UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

FEB 23 2012

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon

LOCATION: Southern Oregon and Northern California

SUMMARY:

PacifiCorp Energy is applying to the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) for an incidental take permit (ITP) under Endangered Species Act Section 10(a)(1)(B) for a 10-year period authorizing the incidental take of Southern Oregon/Northern California Coast Evolutionarily Significant Unit of coho salmon (*Oncorhynchus kisutch*), which is listed as threatened under the Endangered Species Act. The ITP would require implementation of a Habitat Conservation Plan with measures to monitor, mitigate, and minimize effects of PacifiCorp's Klamath Hydroelectric Project on these listed coho salmon for this period.

Two alternatives were analyzed in this EA: issuance by NMFS of an ITP for listed Southern Oregon/Northern California Coast Evolutionarily Significant Unit coho salmon (*Oncorhynchus kisutch*) and the associated implementation of minimization and mitigation measures for coho salmon that would be implemented under an approved HCP (proposed action), or NMFS not issuing an ITP to PacifiCorp (no action alternative).

The Proposed Action is likely to result in beneficial effects including improvements to salmonid populations and their habitat in the basin, potential for expanded prey base for fish-eating birds along the Klamath River mainstem, and improvements to employment opportunities for tribal and non-tribal workers in the basin. No significant adverse impacts to the human environment are expected as a result of the proposed action. The No Action alternative would in general not change effects from those under current conditions, but continued degraded conditions in the Klamath River mainstem would occur with no mitigating actions taken to improve these degraded conditions. The preferred alternative for this EA is the proposed action.

RESPONSIBLE
OFFICIAL: Rodney R. McInnis
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The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact (FONSI), including the environmental assessment, and final PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon is enclosed on compact disk for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the Responsible Official named above.

Sincerely,

Patricia Montanio
NOAA NEPA Coordinator

Enclosure(s)

1. Final Environmental Assessment: Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon (on compact disk)
2. Finding of No Significant Impact for Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon (on compact disk)
3. Final PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon (on compact disk)

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Marine Fisheries Service

FINAL ENVIRONMENTAL ASSESSMENT:

Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Prepared in:
February 2012

Federal Agency:
National Marine Fisheries Service

Final
Environmental Assessment:
Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon

February- 2012

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Executive Summary

Proposed Action

In accordance with the National Environmental Policy Act (NEPA), the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) has developed this Environmental Assessment (EA) to evaluate the effects of issuing a proposed Incidental Take Permit (ITP) under Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended, to PacifiCorp Energy (PacifiCorp, or the applicant) related to interim operation of the Klamath Hydroelectric Project (Project). The Klamath Hydroelectric Settlement Agreement (KHSA) calls for the Secretary of the Interior to make a determination on whether to remove four dams within PacifiCorp's Klamath Hydroelectric Project on the Klamath River. If the Secretary of the Interior makes an affirmative determination, the dams are anticipated ~~that four dams within PacifiCorp's Klamath Hydroelectric Project on the Klamath River would~~ to be removed by the end of 2020. PacifiCorp is separately applying to NMFS and the U.S. Fish and Wildlife Service (USFWS) for ITPs to address the transition period before dam removal, Project decommissioning, and restoration of volitional fish passage. PacifiCorp is applying to NMFS for an ITP for a 10-year period authorizing the incidental take of Southern Oregon/Northern California Coast Evolutionarily Significant Unit of coho salmon (*Oncorhynchus kisutch*), which is listed as threatened under the ESA. PacifiCorp is separately applying to the USFWS for an ITP for a 10-year period that would authorize incidental take of Lost River sucker (*Deltistes luxatus*) and shortnose sucker (*Chasmistes brevirostris*), which are listed as endangered under the ESA.

NMFS' issuance and continuation of the ITP would be contingent on the implementation of a Habitat Conservation Plan (HCP) developed, in coordination with NMFS, by the applicant (PacifiCorp 2012). This HCP includes a series of conservation measures to minimize and mitigate the effects of operation of the Project on potential take of listed coho salmon during this transition period until ~~planned~~ proposed dam removal, or alternatively, the establishment of volitional fish passage facilities where they currently do not exist.

The transfer of the Hydroelectric Project to a Dam Removal Entity (DRE) is anticipated by the KHSA to occur on or before December 31, 2020. If dam removal under the KHSA does not proceed, PacifiCorp would return to the Federal Energy Regulatory Commission (Commission, or FERC) relicensing process for the Project and would implement the conditions of a new Project license, including mandatory conditions prescribed by NMFS for installation of volitional fish passage facilities providing fish passage throughout the Project area. This EA analyzes a permit term of 10 years, assuming ~~initial~~ permit issuance would occur in early 2012 ~~2011.~~

Conservation/Mitigation Measures

The conservation or mitigation measures and their effects, summarized below, are derived from, among other things, Biological Opinions developed by NMFS and USFWS in

conjunction with a Final Environmental Impact Statement (FEIS) developed by FERC for reissuing the federal license to operate the Project, without dam removal, for a 50-year period, and updated studies and analyses described in the HCP. This EA assesses potential impacts of issuing the proposed ITP and these conservation or mitigation measures, taking into account differences between the original 50-year FERC relicensing proposal and the current 10-year interim operation period.

The conservation or mitigation measures incorporated into the HCP include the following:

- The applicant would implement a system to introduce air into its turbine at Iron Gate dam ("turbine venting"). This would increase the levels of dissolved oxygen downstream of the dam, which would benefit habitat conditions for coho salmon and other aquatic species.
- The applicant would participate in the development and implementation of a plan to increase flow variability below Iron Gate dam during the fall/early winter period. Increased flow variability is expected to result in important habitat improvements for coho salmon and other aquatic species downstream of Iron Gate dam, including the potential reduction in disease-causing organisms.
- The applicant would implement measures to increase the quantity and functionality of large woody debris (LWD) downstream of Iron Gate dam, benefitting habitat conditions for coho salmon and other aquatic organisms.
- The applicant would implement a plan to augment gravel to enhance spawning habitat and reduce disease outbreaks downstream of Iron Gate dam.
- The applicant would establish a Fish Disease Research Fund, which would fund programs expected to contribute to disease reduction and thus benefit coho salmon and other aquatic species.
- The applicant would create and fund a Coho Enhancement Fund that would be used to implement various projects designed to benefit coho salmon (e.g., by enhancing habitat conditions).

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Acronyms and Abbreviations

BiOp	Biological Opinion
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
cfs	cubic feet per second
DO	dissolved oxygen
DOI	U.S. Department of the Interior
DRE	Dam Removal Entity
EA	Environmental Assessment
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission (or "Commission")
HCP	Habitat Conservation Plan
HGMP	Hatchery and Genetic Management Plan
IA	Implementing Agreement
ITP	Incidental Take Permit
KHSA	Klamath Hydroelectric Settlement Agreement
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
RM	river mile
SONCC	Southern Oregon and Northern California Coast (coho salmon)
USFWS	U.S. Fish and Wildlife Service

SECTION 1

Introduction

PacifiCorp Energy (PacifiCorp or the applicant) is applying to the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) for an incidental take permit (ITP) under Endangered Species Act (ESA) Section 10(a)(1)(B) for a 10-year period authorizing the incidental take of Southern Oregon/Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon (*Oncorhynchus kisutch*), which is listed as threatened under the ESA. The ITP would require implementation of a Habitat Conservation Plan (HCP) with measures to monitor, mitigate, and minimize effects of PacifiCorp's Klamath Hydroelectric Project (Project) on these listed coho salmon for this period. This Environmental Assessment (EA) analyzes the potential effects of NMFS's proposed action of issuance of an ITP as provided under the National Environmental Policy Act (NEPA) and implementing regulations and policy.

Project facilities at Iron Gate dam, which is the Project dam furthest downstream on the Klamath River, do not include fish passage structures. Thus, anadromous fish passage, including passage of listed coho salmon, is currently blocked at Iron Gate dam. ~~Subject to certain conditions and a pending determination in March 2012 by the Secretary of the Interior, the Klamath Hydroelectric Settlement Agreement (KHSA) anticipates that four Project dams (Iron Gate, Copco No.1, Copco No. 2, and J.C.Boyle) on the Klamath River,~~ The Klamath Hydroelectric Settlement Agreement (KHSA) [1] calls for the Secretary of Interior to make a determination on whether to remove four dams (Iron Gate, Copco No. 1, Copco No. 2, and J.C. Boyle) within PacifiCorp's Klamath Hydroelectric Project on the Klamath River. If the Secretary of the Interior makes an affirmative determination, the dams are anticipated to ~~will~~ be removed on or before December 31, 2020 to accomplish volitional fish passage for listed coho salmon and other species. The removal of the dams proposed ~~envisioned~~ in the KHSA modifies an earlier proposal by PacifiCorp to the Federal Energy Regulatory Commission (FERC) to relicense and continue to operate the Project for 50 years. The KHSA provides that operations of the Project, including these dams, will continue over the interim period until the dams are removed or, should dam removal not proceed, PacifiCorp would return to the Federal Energy Regulatory Commission (Commission, or FERC) relicensing process for the Project. ~~until FERC issues a new license to PacifiCorp for operation of the Project and volitional fish passage is implemented~~. Even if the dams are not removed under the KHSA for some reason, NMFS has prescribed mandatory fishways, which FERC must include as conditions of any new license for operation of the Project, in the FERC relicensing process. These fishways would provide volitional fish passage for listed coho salmon and other species (NMFS 2007a, b), or dam decommissioning and dam removal could also potentially be the end result of the FERC process which would also

[1] Representatives of numerous organizations, including the states of California and Oregon, Indian tribes, counties, irrigators and conservation and fishing groups have developed a comprehensive solution to resolve many of the complex water-related issues of the Klamath Basin. Many of the participants in the Klamath settlement process signed the Klamath Basin Restoration Agreement and Klamath Hydroelectric Settlement Agreement on February 18, 2010. In order to access these agreements for more information, see http://klamathrestoration.gov

establish volitional fish passage. Therefore, as further described in this EA below and in the HCP, NMFS expects that there would be volitional fish passage under either dam removal pursuant to the KHSA or FERC's issuance of a new license for the Project by approximately the end of 2020, and volitional fish passage under either of these processes will provide substantial benefits to coho salmon and other anadromous fish species at the completion of the interim term of this ITP. The HCP that PacifiCorp included with its application for an ITP includes a series of conservation measures to minimize and mitigate the effects of operation of the Project on potential incidental take of listed coho salmon during this transition period until dam removal or FERC's issuance of a new license to PacifiCorp for operation of the Project.

1.1 Chronological Background

In 2004, PacifiCorp filed an application with FERC for a new license to operate the Project. The potential alternatives, environmental impacts and mitigation measures for the continued operation of the Project under a new FERC license were considered in FERC's relicensing process, as documented in the Final Environmental Impact Statement (FEIS) prepared by FERC (FERC 2007; a hyperlink to this document is available in the References section of this EA). In December 2007, NMFS and U.S. Fish and Wildlife Service (USFWS) (NMFS and USFWS - the Services) issued Biological Opinions (BiOps) on FERC's proposed relicensing action. NMFS' Biological Opinion analyzed the effects on listed coho salmon of FERC's proposed relicensing action, which for purposes of the Biological Opinion included mandatory requirements to construct fishways for volitional passage of anadromous fish around the Project dams, but did not include removal of the Project dams. USFWS analyzed the effects of FERC's proposed relicensing action on endangered Lost River suckers and shortnose suckers in their 2007 Biological Opinion. The Services' Biological Opinions included incidental take statements that described the incidental take of those listed species expected as a result from Project operations, included reasonable and prudent measures necessary to minimize the impact of that incidental take, and included terms and conditions to implement those reasonable and prudent measures (NMFS 2007a, USFWS 2007).

To address the Services' concerns about the potential effects of Project operations identified in the BiOps and during the transition period (i.e., prior to potential dam removal under the ESA or relicensing of the Project by FERC), PacifiCorp submitted an Interim Conservation Plan to the Services (PacifiCorp 2008) identifying mitigation and minimization measures that PacifiCorp would implement until a decision regarding dam removal or relicensing has been made. On November 12, 2008, the Services confirmed receipt of the plan, noting that the plan contained an important set of actions that, if fully implemented, would reduce and help minimize the effects of interim operations on coho salmon, Lost River suckers, and shortnose suckers. However, the Services noted that they would need to subsequently review the measures of the Interim Conservation Plan pursuant to the Endangered Species Act (NMFS and USFWS 2008).

Related to the Klamath Hydroelectric Project is Reclamation's Klamath Project which controls water deliveries from the Klamath River to agricultural producers in the upper river basin. Numerous consultations have occurred between Reclamation and NMFS on Reclamation's Klamath Project with the most recent formal consultation occurring in 2010

on Project operations. The results of this consultation established minimum flow requirements for Iron Gate dam discharges. The connection to the Klamath Hydroelectric Project is that Reclamation is responsible for providing enough water in the Klamath River system in order for PacifiCorp to provide these minimum flows out of Iron Gate dam.

As described previously, a number of organizations entered into the KHSA on February 18, 2010. The KHSA provides for the abeyance of the FERC relicensing process for the Project pending the outcome of the Secretary of the Interior's 2012 determination regarding dam removal. If the Secretary of the Interior determines that dam removal should not proceed, or the KHSA terminates for other reasons, the FERC relicensing process for the Project would resume. On September 22, 2011, the Department of the Interior and the California Department of Fish and Game ~~has issued a notice of intent to prepare an~~ released a Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for public review and comment (76 FR 58833; September 22, 2011). The EIS/EIR evaluates the effects of removing four dams on the Klamath River in southern Oregon and northern California. The public comment period on the EIS/EIR has ended, but the Final Environmental Impact Statement/Environmental Impact Report has not been issued yet.
~~on the Secretary of the Interior's determination regarding dam removal pursuant to the KHSA (75 FR 33634: June 14, 2010).~~[2]

With technical assistance from NMFS, the applicant developed an HCP and included it with its application for an ITP under Section 10(a)(1)(B) of the ESA for an interim 10-year period until dam removal under the KHSA or relicensing of the Project by FERC (PacifiCorp 2011a).

1.2 Purpose and Need

NMFS is reviewing the application from PacifiCorp for an ITP pursuant to Section 10(a)(1)(B) of the ESA for operation of its Klamath Hydroelectric Project (Project) for an interim 10-year period until anadromous fish passage is provided at its Project through either dam removal under the KHSA or the installation of volitional fish passage facilities under a new Project license issued by FERC. Pursuant to ESA Section 10(a), if NMFS finds that all requirements for issuance of an incidental take permit are met, NMFS shall issue the requested permit. Issuance of an incidental take permit is a Federal action subject to analysis for potential environmental impacts under NEPA.

In addition, NMFS' purpose for the proposed action of issuance of an incidental take permit for interim operations of PacifiCorp's Project is to protect the covered species (the SONCC ESU of coho salmon) and its habitat while enabling the permit applicant (PacifiCorp) to continue to conduct activities in compliance with the ESA. The proposed action is needed because normal, otherwise lawful operations of PacifiCorp's Project could result in incidental take of the covered species, and the covered species needs protection as provided in the ESA.

NMFS' need in this action, therefore, is to review PacifiCorp's application of an incidental take permit, including the HCP that PacifiCorp submitted with its application, and decide

[2] For more information related to the Secretary's determination, see http://klamathrestoration.gov

whether to issue the requested permit pursuant to the requirements of Section 10(a)(1)(B) of the ESA, and in accordance with NEPA policy and guidelines.

SECTION 2

Description of Proposed Action and Alternatives

2.1 Proposed ITP

The proposed action, issuance of an ITP, would authorize incidental take of listed coho salmon (*Oncorhynchus kisutch*) during the proposed 10-year term of the ITP. Issuance and continuation of the ITP would be contingent on the implementation of the HCP developed by the applicant that includes a series of conservation or mitigation measures related to the interim operation of the Project (PacifiCorp 2012).

The USFWS will be separately processing a pending ITP application from PacifiCorp that would authorize incidental take of endangered Lost River sucker (*Deltistes luxatus*) and shortnose sucker (*Chasmistes brevirostris*), which would likewise include the implementation of a HCP related to those species. Some of the conservation measures in the separate HCPs that PacifiCorp included with separate applications for ITPs from NMFS and USFWS will assist more than one affected species. However, each agency will process its ITP reviews and NEPA analysis separately. NMFS and USFWS will coordinate their processes for review of the applications as much as possible. Each ITP application process may proceed even if the other ITP application process is delayed or does not proceed for some reason.

2.2 No Action

Under this No Action Alternative, NMFS would not issue an ITP to PacifiCorp. This No Action Alterative would mean deferring or not implementing the additional mitigation measures outlined in the HCP submitted to NMFS. The Project would continue to operate under the terms and conditions of the existing FERC license in a manner consistent with current operations, which does not include minimization, mitigation, and conservation measures based on Project impacts identified by NMFS (NMFS 2007a).

2.3 Alternatives Considered but Dismissed for Further Analysis

2.3.1 Conservation Actions without an Incidental Take Permit

As is described above, PacifiCorp has been implementing certain interim conservation measures described in its Interim Conservation Plan, and the KHSA provides that PacifiCorp will implement certain interim conservation measures according to specific deadlines for each measure, unless the KHSA is terminated. As is described in the HCP Chapter XI, in discussions in development of the HCP, NMFS considered whether PacifiCorp would continue to implement these conservation measures in the absence of an ITP from NMFS authorizing take associated with such measures. Failing to obtain an ITP may prevent

PacifiCorp's full implementation of certain conservation measures that would benefit listed coho salmon, including flow variability below Iron Gate dam. Further, PacifiCorp has justified expenditures associated with the interim conservation measures on the basis that it would obtain an ITP from NMFS in a timely manner that provides additional regulatory certainty. Consequently, it is uncertain whether PacifiCorp could continue expenditures on conservation measures without issuance of an ITP by NMFS. Thus, due to this level of uncertainty, NMFS will not further analyze the effects of this Alternative in the remainder of this document.

2.4 Proposed Action

The proposed action is the issuance of an ITP by NMFS to PacifiCorp ~~of an ITP~~ for listed SONCC coho salmon (*Oncorhynchus kisutch*) and the associated implementation of minimization and mitigation measures for coho salmon that would be implemented under an approved HCP. The proposed minimization and mitigation measures are based on analyses contained in the NMFS' BiOp for FERC's proposed relicensing action, FERC's FEIS for its proposed relicensing action, and PacifiCorp's HCP (NMFS 2007a, FERC 2007, PacifiCorp 2012), and are intended to monitor, minimize and mitigate the impacts of incidental take of coho salmon resulting from interim operation of the Project to the maximum extent practicable pursuant to ESA Section 10(a)(1)(B).[3] The term of the proposed ITP is 10 years, which is explained in greater detail below under the heading "Permit Duration."

2.4.1 Covered Activities

Activities covered under the ITP ("Covered Activities") include those activities that are necessary to operate and maintain Project facilities during the Permit duration as well as certain mitigation and conservation measures identified in the HCP.

Covered Activities under the HCP include activities that are otherwise necessary to operate and maintain Project facilities during the Permit Term. Hydroelectric generation is the primary activity conducted at Project facilities, with the exception of the Keno development, which does not include power-generating equipment. Many of these activities are governed by the existing FERC license or agreements with other entities (e.g., U.S. Bureau of Reclamation, or Reclamation), or through voluntary commitments from PacifiCorp. The majority of the operations activities were considered in the NMFS 2007 BiOp; therefore, the terms and conditions of the 2007 BiOp served as the basis for developing the avoidance, minimization, and mitigation measures contained in the HCP (PacifiCorp 2012). Detailed descriptions of Project facilities and their operations are provided in Chapter IV (*Current Conditions*) of the HCP. Detailed information on HCP Covered Activities can be found in Chapter ~~2~~ II of the PacifiCorp HCP (PacifiCorp, 2012). As is described in the HCP, the Covered Activities necessary to operate and maintain Project facilities are:

- Operate and maintain the spill gates at Link River dam for regulation and releases of flows from Link River dam for purposes of hydroelectric generation

[3] The impacts of direct take of listed coho salmon from Iron Gate Hatchery operations, and the rearing and release of juvenile Chinook salmon that may potentially result in the incidental take of coho salmon, are addressed through the development of a Hatchery and Genetics Management Plan (HGMP) by PacifiCorp and the California Department of Fish and Game (CDFG). In September 2010, CDFG included the HGMP in an application to NMFS for an enhancement permit, not an ITP, for the Iron Gate Hatchery under ESA section 10(a)(1)(A), which is described in greater detail below in the EA and in HCP Chapter IV (PacifiCorp 2011a).

