

Proposed Letter to the Federal Energy Regulatory Commission (FERC)  
in response to their Draft Environmental Impact Statement (DEIS)  
on Klamath Hydropower Operations

Developed by the Habitat Committee

Attachments:

1. Summary of alternatives from the Klamath Hydropower Project DEIS developed by FERC
2. Cover letter to FERC
3. Draft letter to FERC reiterating the Council's April 24, 2006 letter calling for the removal of the four lower Klamath dams, and commenting briefly on the DEIS
4. Executive summary of FERC DEIS

**Summary of Alternatives from the  
Klamath Hydropower Project Draft Environmental Impact Statement  
(Federal Energy Regulatory Commission, or FERC)**

**1. Status Quo**

- Eight dams operating as they do in the Klamath River (one in a tributary to the Klamath).

**2. PacifiCorp's Proposed alternative**

- Remove Keno Dam (the dam doesn't produce electricity and is primarily used for regulating water to power plants downstream and allowing agricultural diversions)
- Remove the East Side and West Side power plant (small diversions that produce power near Upper Klamath Lake – in light of their minimal power production, the cost of installing screens to protect endangered suckers would be prohibitive).
- Retain four mainstem dams (Iron Gate, Copco I and II, and J.C. Boyle) and a tributary power plant (Fall Creek).
- This alternative includes many mitigation/enhancement measures such as operating Iron Gate Hatchery, oxygenating Iron Gate Reservoir, etc. (See page xxviii of executive summary)

**3. FERC's staff alternative**

- Similar to PacifiCorp's proposed alternative with additions, including those listed below.
- Note that the staff alternative does not include the Department of Interior and National Marine Fisheries Service's **mandatory** terms and conditions regarding fishways and conditions on Federal property (such as instream flow and ramp rates). The basis for these terms and conditions was strongly upheld in the recent Administrative Law Judge hearing (the DEIS was released two days prior to the Judge's ruling).
- Staff alternative additions include
  - Implementation of turbine venting as a dissolved oxygen enhancement measure
  - Implementation of an anadromous fish restoration plan, including installing fishways needed to restore passage to a project reach to be selected for initial restoration efforts. Emphasis is on studying fish reintroduction with no commitment to full-scale reintroduction.
  - Paying for all of Iron Gate Hatchery operations and marking 100% of production
  - Evaluating the potential for cool water releases from Iron Gate Dam
  - See page xxix of executive summary for more details

**4. Staff alternative with mandatory conditions included**

- This would include the installation of fishways (upstream and downstream) at all mainstem dams, as well as the following:
  - Substantially increased flow in the J.C. Boyle bypass reach. (Status Quo is approximately 90 cfs, Staff Alternative is 200 cfs., and Staff Alternative with mandatory conditions is 470 cfs.)
  - More restrictive ramping rates. Peaking would be limited to once per week rather than daily.
  - Fishways would be installed at all facilities.
  - Implementation of a gravel augmentation plan.

**V. Removal of Iron Gate and Copco I dams alternative.**

- This alternative includes removal of two of four mainstem dams.



## Pacific Fishery Management Council

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November 9, 2006

The Honorable Magalie Salas  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, D.C. 20426

Re: Pacific Fishery Management Council's essential fish habitat recommendations and comments on the Klamath Hydropower Project (FERC No. P-2082) Draft Environmental Impact Statement.

Dear Secretary Salas:

Enclosed for filing please find the original and eight (8) copies of a letter providing the Pacific Fishery Management Council's comments and essential fish habitat recommendations related to the Klamath Hydropower Project (FERC No. P-2082).

Sincerely,

DRAFT

Donald. O. McIsaac  
Executive Director  
(503)820-2280

Enclosures

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# DRAFT

November 9, 2006

The Honorable Magalie Salas  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, D.C. 20426

RE: Docket Number P-2082 (Pacific Fishery Management Council's Comments on the Draft Environmental Impact Statement, and Essential Fish Habitat [EFH] Recommendations for the Klamath Hydropower Project).

Dear Secretary Salas:

The Pacific Fishery Management Council (Council) submits these comments regarding the Draft Environmental Impact Statement (DEIS) for Hydropower License for the Klamath Hydroelectric Project (P-2082).

