Consistency. As indicated above, no Project facilities are located on land addressed by this plan. In addition, no new Project facilities are proposed. For these reasons, the Project does not conflict with this plan.

4. Siskiyou County. 1973. General Plan of Siskiyou County, California. Siskiyou County Planning Department, Yreka, California. Adopted June 1973.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. Visual resources are indirectly protected through the plan's conservation element. An overall goal for the county's scenic lands is to work for the conservation of Siskiyou County's scenic beauty. The county's natural areas are recommended for preservation of their scenic beauty as areas of active and passive recreation.

Relevance to Project. The General Plan guides activities within a large section of the Project area. However, scenic lands are not specifically identified by the plan. The Project contains two hydroelectric reservoirs, Copco and Iron Gate, in Siskiyou County. Away from these facilities, Project lands along the Klamath River are devoted to open space and agricultural uses.

Project Consistency. The Project is consistent with Siskiyou County's goal to conserve the county's scenic beauty. Because the Project does not propose the construction of new facilities or the expansion of existing facilities in Siskiyou County, it will not alter the existing visual quality of Siskiyou County. The Project will not detract from the county's existing scenic beauty, and will thereby conserve the existing visual quality.

5. Siskiyou County. 1994. Siskiyou County Zoning Ordinance. Siskiyou County Planning Department, Yreka, California. June 1994.

See Section 2.7.2.2 for a summary of the ordinance.

Visual Resource Management Element. The zoning code has no specific visual resource element, although elements of the code may influence the ultimate appearance of individual parcels as they are developed.

Relevance to Project. The zoning code is relevant to the Project only to the extent that construction of new facilities or changes to existing facilities are proposed that would require permitting activities by the county. Although there are Project facilities located in Siskiyou County, no changes to existing facilities or construction of new facilities are proposed.

Project Consistency. The Project does not include any actions that require review under the Siskiyou County Zoning Code. As a result, there are no actions upon which to judge Project consistency. If new facilities or modifications to existing facilities are proposed in the future as part of another project, they will be subject to the code.

Oregon

1. Bureau of Land Management. 1995. Klamath Falls Resource Area Record of Decision and Resource Management Plan and Rangeland Program Summary. Department of the Interior, Klamath Falls, Oregon. June 1995. 86 pp. Appendices and maps.

See Section 2.7.2.2 for a summary of the ROD.

Visual Resource Management Element. This BLM plan directs the management of all BLM-administered land to meet the established visual quality objectives of the four different classes. Policies related to visual resources provide additional details for the various classes of land. The two relevant classes to the Project area are Classes II and III. 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. Class III lands should be managed for moderate levels of change to the characteristic landscape.

Relevance to Project. The KFRA surrounds the city of Klamath Falls and extends south to the Oregon-California border. The Klamath River is classified as VRMC III from the city of Klamath Falls to just north of the J.C. Boyle powerhouse. The river is designated as Class II from just north of the powerhouse to the Oregon-California border.

Project Consistency. Project facilities predate the preparation and adoption of the Klamath Falls RMP. As such, Project facilities were already a part of the landscape when that plan was prepared. For this reason, a level of change is not identified in the analysis. Instead, the VRMC is discussed to place the description of the facility in the context of its surroundings and the BLM VRM objectives. Although the existing Project facilities do not alter the existing visual quality of resources addressed by the plan, several of the Project facilities dominate the view and for this reason do not meet the objectives of the designated VRMC.

2. Bureau of Land Management. 1995. Medford District Record of Decision and Resource Management Plan. Department of the Interior, Medford, Oregon. June 1995. 248 pp. and maps.

This document records the decision on a preferred alternative analyzed in the Medford district proposed RMP/EIS. The Medford district proposed RMP/EIS includes lands in Coos, Curry, Douglas, Jackson, and Josephine counties in Oregon. The proposed Project area is generally outside of the area addressed by this document. Although land management policies in the Medford district could indirectly affect downstream resources (e.g., water quality), no relation exists between the RMP and the land uses within the proposed Project area. For these reasons, this plan is not relevant to the Project.

The Spring Creek diversion facility is located in Jackson County within the Medford RMP area. As relevant, this facility will be analyzed as part of a supplement.

3. Bureau of Land Management. 1990. Final eligibility and suitability report for the Upper Klamath Wild and Scenic River study. Department of the Interior, Klamath Falls, Oregon. March 1990. 131 pp. and appendices.

See Section 2.7.2.2 for a summary of the report.