- Operate and maintain the East Side and West Side canals, penstocks, turbines, and powerhouse facilities, and operate and maintain penstocks, turbines, and powerhouse facilities prior to shutdown
- Operate and maintain Keno dam, spill gates, and fish ladder
- Regulate the water level upstream of Keno dam in accordance with the agreement with Reclamation (per PacifiCorp's existing FERC license) and for irrigation withdrawal activities
- Operate and maintain J.C. Boyle dam, fish bypass system, water conveyance system, turbines, and powerhouse facilities
- Maintain an instream flow release from the J.C. Boyle dam to the river of not less than 100 cfs (per PacifiCorp's existing FERC license)
- Regulate flows from J.C. Boyle dam and powerhouse during normal operations, such that ramping rates of flow in the river do not exceed 9 inches per hour (as measured at the United States Geological Survey (USGS) gage located 0.5 mile downstream of the J.C. Boyle powerhouse) per PacifiCorp's existing FERC license
- Operate and maintain Copco No. 1 and Copco No. 2 dams, water conveyance systems, turbines, and powerhouse facilities
- Operate and maintain Iron Gate dam (and associated appurtenances), penstocks, turbines, and powerhouse facilities
- Regulate releases from Iron Gate dam in accordance with NMFS' BiOp on Reclamation's Klamath Project operations (NMFS 2010, and future consultations) which identifies instream flow and ramping rate requirements (as measured at the USGS gage located 0.5 mile downstream of Iron Gate dam).
- Regulate water levels at Keno, J.C. Boyle, Copco, and Iron Gate reservoirs

The minimization, mitigation, and conservation measures identified in the HCP include measures that comprise the *Coho Salmon Conservation ~~Program~~ Strategy*. The implementation of some of these measures are also Covered Activities. A general description of these measures that are also Covered Activities is:

- Implementation of turbine venting at Iron Gate dam to enhance dissolved oxygen concentrations in surface waters downstream of Iron Gate dam,
- Instream flow, flow variability, and flow ramping rate measures to benefit listed coho salmon downstream of Iron Gate dam, and consistent with NMFS' BiOp to Reclamation (NMFS 2010, and future consultations with Reclamation),
- Retrieving Large Woody Debris trapped at or near Project dams and placing it in mainstem or tributary waters downstream of Iron Gate dam, and
- PacifiCorp's funding of certain habitat enhancement projects and scientific research studies.

Detailed descriptions of the minimization, mitigation and conservation measures in the categories listed above are provided in Chapter VI (*Conservation Program*) of the HCP (PacifiCorp 2012).

In addition to the Covered Activities described above, PacifiCorp is facilitating the following conservation measures to provide further benefits to SONCC coho as further mitigation for Project effects:

- Habitat restoration projects designed to enhance the survival and recovery of listed coho salmon, funded through the Coho Enhancement Fund, and conducted by third parties;
- Research studies on fish disease conditions and causal factors downstream of Iron Gate dam, funded through the Klamath River Fish Disease Research Fund, and conducted by third parties; and
- Funding and participation in Iron Gate Hatchery measures developed to support a Hatchery and Genetic Management Plan (HGMP) to maximize conservation benefits of the hatchery program to coho salmon.

Specific habitat enhancement projects and fish disease research studies, while a part of the HCP, are not considered Covered Activities under the ITP because such activities, and the potential that the projects themselves may result in some form of take of SONCC coho even if beneficial overall, have not been completely identified yet and will be undertaken by third parties outside the direct control of PacifiCorp. PacifiCorp will be providing the funding for these enhancement projects and research studies that will benefit coho salmon, but third parties undertaking habitat projects and research studies must obtain all necessary State and federal permits and authorizations prior to conducting such activities. Thus, the environmental analysis for these conservation measures contained in the HCP and this EA is general in nature, but it should help expedite future permitting processes and any related environmental analyses required for specific projects.

Operation and maintenance actions at the Iron Gate Hatchery by California Department of Fish and Game (CDFG) involve purposeful take of coho salmon and will be addressed through a separate ESA permitting process involving the development of a HGMP by PacifiCorp and CDFG as described in the KHSA. PacifiCorp has agreed to fund the development and implementation of an HGMP for the Iron Gate Hatchery for approval by NMFS in accordance with the applicable criteria and requirements of 50 CFR Section 223.203(b)(5). On September 16, 2010, PacifiCorp and CDFG submitted an application for an ESA Section 10(a)(1)(A) enhancement permit incorporating the HGMP to NMFS for review and approval (CDFG 2011b). CDFG will implement the terms of the permit and related HGMP at Iron Gate Hatchery upon issuance of an ESA Section 10(a)(1)(A) permit by NMFS. Because an ESA Section 10(a)(1)(A) enhancement permit addresses purposeful take of coho salmon due to operation and maintenance actions at the Iron Gate Hatchery, and the permit would address activities by CDFG, NMFS' processing of the application for an ESA Section 10(a)(1)(A) permit may proceed separately from processing the ITP that is the subject of this EA, and NMFS will conduct a separate environmental analysis regarding its decision whether to issue the ESA Section 10(a)(1)(A) permit. Therefore, the environmental analysis for PacifiCorp's funding and participation in

Iron Gate Hatchery measures developed to support a Hatchery and Genetic Management Plan described in the HCP and this EA is more general in nature.

2.4.2 Permit Area

PacifiCorp operates the Klamath Hydroelectric Project (Project), located in southern Oregon and northern California (Figures 1 and 2) under a license issued by FERC (FERC Project No. 2082). The Project consists of eight developments. Seven of the developments are located on the Klamath River between river mile (RM) 190.1 and 254.3, including (in order moving upstream) Iron Gate (RM 190.1 to 196.9), Copco No. 2 (RM 198.3 to 198.6), Copco No. 1 (RM 198.6 to 203.1), J.C. Boyle (RM 220.4 to 228.3), Keno (RM 233 to 253.1), East Side and West Side (both in Link River at RM 253.1 to 254.3). The eighth development is on Fall Creek, a Klamath River tributary at RM 196.3. Detailed descriptions of Project facilities on the Klamath River and their operations are provided in Chapter IV of the HCP.

The Permit Area includes PacifiCorp's existing Project facilities and the adjacent water and land areas potentially influenced by Project maintenance and operations, including the mainstem Klamath River and reservoirs from Link River dam at the outlet of Upper Klamath Lake down to the Klamath River estuary, inclusive (see Figure 1). Project facilities and their operations are described in Chapter IV (*Current Conditions*) of the HCP. Figure 2 shows PacifiCorp Project facilities in relation to the Klamath River.

2.4.3 Permit Duration

The term of the proposed ITP (referred to herein as "Permit Term" or "term of the ITP") will be for 10 years. The proposed permit term of 10 years is consistent with the target date for dam removal proposed under the KHSA, if various conditions are met, on or before December 31, 2020. If the KHSA is terminated, the FERC relicensing proceedings for the Project would resume, and it is anticipated that FERC would issue a new license for the Project including mandatory conditions for volitional fish passage which would be in place by the end of 2020 (volitional fish passage could also potentially be accomplished via decommissioning and dam removal if that is the final outcome of the FERC process). Thus, the ITP and HCP address the impact of anticipated incidental take of coho salmon from interim operations of the Project for 10 years until it is anticipated that anadromous fish passage will occur in the Klamath River upstream of Iron Gate dam either through dam removal under the KHSA or mandatory conditions in a new FERC license. The proposed Implementing Agreement (IA) for the ITP provides procedures for termination of the ITP in the event NMFS determines that circumstances have changed such that it is no longer reasonably certain that anadromous fish passage will occur in the Klamath River upstream of Iron Gate dam for the Project by the end of 2020 as described above. These termination procedures are designed to address the potential for any circumstances that would change these assumptions regarding anadromous fish passage.

In addition, the Permit Term may be extended as provided in the IA. However, extension of the Permit Term may require additional environmental analysis. By the terms of the KHSA, circumstances may arise resulting in the termination of the KHSA. In the event of termination of the KHSA, the ITP will remain in effect for the Permit Term of 10 years, as long as the HCP and IA are being adhered to, during which time the FERC relicensing process will resume. Incidental take associated with Project operations under a new FERC

license may be authorized ~~by NMFS~~ under Section 7 of the ESA in a NMFS biological opinion, ~~and a resulting in a NMFS Biological Opinion is i~~ssued for FERC's action of issuance of a new Project license. In the event that the KHSA is terminated and that incidental take associated with Project operations under a new FERC license is not authorized under Section 7 of the ESA prior to the end of the 10-year term of the ITP, then PacifiCorp may initiate discussions with NMFS to extend the term of the ITP in accordance with the Implementing Agreement.

2.4.4 Conservation Strategy

The HCP describes actions to benefit the conservation of populations of SONCC coho salmon in the Klamath River downstream of Iron Gate dam during the interim period prior to providing volitional fish passage through the Project as described above. Therefore, installation of volitional fish passage is not contemplated under the interim period covered by this HCP. Instead, PacifiCorp proposes measures as described in Sections 2.4.4.1 and 2.4.4.2 of this EA, and more fully detailed in Chapter VI of the PacifiCorp HCP to mitigate the lack of access to habitat upstream of Iron Gate dam during the interim period. The measures in this HCP focus on enhancement of coho salmon habitat availability and use in the Klamath River basin downstream of Iron Gate dam during the interim period. As such, these interim conservation actions will not impede the survival and recovery of SONCC coho salmon prior to implementing fish passage past Iron Gate dam, and will further augment the anticipated future benefits of providing fish passage. The PacifiCorp HCP has at its foundation seven biological goals to aid the viability of SONCC coho salmon in the 10-year interim period. They are:

- Goal I: Offset biological effects of blocked habitat upstream of Iron Gate dam by enhancing the viability of the Upper Klamath coho salmon population.[4]
- Goal II: Enhance coho salmon spawning habitat downstream of Iron Gate dam.
- Goal III: Improve instream flow conditions for coho salmon downstream of Iron Gate dam.
- Goal IV: Improve water quality for coho salmon downstream of Iron Gate dam.
- Goal V: Reduce disease incidence and mortality in juvenile coho salmon downstream of Iron Gate dam.
- Goal VI: Enhance migratory and rearing habitat for coho salmon in the Klamath River mainstem corridor.
- Goal VII: Enhance and expand rearing habitat for coho salmon in key tributaries.

The HCP provides objectives and specific measures to implement these goals to improve habitat conditions during the interim period. These objectives and measures are more fully described in the HCP and are summarized in this EA into two categories: near-term operational improvements, and long-term planning and management investments.

[4] NMFS has divided the SONCC coho ESU into six separate diversity stratums. Within each stratum NMFS has identified functionally independent populations. The Upper Klamath River is considered by NMFS to be a functionally independent population within the Central Interior Stratum.

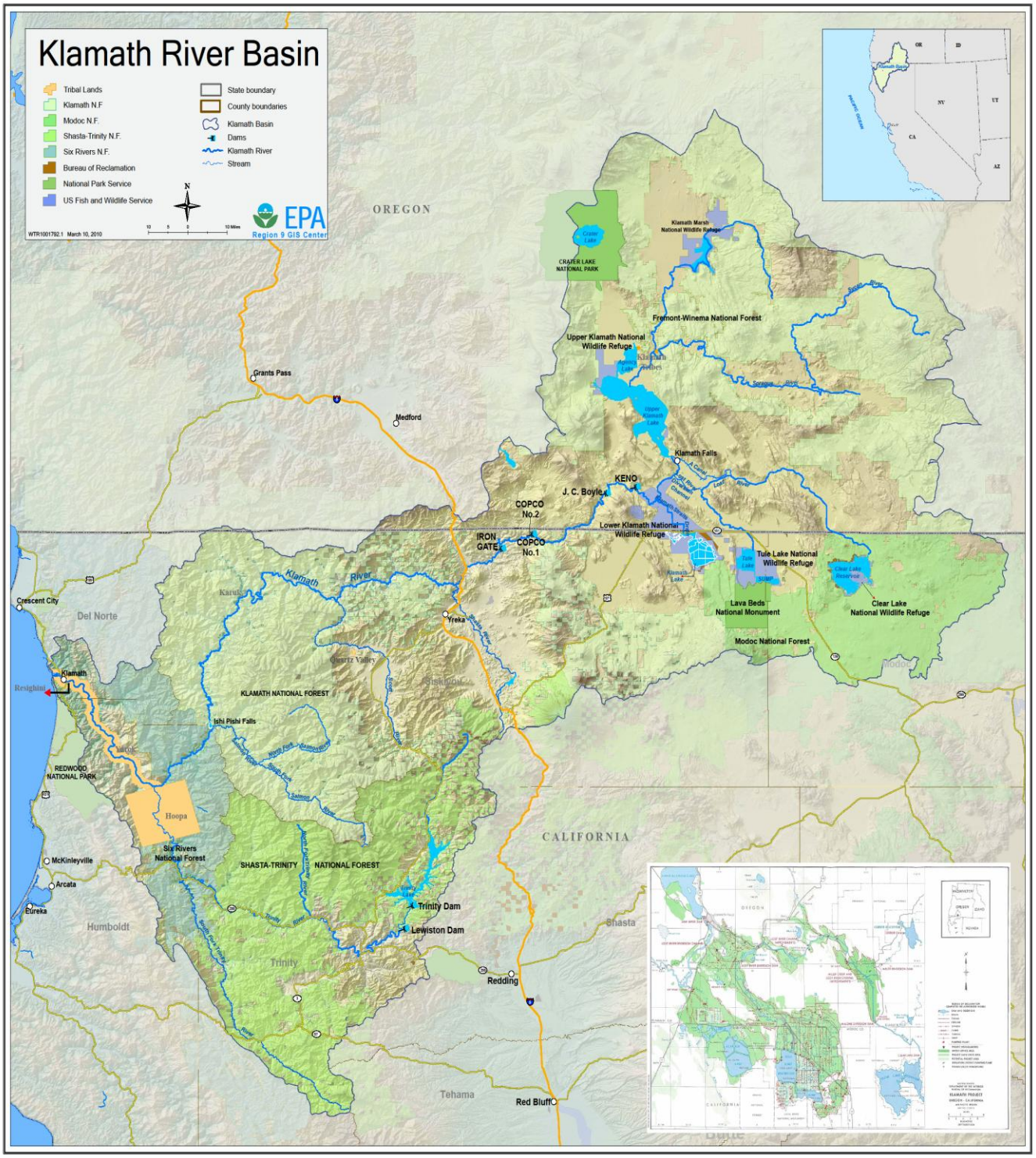

Figure 1. Map of Klamath River basin showing locations of rivers and lakes, Project facilities and federal and tribal lands within the basin (Source: USEPA Region 9)

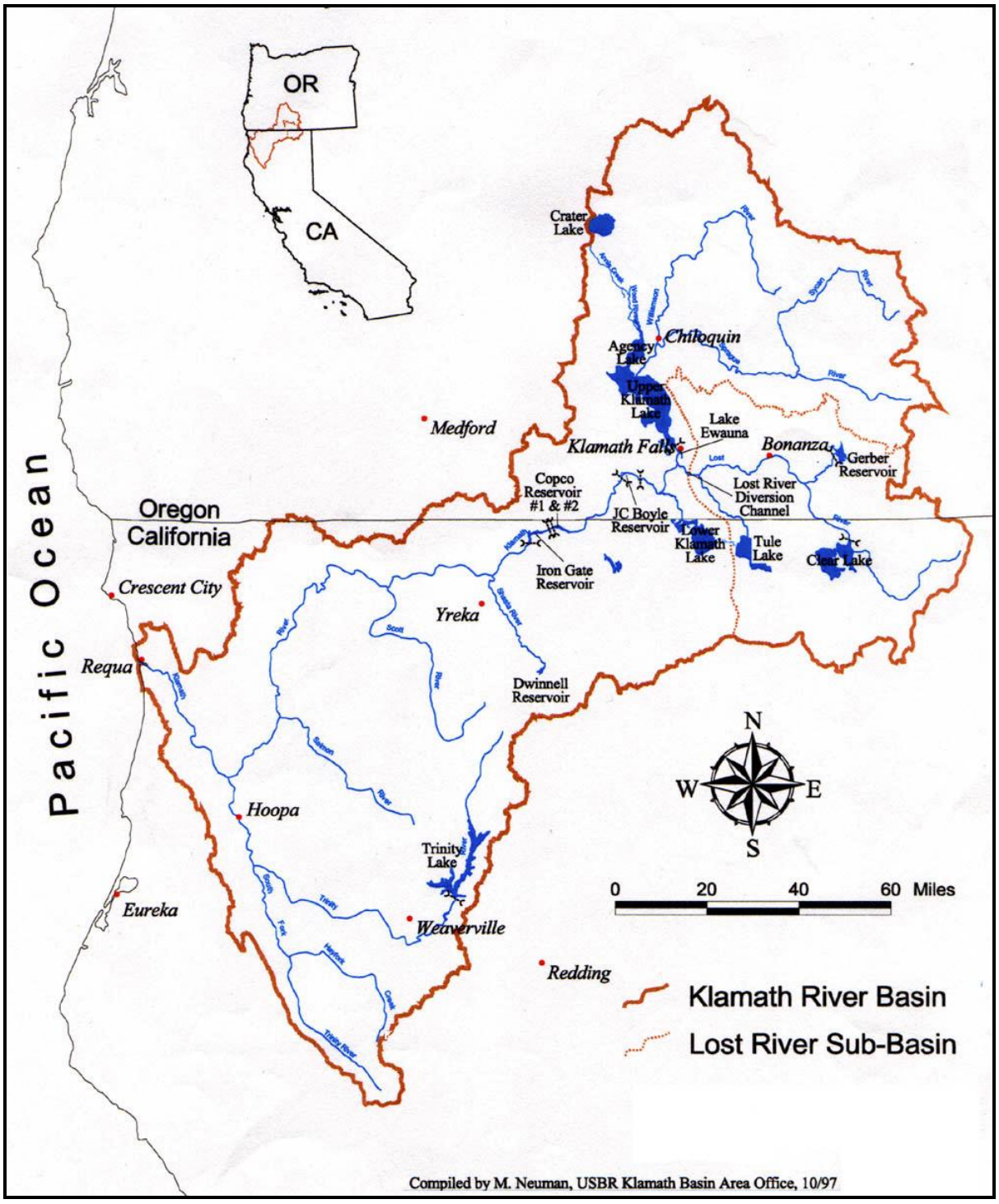

Figure 2. Map showing PacifiCorp's Project Facilities in the Klamath River Basin (Source: GEC, 2006)

2.4.4.1 Near-Term Operational Improvements

Turbine Venting System

PacifiCorp will "vent" its turbine at Iron Gate dam using an existing valve that allows air to enter the turbine. The valve will be kept in a fully open setting during periods when dissolved oxygen (DO) levels fall below 87 percent saturation in the Klamath River immediately below Iron Gate powerhouse.[5]

To support this action, PacifiCorp will monitor DO concentration and percent saturation using equipment deployed downstream of Iron Gate dam near the Iron Gate Hatchery bridge (at RM 189.8). PacifiCorp will evaluate the turbine venting system at Iron Gate dam by conducting field tests to verify air flow and DO increases, and will quantify the potential effects of increased air flow on turbine efficiency. Upon completion of further ~~its~~ evaluations in 2011, and within the first year of implementation of the HCP, PacifiCorp will submit a final turbine venting plan to NMFS for review and approval, and will develop standard operating procedures and a monitoring strategy in consultation with NMFS.