In a letter dated April 24, 2006, the Council submitted its recommendation that the Federal Energy Regulatory Commission (FERC) order the removal of the lowermost four dams on the Klamath River (Iron Gate, Copco 1 and 2, and JC Boyle Dams). FERC replied on May 12, 2006, noting that "We will consider your April 24, 2006, EFH comments under section 10(a) of the Federal Power Act as we prepare our Draft Environmental Impact Statement (DEIS)... We will look forward to your comments and any EFH recommendations after you've reviewed our DEIS and EFH Assessment."

We note with disappointment that the DEIS contains no alternative for the removal of all four lower Klamath dams. Instead, FERC's proposed final action is unclear. Although FERC is mandated to follow prescriptions submitted to it by the Secretaries of Commerce and Interior under Section 18 of the Federal Power Act, it has failed to adopt these prescriptions for fishways in its "Staff Alternative." Similarly, FERC has failed to include many of the mandatory 4(e) conditions in its "Staff Alternative." FERC needs to clearly lay out a preferred alternative that includes these mandatory terms and conditions.

The Council requests that FERC augment its analysis of the removal of two dams (Iron Gate and Copco 1) with a full analysis of the removal of the lowermost four dams. In addition, we strongly urge FERC to modify its "Staff Alternative" to reflect the mandatory conditions placed upon the new license by the Departments of Interior and Commerce.

The Council believes that FERC's essential fish habitat (EFH) analysis is completely inadequate. On page 5-88, FERC addresses EFH issues as they relate to the Klamath River Hydroelectric Project. This "analysis" reiterates the measures that PacifiCorp and FERC propose in the DEIS, and then, comparing with today's extremely impaired baseline, states that the proposed action

will “not adversely affect EFH.” We believe that this analysis misses the point – that the current facilities and operations have caused the degradation of EFH below the Klamath River Hydroelectric Project, and that measures should be taken to address those damages.

The Council further notes that of the five additional measures proposed by FERC (in addition to PacifiCorp’s proposed measures), four are requirements for PacifiCorp to make maps or plans with no obligation to implement any actual measures to improve EFH downstream. This is unacceptable. Measures to protect or enhance EFH must encompass real actions, not simply more plans and studies.

As the near-shutdown of ocean fisheries demonstrated this year, Klamath stock abundance affects economies up and down the coast. Thus, the economic consequences that result from the degradation of EFH located below the Klamath Hydroelectric Project can be quite large. Thus, it is important to address effects to EFH completely, and to fully explore ways to mitigate for such impacts.

In summary, the Council requests that FERC add a four dam removal scenario to its analysis, and further, based upon the recommendations of numerous individuals, agencies, and other organizations, select the removal option as the preferred alternative. Volitional, or other fish passage scenarios, do nothing to address serious water quality problems that FERC’s own analyses show impact anadromous fish.

Sincerely,

DRAFT

Pacific Fishery Management Council

# **COVER SHEET**

FEDERAL ENERGY REGULATORY COMMISSION

DRAFT ENVIRONMENTAL IMPACT STATEMENT  
FOR THE KLAMATH HYDROELECTRIC PROJECT

Docket No. P-2082-027

Executive Summary  
Pages xxvii to xxxviii  
DEIS

1

## SUMMARY

2 This draft environmental impact statement (EIS) for relicensing the Klamath Hydroelectric  
3 Project has been prepared by the staff of the Federal Energy Regulatory Commission (Commission or  
4 FERC) to fulfill the requirements of the National Environmental Policy Act (NEPA); the Commission's  
5 implementing regulations under Title 18, Code of Federal Regulations (CFR), Part 380; and the Council  
6 on Environmental Quality regulations for implementing NEPA (40 CFR Parts 1500-1508). The purpose  
7 of this document is to inform the Commission, the public, and the various federal and state agencies,  
8 tribes, and non-governmental organizations about the potential adverse and beneficial environmental  
9 effects of the proposed project and reasonable alternatives.