Visual Resource Management Element. The BLM determined Segment 1 ineligible for inclusion in the system because of significant modification of the waterway and major continuous diversion. Segments 2 and 3 were determined eligible for inclusion in the national system. The ORVs in Segment 2 are recreation, fish, wildlife, historic, prehistoric, and scenic resource values, and Native American traditional use of the Klamath River Canyon. In Segment 3, ORVs are recreation, fish, wildlife, historic, and scenic resources. Both Segments 2 and 3 meet or exceed the criteria for a *scenic* classification, but do not meet the criteria for a *wild* classification.

Relevance to Project. Segments 1 and 2 as defined in this study were subsequently classified as Wild and Scenic. Project facilities are located along this portion of the river. BLM VRM goals apply.

Project Consistency. This document provides key background studies used in future eligibility studies and management plans for the river. However, the document is not an RMP and it does not constitute a recommendation by BLM regarding congressional designation of the Upper Klamath River. For these reasons, this document is not further assessed for relation to visual and aesthetic resources in the Project area. Consistency with BLM VRM goals as outlined in the applicable RMP is addressed in Section 4.7.2.

4. Oregon Parks and Recreation Department. Klamath River Scenic Waterway Rules (OAR 736-040-0053(1)).

Summary. These rules classify the Klamath River from the J.C. Boyle dam powerhouse to the California border as an Accessible Natural River Area, which should be administered to preserve or enhance the river's essentially primitive scenic character while allowing compatible outdoor recreational use. The rules primarily apply to the visibility of new development or changes to existing development adjacent to the river, including structures, roads, public recreation facilities and utility facilities.

Visual Resource Management Element. The following provisions of the rule may apply to the Project:

- Structures: New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, with some exceptions.
- Roads: New roads are permitted only when totally screened from the river by topography and/or vegetation. Where existing roads are visible from the river, major extensions, realignments or upgrades shall be totally screened from view from the river. Necessary minor road improvements shall be substantially screened from the river. When an existing road is regraded, no side cast into or visible from the river shall be permitted.
- Trees: Visible tree harvest or other vegetation management may be permitted with certain provisions, including that the harvest or management is designed to enhance the scenic view in 5 to 10 years.
- Public Recreation or Resource Protection: 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.

- **Utility Facilities:** Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ nonvisible alternatives when reasonably possible.

Relevance to Project. The rules governing the Klamath River Scenic Waterway address the development of new facilities. The portion of the Project area within the Scenic Waterway includes three existing facilities and three proposed recreation facilities.

Project Consistency. As described above, the Scenic Waterway Rules govern the development of new facilities or modifications to existing facilities. Because the rules were developed subsequent to the construction of Project facilities in this river reach (the J.C. Boyle powerhouse, the transmission line from the powerhouse, canal, and penstock) it is assumed that these facilities would continue to exist and operate. However, if the Project facilities were to be modified in the future, those modifications would be subject to the rules.

The Project area also includes three potential scenic overlook sites along Topsy Grade Road. If these sites are developed, they would be consistent with the rules to the extent that they are primitive in character and blend with the landscape.

5. City of Klamath Falls. 1981. Comprehensive Plan. Planning Department, Department of Public Services, City of Klamath Falls, Oregon. Adopted April 20, 1981.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. The Klamath Falls Comprehensive Plan has several goals and policies that relate to visual resources. The provision and conservation of natural and scenic resources is a common theme in all of the goals. Maintaining scenic waterways within the urban area is specifically called out. In particular, Upper Klamath Lake, Link River, and Keno reservoir (Lake Ewauna) are areas of critical scenic concern, and all actions relating to these bodies should be made in consideration of protecting and enhancing their scenic values. To help achieve these goals, the city encourages private enterprise and intergovernmental agreements to provide for open space, recreational lands, and facilities, and to preserve natural, scenic, and historical areas in appropriate proportions and in a manner consistent with the availability of resources.

Relevance to Project. Because of the Project's location, it most directly affects land and water associated with the Link River and Lake Ewauna. Several policies from a variety of elements target this stretch of land, stressing its importance to the community.

Project Consistency. The Project is consistent with the city of Klamath Fall's goal to maintain its scenic values and waterway. Because the Project does not propose the construction of new facilities or the expansion of existing ones, it will not alter existing visual quality. Currently, the Project does not include actions that would meet the city's goal of enhancing the scenic values of Link River and Keno reservoir (Lake Ewauna).

6. City of Klamath Falls. 2000. Community Development Ordinance. Planning Department, City of Klamath Falls, Oregon. May 2000.

See Section 2.7.2.2 for a summary of the ordinances.