The final turbine venting plan could include installation of a permanent turbine venting system including a blower to increase air entrainment into the turbine draft tube. This measure is described in greater detail in HCP Chapter VI.

Instream Flow, Flow Variability, and Flow Ramp Rate Measures

Over the permit term PacifiCorp will implement measures to provide instream flows, flow variability, and flow ramp rates in the Klamath River downstream of Iron Gate dam to improve coho salmon survival during the permit term. Reclamation must implement these measures as described in the NMFS (2010) BiOp, or any future BiOps, on Reclamation's Klamath Project Operations. The KHSA (Appendix C, Interim Measure 5) states, "In the event that fall and early winter flow variability can feasibly be accomplished, PacifiCorp, in coordination with NMFS, USFWS, and Reclamation will, upon a final Incidental Take Permit issued to PacifiCorp by NMFS becoming effective, annually develop fall and early winter flow variability plans and implement those plans." This coordination will be accomplished via the Variable Flow Technical Team described in the HCP. Additionally, PacifiCorp will work to implement instream flow measures, flow variability, and flow ramp rates downstream of Iron Gate dam that may result from future consultations between NMFS and Reclamation during the permit term. Although PacifiCorp has been coordinating with Reclamation in order for Reclamation to implement these measures, PacifiCorp's implementation of these measures through issuance of an ITP and implementation of the proposed HCP will help ensure coordination and implementation of these measures. For instream flows, PacifiCorp will coordinate with Reclamation to ensure releases from Iron Gate dam that are consistent with instream flow requirements stipulated in the NMFS (2010) BiOp on Reclamation's Klamath Project Operations, or are consistent with any future consultation flow requirements during the permit term. These consist of instream flow releases described for Reclamation's Proposed Action, and modified by the Reasonable and Prudent Alternative (RPA) for flows stipulated in the NMFS (2010) BiOp, or future consultation requirements. The modified RPA flows include recommended adjustments to

[5] The saturation level of 87 percent is intended to provide a margin of safety helping to ensure that DO levels do not fall below 85 percent, which is consistent with ~~the proposed~~ the existing standard for DO from April 1-September 30 established by the California North Coast Regional Water Quality Control Board. ~~2008).~~

flows under Reclamation's Proposed Action for some monthly exceedance categories (per Table 18 in the NMFS [2010] BiOp). PacifiCorp will also coordinate with Reclamation to ensure implementation of any further adjustments to instream flow releases from Iron Gate dam that may arise from related flow monitoring activities as stipulated in the Terms and Conditions of the NMFS (2010) BiOp, or future consultation requirements.

PacifiCorp will coordinate with Reclamation to ensure implementation of the *Fall and Winter Flow Variability Program* (Flow Variability Program) as described in the NMFS (2010) BiOp, or future consultation requirements. As described in Section RPA A(1) of the NMFS (2010) BiOp, the Flow Variability Program will provide up to 18,600 acre-feet of water in the fall and winter period to simulate short-term flow increases from significant precipitation runoff events that would naturally occur at the point of Iron Gate dam release. Future consultations between Reclamation and NMFS that occur during the permit term may result in modifications to 2010 BiOp conditions. Specific procedures for implementing the Flow Variability Program are still under development. NMFS has developed a recommended Flow Variability Protocol to assist in the implementation of this Flow Variability Program. A Variable Flow Technical Team, including NMFS, Reclamation, PacifiCorp, USFWS, states, and tribes, has been convened to further refine and develop protocols and procedures for implementing the Flow Variability Program as discussed in a letter from Reclamation to NMFS dated January 3, 2011 (Reclamation, 2011).

The flow plan would be developed in a manner consistent with PacifiCorp's existing license requirements (e.g., ramping restrictions, minimum flow requirements, if any), and would contain exceptions for forced and planned outages (such exceptions include unforeseeable equipment malfunctions or failures and foreseeable events, such as powerhouse maintenance, dam and spillway repairs, and other planned maintenance activities). PacifiCorp intends to implement this measure within the operational capabilities of the existing Project without the need for construction of new equipment or the addition of new personnel.

PacifiCorp will undertake maintenance actions at Iron Gate powerhouse to maintain flow ramp rates as specified in the NMFS (2010) BiOp, or in future BiOps resulting from consultation between NMFS and Reclamation during the permit term. These ramp rates are designed to avoid or reduce potential stranding of fish that might otherwise occur due to flow changes from Project operations (as specified in NMFS 2010, or future BiOps). The ramp rates specify that, if flows are greater than 1,750 cfs, but less than 3,000 cfs, the rate at which flows can be decreased will be no more than 300 cfs in 24 hours and no more than 125 cfs in any 4-hour period. If flows are less than or equal to 1,750 cfs, the rate at which flows can be decreased will be no more than 150 cfs in 24 hours and no more than 50 cfs in any 2-hour period.

The 2010 BiOp (NMFS 2010) does not contain specific daily or hourly ramp rates when the flow release at Iron Gate dam is greater than 3,000 cfs. The 2010 BiOp (NMFS 2010) assumes Reclamation's proposed approach that the ramp-down of flows greater than 3,000 cfs should mimic natural hydrologic conditions of the basin upstream of Iron Gate dam. PacifiCorp will coordinate with Reclamation to ensure that the ramp-down of flows greater than 3,000 cfs is done to be consistent with natural hydrologic conditions, and is practicable based upon the physical limitations of the Iron Gate facilities as well as other safety considerations. Future consultations between NMFS and Reclamation during the

permit term may modify ramp-down flows. If this occurs, PacifiCorp will continue to coordinate with Reclamation to meet requirements of any future consultations.

Large Woody Debris (LWD)
Over the term of ITP, PacifiCorp will increase the abundance of large woody debris (LWD) in the Klamath River downstream of Iron Gate dam to contribute to the river's habitat elements and habitat forming features. On a quarterly basis PacifiCorp will retrieve LWD trapped at or near Iron Gate, Copco 1, and Copco 2 dams, and release retrieved LWD pieces to the river channel below Iron Gate dam or reserve the wood for use in habitat structures to be placed downstream of Iron Gate dam (e.g. complex wood jams). This measure will offset the impacts of the Project on LWD recruitment to the river and enhance the habitat forming functioning of LWD in the river.

2.4.4.2 Long-Term Planning and Management Investments

Fish Disease Research
PacifiCorp established a Klamath River Fish Disease Research Fund for research in the Klamath River below Iron Gate dam. PacifiCorp will proactively solicit and fund fish disease research projects to enhance understanding and fill knowledge gaps related to factors and conditions causing disease in coho salmon in the Klamath River. In a letter agreement dated May 21, 2009 (see Appendix B of the HCP), PacifiCorp and NMFS set forth the terms concerning the use and administration of the Klamath River Fish Disease Research Fund. PacifiCorp will work with the Klamath River Fish Health Workgroup to identify research projects that address key scientific questions concerning fish disease and disease impacts on coho salmon in the Klamath River basin. These projects will be funded and implemented within the 10-year Permit Term and the results used to inform management and further research decisions.

Coho Enhancement Fund
PacifiCorp established a Coho Enhancement Fund in coordination with NMFS and CDFG. During the Permit Term, PacifiCorp will make an annual payment in the amount of $510,000 into the Coho Enhancement Fund by January 31 of each year[6]. If the term of the ITP continues beyond the 10-year permit term, the annual payments of $510,000 would continue for each additional year.

Implementation of the Coho Enhancement Fund will include coho salmon enhancement projects jointly recommended by CDFG and NMFS. The projects selected would comply with applicable agency policies, regulations, and planning documents relating to salmonid conservation in the Klamath River basin, including the ~~pending~~ Draft SONCC Coho Recovery Plan (NMFS 2012) ~~for coho salmon~~. The applicant would evaluate and approve the selected projects to ensure consistency with applicable license conditions and other regulatory requirements.

The Coho Enhancement Fund will be used to facilitate projects designed to have immediate benefits to coho salmon, by achieving the Goals listed above and the objectives and measures described in detail in HCP Chapter VI (PacifiCorp 2012). These measures will include projects to:

[6] PacifiCorp created the Coho Enhancement Fund and made its first contribution earlier in 2009. See HCP Appendix A.

- Improve access and remove barriers to otherwise suitable salmonid habitats (e.g., culvert replacements, fish ladders).
- Improve and protect thermal refugia in the mainstem Klamath River and at the mouths of tributaries downstream from Iron Gate dam.
- Improve the quality of coho salmon rearing habitat in the mainstem Klamath River corridor and in tributaries downstream from Iron Gate dam (e.g., habitat enhancements, water rights acquisitions, diversion screening improvements)
- Augment gravel to enhance spawning habitat downstream of Iron Gate dam.

Other fishery and habitat protection projects that provide immediate benefits and that will achieve the Goals and Objectives identified in the HCP (PacifiCorp 201<u>2</u>) will also be considered. The focus area includes cold water tributaries of the Klamath River with adult coho access and juvenile rearing habitat downstream from Iron Gate dam to the Pacific Ocean.

<u>Hatchery Management</u>
PacifiCorp will provide funding for the implementation of a Hatchery <u>and</u> Genetic Management Plan (HGMP) developed by the California Department of Fish and Game (CDFG), which is the hatchery manager, and PacifiCorp for Iron Gate Hatchery as may be authorized by NMFS in an ESA Section 10(a)(1)(A) enhancement permit. The primary goal of an HGMP is to devise biologically-based hatchery management strategies that contribute to the enhancement of salmon and steelhead. Implementation of the HGMP is important to ensure that ongoing Iron Gate Hatchery operations contribute to the enhancement of listed coho salmon in the Klamath River basin.

The HGMP has been incorporated into an application by CDFG for a permit under ESA Section 10(a)(1)(A), which was submitted to NMFS (CDFG, 2011b). Section 10(a)(1)(A) permits allow for authorization under the ESA for scientific research actions or actions to enhance the propagation or survival of an ESA-listed species that will likely result in the take of the species. Hatchery operations, genetic research, and monitoring of coho salmon are among the activities at Iron Gate Hatchery for which a Section 10(a)(1)(A) permit is being sought. <u>The application for issuance of a permit under ESA Section 10(a)(1)(A) and the associated HGMP will undergo a separate permitting process with a review under the National Environmental Policy Act. Therefore, this EA reviews PacifiCorp's funding of the HGMP and its implementation as part of the HCP conservation strategy in a general sense, but the review under the separate permitting process will specifically review actions to be undertaken under the proposed ESA Section 10(a)(1)(A) permit.</u> Upon issuance of ~~a~~ <u>the proposed</u> permit under ESA Section 10(a)(1)(A) for the Iron Gate Hatchery, CDFG and PacifiCorp will implement all measures contained in the HGMP as provided in the permit.

During the term of the <u>proposed</u> ESA Section 10(a)(1)(A) permit, the coho program at the Iron Gate Hatchery will be operated in support of the basin's coho salmon recovery efforts by conserving a full range of the existing genetic, phenotypic, behavioral, and ecological diversity of the run. The <u>proposed</u> program will include conservation measures, genetic analyses, broodstock management, and rearing and release techniques that maximize fitness and reduce straying of hatchery fish to natural spawning areas. Monitoring and evaluation

activities will also be conducted to ensure that the performance standards and indicators identified for the program are achieved, and that critical uncertainties are addressed.

SECTION 3

Affected Environment

Information for the Affected Environment Section has been generated from several source documents that contain descriptions of the resources potentially affected by the actions considered in this EA. In an effort to incorporate efficiencies and utilize relevant information from other documents, NMFS has adopted pertinent language from parts of these source documents and incorporated by reference pertinent information in this chapter. Readers of this EA are encouraged to review these source documents for more detailed information than that which is summarized in this EA. These source documents are:

- *FERC Final Environmental Impact Statement for Relicensing of the Klamath Hydroelectric Project No. 2082-027 (Issued: November 16, 2007),*
- *PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon, dated March 15, 2011* (PacifiCorp 2011a),
- *Final PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon, dated February 16, 2012* (PacifiCorp 2012)
- *Draft Fruit Growers Supply Company Multi-Species Habitat Conservation Plan, dated September 2009,*
- *The North Coast Regional Water Quality Control Board (NCRWQB) Final Staff Report for the Klamath River Total Maximum Daily Loads (TMDLs) Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in California, the Proposed Site Specific Dissolved Oxygen Objectives for the Klamath River in California, and the Klamath River and Lost River Implementation Plans, dated March 2010,*
- *The North Coast Regional Water Quality Control Board Action Plan for the Klamath River Total Maximum Daily Loads Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in the Klamath River in California and Lost River Implementation Plan, dated March 2010*
- *Yurok Tribe 2009 Report: Klamath River Estuary Wetlands Restoration Prioritization Plan*

3.1 Geologic Resources and Geomorphology of Permit Area

As habitat conditions in the Klamath River have evolved over time with the geology and geomorphic processes of the region, it is important to understand how land-forming processes affect areas of the basin differently, leading to variations in physical and biological dynamics of the Klamath mainstem and its tributaries. These variations can influence habitat suitability and the spatial distribution of species such as coho salmon.

The Klamath River runs a course approximately 260 miles in length from Upper Klamath Lake in Oregon to the mouth of the river at the Pacific Ocean near Requa, California (see Figure 1). In Oregon, the headwaters of the Klamath River lie within the Basin and Range geologic province. Moving into California, the Klamath River basin lies in the transition zone between the Modoc Plateau and Cascade Range physiographic provinces, with the Klamath River cutting west through the Klamath Mountain province and then the Coast Range province. Figure 3 shows the geomorphic provinces of California that lie within the Klamath River basin.

The transition from the Modoc Plateau to the Cascade Range province is subtle; the Klamath River enters the Cascade Range province roughly in the area below Keno dam. The portion of the Cascade Range province included in the Klamath River watershed is largely in the rain shadow of Mt. Shasta and the Klamath Mountains. With its porous volcanic geology and relatively moderate topography, runoff is slow, and there are relatively few streams compared to downstream provinces.

The Klamath River passes through four distinct geologic provinces, each of which changes the character of the river's channel morphology and that of its tributary watersheds, varying the supply of inputs such as water, sediment, nutrients, and wood. The Klamath River as it passes through ~~in~~ the PacifiCorp facilities is a predominantly non-alluvial, sediment supply-limited river flowing through mountainous terrain. For most of its length to the Pacific Ocean, it maintains a relatively steep, high-energy, coarse-grained channel frequently confined by bedrock (Ayres Associates, 1999). Much of the river in the permit area is geologically controlled, interspersed with relatively short alluvial reaches. Floodplain development is minimal, and wider valleys allowing more alluvial channel migration processes are rare, increasing somewhat downstream of Interstate 5. A variable local climate and geology are reflected in the geomorphic and vegetative characteristics of the river valley, and generally, the channel changes character as it passes from one geologic province to the next.

The Upper Klamath basin, within the Modoc Plateau province, is bounded on its west side by the eastern edge of the Cascades Range; with tributaries of Wood River draining the flanks of the Crater Lake area (see Figure 1). To the east, the northwesterly trending fault-block mountains with intervening valleys are commonly interspersed with lakebed deposits, shield volcanoes, cinder cones, or lava flows. Shallow lakes (Upper Klamath, Lower Klamath, and Tule Lakes) and marshes (Klamath Marsh) are prominent features of the Modoc Plateau, as are areas drained by Anglo-American immigrants. Upper Klamath Lake is a shallow, regulated natural lake, which serves as a storage reservoir for extensive, irrigated lands (approximately 250,000 acres) in the basin. Sediment yield also is low relative to provinces downstream.

The Shasta River is the major tributary to the Klamath River within the Cascade Range province (see Fig. 1). The headwaters of the Shasta River originate on the flanks of Mt. Shasta and the majority of its watershed is comprised of the expansive Shasta Valley (Crandell, 1989). The western side of the Shasta River and Cottonwood Creek watersheds marks the western boundary of this province. Mass wasting and fluvial erosion are the main erosional processes within this province (USFS, 2005).

Land-forming processes affect the generation of sediment to streams that support aquatic resources such as salmon and Pacific lamprey. Too much sediment in a watershed can

adversely impact spawning and rearing areas (sediment enriched), and too little sediment input can result in simplified habitats that are unsuitable for the formation of spawning gravels (sediment starved). The Klamath watershed in its entirety has a wide variety in geomorphic processes that result in the production of sediment, critical to the perpetuation of basin salmonids.

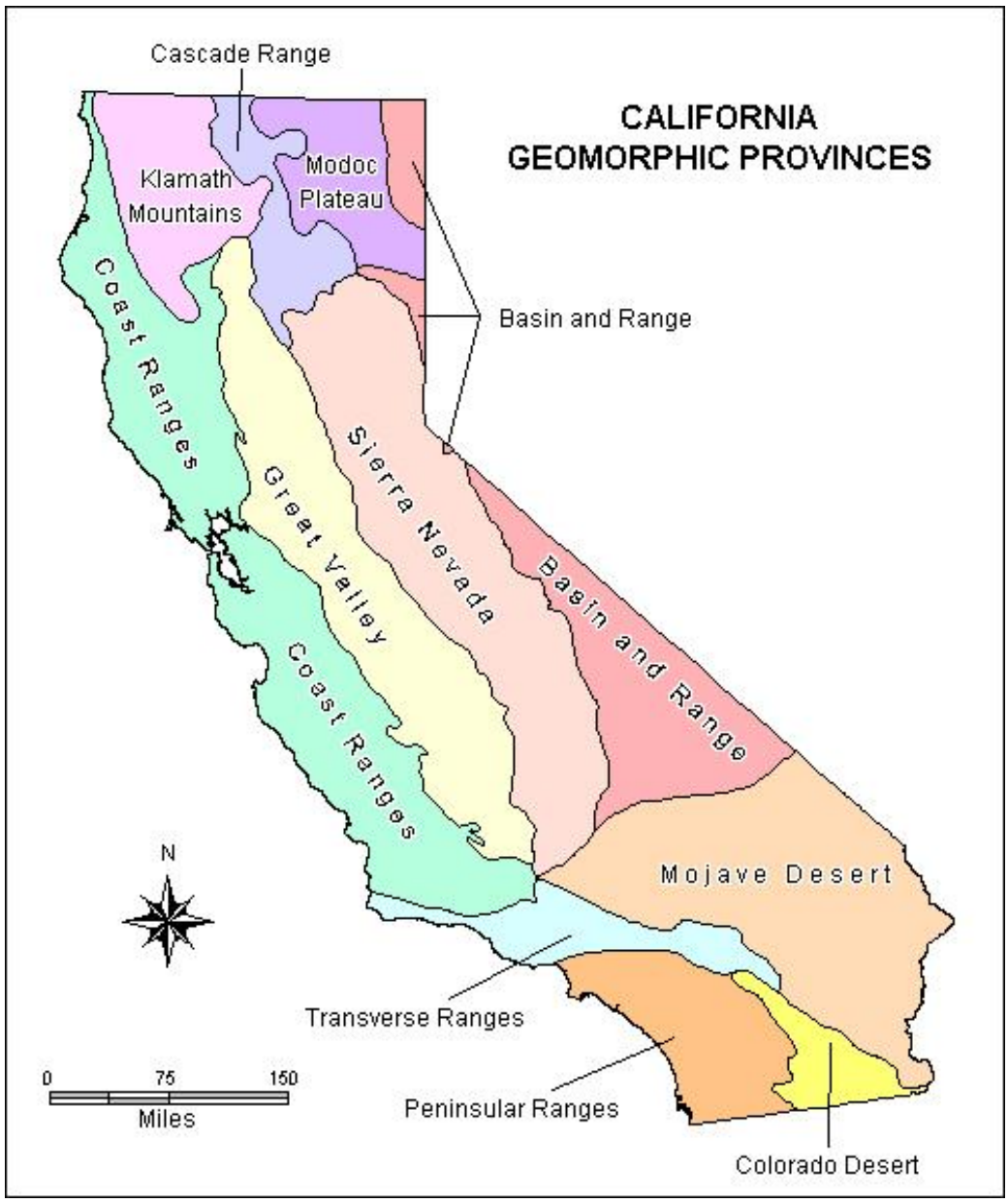

Figure 3. Geomorphic Provinces of California (derived from California Geologic Survey, Note 36)

The Klamath Mountains province includes a complex of mountain ranges in southwest Oregon and northwest California, collectively called the Klamath Mountains; they include the Trinity Alps, Salmon Mountains, Marble Mountains, and Siskiyou Mountains. Large tributary watersheds to the Klamath River in this province include the Scott, Salmon, and Trinity Rivers. Compared to all other areas of the Klamath River watershed, this province includes some of the steepest topography and tallest mountains; summits in the Trinity Alps exceed 9,000 feet in elevation. Gold-bearing deposits occur within this province, and the legacy effects of gold mining and dredging on aquatic environments including fish-bearing streams persist in some areas. Precipitation generally increases in proximity to the coast, so here soils are generally deeper than in upstream provinces. Deep soils, steep slopes, and high precipitation make mass wasting and fluvial erosion the main geomorphic processes in this province, particularly in the middle to lower portions of the mid-Klamath River (i.e., the Salmon River watershed) (USFS, 2005; de La Fuente and Haessig, 1993). Because of this, sediment yields are relatively high compared to upstream areas of the Klamath River watershed.