10 The Commission must decide whether to relicense the Klamath Hydroelectric Project and, if so,  
11 what conditions to place on any license issued. In deciding whether to authorize the continued operation  
12 of the hydroelectric project, the Commission must determine that the project will be best adapted to a  
13 comprehensive plan for improving or developing a waterway. In addition to the power and  
14 developmental purposes for which licenses are issued (e.g., flood control, irrigation, and water supply),  
15 the Commission must give equal consideration to the purposes of energy conservation; the protection and  
16 enhancement of fish and wildlife (including related spawning grounds and habitat); the protection and  
17 enhancement of recreational opportunities; and the preservation of other aspects of environmental quality.

18 The principal issues that we address in the draft EIS include the influence of project operations on  
19 water quality, including downstream of Iron Gate dam; approaches to facilitate the restoration of native  
20 anadromous fish within and upstream of the project; the influence of peaking operations at J.C. Boyle  
21 development on downstream biota and whitewater boating opportunities; the effect of project operations  
22 on archaeological and historic sites and resources of concern to various tribes; the effects of  
23 decommissioning East Side and West Side developments and removing Keno development from the  
24 project; and decommissioning other project developments.

25

### **PacifiCorp's Proposal**

26 On February 25, 2004, PacifiCorp filed an application with the Commission for a new license for  
27 the Klamath Hydroelectric Project, located principally on the Klamath River in Klamath County, Oregon  
28 and Siskiyou County, California, between Klamath Falls, Oregon, and Yreka, California. The existing  
29 project occupies 219 acres of lands of the United States, which are administered by the U.S. Bureau of  
30 Land Management or the U.S. Bureau of Reclamation. The current license expired on March 1, 2006,  
31 and the project is operating under an annual license.

32 The existing Klamath Hydroelectric Project consists of eight developments, seven of which are  
33 located on the Klamath River. One of the seven developments, Keno, serves as a regulating facility; it  
34 has no generation capabilities and PacifiCorp states that it no longer serves project purposes and should  
35 be deleted from the project. PacifiCorp also proposes to decommission East Side and West Side  
36 developments because the cost of installing screens that would be protective of federally listed suckers  
37 that reside in Upper Klamath Lake would be prohibitive. The remaining project developments on the  
38 mainstem of the Klamath River include J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate. The Iron  
39 Gate Fish Hatchery produces anadromous fish to compensate for lost spawning and rearing habitat  
40 between Iron Gate and Copco No. 2 dams. The eighth project development, Fall Creek, is on a Klamath  
41 River tributary that flows into Iron Gate reservoir. The installed capacity of the entire project is 161  
42 megawatts (MW) and, on average, the project annually generates 716,820 megawatt-hours (MWh) of  
43 electricity.

44 PacifiCorp proposes to operate the five remaining developments in a manner similar to past  
45 operations with a set of 41 environmental measures (described in detail in section 2.2.3), the purposes of  
46 which include the following:

- 1 • Enhancement of the quality of project-influenced waters by installing a hypolimnetic  
2 oxygenation system at Iron Gate reservoir and evaluating other methods to increase dissolved  
3 oxygenation, decrease temperature, and decrease nutrient loading and associated problems.
- 4 • Enhancement of aquatic habitat in the J.C. Boyle bypassed and peaking reaches by increasing  
5 the minimum flows and controlling ramping rates.
- 6 • Elimination of the source of major slope failures downgradient of the J.C. Boyle emergency  
7 overflow spillway by installation of bypass valves at the powerhouse.
- 8 • Facilitation of fish passage at J.C. Boyle dam by installation of a surface collection system  
9 upstream of the dam and making improvements to the existing fish ladder.
- 10 • Enhancement of spawning habitat in the J.C. Boyle bypassed reach and downstream of Iron  
11 Gate dam by gravel placement.
- 12 • Enhancement of aquatic habitat downstream of the Fall Creek diversion by increasing the  
13 minimum flow to 5 cubic feet per second (cfs).
- 14 • Protection of habitat downstream of the Spring Creek diversion dam by not diverting flow  
15 during July and August and releasing a minimum flow of 1 cfs for the remainder of the year.
- 16 • Facilitation of fish passage at the Fall and Spring Creek diversion dams by installing fish  
17 screens and ladders at both sites.
- 18 • Enhancement of Iron Gate Hatchery stock management by purchasing and operating a facility  
19 capable of marking 25 percent of all Chinook salmon released.
- 20 • Management of vegetation resources by implementation of a vegetation resource  
21 management plan.
- 22 • Management of wildlife resources by implementation of a vegetation resource management  
23 plan.
- 24 • Enhancement of recreational opportunities by improving existing and construction of  
25 additional recreation sites and facilities and implementation of a recreation resources  
26 management plan.
- 27 • Enhancement of the appearance of project facilities by reducing their visibility and contrast  
28 through vegetative screening at recreation sites and at J.C. Boyle and Iron Gate developments  
29 via implementation of a visual resources management plan.
- 30 • Coordination of the management of project roads via implementation of a Project Roadway  
31 Management Plan.
- 32 • Protection of archaeological and historic resources via implementation of a Historic  
33 Properties Management Plan.