Visual Resource Management Element. Landscaping requirements are covered in Sections 14.400 through 14.430 of the code. These requirements involve street trees, landscaping of parking areas, and multifamily dwelling requirements. No specific mention is made of landscaping requirements for public facilities.

Relevance to Project. The East Side and West Side powerhouses are both within the city of Klamath Falls along the Link River. In addition, the existing FERC boundary stretches along the river and Lake Ewauna south through and out of the city's UGB.

Project Consistency. The CDO is relevant to the Project only to the extent that construction of new facilities or changes to existing facilities are proposed that would require permitting activities by the city. The Project does not propose any changes to existing facilities or new construction that would require permitting, so the CDO is not applicable at this time.

7. City of Klamath Falls. 2000. Parks, Recreation and Open Space Master Plan. Planning Department, City of Klamath Falls, Oregon. May 1, 2000.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. The Parks Master Plan does not present specific policies for managing visual resources; however, it does recommend the development of "Scenic and Aesthetic" open spaces. These areas help define and enhance the aesthetic and scenic quality of the city because of their location, geological, or natural features. Structures, roads, and grading on sites determined to have significant scenic viewsheds or corridors must be located and designed to minimize visual impact on and off site. The plan recommends that recreation trails maximize the number and diversity of enjoyable viewing opportunities to provide interest to the user.

Relevance to Project. The Parks Master Plan recommends two open spaces in proximity to the study area: the (East) Link River and Lake Ewauna/Klamath River Open Spaces. The proposed location of the Link River Open Space is shown in an area that includes PacifiCorp property. The Lake Ewauna Open Space covers area on the east and west sides of the lake. With respect to trails, the plan recommends the extension of the Wingwatchers and Link River Trails to create the West Lake Ewauna Trail as well as the development of a trail on the eastern shore of the Lake Ewauna. The East Link River Trail would go from Veteran's Park along the east side of the Link River, possibly through PacifiCorp property, to connect with the proposed Link River Open Space.

Project Consistency. The Project is consistent with the city of Klamath Fall's goal to develop "Scenic and Aesthetic" natural open spaces along Lake Ewauna because the Project does not propose the construction of new facilities or the expansion of existing ones. As a result, the Project will not alter existing visual quality of these areas. Existing PacifiCorp facilities along the Link River would provide diverse views for users along any new trails. However, if views of existing PacifiCorp facilities are unwanted, new trails could be designed to avoid or mitigate such views.

8. Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part I – Comprehensive Plan, Policies. Klamath County Planning Department, Klamath Falls, Oregon. Adopted November 25, 1981. Latest revision September 8, 1999.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. Visual resource policies in the county's plan involve the conservation and enhancement of natural and scenic resources. To implement these policies, the county wishes to encourage the designation of scenic views for the public's information and encourage the protection of recognized scenic views. However, the county will recognize that intensive farm or forestry activities are an integral part of the community and will not restrict these activities pertaining to scenic view enhancement.

Relevance to Project. Project facilities are scattered through Klamath County, including the Keno dam, the J.C. Boyle dam and powerhouse, and several recreation sites. No policies relate directly to the Project or its facilities, although the protection of wildland habitat and riparian areas is a common theme within the plan, and much of the Project area within the county is in wildland habitat and riparian areas.

Project Consistency. The Klamath County Comprehensive Plan was adopted following construction of Project facilities. As a result, the visual quality of these facilities was known at the time of the plan's development and was taken into consideration; there was no expectation that those facilities would be altered as a result of the plan's adoption.

Three potential overlooks are being considered in the Project area along Topsy Grade Road. If these overlooks are developed, they would be consistent with Klamath County's desire to encourage the designation of scenic views for the public's information.

9. Klamath County. 1981. Comprehensive Plan for Klamath County, Oregon. Part III – Land Development Code. Klamath County Planning Department, Klamath Falls, Oregon. Adopted November 25, 1981. Latest revision September 8, 1999.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. Article 65 in the land development code addresses landscaping. Its purpose is to maintain and enhance the appearance of structures and properties, provide for visual privacy and a quality visual environment, and provide areas on sites to absorb rainfall and reduce stormwater runoff. Landscaping policies are targeted at yards, parking areas, and multifamily dwellings, and do not specifically address public facilities.

Relevance to Project. Project facilities are scattered through Klamath County, including the Keno dam, and the J.C. Boyle dam and powerhouse hydroelectric facilities. They are subject to local review in part through the zoning code.

Project Consistency. Project facilities were constructed prior to the adoption of the county's land development code. Because the facilities existed prior to the code, they have been grandfathered in; in other words, they are not retroactively subject to the requirements of the code. If modifications are made to the facilities, these modifications would be subject to the code's requirements.