The lowermost 40 miles of the Klamath River (from the town of Weitchpec to the Pacific Ocean) traverse the Coast Range province. The Coast Range province comprises three linear belts of rock separated by faults (most notably the San Andreas and also including thrust faults that are presently increasing the height of the range). The Klamath River watershed portion of the Coast Range province comprises Franciscan Complex rocks. Because of Coast Range faulting, the relatively young Franciscan rocks are still uplifting, encouraging steep hillslopes and relatively high erosion rates resulting in high sediment yields.

3.1.1 Slope Stability/Landslides

Mass failures and other gravity-driven erosion processes require relatively steep slopes. Such conditions within the project area exist only within the Klamath River Canyon area from J.C. Boyle dam to just downstream of Iron Gate dam. Landsliding outside the project area is prevalent in the Franciscan geology of the lower Klamath River watershed and in certain Klamath Mountain province watersheds, such as the Salmon River (de la Fuente and Haessig, 1993). As previously mentioned, Project facilities (dams) block the transport of much of the landslide driven sediment resulting in sediment "starvation" downstream of Iron Gate dam for some distance.

For more detail on geology, geomorphology, and sediment in the basin please refer to the FERC FEIS Chapter 3.3 which has extensive detail on these subject matters.

3.2 Water Resources

Precipitation patterns in the basin, in addition to seasonality of water withdrawals for purposes such as irrigated agriculture and commercial and residential development, determine river flow in the basin.

3.2.1 Climate and Water Flow

How water flows in the basin affects various aspects of important life history stages of aquatic species such as anadromous salmon. For example, natural flows in the late summer

and early fall trigger adult run timing and migratory routes for certain salmonids, and natural flows in the spring trigger juvenile outmigration to the sea. Alterations in natural flow regimes can negatively affect these critical life history traits, as well as influence water temperatures in the basin which are important in the growth and survival of basin salmonids. The Klamath River watershed experiences natural and man-made variation in how water enters and moves through the basin which has an effect on salmonids as well as other aquatic species. In addition to the projects which captured and stored water in the upper basin, the construction of Iron Gate dam, the lowermost dam in the PacifiCorp Project facilities, not only further restricted flow in the upper basin, but also culminated in the total blockage of more than 300 miles of historic fish habitat in the upper basin.

The high elevation, semi-arid desert environment of the Modoc Plateau in the upper part of the basin receives an average of about 15 inches of precipitation annually. Precipitation occurs mostly during the late fall, winter, and spring and is mostly in the form of snow above elevations of 5,000 feet. Average yearly precipitation varies greatly with elevation and location and ranges from about 10 to more than 50 inches. Annual precipitation in Klamath Falls at the upper end of the Klamath River is 13.3 inches, 18.2 inches at Copco No. 1 Reservoir, and over 100 inches in some parts of the Lower Klamath watershed. Precipitation occurs primarily as rain, mostly during the fall and winter, with occasional afternoon thunderstorms occurring in the summer. Snow often occurs during winter, particularly in the higher elevations (i.e., above the canyon rim and east to Klamath Falls)

Streamflows normally peak during the late spring and/or early summer from snowmelt runoff. Low flows within this watershed typically occur during the late summer or early fall, after the snowmelt and before the runoff from the fall storms moving inward from the Pacific Ocean. Figure 4 depicts the average annual precipitation, in inches, for the Klamath River basin in California. The map shows the wide variation in annual rainfall amounts from the upper basin to the lower basin. Precipitation amounts in the upper basin in Oregon are similar to amounts depicted in the northeastern portion of the California.

The dams on the Klamath directly affect how long it takes for water to travel from Upper Klamath Lake to the estuary (except for Copco No. 2 dam, which has a small reservoir and does not appreciably affect water travel time). The dams increase the time it takes water to travel through the upper 65 miles of the river between Link River and Iron Gate. The transit time of waters released from Upper Klamath Lake to the estuary (as well as water released from ~~the Klamath Irrigation Project~~ Reclamation's Klamath Project to the river between Upper Klamath Lake and Keno dam) is about 1 to 2 months or more, except during high winter flow conditions when the transit time may be reduced to as little as 2 weeks. If no dams were in place, transit time from Upper Klamath Lake (Link River dam) to the estuary would be about a week during summer periods and less during winter high flow events.

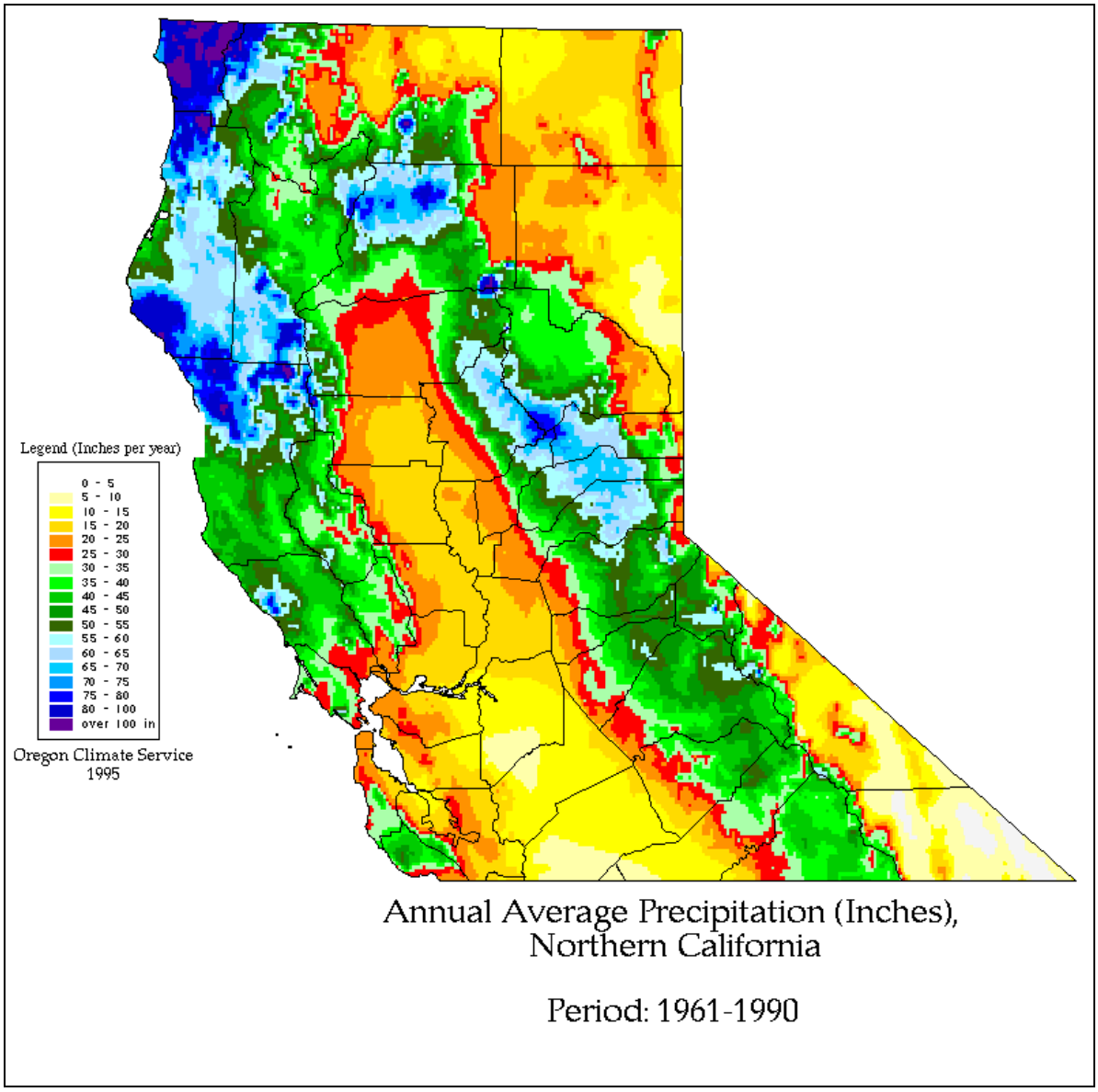

Figure 4. Average annual precipitation within the California side of the Klamath basin (Source: Oregon Climate Service)

Upper Klamath Lake is the dominant feature of the upper part of the Klamath River basin. Upper Klamath Lake receives most of its water from the Williamson and Wood Rivers (NRC 2004). The Williamson River watershed consists of two subbasins drained by the Williamson and Sprague Rivers, which together provide about 75 percent of the drainage area to Upper Klamath Lake. The Sycan River, a major tributary to the Sprague, drains much of the northeastern portion of the watershed. The Wood River drains an area northeast of Upper Klamath Lake extending from the southern base of the eastern slopes of the Cascade Mountains near Crater Lake to its confluence with the northern arm of Upper Klamath Lake, which is often referred to as Agency Lake. The balance of the water reaching Upper Klamath Lake is derived from direct precipitation and groundwater that flows from springs, small streams, irrigation canals, and agricultural returns. In addition, a relatively large set of springs discharges about 220 to 250 cfs into the Klamath River beginning about 0.5 miles downstream from J.C. Boyle dam.

Alterations to the basin's natural hydrologic character began in the late 1800s, accelerating in the early 1900s, including construction and operation of Reclamation's Klamath ~~Irrigation~~ Project. ~~The Klamath Irrigation Project~~ Reclamation's Klamath Project includes facilities to divert, store, and distribute water for irrigation, National Wildlife Refuges, and control of floods in the basin. ~~The Klamath Irrigation Project~~ Reclamation's Klamath Project diversion of stored water occurs year-round, but primarily occurs from early April through mid-October in support of irrigated crop lands. Water is diverted from Upper Klamath Lake at Link River dam through "A" Canal, and also is diverted from the Klamath River through the North Canal, Ady Canal, and the Lost River Diversion Channel. A portion of the diverted water is returned to the Klamath River through Reclamation's Lost River Diversion Channel and the Klamath Straits Drain (see Figure 2).

Reclamation is responsible for providing a sufficient volume of water to PacifiCorp facilities to enable PacifiCorp to make water releases from Iron Gate Dam that will meet biological opinion requirements for Reclamation's operations. ~~management of flow volumes in the upper Klamath River, including flows that both enter (from Upper Klamath Lake at Link River dam at RM 254) and exit (from Iron Gate dam at RM 190.5) the area occupied by PacifiCorp's Project developments~~. Reclamation also manages Upper Klamath Lake elevations to meet ESA requirements and contractual irrigation demands of ~~the Klamath Irrigation Project~~ Reclamation's Klamath Project. Upper Klamath Lake has a total storage capacity of 873,000 acre feet and an active storage capacity of 465,000 acre feet. PacifiCorp's reservoirs on the mainstem of the Klamath River provide about 17 percent of the total water storage of the Klamath River, and about 3 percent of active storage. PacifiCorp's operation of their Project facilities therefore, has a relatively minor role in how water is stored and controlled in the basin as Reclamation plays the dominant role in basin water storage and delivery to upper basin users.

Downstream of Link River dam, surface water volumes are largely controlled by Reclamation operations. Flows below Link River dam into the Link River are passed through the spill gates and/or PacifiCorp's East Side and West Side facilities depending on a variety of factors including: a) flow requirements under NMFS' BiOp for Reclamation's operation of its Klamath Project (NMFS, 2010, or future consultations), b) lake elevation of Upper Klamath Lake, c) seasonal shut down of PacifiCorp's facilities for maintenance, and d) inflow into Upper Klamath Lake. At no time are flows immediately below Link River dam

less than 90 cfs. Keno reservoir is relatively shallow (average depth of 7.5 feet) and long (22.5 miles), and receives most of its water from Upper Klamath Lake via Link River. A~~n~~ contractual agreement between PacifiCorp and Reclamation pertaining to operations of Keno Dam requires PacifiCorp to maintain ~~specifies that the maximum~~ water surface elevations between elevations 4085 and 4086.5. ~~of Keno reservoir remains relatively constant most of the year.~~ The minimum flow requirement below Keno dam is 200 cfs per a cooperative agreement with Oregon Department of Fish and Wildlife (ODFW). J.C. Boyle reservoir is a relatively small mainstem reservoir; under typical peaking operations, the reservoir fluctuates about 3.5 feet, while average daily fluctuations are approximately 1 to 2 feet.

The flows that are released to the Klamath River from J.C. Boyle powerhouse during peaking operations are ramped up to either one turbine operation (up to 1,500 cfs) or two turbines operation (up to 2,500 cfs). When generation is not occurring at the J.C. Boyle powerhouse (and J.C. Boyle dam is not spilling), typical non-generation base flows in the J.C. Boyle peaking reach (i.e., the reach of the Klamath River between J.C. Boyle powerhouse and Copco reservoir) are about 320 to 350 cfs, consisting of the 100 cfs minimum flow release from J.C. Boyle dam and the accretion of 220 to 250 cfs of spring flow in the upstream J.C. Boyle bypass reach.

Water levels in Copco No. 1 reservoir are normally maintained within 6.5 feet of full pool (elevation 2,607.5 feet) and daily fluctuations in reservoir water levels of about 0.5 foot are due to peaking operation of the Copco No. 1 powerhouse and variance in the inflow from the J.C. Boyle peaking reach (PacifiCorp 2004; FERC 2006). Copco No. 2 reservoir has virtually no storage, and the water level within Copco No. 2 reservoir rarely fluctuates more than several inches. There is no minimum flow requirement below Copco 2 dam but PacifiCorp maintains a release of 5 cfs in this short reach (approximately 1 mile) between Copco 2 dam and Iron Gate reservoir. Because Reclamation's flow release requirements are met at Iron Gate dam, accretions from tributaries and naturally-occurring springs upstream of Iron Gate are generally managed and included within Reclamation's minimum flow requirements at Iron Gate. Operation of PacifiCorp's Project facilities therefore does not generally affect flow volumes in the Klamath River, but can affect rates of change in flows on a short-term basis (i.e., hourly, daily) due to flow ramping during powerhouse start-up or shut-off and seasonal spillway use.

Reclamation's management of flows in the upper Klamath River is based on operational plans developed in consultations with USFWS and NMFS to protect the federally listed Lost River and shortnose suckers, and SONCC coho salmon, and their designated critical habitats. In March 2010, NMFS issued its final BiOp on Reclamation's operation of the Klamath Project for the period 2010-2018 (NMFS 2010). That BiOp contemplates PacifiCorp's interrelated operations of Link River dam and Iron Gate dam consistent with the 2010 Reclamation BiOp, and it covers PacifiCorp's coordination with Reclamation over implementation of certain Reclamation operations. The BiOp also identifies modified minimum flow releases from Iron Gate dam. PacifiCorp would continue to work with Reclamation and NMFS on any future modifications to flow management that results from consultation between the agencies during the permit term.

3.2.2 Release Flows

Upstream of Iron Gate dam, PacifiCorp in coordination with Reclamation, stores and releases river water to both generate electricity, deliver water to irrigation project users and municipalities, and provide water for the protection of aquatic resources. Details on how water is stored and released upstream of Iron Gate dam can be found in their HCP (PacifiCorp 2012), but will not be described here in detail.

3.2.2.1 Iron Gate Dam

~~Reclamation~~ PacifiCorp has managed and continues to manage flow releases to the Klamath River to ensure flows at Iron Gate dam meet or exceed specific flow releases prescribed in the applicable 1999, 2001, 2002, and now applicable 2010 BiOps from NMFS on Reclamation's Klamath Project operations. These releases are considered under the "Proposed Action" in the Reclamation BiOps in which the action area includes the historically accessible portion of the mainstem Klamath River to Iron Gate dam (RM 190). PacifiCorp provides these required Reclamation flow releases at Iron Gate dam in coordination with Reclamation. The current NMFS modified RPA minimum flow releases from Iron Gate dam (NMFS 2010) are presented in Table 1.

Table 1. NMFS Modified RPA Monthly Instream Flow Releases (cfs) from Iron Gate Dam by Percent Flow Exceedance

	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	August 1-15	August 16-31	Sept
95%	1,000	1,300	1,260	1,130	1,300	1,275	1,325	1,175	1,025	805	880	1,000	1,000
90%	1,000	1,300	1,300	1,245	1,300	1,410	1,500	1,220	1,080	840	895	1,000	1,000
85%	1,000	1,300	1,300	1,300	1,300	1,450	1,500	1,415	1,160	905	910	1,001	1,000
80%	1,000	1,300	1,300	1,300	1,300	1,683	1,500	1,603	1,320	945	935	1,005	1,006
75%	1,000	1,300	1,300	1,300	1,300	2,050	1,500	1,668	1,455	1,016	975	1,008	1,013
70%	1,000	1,300	1,300	1,300	1,300	2,350	1,500	1,803	1,498	1,029	1,005	1,014	1,024
65%	1,000	1,300	1,300	1,300	1,323	2,629	1,589	1,876	1,520	1,035	1,017	1,017	1,030
60%	1,000	1,300	1,300	1,309	1,880	2,890	2,590	2,029	1,569	1,050	1,024	1,024	1,041
55%	1,000	1,300	1,345	1,656	2,473	3,150	2,723	2,115	1,594	1,056	1,028	1,028	1,048
50%	1,000	1,300	1,410	1,751	2,577	3,177	3,030	2,642	1,639	1,070	1,035	1,035	1,060
45%	1,000	1,300	1,733	2,018	2,728	3,466	3,245	2,815	1,669	1,077	1,038	1,038	1,066
40%	1,000	1,300	1,837	2,242	3,105	3,685	3,485	2,960	1,682	1,082	1,041	1,041	1,071
35%	1,000	1,300	2,079	2,549	3,505	3,767	3,705	3,115	1,699	1,100	1,050	1,050	1,085
30%	1,000	1,434	2,471	2,578	3,632	3,940	3,930	3,225	1,743	1,118	1,053	1,053	1,089
25%	1,000	1,590	2,908	2,627	3,822	3,990	4,065	3,390	2,727	1,137	1,058	1,058	1,097
20%	1,000	1,831	2,997	2,908	3,960	4,160	4,230	3,480	2,850	1,152	1,066	1,066	1,135
15%	1,000	2,040	3,078	3,498	4,210	4,285	4,425	3,615	2,975	1,223	1,093	1,093	1,162
10%	1,000	2,415	3,280	3,835	4,285	4,355	4,585	3,710	3,055	1,370	1,126	1,126	1,246
5%	1,000	2,460	3,385	3,990	4,475	4,460	4,790	3,845	3,185	1,430	1,147	1,147	1,281

Future consultation between Reclamation and NMFS may result in modifications to the 2010 BiOp conditions. PacifiCorp, working with the Variable Flow Technical Team, will work to implement those conditions during the permit term. Spill releases from Iron Gate dam in excess of the minimum flow requirements contained in Reclamation's BiOp generally only occur as a result of precipitation events that occur when there is insufficient available capacity in Upper Klamath Lake and Project reservoirs to store those flows. Although this is generally the rule, brief spill events can occur when operational adjustments to reduce flows at Link River dam in response to transient tributary inflows below Keno dam are determined to be impractical due to the requirement that PacifiCorp must salvage fish from the Link River when flows from Link River dam drop significantly. In addition, the lack of information on tributary contributions below Keno dam can result in spill if Project reservoirs are near maximum storage capacity and tributary contributions increase significantly as a result of localized precipitation. Finally, rain-on-snow precipitation events that occur within Reclamation's ~~Klamath Irrigation Project~~ Klamath Project can result in significant irrigation return flows to Keno Reservoir. If there is insufficient Project reservoir storage then spill may occur at Iron Gate in response to this type of event. Because these spill events occur as a result of precipitation events or due to lack of information regarding tributary flow accretions, these spill events are non-discretionary in nature.