#### 34 **Staff Alternative**

35 After evaluating PacifiCorp’s proposal, along with the terms and conditions, prescriptions, and  
36 recommendations from resource agencies, tribes, and other interested parties, we compiled a set of  
37 environmental measures to address the resource issues raised in the proceeding. We call this the “Staff  
38 Alternative” (described in detail in section 2.3.2). The Staff Alternative incorporates most of  
39 PacifiCorp’s proposed environmental measures, but in some instances, with modifications. Key  
40 modifications include:

- 1 • Implementation of turbine venting as an initial dissolved oxygen enhancement measure,  
2 rather than hypolimnetic oxygenation, and further evaluation of other measures to enhance  
3 water quality.
- 4 • Implementation of an anadromous fish restoration plan, including the installation of fishways  
5 needed to restore passage to a project reach to be selected for initial restoration efforts, rather  
6 than the proposed surface collector at J.C. Boyle.
- 7 • Implementation of an adaptive spawning gravel augmentation program in the J.C. Boyle  
8 bypassed reach and downstream of Iron Gate dam based on habitat mapping.
- 9 • Increasing the minimum flow in the Copco No. 2 bypassed reach to 70 cfs.
- 10 • Increased funding responsibilities for Iron Gate Hatchery operation and maintenance, tagging  
11 operations, and full funding of Fall Creek rearing facility operations.
- 12 • Addition of operation and maintenance responsibilities for Topsy Campground and Day Use  
13 area at J.C. Boyle development.
- 14 • Inclusion of Fall Creek and Copco No. 2 powerhouses and Copco No. 2 substation in the  
15 visual resources management plan.
- 16 • Expansion of the geographic scope of PacifiCorp's proposed area of potential effects  
17 pertaining to the protection of cultural resources.

18 The Staff Alternative includes 31 environmental measures additional to those proposed by  
19 PacifiCorp.

## 20 **Staff Alternative with Mandatory Conditions**

21 Section 18 of the Federal Power Act, 16 U.S.C §811, states that the Commission shall require  
22 construction, maintenance, and operation by a licensee of such fishways as the Secretaries of the U.S.  
23 Department of Commerce (Commerce) and U.S. Department of Interior (Interior) may prescribe. In  
24 March 29, 2006, filings with the Commission, Commerce and Interior submitted joint preliminary  
25 fishway prescriptions for anadromous and resident fish consisting of 7 general prescriptions and 31  
26 development-specific prescriptions, summarized in section 2.3.1.2. PacifiCorp filed alternative fishway  
27 prescriptions by letter dated April 28, 2006, in accordance with section 241 of the Energy Policy Act of  
28 2005, that take an adaptive approach for restoring anadromous fish to historically accessible habitat.

29 Section 4(e) of the Federal Power Act gives the Secretary of Interior authority to impose  
30 conditions on a license issued by the Commission for hydropower projects located on "reservations"  
31 under the Secretary's supervision (16 U.S.C §§796[2], 797[e]). In a March 29, 2006, filing with the  
32 Commission, Interior submitted nine preliminary section 4(e) conditions (seven with multiple  
33 components) on behalf of the Bureau of Land Management and 7 preliminary section 4(e) conditions (one  
34 with multiple components) on behalf of Reclamation (see section 2.3.13). PacifiCorp filed alternative  
35 section 4(e) conditions to most of the measures specified by Interior by letter dated April 28, 2006, in  
36 accordance with section 241 of the Energy Policy Act of 2005. The alternative conditions, in general,  
37 either eliminated the 4(e) condition or reduced the scope of the measure described in the 4(e) condition.