California/Oregon

1. National Park Service. 1994. Klamath Wild and Scenic River eligibility report and environmental assessment. Department of Interior, Seattle, Washington. August 1994. 108 pages.

Summary. This document was prepared in response to a request by the state of Oregon to the Secretary of the Interior in April 1993 that the Upper Klamath River be designated as a national wild and scenic river. The report provides documentation that the river is eligible for designation and also assesses environmental impacts of the designation as required by NEPA.

Visual Resource Management Element. This report finds that all requirements of section 2(a)(ii) of the National Wild and Scenic Rivers Act and Department of Interior guidelines have been met and recommends that the state of Oregon's application for wild and scenic river designation for the Upper Klamath River be approved. The recommended designation extends from immediately downstream of the John C. Boyle powerhouse (RM 220.3) to the Oregon-California border (RM 209.3). The river is recommended for designation as a National Scenic River.

Relevance to Project. The Wild and Scenic segment of the river is adjacent to several Project facilities. BLM VRM goals apply.

Project Consistency. Because this is not a policy document for managing the river, it is not analyzed further for relation to the Project. Consistency with BLM VRM goals is addressed elsewhere in this document.

2. Bureau of Land Management. Draft Upper Klamath River Management Plan Environmental Impact Statement and Resource Management Plan Amendments. Department of the Interior, Bureau of Land Management, Lakeview District Office, Lakeview, Oregon. Three Volumes. April 2003.

See Section 2.7.2.2 for a summary of the plan.

Visual Resource Management Element. The Upper Klamath River Plan is currently in draft form and includes four alternatives. The alternatives have common goals related to visual resources and some common proposed actions. The resource goals are as follows: maintain the diversity of the natural landscape; maintain the mature, old-growth, multilayered canopy structure in forested areas; maintain plant communities in healthy condition; reduce or eliminate noxious weeds in more arid areas; meet long-term scenic quality objectives by using prescribed fire and other vegetation treatment to reduce the likelihood of catastrophic fire; and enhance scenic quality of areas with existing hydropower facilities through the FERC relicensing process. Relevant actions common to all alternatives include BLM cooperating with PacifiCorp and other private landowners to minimize the visual effects of their management activities and structures, to modify existing structures and projects to lessen negative visual effects, and to pursue river flows that improve the scenic quality. Three of the alternatives also include the objective to "require vegetative screening and other measures to mitigate hydroelectric project facilities scenic degradation." The plan assumes that all BLM-managed lands in the planning area are classified and managed as BLM VRM Class II.

Relevance to Project. Although the plan identifies specific actions related to PacifiCorp hydroelectric facilities, it also indicates such changes are beyond the scope of the plan: “This Plan does not propose any changes to PacifiCorp hydroelectric facilities. While these impacts to scenic resources are outside the scope this plan, it should be noted that the impacts of hydroelectric facilities on scenic resources would be addressed during the FERC relicensing process.” Thus the plan is relevant as an advisory document but not a policy document with regard to BLM’s goals for Project operations and facilities.

Project Consistency. Project facilities predate this plan; that is, they were already a part of the landscape when the draft plan was prepared. The consistency of the Project’s facilities with the plan’s VRMC designations is therefore not applicable because no modifications are proposed to those facilities and there is no corresponding level of change. The visual assessment of Project facilities and operations in Section 4.7.2 describes the visual quality of each facility in terms of the BLM VRM objectives, using VRM Class II for the facilities in the plan area. However, because the facilities already exist and predate the plan, a level of change is not identified. Instead, the assessment compares each facility against the corresponding VRMC to place the facility in the context of its surroundings and the BLM visual resource management objectives. The Project is consistent with the RMP because it does not alter the existing visual quality of resources addressed by the plan.

4.7.4 Characterization of Existing Conditions

Existing visual characteristics and qualities of Project facilities and operations in relation to their surroundings are described by KOP in Section 4.7.1 above. The conclusions from that analysis are summarized below by the type of KOP: facilities, river reaches, and reservoirs.

4.7.4.1 Project Facilities

Project facilities are characterized using the BLM VRM methods. These characterizations are compared to the applicable VRM objectives. All of the facilities except three are located in areas that have been designated as a Class III area by an RMP or have been classified as a Class III area because the area has not been given a specific VRM class by BLM. In a VRM Class III area, management activities may attract attention, but they should not dominate the view of the casual observer. Three facilities are located in Class II areas, where non-native elements should not attract the attention of the casual observer.