3.2.3 Ramping Rates

Under current operations, PacifiCorp follows ramping rates below Iron Gate dam as specified in Reclamation's Operations Plan for ~~the Klamath Irrigation Project~~ Reclamation's Klamath Project (Reclamation 2010) in accordance with the 2010 NMFS BiOp (NMFS 2010). Ramp-down rates below 3,000 cfs are artificially set to minimize risks of stranding juvenile coho salmon (NMFS 2010). These ramping rates specify that when flows exceed 1,750 cfs, decreases in flow are limited to 300 cfs or less per 24-hour period, and no more than 125 cfs per 4-hour period (as measured at USGS gauging station 11516530 located approximately 0.6 mile downstream of Iron Gate dam). When flows are 1,750 cfs, or less, decreases in flow are limited to 150 cfs or less per 24-hour period, and no more than 50 cfs per 2-hour period.

The 2010 BiOp (NMFS 2010) does not contain specific daily or hourly ramp rates when the flow release at Iron Gate dam is greater than 3,000 cfs. The 2010 BiOp (NMFS 2010) assumes Reclamation's proposed approach that the ramp-down of flows greater than 3,000 cfs should mimic natural hydrologic conditions of the basin upstream of Iron Gate dam. PacifiCorp is currently coordinating with Reclamation to ensure that the ramp-down of flows greater than 3,000 cfs is done to be consistent with natural hydrologic conditions, and that is practicable based upon the physical limitations of the Iron Gate facilities as well as other safety considerations.

These ramp rates supersede the ramp rates managed by PacifiCorp in prior years as specified in PacifiCorp's FERC license. The ramping rates now being followed below Iron Gate dam are more restrictive than the current FERC license ramp rate of 250 cfs per hour. However, coordination between Reclamation and PacifiCorp is necessary to make sure enough water is available from upstream for release over the long ramp-down periods. PacifiCorp currently continues to implement these ramp rates to the maximum extent practicable based upon the

physical limitations of the Iron Gate facilities, as well as other safety considerations. In instances in which upstream flow releases, natural conditions, operational issues, or other factors have resulted in deviation from these ramp rates, PacifiCorp has coordinated with NMFS to insure such events will not adversely affect listed species. Future consultations between NMFS and Reclamation during the permit term may modify ramping flows. If this occurs, PacifiCorp will continue to coordinate with Reclamation to meet requirements of any future consultations

Above Iron Gate dam, the J.C. Boyle facility has a maximum ramp rate requirement of 9 inches per hour. For more detailed information on how river flow is managed in the basin please refer to Chapter 3.3 of the FERC EIS and Chapter 4 of the PacifiCorp's HCP.

3.2.4 Water Quality

Water quality conditions in the Klamath River basin vary dramatically along the approximately 250 river miles from Upper Klamath Lake to the estuary at the Pacific Ocean. A wide range of natural and anthropogenic influences affect water quality throughout the system. Inflows to the system at Link River dam originate from hypereutrophic Upper Klamath Lake. Diversions and return flows for agriculture, as well as municipal and industrial use, occur in the reach between Link River dam and Keno dam. The river receives considerable inflow from major and minor tributaries between Iron Gate dam and the estuary. Due to an increasing stream gradient and inputs from tributaries with water that is both cooler and generally lower in nutrient concentrations, the Klamath River is generally less eutrophic as the river approaches the Pacific Ocean. However, despite this unique attribute, current source loads have overwhelmed the historic renewal capabilities of the Klamath River, leading to its impaired status. Both point and nonpoint sources of pollution contribute to the water quality impairments in the Klamath River. Land use pollutant source categories impacting Klamath River water quality are identified as wetland conversion, grazing, irrigated agriculture, timber harvest, and roads.

The Klamath River has a relatively low alkalinity (less than 100 mg/L). The low alkalinity provides for a weak buffering capacity of Klamath River water. Photosynthetic activity removes carbon dioxide in the water (in the form of carbonic acid) which increases the water pH. Natural alkalinity serves as a buffer to minimize the photosynthetically induced increase in pH. In low alkalinity waters such as the Klamath River, this buffering capacity is frequently exceeded and high pH values are observed during daytime hours when photosynthesis is occurring. The large daily variation of pH observed in the Klamath River is caused by photosynthetic activity in the low alkalinity water. Water quality data on pH concentrations taken in the years 2004-2006 by the USFWS, Karuk, and Yurok tribes show pH levels exceeding 8.5 routinely at stations located below Iron Gate dam. Measurements of pH above 8.5 commonly occurred more than 25 percent of the time at many stations within the Klamath mainstem, with some stations exceeding a pH of 8.5 more than 40 percent of the time. The North Coast Regional Water Quality Control Board (NCRWCB) sets the water quality objective for pH in the Klamath River at a maximum of 8.5 and a minimum of 7.0. Further studies into an examination of ammonia toxicity in the Klamath mainstem in which all three parameters (pH, NH_3, and temperature) were collected at the same time, gave results for which the NCRWCB concluded that acute ammonia toxicity likely does not occur regularly and that any toxic conditions that do form likely occur for short durations and a few days a year. The NCRWCB concludes that ammonia levels in the Klamath mainstem, which

includes pH as a parameter, do not constitute an impairment of beneficial uses in the Klamath mainstem.

Further exacerbating the effect of the naturally productive and weakly buffered system is the presence of regionally high ambient summer air temperatures, and the resulting high heat load to the shallow and predominantly un-shaded Upper Klamath Lake. These naturally warm waters are the source of the Klamath River. In addition, the east-west aspect of much of the Klamath River also makes it prone to heating, even within the steep gorges of some reaches of the river.

Summary statistics compiled by the U.S. Environmental Protection Agency (USEPA) indicate that in June, water temperatures at locations between Iron Gate dam and above the confluence with the Scott River range from about 16 to 22°C, while in July, temperatures range from 16 to 26°C. In August the minimum temperatures are higher but the maximum temperatures are lower than in July. Temperature modeling indicates human impacts are responsible for the elevated temperatures that are above biological temperature thresholds for rearing juvenile salmonids and reproductive success of adult salmonids. Under current conditions, the seasonal increase in temperatures during the winter and spring months is delayed in comparison to estimated natural temperatures. Similarly, the seasonal decline in temperatures during the fall months is also delayed in comparison to estimated natural temperatures. These phenomena due to the alteration in the river's flow and storage capacities are known as "thermal lag." In essence, due to the presence of reservoirs and storage of water there is a lag in downstream temperatures than what would occur in a natural, unaltered system.

Dunsmoor and Huntington (2006) evaluated the effects of the delay in the seasonal fall temperature decline on salmonids due to the Klamath Hydroelectric Project. Their analysis of temperature alteration during the fall months indicates impaired spawning conditions resulting from the presence of the Klamath Hydroelectric Project. USEPA (2001) reviewed multiple literature sources and concluded that optimal protection of salmonids from fertilization through initial fry development requires that temperatures be maintained below 9-10ºC, and that daily maximum temperatures should not exceed 13.5-14.5ºC. Under current conditions, these temperatures are not reached until late October or November. However, the current Chinook salmon spawning season begins in mid-September and peaks in late October.

In 1996, the Klamath River mainstem was listed as impaired for organic enrichment/low dissolved oxygen (DO) from Iron Gate Reservoir to the Scott River, and for nutrient and temperature impairment in the remainder of the basin pursuant to Section 303(d) of the Clean Water Act. In 1998 the Klamath River mainstem was listed for organic enrichment/low dissolved oxygen in the reaches upstream of Iron Gate Reservoir and downstream of the Scott River. Iron Gate and Copco Reservoirs and the intervening reach of the Klamath River were listed for the blue-green algae toxin microcystin impairment in 2006. The 303(d) listings were confirmed in the Klamath River TMDL analysis. As the Klamath River has been listed as impaired for many years for temperature, dissolved oxygen, nutrients, and microcystin, on December 28, 2010, the USEPA approved the North Coast Regional Water Quality Control Board TMDLs for the Klamath River. The State Water Resources Control Board adopted a resolution on September 7, 2010 that approved amendments that approved the establishment of the following: (1) Site Specific Dissolved Oxygen Objectives for the

Klamath River; (2) An Action Plan for the Klamath River Total Maximum Daily Loads Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in the Klamath River; and (3) An Implementation Plan for the Klamath and Lost River Basins. The TMDLs, Implementation Plan, and new Dissolved Oxygen Objectives are currently in effect.

Dissolved oxygen concentrations are regularly too low to comply with the NCRWQCB Basin Plan dissolved oxygen objectives. Water temperature conditions regularly exceed temperature thresholds protective of salmonids. Low dissolved oxygen concentrations and elevated water temperatures in the Klamath River, its tributaries, Copco No.1 and Copco No. 2, and Iron Gate Reservoirs, and seasonal algae blooms have resulted in degraded water quality conditions that do not meet applicable water quality objectives and that impair designated beneficial uses.

In summary, the solar exposure and seasonally high ambient air temperatures, coupled with the high levels of biological productivity and respiration that are enhanced by the high levels of biostimulatory nutrients, yield large volumes of organic matter, seasonally high water temperatures, daily low dissolved oxygen, and high pH levels. All of these water quality conditions can be extremely stressful to many forms of aquatic life. These natural background heat, nutrient, and organic matter loads to the Klamath River underscore the very limited capacity of the river to assimilate anthropogenic pollutant sources, and the necessity for establishing load allocations that will result in attainment of water quality standards.

Aiding somewhat in the amelioration of Project related elevated water temperatures and the problems associated with "thermal lag" discussed previously, is the presence of a limited number of locations downstream of Iron Gate dam that provide some amount of refuge from high mainstem water temperatures in the summertime. These thermal refugia locations along the Klamath River are used mostly by juvenile coho salmon in the range of the Upper Klamath coho salmon population unit upstream of Portuguese Creek (RM 134). Juvenile coho salmon have been observed residing within thermal refugia in the mainstem Klamath River throughout the summer and early fall when ambient water temperatures in the river are above about 22ºC (NMFS 2010). Mainstem refugia areas are often located near tributary confluences, where water temperatures are 2 to 6°C lower than the surrounding river environment (NRC 2004; Sutton et al. 2004) providing juvenile salmonids, as well as other aquatic species "refuge" from the warm waters of the Klamath mainstem in the summer.

For example, Soto (2007) reported robust numbers of rearing coho salmon within refugia at the mouths of Beaver Creek (RM 162) and Tom Martin Creek (RM 143). Sutton et al. (2004) indicate that juvenile coho salmon have not been documented, or have been documented in very small numbers, utilizing cold water refugia areas within the Middle and Lower Klamath population areas upstream of Portuguese Creek (RM 134) and the Trinity River (RM 40), respectively. During past refugia studies (Sutton et al. 2004), no coho salmon were observed within extensive cold-water refugia habitat adjacent to lower river tributaries such as Elk Creek (RM 107), Red Cap Creek (RM 53), and Blue Creek (RM 16). However, Naman and Bowers (2007) captured 15 juvenile coho salmon in the Klamath River between Pecwan Creek (RM 24.5) and Blue Creek near cold water seeps and thermal refugia during June and July of 2007.

3.2.5 Water Quality Conditions Contributing to Fish Disease and Fish Kills

Fish kills in the Klamath mainstem have become relatively frequent events in modern times. Juvenile fish kills have been documented for the years 1994, 1997, 1998, 2000, 2001, and 2004. Estimates of the number of dead fish occurring in these years range from 269,000 to 300,000 juvenile salmonids and non-salmonids. Disease was the ultimate cause of death in all juvenile fish kills documented. The effects of disease were exacerbated by poor water quality conditions, including low DO, high water temperature, extreme pH fluctuations, and low flow. Temperatures documented during these fish kills were as high as 25°C, well above the lethal threshold for juvenile salmonids. Additionally, DO levels as low as 3.1 mg/L were recorded during these fish kills, which is well below the current Basin Plan objective of 8 mg/L.

Documentation of adult fish kills in the Klamath River is available for 1997 and 2002. The 1997 fish kill was determined to be caused by Columnaris and other diseases and was exacerbated by maximum water temperatures around 26°C, low DO levels of 3.1 mg/L, and low flows (Hannum 1997; Hendrickson 1997). Multiple compounding factors likely contributed to the 2002 fish kill, including an early large run of fall Chinook, low river discharge which ~~did~~ may not have provided suitable attraction flows to trigger upstream migration, and warm water temperatures which were optimal for disease proliferation (CDFG 2004a, p.III, 33, 124; USFWS 2003, p.ii). Additionally, fish passage through the lower Klamath River may have been impeded by the shallow depth of the water flowing over some riffles, which were created by sediment deposition during high discharge events in the winters of 1997 and 1998 (CDFG 2004a, p.III; USFWS 2003, p.37). The majority of the dead adult fish examined were infected with the fish diseases *Ichthyophthiriasis* (Ich) and Columnaris, which was identified as the principal cause of death (CDFG 2004a, p.III; USFWS 2003, p.ii).

Another potential disease forming agent due to poor water quality is periodic blooms of blue-green algae. Blooms of algae occur from high levels of nutrients in the water column. Recent studies have found that microcystin (harmful peptides formed by blooms of blue-green algae) levels in yellow perch from Copco Reservoir were higher than Iron Gate Reservoir (SWRCB, 2008). This study also reported that although there was variability in microcystin concentrations found in perch, the detected concentrations appear to roughly correlate to toxin levels at those locations in the reservoir. For example yellow perch in the middle section of Copco Reservoir had a higher average concentration than fish in the upper and lower sections. The highest microcystin concentration in tissues collected in this 2008 study was from mussels collected near the I-5 Bridge downstream of Iron Gate Reservoir although the study found microcystin levels in mussels generally decreases downstream from Iron Gate Dam. The study concluded that although freshwater mussels are sensitive to environmental degradation, additional study is required to understand the impacts of cyanotoxins on freshwater mussels

Kann (2008) used results from this 2008 study to evaluate the risk to humans from consuming fish or shellfish from the Klamath River and concluded the level of microcystin warrants the development of advisories for tissue consumption. Kann, et al. (2010) conducted studies in the mainstem Klamath River and found *Microcystis aeruginosa*

(MSAE) from July-September, exceeding public health thresholds by numerous times during these months. Sampling stations downstream from Copco and Iron Gate Reservoirs showed levels of both MSAE and microcystin toxin that were lower relative to the reservoir stations; however, river samples taken in the mixed portion of the channel exceeded the threshold guideline values of 40,000 cells/ml MSAE or 8 μg/L microcystin. This study reported that samples taken in areas of low velocity in Klamath River edge habitat in 2009 showed that MSAE cell density and microcystin concentration were often higher than the open water samples, and more frequently exceeded public health guideline values. These cyanotoxins are known to cause mild to acute toxicity in humans and other mammals after ingestion, but direct toxicity on fish is poorly understood. However, indirect toxicity can occur when algal blooms lead to anoxia (oxygen deprived) conditions.

~~**Summary:**~~ It is believed this combination of high summer/fall water temperatures, low DO concentrations, elevated nutrient concentrations, and impairment of seasonal flows large enough to scour bedload sediment that provide habitat for disease-causing organisms, contribute to environmental conditions in the Klamath mainstem that cause disease outbreaks and mortality events of both juvenile and adult salmonids.

For more detailed information on water quality, water quality objectives, and beneficial uses within the basin and the role the Project reservoirs play in the water quality problems of the basin see the FERC FEIS, ~~NCRWQCB~~ SWRCB report, and PacifiCorp's HCP.

3.3 Biological Resources

3.3.1 Upper Klamath River System (Above Iron Gate Dam and Reservoir)

3.3.1.1 Shortnose and Lost River Suckers

The following information is derived from the 2008 USFWS BiOp for the Bureau of Reclamation's Proposed Klamath Project Operations from 2008 to 2018.

Two species of endangered sucker fish, the endangered Lost River sucker (LRS) (*Delistes luxatus*) and the endangered shortnose sucker (SNS) (*Chasmistes brevirostris*), are part of a group of suckers that are large, long-lived, late-maturing, and live in lakes and reservoirs but spawn primarily in streams; collectively, they are commonly referred to as lake suckers (NRC 2004). Both of these species are managed by the USFWS. Zooplanktivory can also be linked to the affinity of these suckers for lakes, which typically have greater abundance of zooplankton than do flowing waters.

LRS and SNS grow rapidly in their first 5 to 6 years, reaching sexual maturity sometime between years 4 and 6 for SNS and 4 and 9 for LRS (Perkins et al. 2000). The LRS and SNS are very long-lived fish species and have been aged to 55 and 33 years, respectively. LRS and SNS spawn in riverine habitat from February through May. LRS and SNS do not die after spawning and can spawn many times during their lifetime. Most of the suitable spawning habitat occurs upstream of Keno Reservoir in the lakes of the Upper Klamath basin. Soon after hatching from river gravels, sucker larvae move out of the gravel. Larvae generally spend relatively little time upriver before drifting downstream to the lakes (Hodge,

USFWS, pers. comm. 2007). Once in the lake, larval suckers disperse to near-shore areas (Cooperman 2004; Cooperman and Markle 2004). Larval habitat is generally along the shoreline, in water 10 to 50 cm deep and associated with emergent aquatic vegetation, such as bulrush (Buettner and Scoppettone 1990; Cooperman and Markle 2004). Emergent vegetation provides cover from predators, protection from currents and turbulence, and abundant prey (including zooplankton, macroinvertebrates, and periphyton). As they grow during the summer many move offshore. Adult suckers generally use water depths 3 feet or deeper (Peck 2000; Banish et al. 2007).

3.3.1.2 Other Fish Species

This information on Rainbow Trout is taken from the FERC FEIS

Behnke (1992) considers the strains of rainbow trout that predominate inland of the Cascade Range to be a separate subspecies from the coastal form. In the Klamath River Basin, he identifies the inland form as the Upper Klamath redband trout, *Oncorhynchus mykiss newberrii*, while he considers steelhead and resident rainbow trout downstream of Upper Klamath Lake to be primarily coastal rainbow trout, *Oncorhynchus mykiss irideus*. He indicates that there may be two distinct groups of redband trout in the upper basin, one that is adapted to lakes and another that is adapted to streams. Classification of resident rainbow trout populations in the lower part of the basin appears to be less distinct, as Behnke (1992) reports that trout in some of the small tributaries downstream of Upper Klamath Lake have characteristics that are typical of inland redband trout. Because some genetic mixing between the subspecies is likely to occur and the ancestry of specific populations cannot be determined without genetic testing, we refer to all resident *O. mykiss* in the basin as rainbow trout, and the anadromous form as steelhead.

Upper Klamath Lake supports a population of large rainbow trout which appear adapted to the harsh water quality conditions and resistant to *C. shasta.* This population supports a trophy-sized trout fishery.