38 When finalized, the fishway prescriptions and 4(e) conditions may need to be included in a new  
39 license for this project. Incorporation of these mandatory conditions into a new license would cause us to  
40 modify or eliminate some of the environmental measures that we include in the Staff Alternative.  
41 Because the Staff Alternative does not include East Side, West Side, and Keno developments, we do not  
42 include any mandatory conditions associated with these developments in this alternative. Key differences  
43 in this alternative compared to the Staff Alternative include the following:

- 1 • The minimum flow in the J.C. Boyle bypassed reach would be increased from 200 to 470 cfs  
2 or more.
- 3 • The ramping rates in the J.C. Boyle peaking reach would be considerably more restrictive.
- 4 • J.C. Boyle powerhouse would only be able to operate in a peaking mode 1 day per week.
- 5 • The anadromous fish restoration plan would be replaced by the installation of fishways at  
6 each development.
- 7 • Substantially more gravel would be placed in the J.C. Boyle bypassed reach, and additional  
8 gravel would be added to the peaking reach.

### 9 **Retirement of Copco No. 1 and Iron Gate Developments**

10 We have identified for analysis a dam removal and development retirement alternative, consisting  
11 of the removal of Copco No. 1 and Iron Gate developments from the project. This alternative would  
12 address water quality issues that originate in the reservoirs associated with both developments, facilitate  
13 restoration of anadromous fish to habitat upstream of Iron Gate dam, and retain a substantial portion of  
14 the generation capability of the project. In this alternative, we modify or eliminate some of the  
15 environmental measures that we include in the Staff Alternative. Key differences in this alternative  
16 compared to the Staff Alternative include the following:

- 17 • Potential corrective actions to enhance water quality would no longer be necessary, and the  
18 water quality management plan would be replaced with a water quality monitoring plan.
- 19 • More restrictive down-ramping rates would be implemented downstream of project  
20 powerhouses.
- 21 • Gravel augmentation downstream of Iron Gate dam would be eliminated.
- 22 • The anadromous fish restoration plan would be replaced by the installation of upstream and  
23 downstream fishways at Copco No. 2 dam, and the spillway of Copco No. 2 dam would be  
24 modified to protect downstream migrating smolts.
- 25 • The cooperative fish disease risk monitoring and management plan would be eliminated.
- 26 • Funding obligations for Iron Gate Hatchery and the Fall Creek rearing facility would be  
27 eliminated.
- 28 • Operation and maintenance requirements for existing recreational facilities at Copco No. 1  
29 and Iron Gate developments would be eliminated, as would proposed new facilities at both  
30 developments.
- 31 • Proposed visual enhancements at Iron Gate development would be eliminated.
- 32 • Consultation with the California Historic Preservation Officer regarding measures to protect  
33 or mitigate for historic properties associated with both developments would be necessary.

### 34 **Other Alternatives Considered**

35 Under the No-action Alternative, the project would continue to operate under the terms and  
36 conditions of the existing license and existing agreements. No new environmental measures would be  
37 implemented. We use this alternative to establish baseline conditions for comparison with PacifiCorp's  
38 Proposal, the Staff Alternative, the Staff Alternative with Mandatory Conditions, and the Retirement of  
39 Copco No. 1 and Iron Gate Developments, and to judge the benefits and costs of any measures that might  
40 be required under a new license. We also considered federal takeover, issuance of a nonpower license,  
41 project decommissioning with dams in place, and decommissioning other developments besides East

1 Side, West Side, Keno, Copco No. 1, and Iron Gate, but concluded that none of these alternatives are  
2 reasonable in the context of this proceeding.

3 **Project Effects**

4 We summarize the more substantial differences between PacifiCorp's Proposal, the Staff  
5 Alternative, the Staff Alternative with Mandatory Conditions, and Retirement of Copco No. 1 and Iron  
6 Gate Developments in table ES-1. Based on our detailed analysis of the environmental benefits and costs  
7 associated with the four alternatives considered in detail in this draft EIS, we conclude that the best  
8 alternative for the Klamath Hydroelectric Project would be to issue a new license consistent with the  
9 environmental measures specified in the Staff Alternative.