The J.C. Boyle dam, powerhouse, and an associated transmission line are located in a VRM Class II area. All three facilities attract the attention of the casual observer. The dam (BB1) is quite visible in the landscape from downstream, though it is much less visible from the upstream side. The powerhouse and penstocks (KOP BB8) are prominent in the landscape because of their color and strong lines that contrast with the natural setting. The transmission line (KOP BB9) is noticeable because it crosses a long distance and rises above the other features in the landscape.

Five of the 17 Project facilities located in Class III areas dominate the view of the casual observer. These facilities are:

- LR5: West Side powerhouse
- C3: Copco No. 1 dam and powerhouse
- C6: Copco No. 2 powerhouse

- FC4: Fall Creek powerhouse
- IG10: Iron Gate fish hatchery and fish ladder

In general, these facilities dominate the view because of their size and prominence in relation to the position of the viewer; that is, the KOP is located quite close to the facility and is not necessarily representative of the prominence of the facility in the broader landscape setting. These facilities also have lines, forms, and colors that contrast with their natural settings. However, two of these (KOPs LR5 and IG10) are much less prominent from a slight distance and small compared to the surrounding natural features.

The following 11 KOPs were determined to be consistent with the VRM Class III objectives:

- LR1: Link River Nature Trail
- LR4: East Side powerhouse
- LR6: Link River transmission line
- K3: Keno dam
- C4: Copco No. 2 dam
- C7: Copco Transmission line
- FC1: Fall Creek recreation area and trail
- FC2: Fall Creek fish hatchery
- FC5: Fall Creek transmission line
- IG8: Iron Gate transmission line
- IG9: Iron Gate dam and powerhouse from Iron Gate fish hatchery

These KOPs are primarily dams, transmission lines, and recreation and trail areas. Even though the dams are large structures, they have been designed to sit within the profile of the surrounding landscape, making them appear more like part of the landscape than they would otherwise. In general, the dams are constructed with colors and lines that blend with their surroundings. Despite the fact that the transmission lines rise above other features, they are typically at a distance from the casual viewer and blend into the sky above. From a distance, the lines do not obstruct or overpower other elements in the landscape. In cases where the transmission lines or support structures dominate a view, it is typically for a short time as the viewer walks or drives by. The facilities in the trail and fish hatchery views are generally small in size compared to natural features; as a result, the non-native elements are not dominant.

4.7.4.2 River Reaches

The visual qualities of the river reaches were assessed at low, medium, and high flow conditions. In general, at low flows, rocks and vegetation are visible at the channel edges and hydraulic expression is limited to areas where rocks extend above the water surface. As flows increase, fewer rocks and less vegetation are visible, hydraulic expression increases, and the channel narrows.

4.7.4.3 Reservoirs

Visual characteristics of the reservoirs were documented at two different water levels: high pool and low pool. At two reservoirs, the Keno reservoir and the J.C. Boyle reservoir, water levels vary little throughout the year, so conditions at these reservoirs were documented only once.

Keno Reservoir

The views at the two KOPs for this reservoir have different characteristics. From one view, shrubs and grasses are visible along the shoreline; the surface and coloration of the lake bottom is not visible. At the other view, the water is relatively still and grasses grow from the lake bottom through the shallow water.

J.C. Boyle Reservoir

At all three KOPs, the low pool view is of an open expanse of relatively flat water with light green vegetation growing up from the lake bottom and small areas of exposed shoreline. At high pool conditions, the light green vegetation is no longer apparent from any of the KOPs and less of the shoreline and reservoir bottom is visible.

Copco Reservoir

During high pool conditions, a small area of near-shore lake bottom is exposed at the two KOPs for this reservoir. The area of exposed lake bottom increases during low pool conditions. At one of the views, the water has receded to the extent that two docks appear to no longer extend over the water during low pool conditions. The visual quality is lower here during low pool conditions because of the increased exposure of the shoreline. A change in visual quality is not noticeable at the other KOPs during the different pool conditions.

Iron Gate Reservoir

The views from six recreation areas at the reservoir were documented. At high pool, little to none of the lake bottom is exposed along the shoreline at the recreation areas. At low pool, conditions vary slightly. In several views, larger areas of lake bottom are more exposed than in other views. At one recreation area, a sandbar is exposed, and, at another, driftwood has become visible. The visual quality of the reservoir is lowest when its elevation is at low pool.

4.7.5 Characterization of Future Conditions

Conditions with respect to visual impacts of the Project and consistency with applicable VRM plans are not expected to change in the near future. Future changes to Project facilities, including any that might result as part of the relicensing process, would need to be reviewed for consistency with applicable plans. Such new actions or facilities could, by definition or impact, raise potential conflicts with plans.

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