3.3.2 Keno, JC. Boyle, and Copco Reservoirs

3.3.2.1 Shortnose and Lost River Suckers

Adult shortnose and Lost River suckers, numbering up to several hundred individuals, are in Keno, J.C. Boyle, and Copco reservoirs. The number of endangered suckers found in Project reservoirs diminishes in a downstream direction and there is no evidence that self-sustaining populations exist in any of the reservoirs (USFWS 2007). Although previous efforts have been made to survey suckers in the Klamath River reservoirs (Coots 1965; Beak Consultants 1987; Buettner and Scoppettone 1990; PacifiCorp 2004; and others cited in Buettner et al. 2006), the most intensive survey for suckers was performed in 1998 and 1999 (Desjardins and Markle 2000). SNS is the only lake sucker that occurs commonly in the reservoirs below Keno Dam. LRS are rare in all three reservoirs (Buettner et al. 2006;Desjardins and Markle 2000). Although SNS adults are more abundant in Copco No.1 Reservoir, both Copco No.1 and Iron Gate Reservoirs contain primarily larger individuals than J.C. Boyle Reservoir which contains a wide range of size classes including juveniles (Buettner et al. 2006). These fish are probably expatriated from UKL (Desjardins and Markle 2000). Unidentified sucker larvae have been caught in all three reservoirs, and SNS spawn in the Klamath River above Copco No.1 Reservoir; although, there is no evidence that SNS larvae and juveniles

consistently survive in the reservoir (Beak Consultants 1987; Buettner and Scoppettone 1990; Desjardins and Markle 2000). Poor summertime water quality, lack of larval and juvenile rearing habitat, and large populations of non-native fish predators likely limit sucker populations in the Klamath River reservoirs (NRC 2004). The National Research Council (2004) concluded that sucker populations in Klamath River reservoirs below Keno Reservoir do not have a high priority for recovery because they are not part of the original habitat complex of the suckers and probably are inherently unsuitable for completion of life cycles of suckers.

3.3.2.2 Other Fish Species

The dominant fish species found in Project reservoirs are warm water species that include yellow perch, various species of centrarchids, fathead minnows, chub species, bullheads, and golden shiners. Fish species found in the Klamath River reaches above Iron Gate reservoirs also include redband/rainbow trout, speckled dace, and marbled sculpin. With regard to redband/rainbow trout, see the discussion of Behnke (1992) above. The free-flowing reach of the Klamath River downstream of Keno reservoir supports a good trout fishery, although the fishing season is closed during the summer because high water temperatures cause excessive mortality in a catch-and-release fishery. The J.C. Boyle bypassed and peaking reaches also support good fisheries for redband/rainbow trout.

3.3.3 Iron Gate Reservoir

Iron Gate reservoir was formed when Iron Gate dam was constructed at RM 190.1 in 1962. The dam is 173 feet high and does not include any fish passage facilities. Water levels in Iron Gate reservoir are normally maintained within 4 feet of full pool, and daily fluctuations due to peaking operation of the upstream J.C. Boyle and Copco developments are typically about 0.5 foot. Large areas of thick aquatic vegetation are common in shallow areas. Nearshore riparian habitat is generally lacking, except at the mouths of Jenny and Camp Creeks, where well developed riparian habitat occurs. Due to the cliff-like nature of shorelines, only very small isolated pockets of wetland vegetation exist around the perimeter of the reservoir. Water quality in the reservoir during the summer is generally quite poor, large blooms of the *Aphanizomenon flos-aquae* occur annually, and surface water temperatures are warm. Fish collected in Iron Gate reservoir during Oregon State University's 1998 and 1999 surveys were dominated by golden shiners, tui chub, pumpkinseed, unidentified chubs, yellow perch, unidentified larval suckers, and largemouth bass, which collectively comprised 95.1 percent of all fish collected. Netting efforts conducted in 2004 in Iron Gate Reservoir caught three species of fish (yellow perch, black crappie, and golden shiner), with yellow perch consistently being the most abundant species caught (PacifiCorp 2004). Redband/rainbow trout are also known to occur in Iron Gate Reservoir.

3.3.3.1 Shortnose and Lost River Suckers

Lost River suckers and shortnose suckers are known to occur infrequently in Iron Gate Reservoir. The shortnose sucker made up only 1 percent of the total catch of adult fish, and no Lost River suckers were collected in Iron Gate reservoir. Although 1,180 sucker larvae were collected in the reservoir, no juvenile suckers were collected, which may reflect predation by non-native species such as yellow perch, largemouth bass, and crappie (Desjardins and Markle, 2000). It is believed the larvae and occasional adult of SNS or LRS

found in Iron Gate Reservoir had been washed down from the lakes of the Upper Klamath basin, but become lost to the population as there is little in the way of suitable habitat in the reservoir to complete their life-cycle. Predation rates are probably also high in Copco reservoir, where only 3 juvenile suckers were collected.

3.3.4 Klamath River Downstream of Iron Gate Dam

The river basin downstream of Iron Gate dam supports a variety of species of anadromous fish including fall-run and spring-run Chinook salmon, coho salmon, steelhead, green sturgeon, and Pacific lamprey. Klamath River fall Chinook salmon contribute to important commercial, recreational, and tribal fisheries; steelhead support a popular recreational fishery; and green sturgeon support a small tribal fishery. Coho salmon that occur in the basin are part of the Southern Oregon/Northern California Coast ESU, which is federally listed as threatened. Information on the abundance and distribution of anadromous fish, and the condition of aquatic habitat in the Klamath River and its tributaries is summarized below.

3.3.4.1 Anadromous Species (Coho, Chinook, and Steelhead)

SONCC Coho Salmon

In May, 1997, NMFS listed SONCC coho salmon as threatened due to significant declines in population abundance and spatial distribution since the 1940's (62 FR 24588; May 6, 1997). NMFS designated critical habitat for SONCC coho downstream of Iron Gate dam in May, 1999 (64 FR 24049; May 5, 1999).

Life History Pattern and Status of Coho Salmon in the Klamath River Downstream of Iron Gate Dam

Coho salmon in the Klamath River basin spend the first 14 to 18 months of their lives in freshwater, after which the fish live in the ocean until they return to freshwater to spawn at the age of 3 years (NRC, 2004). Adults typically start to enter the river in September, peak migration occurs between late October and the middle of November, and a few fish continue to enter the river through the middle of December (NRC, 2004). Most spawning takes place in tributaries, but coho salmon have been observed spawning in side channels, tributary mouths, and shoreline margins of the mainstem Klamath River between Beaver Creek (RM 161) and Independence Creek (RM 94) (T. Shaw, M. Magnusen, A. Olsen, personal communication, as cited by Trihey & Associates, 1996). Fry start emerging in late February and typically reach peak abundance in March and April, although fry-sized fish appear into June and early July (CDFG, 2002). Fry are not territorial and have a tendency to move around; some fry are captured in outmigrant traps at the mouths of the Shasta and Scott Rivers from March through May (Chesney and Yokel, 2003). Typical juvenile habitat consists of pools and runs in forested streams where there is dense cover in the form of logs and other large, woody debris. Preferred coho salmon rearing temperatures are from 12 to 14°C (Bell, 1991), although juvenile coho salmon can, under some conditions, live at 18 to 29°C for short periods (McCullough, 1999; Moyle, 2002).

Juvenile coho salmon transform into smolts and begin migrating downstream in the Klamath River basin between February and the middle of June (NRC, 2004). Most smolts captured in a screw trap at Big Bar are taken between mid-April and mid-June. Smolts may feed and grow in the estuary for a month or so before entering the ocean. Once at sea, they spend

approximately 18 months as immature fish that feed voraciously on shrimp and small fish, and grow rapidly.

Within the Klamath River ESU diversity stratum, five populations of coho salmon were identified: Upper Klamath River, Middle Klamath River, Shasta River, Scott River, and Salmon River populations. Williams et al. (2006) characterized the Upper Klamath River, Shasta River and Scott River populations as "Functionally Independent," defined as those populations sufficiently large to be historically viable-in-isolation and whose demographics and extinction risk were minimally influenced by immigrants from adjacent populations. The Middle Klamath River and Salmon River populations were classified as "Potentially Independent," defined as those populations that were potentially viable-in-isolation, but that were demographically influenced by immigrants from adjacent populations (Williams et al. 2006).

Upper Klamath River Population Unit

In this population spawning has been documented in low numbers within the mainstem Klamath River. From 2001 to 2005, Magneson and Gough (2006) documented a total of 38 coho salmon redds between Iron Gate dam (RM 190) and the Indian Creek confluence (RM 109), although over two-thirds of the redds were found within 12 river miles of the dam. Many of these fish likely originated from Iron Gate Hatchery. In 2003 the total spawner abundance for surveyed streams was 10 adults. In 2004 it was 108 adults with the majority of fish found spawning in Seiad and Grider creeks (Karuk Tribe and HCRD, unpublished data).

Using a variety of methods, including data from a video weir on Bogus Creek and maps and an intrinsic potential (IP) database, Ackerman et al. (2006) developed run size approximations for tributaries in this stretch of river. They assumed that spawning in the mainstem was limited to fewer than 100 fish. From 2001 to 2004, the estimated number of adult spawners returning to the Upper Klamath River Population Unit (100 to 4,000) was below the Low Risk Abundance Level proposed by Williams et al. (2008) of 5,900 spawners. The lower range of the Ackerman estimate is below the depensation threshold for the population (425 spawners), meaning their numbers are so low that long-term survival of the population is unlikely. Coho salmon within the Upper Klamath River population spawn and rear primarily within several of the larger tributaries between Portuguese Creek and Iron Gate dam, namely Bogus, Horse, Beaver, and Seiad Creeks. A small proportion of the population spawns within the mainstem channel, primarily within the section of the river several miles below Iron Gate dam. Coho salmon parr and smolts rear within the mainstem Klamath River by using thermal refugia near tributary confluences to survive the high water temperatures and poor water quality common to the Klamath River during summer months. Surveys by CDFG between 1979 and 1999, and 2000 to 2004, showed coho salmon were moderately well distributed downstream of Iron Gate dam in the Upper Klamath population area. Juveniles were found in 21 of the surveyed 48 tributary streams. Based on juvenile surveys in the Upper Klamath between 2002 and 2005 there is low production in Upper Klamath tributaries with fewer than 200 juveniles found in most tributaries and most years (Karuk Tribe and HCRD, unpublished data). The greatest number of juveniles was just over 1,000, which were found in Horse Creek in 2005.

Habitat Conditions in the Upper Klamath River

Juvenile Summer and Winter Rearing Areas. For the Upper Klamath River Population Unit, juvenile summer rearing areas have been compromised by low flow conditions, high water

temperatures, insufficient dissolved oxygen levels, excessive nutrient loads, habitat loss, disease effects, pH fluctuations, non-recruitment of large woody debris, and loss of geomorphological processes that create habitat complexity (NMFS 2010). Water released from Iron Gate dam during summer months is already at a temperature stressful to juvenile coho salmon, and solar warming can increase temperatures even higher as flows travel downstream (NRC 2004). Nighttime DO levels directly below Iron Gate dam are likely below 7.0 mg/L and ~~highly~~ potentially stressful to coho salmon adults and juveniles during much of the late summer and early fall. Between Iron Gate dam and Seiad Valley, daily maximum pH values in excess of 9.0 have been documented, as high primary production within the weakly buffered Klamath River basin causes wide diurnal pH fluctuations (NMFS 2010).

Juvenile Migration Corridor. NMFS (2010) concludes that, in the Upper Klamath River reach, the juvenile migration corridor suffers from low flow conditions, disease effects, high water temperatures and low water velocities that slow and hinder emigration or upstream and downstream redistribution. The unnatural and steep decline of the hydrograph in the spring may slow the emigration of coho salmon smolts, speed the proliferation of fish diseases, and increase water temperatures more quickly than would occur otherwise. NMFS (2010) indicates that disease effects, particularly in areas such as the Trees of Heaven site, likely have a substantial impact on the survival of juvenile coho salmon in this stretch of river.

Adult Migration Corridor. The current physical and hydrologic condition of the adult migration corridor in the Upper Klamath River reach likely functions in a manner that supports its intended conservation role. As adults are mainly running in the late fall and early winter when rain events have already begun in the basin, water quality is likely suitable for upstream adult migration, and flow volume is above the threshold at which physical barriers may form (NMFS 2010).

Spawning Areas. Coho salmon are typically tributary spawners. However, low numbers of adult coho salmon do spawn in the Upper Klamath River reach annually. Upstream dams reduce the transport of sediment into this reach of river. NMFS (2010) indicates that the lack of clean and loose gravel diminishes the amount and quality of salmonid spawning habitat downstream of dams, especially below Iron Gate dam. However, water temperatures and water velocities are generally sufficient in this reach for successful adult coho salmon spawning.

Middle Klamath River Population Unit

The Middle Klamath River Population Unit covers the area from the Trinity River confluence upstream to Portuguese Creek (inclusive). Spawning surveys by the Karuk tribe in 2003, 2004, 2007, and 2008 in some spawning tributaries found only a handful of redds and adult coho salmon each year. One estimate of the total population size for this population unit is from 2001 to 2004; Ackerman et al. (2006) estimated a run size between 0 and 1,500. Juvenile counts indicate that productivity is relatively low with fewer than 12,000 juvenile coho salmon found between 2002 and 2009 during surveys of mid-Klamath tributaries (Six Rivers and Klamath National Forest and Karuk Tribe, unpublished data). Many of these juveniles are likely from other populations and the actual number of juveniles produced by the Mid-Klamath population could be much lower. Based on current estimates of the population, it is likely that the population is above depensation, but it is well below the low risk spawner threshold of 4,000 fish proposed by Williams et al. (2008).

Adults and juveniles appear to be well distributed throughout the Mid-Klamath area; however, use of some spawning and rearing areas is restricted by water quality, flow, and sediment issues in the mainstem and tributaries. Juvenile surveys have been conducted over the past several decades by various parties including the Karuk Tribe, the Mid Klamath Watershed Council (MKWC), and the Forest Service. These surveys have found coho salmon juveniles in Hopkins, Aikens, Bluff, Slate, Red Cap, Boise, Camp, Pearch, Whitmore, Irving, Stanshaw, Sandy Bar, Rock, Dillon, Swillup, Coon, Kings, Independence, Titus, Clear, Elk, Little Grider, Cade, Tom Martin, China, Thompson, Fort Goff, and Portuguese creeks (U.S. Forest Service unpublished data; Soto et al. 2008; MKWC, unpublished data). Most of the juvenile observations are of juveniles using the lower parts of the tributaries and it is likely that many of these fish are non-natal rearing in these refugial areas. Coho salmon spawning surveys have been limited in the Mid-Klamath and therefore information on adult distribution is scarce. Known adult spawning coho salmon have been documented in Bluff, Red Cap, Camp, Boise, South Fork Clear, Indian, and Grider creeks (Soto et al. 2008). Spawning surveys by the Karuk Tribe found adults spawning in Aikens, China, Elk, and the South Fork of Clear Creek.

Shasta River Population Unit

Currently, coho salmon entering the Shasta River are counted at the Shasta River Fish Counting Facility (SRFCF) operated by CDFG. Adult coho salmon returns were 30 and 9 in 2008 and 2009, respectively. Ackerman et al. (2006) used the coho salmon counts from this video weir combined with return timing information and the number of hatchery coho salmon carcasses recovered at the weir to develop approximations of run sizes for the Shasta River. The estimated number of adult coho salmon returning to the Shasta River ranges from 100 to 400 annually. At these low levels, depensation (e.g., failure to find mates), inbreeding, and genetic drift, which accelerate the extinction process, become a concern. These brood year population estimates are low, and have not trended upward over time. The current distribution of spawners is limited to the mainstem Shasta River from river mile 17 to river mile 23, lower Parks Creek, lower Yreka Creek, the upper Little Shasta River, and the Shasta River Canyon. Juvenile rearing is also currently confined to these same areas.

Scott River Population Unit

The Scott River coho salmon population size is not precisely known, although Ackerman et al. (2006) estimated total run size for the Scott River basin. Estimated run sizes were 1,000 to 4,000 in 2001, 10 to 50 in 2002 and 2003, and 2,000 to 3,000 in 2004. Variable rates of effort and differences in survey conditions between years may have influenced these estimates of run size. Uncertainty regarding mainstem spawning of coho salmon in the Scott River was also a source of concern (Ackerman et al. 2006). In 2009, 81 adult coho salmon returned to the river. The adult return estimates for the Scott River were less than the low risk spawner threshold in each of the years examined, and below high risk threshold in 2 of the 4 years.

Routine fish surveys of the Scott River and its tributaries have been occurring since 2001. These surveys have documented coho salmon presence in 11 tributaries, with the six most productive of these tributaries consistently sustaining rearing salmon juveniles in limited areas. The five other tributaries surveyed do not consistently sustain juvenile coho salmon, indicating that the diversity of this population is restricted by available rearing habitat.

Habitat Conditions in the Middle Klamath River

The Middle Klamath River section begins above the Trinity River confluence and extends upstream 85 miles to the mouth of Portuguese Creek. It is substantially different from the Klamath River upstream and downstream and adjacent sub-basins (Salmon and Scott Rivers), particularly in precipitation and flow patterns (Williams et al. 2006). NMFS (2010) concludes that the effects of Iron Gate dam on channel processes (e.g., recruitment of sediment and large woody debris) and water quality in the Klamath River diminish in the downstream direction as flow combines with tributary inputs. NMFS (2010) indicates that, while the effects of Iron Gate dam are minimal in this reach, they may combine with other factors to influence the coho salmon population.

Juvenile Summer and Winter Rearing Areas. Juvenile summer rearing areas in the Middle Klamath River are likely degraded relative to historical conditions (NMFS 2010). A few key tributaries within the Middle Klamath River Population Unit (e.g., Boise, Red Cap and Indian creeks) support populations of coho salmon and offer critical cool water refugia within their lower reaches when mainstem temperatures and water quality approach uninhabitable levels. High tributary sediment loads have caused chronically high sediment concentrations within most tributaries (NMFS 2010). Daytime water temperatures are at levels stressful to juvenile coho salmon, above 22ºC for much of July and August (NMFS 2010). Values for pH at Weitchpec tend to rise throughout the monitoring season toward peak values in late August. Daily maximum values were greater than 8.5 for most of the summer, but attenuated in early October. High pH, in combination with high water temperatures, can precipitate high ammonia levels during summer months. Highly fluctuating DO concentrations, such as those measured during summer 2004 at the Weitchpec site, are common throughout the mainstem, resulting from high primary productivity fueled by naturally elevated water temperatures and the large loads of nutrients from upstream sources, notably Upper Klamath Lake. DO levels at Weitchpec during 2004 peaked above 10 mg/L for several days in mid-October, but were generally above 7 mg/L for most of the summer (NMFS 2010). The exception was several days in both late August and early September, when DO levels as low as 5.5 mg/L were measured. NMFS (2010) concludes that disease effects likely have a substantial impact on the survival of juvenile coho salmon in this stretch of river. NMFS (2010) further concludes that, because the Klamath River is highly productive, food resources may not be limiting.

Juvenile Migration Corridor. Disease effects in this stretch of river can limit the survival of juvenile coho salmon as they emigrate downstream (NMFS 2010). Low flows can slow the emigration of juvenile coho salmon, which can in turn lead to longer exposure times for disease, and greater risks due to predation.

Adult Migration Corridor. Most migrating adult coho salmon are likely unaffected by elevated summer water temperatures characteristic of the Middle Klamath River section (NMFS 2010). By late September when adult coho salmon migration begins, water temperatures are usually close to 19º C throughout the Middle Klamath River section.

Spawning Areas. There is some evidence that limited spawning of coho salmon occurs in the Middle Klamath River reach (Magneson and Gough 2006). However, NMFS (2010) indicates that the quality and amount of spawning habitat in the Middle Klamath River reach is limited due the geomorphology and the prevalence of bedrock in this stretch of river.

Coho salmon are typically tributary and headwater stream spawners, so it is unclear if there was historically very much mainstem spawning in this reach.