10

1 Table ES-1. Summary of effects of PacifiCorp's Proposal, the Staff Alternative with Mandatory Conditions,  
 2 and Retirement of Copco No. 1 and Iron Gate Developments. (Source: Staff)

Resource	PacifiCorp's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions	Retirement of Copco No. 1 and Iron Gate Developments
<b>Power Benefits</b>				
Annual generation (MWh)	676,455	669,215	497,931	448,605
Net annual power benefits	\$12,753,430	\$7,325,700	-\$28,749,400	-\$5,680,030
<b>Geology and Soils</b>				
Sediment Supply and Transport	Minor enhancement of spawning gravel supply from one time placement in J.C. Boyle bypassed reach and downstream of Iron Gate dam.	Moderate enhancement of spawning gravel supply based on mapping and monitoring of distribution in J.C. Boyle bypassed reach and from Iron Gate to Shasta River; quantity and frequency based on habitat needs.	Deposition of from 1,226 to 6,134 tons of gravel a year downstream of J.C. Boyle dam would also provide a moderate enhancement of spawning gravel supply and could increase channel complexity in the peaking reach. Diverting all flow to the J.C. Boyle bypassed reach for 7 days during the spring could serve to transport deposited, and naturally occurring gravel from the bypassed reach into the peaking reach.	Similar to Staff Alternative for J.C. Boyle bypassed reach. Sediment stored in Iron Gate reservoir would likely be released to downstream reaches which would have short term adverse effects on aquatic habitat but eventually stabilize, and spawning gravel released from the reservoir could enhance salmon spawning habitat. Copco No. 2 dam may trap some sediments released from Copco reservoir, but would likely fill and require dredging to maintain powerhouse operations; dredged and natural sediment could be passed downstream to contribute to fluvial geomorphologic processes interrupted by the dams.

Resource	PacifiCorp's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions	Retirement of Copco No. 1 and Iron Gate Developments
Slope stabilization	Installation of bypass valve at J.C. Boyle powerhouse would reduce use of emergency spillway, the source of a major slope failure.	In addition to PacifiCorp's measure, would address stabilization and restoration of this and other slope failures along the J.C. Boyle bypassed reach; removal of sidecast material from bypassed reach channel would enhance access of salmonids to thermal refugium and recreational boating opportunities.	Similar to Staff Alternative, although channel restoration would extend downstream through the peaking reach.	Similar to Staff Alternative; provisions for stabilizing exposed banks following dam removal would be addressed in development decommissioning plan.
<b>Water Quality</b>				
Hypolimnetic oxygenation at Iron Gate reservoir would enhance DO downstream of Iron Gate compared to No-action but would still likely not meet applicable standards for much of the summer. Implementation could have unintended adverse effects in the reservoir. Reservoir management plans could identify measures to further address DO, as well as temperature and nutrient-related problems.	Turbine venting at Iron Gate would offer immediate downstream DO enhancement, while other options would be evaluated in response to monitoring results. DO would meet applicable standards at a level comparable to PacifiCorp's Proposal, but without potential for water quality degradation that could occur with hypolimnetic oxygenation. <i>Microcystis</i> monitoring would enable public notification of potential health risks from contact recreation at project reservoirs. Other effects similar to PacifiCorp's.	Similar to Staff Alternative.	The major sources of project-related water quality problems would be eliminated. Temperature regime downstream of Iron Gate would be more suitable for salmon. DO would usually meet applicable objectives, nutrient load would be reduced downstream of Iron Gate, which may reduce abundance of algae that form habitat for the intermediate host for at least two salmon pathogens.	

Resource	PacifiCorp's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions	Retirement of Copco No. 1 and Iron Gate Developments
Aquatic Resources	<p>Instream flows Additional 100 cfs released from J.C. Boyle dam would enhance physical habitat and retain important thermal refugium in the bypassed reach; proposed peaking operation restriction and ramping rates in the peaking reach would reduce the potential for fish stranding. Minor enhancement of habitat in Fall and Spring creeks.</p>	<p>Similar to PacifiCorp's proposal, although increased minimum flow in Copco No. 2 bypassed reach would substantially increase physical habitat. Warm water would likely continue to limit the suitability of the reach for salmonids during the summer.</p>	<p>Release of at least 470 cfs to the bypassed reach would wash out thermal refugium in J.C. Boyle bypassed reach, but would provide additional physical habitat; limiting peaking operations to one day a week would reduce likelihood of stranding, and provide more stable aquatic environment but would conflict with Outstanding Remarkable Value for this Wild and Scenic River reach by eliminating most whitewater boating opportunities and reducing the availability of optimal flows for angling.</p>	<p>Limiting ramping rate to 2 inches per hour at the USGS gage at Iron Gate, with a 12 inch per day limitation during Chinook salmon spawning and rearing period would likely curtail the ability to operate J.C. Boyle in a peaking mode, which could result in less downstream fluctuation, reducing the stranding potential more than the Staff Alternative, but also curtailing whitewater boating opportunities in the J.C. Boyle peaking reach. Ramping rate downstream of Iron Gate would be faster than Staff Alternative, but effects of ramping would be monitored with provisions for adaptive management of ramping rates during critical spawning, rearing and fry rearing periods. Water temperature of minimum flow to Copco No. 2 bypassed reach likely to be cooler than other alternatives, and more suitable for salmonids.</p>

		Retirement of Copco No. 1 and Iron Gate Developments	
Resource	PacifiCorp's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions
Anadromous fish restoration and fish passage	Improvements to the existing fish ladder at J.C. Boyle dam, and use of a "fish gulper" to move downstream resident migrants past the dam, however, effectiveness of the proposed downstream passage system is uncertain. New fish ladders and screens at Spring and Fall creek diversion dams for resident fish. No specific provisions for restoration of anadromous fish.	Adaptive approach to restoring anadromous fish to most appropriate project reach using primarily trap and haul techniques, telemetry and smolt collection to assess use of habitat, and concentrated restoration effort to most promising reach. Provisions for expanding program to other project reaches based on monitoring results. No upstream or downstream resident fish passage provided at Fall or Spring Creek diversion dams.	Volitional upstream and downstream passage, with tailrace barriers and spillway modification at most project dams. Trap and haul element still included to transport adults and smolts around Keno reservoir during periods of poor water quality. Completion of fish passage facilities at all project developments would take up to 6 years. No provisions made for passing adults or smolts around Iron Gate and Copco reservoirs when water quality is poor or to minimize fish predation. Fish ladders and screens for resident fish prescribed for Fall and Spring creek diversion dams.
Fish disease management	Reservoir management plan development could result in implementation of measures that would reduce nutrient load in project reservoirs, which could reduce downstream occurrence of algal populations that form habitat for fish pathogen host.	Implementation of a cooperative disease monitoring and management plan that integrates fish disease monitoring and management efforts by other entities with PacifiCorp's focused efforts between Iron Gate and Shasta River would address cumulative disease-related effects.	The two most problematic dams (based on height, reservoir size, and landscape constraints) for effective upstream and downstream passage would be removed. Upstream and downstream volitional fishways would be installed at Copco No. 2 dam and enhancements made to the existing fish ladder at J.C. Boyle dam. Water quality barrier to upstream and downstream passage of fish caused by both reservoirs would be eliminated. Migration corridor downstream of the project would be enhanced because conditions that foster disease outbreaks would be reduced. Removal of the two dams would enhance downstream water quality and reduce cumulative effects that contribute to downstream fish kills caused by disease and poor water quality (low DO, high water temperature, variable pH and ammonia levels, crowding, nutrients and armored substrate favorable for algal populations that form habitat for fish pathogen host).

<b>Resource</b>	<b>PacifiCorp's Proposal</b>	<b>Staff Alternative</b>	<b>Staff Alternative with Mandatory Conditions</b>	<b>Retirement of Copco No. 1 and Iron Gate Developments</b>
Iron Gate Hatchery operations	Same level of funding (80%) for general operation and maintenance; unspecified minor improvements would be made to the hatchery; would purchase and operate facilities for tagging 25% of released Chinook salmon.	Increase level of hatchery funding to cover 100% of general operation and maintenance, purchase and operate facilities for tagging 100% of released Chinook and coho salmon. Refurbish and fund 100% of the operation of the Fall Creek rearing facility to enable shifting a greater portion of the released fish to yearlings rather than subyearlings, to reduce crowding effects with wild salmon.	Same as Staff Alternative.	Iron Gate Hatchery would either be dismantled or operated by others. Primary cold water supply, Iron Gate reservoir, would be eliminated. Fate of hatchery would be addressed in a decommissioning plan for the Iron Gate dam, in consultation with a fishery advisory committee that would include resource agency representatives.