Chinook Salmon

Life History Pattern and Status in the Klamath River Downstream of Iron Gate Dam

In 1998, NMFS completed a status review for the Upper Klamath and Trinity Rivers Chinook (*Oncorhynchus tshawytcha*) salmon ESU (NMFS, 1998). Based on the health of the fall-run populations within the ESU, NMFS concluded that the ESU was not at significant risk of extinction, nor was it likely to become endangered in the foreseeable future, and therefore, did not warrant listing under the ESA (63 FR 11482, 11493; March 9, 1998). In January, 2011, NMFS received a petition to list Chinook salmon in the Upper Klamath Basin under the ESA. NMFS found that the petition presents substantial scientific information indicating that the petitioned action may be warranted; therefore, NMFS will convene a biological review team to assess the current status of the ESU (76 FR 20302; April 12, 2011).

Fall Chinook salmon reach their upstream spawning grounds within 2 to 4 weeks after they enter the river, after which they spawn and die. Bjornn and Reiser (1991) identified suitable water temperatures for Chinook salmon spawning as 5.6° to 13.9° C. Chinook salmon prefer to spawn in areas where the velocity ranges between 1 to 3 feet per second and depths exceeding 0.8 foot (Bjornn and Reiser 1991). Time to emergence is dependent on the temperature regime. In the mainstem Klamath River, alevins can emerge from early February through early April, but peak times vary from year to year. After they emerge, fry disperse downstream, and many then take up residence in shallow water on the stream edges, often in flooded vegetation, where they may remain for various periods. As they grow larger, they move into faster water. Some fry, however, keep moving after emergence and reach the estuary for rearing.

Most fall-run Chinook salmon adults returning to spawn in the middle Klamath River tributaries enter the mainstem in late summer, with peak migration occurring in late August and early September. Migration rate to the tributaries is variable and may be somewhat dependent on water temperatures. Fish enter the Scott River and other Klamath River tributaries beginning in September and continue to enter the tributaries through December. The peak of the upstream migration to the Scott River is in late October.

Spawning generally occurs soon after the fish arrive on the spawning grounds, but may be delayed when flow and temperature conditions are unsuitable.

Fall Chinook salmon fry rear in the mainstem at temperatures of 19 to 24°C (NRC, 2004). That pattern is consistent with the thermal tolerances of juvenile Chinook salmon, which can feed and grow at continuous temperatures up to 24°C when food is abundant and other conditions are not stressful (Myrick and Cech, 2001). Under constant laboratory conditions, optimal temperatures for growth are around 13 to 16°C. Continuous exposure to temperatures of 25°C or higher is invariably lethal, although the time until mortality depends on the acclimation temperature of the fish (McCullough, 1999). Juveniles can, however, tolerate higher temperatures (28 to 29°C) for short periods (NRC, 2004). In the lower Klamath River, the presence in late summer of refugia that are 1 to 4°C cooler than the mainstem and lower temperatures at night increase the ability of fry to grow and survive. Juvenile Chinook salmon are found in the Klamath estuary from March through September, over which time new fish constantly enter and older fish leave (NRC, 2004).

Spring Chinook salmon may have been the dominant run in the tributaries upstream of Upper Klamath Lake. NRC (2004) states that the spring run may have been nearly as abundant as the fall run in the basin overall. The Shasta, Scott, and Salmon Rivers all supported large runs, but the spring runs suffered a precipitous decline in the 19th century due to the effects of hydraulic mining, dams, diversions, and fishing (Snyder, 1931). A large run in the Shasta River disappeared around the time that Dwinnell dam was constructed in 1926. In the Klamath River basin upstream of the Trinity River confluence, only the Salmon River continues to support a run of spring Chinook salmon. Returns to the Salmon River between 1980 and 2002 have ranged from 143 fish in 1983 to 1,443 fish in 1995. Returns of spring Chinook salmon to the Trinity River between 1978 and 2002 have ranged from 1,315 fish in 1983 to 53,852 fish in 1988. The Trinity River run is supplemented by the annual release of approximately 1 million spring Chinook smolts each year from the Trinity River Hatchery. Although data indicate that returns to the hatchery constitute about a third of adult spring-run Chinook salmon in the Trinity River, progeny of hatchery produced Chinook salmon, if the progeny return to the system as spawning adults, are considered "natural" spawners. ~~NRC (2004) suggests that all of the Trinity River mainstem spawners may be of hatchery origin.~~

The spawning migration of spring-run Chinook salmon in the Klamath River typically begins in April and continues through June, rarely extending into August. Migration rate to the tributaries is variable; fish reach the tributaries in June and July. The adult fish hold in deep, cold, permanent pools in tributaries until spawning in the fall, generally in October and November. Emergence of fry occurs in January and February. Outmigration of fry and smolts in the Klamath River system occurs from February through mid-June. Like the fall-run, spring-run Chinook salmon adults generally return to the Klamath River in their third and fourth years, but 5-year-olds and 2-year-old males do also occur to a lesser extent (KRTAT 2003, 2004, 2006).

For the purposes of spawning, Chinook require clean gravels with a minimum amount of fine sediment to ensure successful egg-to-fry survival. Gravel beds that contain elevated levels of fine sediment can lead to egg and alevin mortality. Chinook adults can utilize larger coarse substrate for redd construction than either steelhead or coho. Once Chinook juveniles emerge from redds they begin their descent towards the estuary and, in contrast to coho salmon juveniles, are less dependent on complex habitats with deep pools formed by LWD or boulders, and are not as sensitive to cool water refugia while utilizing mainstem habitat.

In terms of abundance of Klamath and Trinity Rivers Chinook, fluctuations in run-size can vary widely and may be heavily influenced by ocean conditions during this stage of the Chinook life-cycle. Iron Gate Hatchery annually releases approximately six million juveniles into the Klamath River, thus abundance numbers are strongly influenced by hatchery production. The Trinity River Hatchery annually releases approximately 4.3 million juveniles into the system. As smolts leave the estuary and enter the Pacific Ocean to complete their pre-spawn adult life-cycle, the occurrence of upwelling along the west coast at the time of ocean entry may play a significant role in the smolt-to-adult survival rates as upwelling brings nutrient-rich waters to the surface enhancing primary productivity and available prey for Chinook.

In 2008 the Pacific Fishery Management Council (PFMC) estimated the Klamath River Chinook run size at 70,572 adults with an estimate of hatchery returns of 13,552 adults. The estimate of spawning escapement to the upper Klamath River tributaries (Salmon, Scott, and

Shasta Rivers), totaled 7,935 adults. In these three upper tributaries, escapement is not likely influenced by hatchery strays. The Shasta River has been the most historically important Chinook salmon spawning stream in the upper Klamath River, supporting an estimated spawning escapement of 30,700 adults as recently as 1964, and 63,700 in 1935 (PFMC 2008). The estimated escapement in 2008 to the Shasta River was only 2,741 adults, while escapement to the Salmon and Scott Rivers was 1,749 and 3,445 adults, respectively (PFMC 2008). Of the 2008 total Klamath River system estimate, 16,356 adults were estimated to be Trinity River origin with most of these being naturally produced. Over the last 11 years the peak estimated in-river run of Klamath River fall Chinook was in 2000 at 218,077 adults (PFMC, 2008). Since 2007 the PFMC enacted significant reductions in ocean and in-river harvest of Chinook adults as the numbers of estimated natural adult spawners in the Klamath basin fell short of the 35,000 target~~. enacting restrictions on harvest~~. The PFMC pre-season 2011 forecast for the ocean abundance of Klamath River fall Chinook is 304,600 age-3 fish, the age-4 forecast is 61,600, and the age-5 forecast is 5,000 fish (PFMC, 2011). These numbers are in alignment with other river systems in California that have experienced higher 2010/11 levels of adult Chinook returns than in recent history.

Steelhead

Life History Pattern and Status in the Klamath River Downstream of Iron Gate Dam

NMFS considers all steelhead (*Oncorhynchus mykiss*) in the Klamath River basin to be part of the Klamath Mountains Province ESU. Moyle (2002) describes two life history forms within this ESU, a summer run and a winter run. Hopelain (1998), however, concluded that there are three distinct runs of steelhead in the Klamath River basin: a winter run that enters the river from November through March, a spring run that enters the river from March through June, and a fall run that enters the river from July through October. Other reports appear to consider the fall run described by Hopelain to be a component of the winter run, based on a run timing of August through February given for winter-run steelhead by Barnhart (1994; as cited by NRC, 2004).

The life history of steelhead differs from that of coho and Chinook salmon in several ways. Steelhead do not necessarily die after spawning, and a small number survive to become repeat spawners. Juvenile steelhead generally have a longer freshwater rearing requirement (usually from 1 to 3 years), and adults and juveniles are both more variable in the length of time they spend in fresh and salt water. Some individuals may remain in a stream, mature, and even spawn without ever going to sea; others migrate to the ocean at less than 1 year of age, and some may return to freshwater after spending less than 1 year in the ocean. Like other anadromous salmonids, steelhead typically return to their natal streams to spawn. Fall, winter, and summer runs are present in the Klamath River and Scott River systems, and there is considerable overlap in the timing of their life-stages. In larger tributaries of the upper Klamath River (for example, the Scott River), the fall steelhead run may begin as early as September and continue through November, while the later winter steelhead run occurs from December through April. Summer steelhead migrate into Klamath River basin tributaries in May and June; hold over in deep, cold pools; and spawn the following winter. Because of their extended stay in freshwater, adult summer steelhead are vulnerable to elevated summer water temperatures and dewatering events.

Similar to other salmonids, steelhead lay their eggs in the gravel of the stream bottom where they incubate for approximately 3 to 12 weeks, depending on water temperature. After

hatching, pre-emergent fry remain in the gravel for another 4 to 6 weeks; but factors such as redd (the spawning nest of trout or salmon) depth, gravel size, siltation, and temperature can speed or retard this time (Shapolov and Taft 1954). Emergence begins as early as March and can continue through July.

Juvenile steelhead of all three runs outmigrate from freshwater after spending 1 to 3 years in nursery streams (Busby et al. 1996). A large percentage of juvenile steelhead outmigrate during their first year of rearing (age 0) or after a full year of rearing (age 1+) (66 FR 9808; February 12, 2001). However, based on analysis of scales taken from returning adults, approximately 91 percent of Klamath River winter-run steelhead juveniles enter the ocean at age 2+, having spent two summers in freshwater (Hopelain 1998). Juvenile steelhead generally outmigrate from March through June, although smolts may outmigrate during nearly every month of the year.

Steelhead in the Klamath Mountains Province ESU were proposed for federal listing as threatened. The history of petitions and agency findings regarding the Klamath Mountain Province steelhead ESU are detailed in the February 12, 2001, listing proposal (66 FR 9808). After reviewing the best available scientific and commercial information, NMFS concluded in April 2001 that the Klamath Mountains Province ESU did not warrant listing (66 FR 17845; April 4, 2001). The not warranted finding for this ESU does not distinguish between runs.

Historically, the Klamath River supported large populations of steelhead, the anadromous form of rainbow trout. Steelhead were distributed throughout the mainstem and the principal tributaries such as the Shasta, Scott, Salmon, and Trinity River basins, and many of the smaller tributary streams. Steelhead also were likely distributed in the tributaries upstream of Upper Klamath Lake, but due to difficulty in differentiating steelhead from large resident rainbow trout, precise information on the upstream limit of their distribution is lacking. Hamilton et al. (2005) note that, in watersheds where both Chinook salmon and steelhead are present, the range of steelhead is usually the same, if not greater. Hardy and Addley (2001) state that, before 1900, runs of steelhead in the Klamath River basin may have exceeded several million fish. They cite more recent run size estimates of 400,000 fish in 1960; 250,000 in 1967; 241,000 in 1972; and 135,000 in 1977. In its most recent status review for the Klamath Mountains Province steelhead ESU, NMFS (2001) indicates that most California populations showed a precipitous decline to very low abundance around 1990 and stayed at low levels through 1999, but a modest increase in abundance was noted in 2000. Escapement estimates of summer steelhead to the Salmon River are consistent with the trend noted by NMFS, and in the Salmon River this increasing trend continued in 2002. The increased return of summer steelhead from 2000 to 2002 coincides with a period of strong returns of adult salmon and steelhead to the region caused by favorable ocean conditions that existed between 1998 and 2001. Information on the abundance of winter steelhead, which is considered to be the most abundant form, is very limited due to logistical difficulties in sampling adults during the winter season (NMFS, 2001).

3.3.4.2 Other Anadromous Species Found Downstream of Iron Gate Dam

Green Sturgeon

Green sturgeon (*Acipenser medirostris*) are an anadromous species that is known to range in nearshore marine waters from Mexico to the Bering Sea. NMFS has identified two distinct

population segments: a northern coastal segment consisting of populations spawning in coastal watersheds northward of and including the Eel River and a southern segment consisting of coastal or Central Valley populations spawning in watersheds south of the Eel River. The Klamath River basin supports the largest spawning population of the species, which is included in the northern Distinct Population Segment (DPS) and also includes fish that spawn in Umpqua, Rogue, and Eel Rivers. Green sturgeon enter the Klamath River to spawn from March through July (NRC, 2004). Most spawning occurs from the middle of April to the middle of June. Spawning takes place in the lower mainstems of the Klamath and Trinity rivers in deep pools with strong bottom currents. ~~As noted previously,~~ Green sturgeon have been observed migrating into the Salmon River, but they are not thought to ascend the Klamath River beyond Ishi Pishi Falls (RM 66)(Moyle, 2002; NMFS, 2005). Juveniles stay in the river until they are 1 to 3 years old, when they move into the estuary and then to the ocean. Optimal temperatures for juvenile growth appear to be from 15 to 19°C, and temperatures above 25°C have been reported to be lethal (Mayfield, 2002, as cited by NRC, 2004). Outmigrant juveniles are captured each year in screw traps at Big Bar (RM 49.7) on the Klamath River and at Willow Creek (RM 21.1) on the Trinity River (Scheiff et al., 2001). After leaving the river, green sturgeon spend 3 to 13 years at sea before returning to spawn, and they often move long distances along the coast (NRC, 2004).

Green sturgeon support small tribal fisheries by the Yurok Tribe in the Klamath River and the Hoopa Valley Tribe in the Trinity River. Although Yurok and Hoopa Valley tribal catch has remained relatively constant in recent years, commercial and sport harvest has been greatly reduced by newly imposed fishing regulations in Oregon and Washington. Commercial fisheries targeting sturgeon have not been allowed in the Columbia River or in Willapa Bay, Washington, since 2001. In California, commercial fisheries for sturgeon are prohibited and regulations prohibiting the recreational harvest of green sturgeon took effect in March 2006.

NMFS published a final rule listing the Southern DPS as threatened (71 FR 17757; April 7, 2006). The Southern DPS includes Green Sturgeon populations south of the Eel River in Humboldt County. NMFS considers the Northern DPS, which includes the Klamath River population, a Species of Concern.

Pacific Lamprey

Pacific lamprey (*Lampetra tridentata*) are found in Pacific coast streams extending from Alaska to Baja California. They currently occur throughout the mainstem Klamath River and its major tributaries downstream of Iron Gate dam. The extent of their historical upstream distribution is uncertain due to the occurrence of several resident species of lamprey in the upper parts of the basin. Hamilton et al. (2005) note that Pacific lamprey are capable of migrating long distances, and generally show a similar distribution as anadromous salmon and steelhead. Pacific lamprey are anadromous nest builders that, like salmon, die shortly after spawning. They enter the Klamath at all times of the year and cease feeding as they migrate upstream. They spawn at the upstream edge of riffles in sandy gravel. Lamprey eggs hatch in approximately 2 to 4 weeks, and then the larvae (ammocoetes) drift downstream to backwater areas where they burrow into the substrate and commence feeding, tail embedded and head exposed, on algae and detritus (Kostow, 2002). Juveniles remain in fresh water for 5 to 7 years before they migrate to the sea at a length of about 6 inches and transform into adults (Moyle, 2002). They spend 1 to 3 years in the marine environment, where they

parasitize a wide variety of ocean fishes, including Pacific salmon, flatfish, rockfish, and pollock. Their degree of fidelity to their natal streams is unknown (USFWS, 2004). Adult Pacific lamprey typically range between 30 and 76 centimeters (12 and 30 inches) in length (Moyle, 2002). Larson and Belchik (1998) interviewed 20 Yurok tribal elders about the historic and current lamprey fishery in the Klamath River. Most of those interviewed reported daily catches as high as 300 to 1,500 lamprey per person per day before the run declined sometime between the late 1960s and the late 1980s. Reported catches since the decline have not exceeded 100 fish, with most respondents indicating that a catch of 20 lamprey was considered an extremely good catch. Pacific lamprey are collected regularly in screw traps fished in the Klamath at Big Bar and in the Trinity River at Willow Creek.

Eulachon

The eulachon (*Thaleichthys pacificus*) or candlefish is a smelt that reaches the southern extent of its range in the Mad River, Redwood Creek, and the Klamath River (Moyle, 2002). Historically, large numbers entered the river to spawn in March and April, but they rarely moved more than 8 miles inland (NRC, 2004). Spawning occurs in gravel riffles, and the embryos take about a month to develop before hatching. Upon hatching, the larvae are washed into the estuary. The eulachon in the Klamath River once was an important food of the Native Americans in the region (Trihey & Associates, 1996). Moyle (2002) states that eulachon have been scarce in the Klamath River since the 1970s, with the exception of 3 years: they were plentiful in 1988 and moderately abundant again in 1989 and 1999. Based on interviews with Yurok tribal elders, Larson and Belchik (1998) state that most tribal fishers perceived a decline in the mid to late 1970s, although a smaller number thought that it was in the 1980s. Similar declines have been noted elsewhere within the species range. Commercial landings in the Columbia River and its tributaries averaged between 1 and 3 million pounds prior to 1993, but declined ten-fold starting in 1994. A similar decline has occurred in the Fraser River, where landings decreased from about 100 metric tons (110 tons) prior to 1966 to about 20 metric tons (22 tons) in the early 1990s, leading to closure of the fishery in 1998, 1999, and 2000.

The Klamath River is believed to support the largest population of eulachon in California. The species is known to spawn at least as far as 40 km upstream in the Klamath River (Fry 1979, Hamilton et al. 2005), and Larson and Belchik (1998) noted that adults generally migrate up to Pecwan Creek or near Weitchpec. Specific spawning areas are not well known. In March, 2010 NMFS listed the Southern DPS, which includes the Klamath River population, of eulachon as threatened (75 FR 13012; March 18, 2010). Primary factors cited as threatening the species include climate change, commercial fisheries, and altered freshwater habitat. NMFS is unsure as to the viability of eulachon in the Klamath River as we are uncertain that abundance is large enough to support a self-sustaining population. NMFS issued a final rule designating critical habitat for the Southern DPS of eulachon on October 20, 2011 (76 FR 65324). The designation includes the Klamath River from the mouth upstream to the confluence with Omogar Creek, but it excludes lands of the Resighini Rancheria and Yurok Tribe.

Coastal Cutthroat Trout and Other Anadromous Fish

NRC (2004) reports that coastal cutthroat trout (*Oncorhynchus clarkii clarki*) occur mainly in the smaller tributaries of the Klamath River within about 22 miles of the estuary; this species also has been observed further upstream in tributaries to the Trinity River (Moyle et al.,

1995). Sea-run adults enter the river for spawning in September and October, and juveniles rear in fresh water for 1 to 3 years before going to sea during April through June. Other anadromous fish species that occur in the Klamath River basin include chum salmon (*Oncorhynchus keta*), white sturgeon (*Acipenser transmontanus*), and American shad (*Alosa sapidissima*). NRC (2004) reports that periodic observations of adult chum salmon and regular collection of small numbers of young suggest that this species continues to maintain a small population in both the Klamath and Trinity Rivers, though it has never been present in large numbers.