**Terrestrial Resources**

Development of vegetation and wildlife management plans would provide for protection of sensitive plants, control of noxious weeds, consideration of plant of importance to Native Americans for revegetation projects, and implementation of measures to protect and enhance wildlife and associated habitat.	Similar to PacifiCorp's proposed measures	Similar to PacifiCorp's proposed measures	Similar to PacifiCorp's proposed measures at remaining developments; exposed reservoir substrate would likely offer ideal conditions for re-establishment of vegetation. Eventually would reach equilibrium, but successional plant communities would likely diversify wildlife habitat.
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**Resource**      **PacifiCorp's Proposal**      **Staff Alternative**      **Staff Alternative with Mandatory Conditions**      **Retirement of Copco No. 1 and Iron Gate Developments**

**Recreational Resources**

<p>Propose to implement substantial recreational enhancements in accordance with its Recreation Resources Management Plan. Major new and modifications to existing facilities would be constructed at J.C. Boyle and Iron Gate developments, and moderate facilities at Copco and Fall Creek developments. Programmatic elements of the plan would also be implemented, including provisions for plan updates, coordination with agencies regarding shared operation and maintenance responsibilities, monitoring, project patrol, and an interpretation and education program.</p>	<p>Similar to PacifiCorp's proposal, although we would include Topsy Campground as a project facility for which PacifiCorp should have a share of the operation and maintenance costs and we provide for increased operation and maintenance at project recreational facilities during the term of a new license, if needed, to keep them current with applicable standards.</p>	<p>Similar to Staff Alternative, but would also include Spring Island Boater Access Site, Klamath Campground, dispersed day-use sites, and scouting trails at major rapids along the peaking reach among the facilities for which PacifiCorp was responsible. Provisions for peaking operations during only one day a week during the recreation season would substantially reduce whitewater boating opportunities in the peaking reach compared to PacifiCorp's proposal and the Staff Alternative. Because of this, commercial outfitters may attempt to crowd trips into the limited window that would be created, and create public safety hazards. Eventually, some commercial outfitters could go out of business because of lack of access to this Wild and Scenic River segment. Such diminishment of boating opportunities would be inconsistent with the Congressionally designated Outstanding Remarkable Value of whitewater boating.</p>	<p>The same as Staff Alternative for remaining developments. Existing recreational sites at Copco and Iron Gate developments would be either transferred to another entity or abandoned after appropriate decommissioning processes followed to secure the sites. Major new or enhanced facilities proposed at Iron Gate development would not be constructed. Some sites could serve as public access sites for the newly created riverine reaches. The length of the peaking reach would be increased by several miles, and additional riverine boating opportunities would be created at the Iron Gate reservoir site, potentially enhancing whitewater boating opportunities; however, restrictions to peaking operations to minimize stranding potential of salmon could reduce boatable days from the proposed project or the Staff Alternative.</p>
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Resource	PacifiCorp's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions	Retirement of Copco No. 1 and Iron Gate Developments
<b>Cultural Resources</b>	Implementation of its revised HPMP would provide reasonable monitoring, inspection, and protective measures for cultural resources within PacifiCorp's defined APE.	We expand PacifiCorp's proposed APE, to include land within the existing and proposed project boundary, the area along the peaking reach influenced by the project, and downstream of Iron Gate dam to the confluence of the Scott River. The HPMP would be revised to address management of cultural resources in the APE.	Similar to Staff Alternative, although may provide for survey of areas outside our defined APE.	Similar to Staff Alternative for developments that remain in the project. However, major site monitoring, inspection, and treatments were proposed for areas at Copco and Iron Gate reservoirs. These sites would need to be addressed as part of a decommissioning plan that would include consultation with the CA SHPO and appropriate tribal and agency representatives.

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