3.3.4.3 Other Non-Anadromous Fish

Although information on the abundance of non-anadromous species downstream of Iron Gate dam is limited, some information is available from sampling conducted to monitor the outmigration of juvenile salmon and steelhead in the lower Klamath River. Klamath smallscale sucker, Pacific lamprey, and speckled dace were the most common of the non-target species that were collected during screw-trap sampling conducted between 1997 and 2000 in the Klamath River upstream of its confluence with the Trinity River. Sculpins, threespine stickleback, and green sturgeon were the next most abundant species collected. Stillwater (2009) reports other non-anadromous species found below Iron Gate dam to the estuary include:

- Surf smelt (*Hypomesus pretiosus*)
- Golden shiner (*Notemigonus crysoleucas*)
- Fathead minnow (*Pimephales promelas*)
- Goldfish (*Carassius auratus*)
- Yellow bullhead (*Ameiurus natalis*)
- Brown bullhead (*Ameiurus nebulosus*)
- Black bullhead (*Ameiurus melas*)
- Channel catfish (*Ictalurus punctatus*)
- Kokanee (*Oncorhynchus nerka*)
- Brown trout (*Salmo trutta*)
- Brook trout (*Salvelinus fontinalis*)
- Arctic grayling (*Thymallus arcticus*)
- Sacramento perch (*Archoplites interruptus*)
- Green sunfish (*Lepomis cyanellus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Bluegill (*Lepomis macrochirus*)
- Largemouth bass (*Micropterus salmoides*)
- Smallmouth bass (*Micropterus dolomieui*)
- Spotted bass (*Micropterus punctulatus*)
- White crappie (*Pomoxis annularis*)
- Black crappie (*Pomoxis nigromaculatus*)
- Yellow perch (*Perca flavescens*)

3.3.4.4 Beaver

Beaver (*Castor Canadensis*) dams measurably affect groundwater recharge rates and retention, increase summer flows, and elevate local water tables allowing riparian and

wetland vegetation to expand. Beaver dams may retain enough sediment to cause substantial changes to the valley floor morphology.

The long history of beaver removal in the Klamath basin may have contributed to declines in anadromous salmonids as the formation of these complex habitats, in which juvenile salmonids are particularly inclined towards, is reduced when beaver have been eliminated from a watershed. Beaver populations are responsible for providing outstanding fisheries and waterfowl habitat by creating wetlands through dam building and maintenance activities. The beaver dams allow wetland conditions to persist during the summer, and store water year round. Currently, beaver dams exist in the Klamath River estuary wetlands and the beaver population seems to be on the rebound (Beesley and Fiori 2007). Studies conducted in central Oregon (Stack and Beschta 1989) showed that beaver can affect important stream characteristics such as pools as beaver within a system can lead to larger pool complexes than streams without beaver. Stream and river corridors can become wider and morphologically more complex and biologically diverse when beavers are present (McKinstry et al. 2001). In general salmonid productivity has been found to be higher, especially for coho salmon, in reaches upstream of beaver dams, relative to habitats were beaver dams were not present (Pollock et al., 2003, Beesley and Fiori, 2007).

3.3.4.5 Fish-Eating Birds in the Klamath Basin Downstream of Iron Gate Dam

Bald Eagle

Bald eagles (*Haliaeetus leucocephalus)* occur in North America from central Alaska and Canada south to northern Mexico (USFWS 1995). They are found primarily along coasts, inland lakes, and large rivers, but may also be found along mountain ranges during migration. Although the bald eagle is greatly reduced in abundance from historical levels, the current distribution is essentially the same (USFWS 1976). Many bald eagles withdraw in winter from northern areas, migrating north again in spring and summer to breed (Terres 1980). They generally nest in large old growth trees near ocean shore, lakes, and rivers. They require open water habitats that support an adequate food base. Bald eagles forage on fish and waterfowl from perch sites adjacent to foraging areas.

In the Klamath Province, which includes the area above and below Iron Gate dam, bald eagles typically nest in very large, emergent trees that may or may not be associated with dense older stands. Nest sites are usually associated with rivers, but may be located on steep mountainsides or drainages over a mile from aquatic habitats used for foraging. During winter, bald eagles often congregate near productive foraging areas (e.g., Klamath Project reservoirs and Klamath River) and use communal roost sites. Bald eagles are known to nest and overwinter along the Klamath River.

Osprey

The osprey (*Pandion haliaetus*) breeds in northern California from Cascade Ranges south to Lake Tahoe, and along the coast south to Marin County. Regular breeding sites include Shasta Lake, Eagle Lake, Lake Almanor, and other inland lakes and reservoirs (CDFG 2011a).

Ospreys are found only in association with lakes, reservoirs, coastal bays, or large rivers. They feed predominantly on fish, although some mammals, birds, reptiles, and amphibians are also eaten. Ospreys require open, clear water for foraging, and swoop down while in flight or from a perch to catch fish at the water's surface. Large trees and snags near the

water are used for roosting and nesting. This species nests on a platform of sticks at the top of large snags, dead-topped trees, on cliffs, or on human-made structures. Nests may be as much as 250 feet above ground. During the breeding season, ospreys generally restrict their movements to activities in and around the nest site, and between the nest and foraging sites.

Ospreys can forage along streams in nearly all forested landscapes, but larger, denser stands are more suitable for foraging. Habitat suitability for cover and reproduction is maximized in stands with large trees (CWHR size classes 4, 5 and 6) in the Klamath Mixed Conifer and similar forest types regardless of canopy density. However, stands with slightly smaller trees (CWHR size class 3) provide at least moderate suitability for cover and reproduction of this species. Ospreys are known to use riparian forests near the Klamath mainstem.

3.4 Socioeconomics and Environmental Justice

The FERC FEIS considered a six-county study area for PacifiCorp's socioeconomic analysis including Klamath, Jackson, and Curry counties in Oregon and Siskiyou, Humboldt, and Del Norte counties in California. The FEIS included detailed information regarding demographic characteristics (population, race, ethnicity, employment, and income) and project-related economic sectors (project employment, payroll, taxes, recreation, commercial fishing, tribal fishery, and irrigated agriculture). A detailed description of these resources is addressed in Section 3 of the FEIS. That information is incorporated herein by reference.

For purposes of the ITP issuance considered within this EA, evaluation of socioeconomic resources is linked to the HCP and the conservation or mitigation measures incorporated therein. Issuance of the ITP is contingent upon the HCP. Three of the HCP measures are downstream improvements (increased dissolved oxygen levels, increased flow variability, and increased quantity and functionality of woody debris). The remaining two measures are more wide-ranging and include (1) funding research and (2) enhancement projects designed to benefit Coho salmon by improving habitat conditions. In consideration of potential impacts from the proposed action NMFS assumes that local economies, services, and human resources could be affected by implementation of the HCP, most importantly, the ~~*coho conservation program*~~ *Coho Salmon Conservation Strategy*. NMFS assumes that most restoration projects considered in the HCP will occur within 3 miles of the Klamath mainstem in smaller tributaries and within the larger Scott and Shasta River watersheds. This assumption is made as enhancement projects located in lower reaches of tributaries are likely to have the greatest benefit to coho which utilize low gradient stream reaches, and because the Scott and Shasta Rivers contain sizeable areas potentially suitable for coho, even if the habitat is currently in a degraded, but restorable condition.

3.4.1 Population, Race, and Ethnicity

The most current U.S. Census data from 2010 was queried to identify different race and ethnic distribution and is shown in Table 2. The total population within the six-county area is 500,083.

Table 2. Race and Ethnic Distribution by County within the Permit Area

County	Total Population	Percent White (alone)	Percent Racial Minority[a]	Percent Hispanic[b]
Curry County, OR	22,364	92.0	8.0	5.4
Klamath County, OR	66,380	85.9	14.1	10.4
Jackson County, OR	203,206	88.7	11.3	10.7
Del Norte County, CA	28,610	64.7	35.3	17.8
Humboldt County, CA	134,623	77.2	22.8	9.8
Siskiyou County, CA	44,900	79.5	20.5	10.3

Source: U.S. Census Bureau, 2010

[a] Racial minority includes all individuals who report a race other than White Non-Hispanic.
[b] Hispanics may be of any race.

3.4.1.1 Employment

The U.S. Bureau of Labor Statistics (BLS) database was queried to determine the average unemployment rate in the six counties between January 2010 and January 2011 (December 2010 and January 2011 data is preliminary). Unemployment averages for the six counties during this time period are Del Norte 13.7 percent; Humboldt 11.9 percent; Siskiyou 19 percent; Curry 19 percent; Jackson 12.6 percent; and Klamath 13.9 percent (BLS, 2011).

In its comments on the draft FERC EIS, the Yurok Tribe cites Bureau of Indian Affairs data (BIA, 2005) indicating the unemployment rate was as high as 75 percent for Yurok and 40 percent for Hoopa Valley tribal members in 2001. It is estimated these high rates of unemployment persist to this day.

3.4.1.2 Tribes

There are five Federally-recognized Native American tribes within the permit area. They are:

- The Quartz Valley Indian Community includes a federal reservation of Klamath, Karuk, and Shasta Indians in northwestern California near the community of Fort Jones, Siskiyou County, California. The total reservation area today is about 174 acres (San Diego State University, 2011).
- The Karuk Tribe, which is today one of the largest tribes in California, has a small land base, with most of the Karuk Tribe living in Humboldt and Siskiyou counties, California, and in southern Oregon (San Diego State University, 2011).
- The Yurok Indian Reservation encompasses 56,585 acres located 1 mile on either side of the Klamath River from the mouth at the Pacific Ocean upstream 22 miles, extending through Del Norte and Humboldt counties, California (San Diego State University, 2011).

- The 85,446-acre Hoopa Valley Indian Reservation is located along the Trinity River in northeast Humboldt County, California (San Diego State University, 2011).
- The Resighini Rancheria is a 228-acre federal reservation of Karuk Indians in Del Norte County, California. The reservation spans the mouth of the Klamath River (San Diego State University, 2011)

3.4.2 Recreation

See FERC FEIS Chapter 3 for detailed information on recreational activities and economics within the Project area. A synopsis of recreational information from the FEIS has been incorporated by reference.

In the upstream subregion, the Klamath River and its reservoirs support a number of recreational pursuits, including whitewater boating (private and commercial), sport fishing (private and commercial), camping, and waterskiing. While Klamath River whitewater boating activity in the downstream subregion has increased over time, in-river fishing has varied from year to year. Severe restrictions in recent years due to low returns of adult Chinook spawners in both the Klamath River and Sacramento River are the cause for the recreational restrictions.

Recreational fishing effort in California was up substantially in 2010 as compared to 2009 effort levels since the sport fishery was not restricted in 2010 to a 10-day fishery in the Klamath Management Zone as it was in 2009. However, given the improvements in recreational fishing opportunities in 2010, fishing effort was still severely depressed compared to historical levels (PFMC 2011). For the 2010 fishing year, it is estimated approximately 5,000 Chinook were taken in the in-river recreational harvest which is below an average of 10,000 for the years 1978-2010 (CDFG 2011c). For all of California, 14,697 Chinook were caught in the 2010 recreational fishery from a total of 48,757 fishing trips, for a success rate of less than one fish per trip (PFMC 2011). Although there were increases in 2010 Chinook salmon adult returns and natural spawner escapement, recreational fishing catches remain depressed.

3.4.3 Commercial Fishing

Currently, salmon products contribute less than 1 percent to the economies of the west coast states. This was not always the case, however, and the contributions of commercial fishing can still be substantial to some coastal communities.

Historically, and in contrast to the current situation, the commercial salmon fishery and the associated canneries were substantial components of the west coast economies. The more recent history (1976 to the present) is characterized by downward trends in market prices, poor ocean condition cycles, and adverse habitat alterations (including construction of hydroelectric facilities) for all regions along the west coast of North America. These trends have caused substantial decreases in the amount of income and jobs in economies where salmon and steelhead fishing have historically been important. Coastal communities and tribes have experienced the greatest losses in this regard.

Chinook salmon continues to be the most abundant salmonid species present in the Klamath basin and supports important commercial, recreational, and tribal fisheries.

The commercial fishing fleet within the Klamath Management Zone (KMZ) boundaries consists of ships that generally fish in waters relatively close to their home ports and land their catch at ports close to the waters where the fish are caught. This fleet catches fish originating from the Klamath River. Reductions in fish produced in the Klamath can impact the KMZ commercial fishery. The KMZ falls under the jurisdiction of the states of California and Oregon, as well as PFMC. PFMC tracks fish landings and fishing effort by port, and generally publishes data for major port areas. The major port areas in the KMZ include Brookings in Oregon and Crescent City, Eureka, and Fort Bragg in California. Historically, significant Chinook salmon and coho salmon fisheries used the waters now designated as the KMZ. The harvest levels of Klamath River fall Chinook (KRFC) salmon in the KMZ were much higher in the mid- to late-1980s (in the tens of thousands of fish) than in the 1990s (in the tens or hundreds of fish). The harvest level recovered somewhat from 2001 to 2005, with the catch in the range of 1,400 to 3,900 fish. This pattern in Klamath River fall Chinook salmon harvest levels, coupled with changes (both up and down) in the ex-vessel price of all salmon caught in the KMZ, has been mirrored in the personal income received by commercial fishermen in the KMZ.

Since 2008, Klamath stocks have experienced reduced impacts from the mixed-stock ocean salmon fishery, as a result of management measures designed to protect continued low returns of Sacramento River fall-run Chinook salmon (SRFC). Despite widespread salmon fishery closures in 2008 and 2009, the 2010 abundance forecast of SRFC was the third lowest on record, with only 2008 and 2009 values being lower. As a result, the PFMC recommended very restrictive salmon fisheries south of Cape Falcon, Oregon again in 2010. Only two 4-day openings in early July were available for commercial fishing in California and no fall commercial fisheries were established south of Cape Falcon due to concerns over the status of SRFC. Retention of coho in the ocean salmon fishery off California was prohibited again in 2010, in accordance with ESA consultation standards designed to reduce fishery impacts on Klamath Basin coho salmon.

The PFMC established a conservation objective for KRFC which requires a long-term average escapement of 33 to 34 percent potential naturally spawning adults, but no fewer than 35,000 naturally spawning adults. Since 2008, the PFMC has been designing the ocean salmon fishery to achieve an escapement of at least 40,700 naturally spawning adults in order to enhance the status of the stock. Although the stock failed to achieve 35,000 naturally spawning adults in 2008, escapement exceeded 40,700 naturally spawning adults in 2009. In 2010, the stock successfully exceeded the conservation objective of 35,000 naturally spawning adults, but the total in-river return of adults was still below the average for the years 1978-2010 (CDFG 2011c).

In recent years, the commercial Chinook ocean fishery in California has been severely impacted due to low adult returns in the Sacramento and Klamath River systems. In 2010 California had its first commercial salmon fishery since 2007, although it remained heavily constrained by SRFC management objectives. The ex-vessel value of the California commercial ocean salmon catch in 2010 was $1.2 million compared with (inflation adjusted) $8.2 million in 2007 and a 1979-2009 average of $17.7 million (inflation adjusted) (PFMC 2011). In 2010, 216 vessels made salmon landings in California compared with zero vessels in 2008 and 2009. In 2007, there were 601 vessels active in California, compared with 477 vessels active in 2006 (PFMC, 2011).

3.4.4 Tribal Fishery

In addition to tribal cultural and ceremonial fishing in the basin, commercial harvest of Chinook salmon also occurs. From 1987 through 1989, commercial tribal harvests of Chinook salmon averaged about 27,500 fish per year. The 1989 harvest, at an average weight of 15.4 pounds per fish, sold for $852,000 ($1.1 million in 2001 dollars). From 1990 through 1998 there was not commercial harvest in the estuary except in 1996 (PFMC, 2005). Based on an estimated 1996 harvest of 43,276 fall and spring Chinook salmon at an average weight of 13.5 pounds per fish, PacifiCorp estimated revenue from the 1996 tribal commercial catch at $525,000 ($575,000 in 2001 dollars). In its comments on the draft FERC EIS, the Yurok Tribe provided additional information with respect to that tribe's commercial harvest, noting that for the past 15 years, the Tribe has not had any commercial fisheries for species such as spring Chinook salmon, coho salmon, steelhead, lamprey, eulachon, and sturgeon because of their concern for the status of those species. In only four of those years did the Yurok have a minimal commercial fishery for fall Chinook salmon, while in the remaining 11 years the Tribal Council determined that the projected abundance of Klamath fall Chinook salmon was insufficient to support a commercial fishery. In its comments on the draft FERC EIS, the Yurok Tribe also presented survey data related to the effect of tribal commercial fishery closures on tribal members. They note that the survey results indicate that the hardships associated with the commercial fisheries closures have had a greater impact on respondents living within the ancestral territory than those living elsewhere, and that those losses have disproportionately affected those respondents who receive food assistance.

Data from PFMC (2011) for the in-river tribal fishery harvest (commercial and subsistence) of the Yurok and Hoopa estimates of both fall and spring-run Chinook adults in the Klamath River basin for 2008 is 22,901, 2009 is 28,565, and 2010 is estimated at 30,432. The 2010 estimates are above average tribal harvest catch in the Klamath basin for the years 1978-2010 (CDFG 2011c).

3.4.5 Land Use, Ownership, and Management

3.4.5.1 Land Ownership and Land Use

PacifiCorp owns the land adjacent to the Iron Gate dam, fish hatchery, and powerhouse, as well as most of the land along the Iron Gate reservoir shoreline and the nearby transmission line right-of-way.

PacifiCorp reports more specific land ownership data for its proposed project boundary. The proposed project boundary, containing 3,736.8 acres of submerged and non-submerged lands, encompasses lands adjacent to J.C. Boyle, Copco, Fall Creek, and Iron Gate developments, including the project reservoirs, hydroelectric generation facilities (dams and powerhouses), ancillary facilities such as fish hatcheries and river recreation areas, and certain transmission lines and access roads.

Land use and management outside the confines of PacifiCorp ownership in the project area can and has had a significant impact on habitat conditions in the Klamath River basin. Figure 5 shows land ownership throughout the Klamath River basin from its headwaters to the estuary. Nearly two-thirds of the entire Klamath River watershed is held in federal ownership. In the upper basin in the State of Oregon, the watershed is dominated by federal lands including Winema and Fremont National Forests, Crater Lake National Park, Klamath

National Wildlife Refuges, the Cascade Siskiyou National Monument, and federal wilderness areas. As depicted in Figure 5, private lands in the upper basin include large areas of irrigated agricultural lands located north and south of Klamath Falls, Oregon. Moving south into California, land ownership grows in private ownership near the City of Yreka, with the eastern basin along the California/Oregon border dominated by federal lands including the Klamath and Modoc National Forests, National Wildlife Refuges, and Lava Beds National Monument. In the middle basin, near Yreka, the Scott and Shasta River watersheds are dominated by private lands with federal land holdings including the Shasta and Klamath National Forests, and small parcels owned by the U.S. Bureau of Land Management. Private lands in the middle Klamath basin include timber production and irrigated agriculture in the Scott and Shasta River valleys. Moving west along the mainstem, land ownership again is dominated by federal ownership including the Klamath, Trinity, and Six Rivers National Forests, along with several federal wilderness areas. Along the lower Trinity River lies the Hoopa Valley Indian Reservation, and along the lower mainstem of the Klamath River to the estuary lies the Yurok Indian Reservation. Other lands in the lower watershed include private lands which are primarily used for timber production.

3.4.5.2 Land Use Jurisdiction

Private land use jurisdiction and management in the northern basin is mainly under the purview of Klamath County, Oregon, with smaller jurisdictional lands falling within Lake and Jackson Counties, Oregon. On the California side of the basin, jurisdiction in the far eastern portion of the basin lies within the jurisdiction of Modoc County with the middle Klamath River basin mainly falling within the jurisdiction of Siskiyou County. Moving further west, the lower Klamath basin shares jurisdiction between Del Norte and Humboldt Counties, with the Trinity River basin tributary to the Klamath falling in the Trinity County jurisdictional boundary. All told, there are two states (California and Oregon), and eight counties that have jurisdiction for private land use in the entire Klamath River watershed.

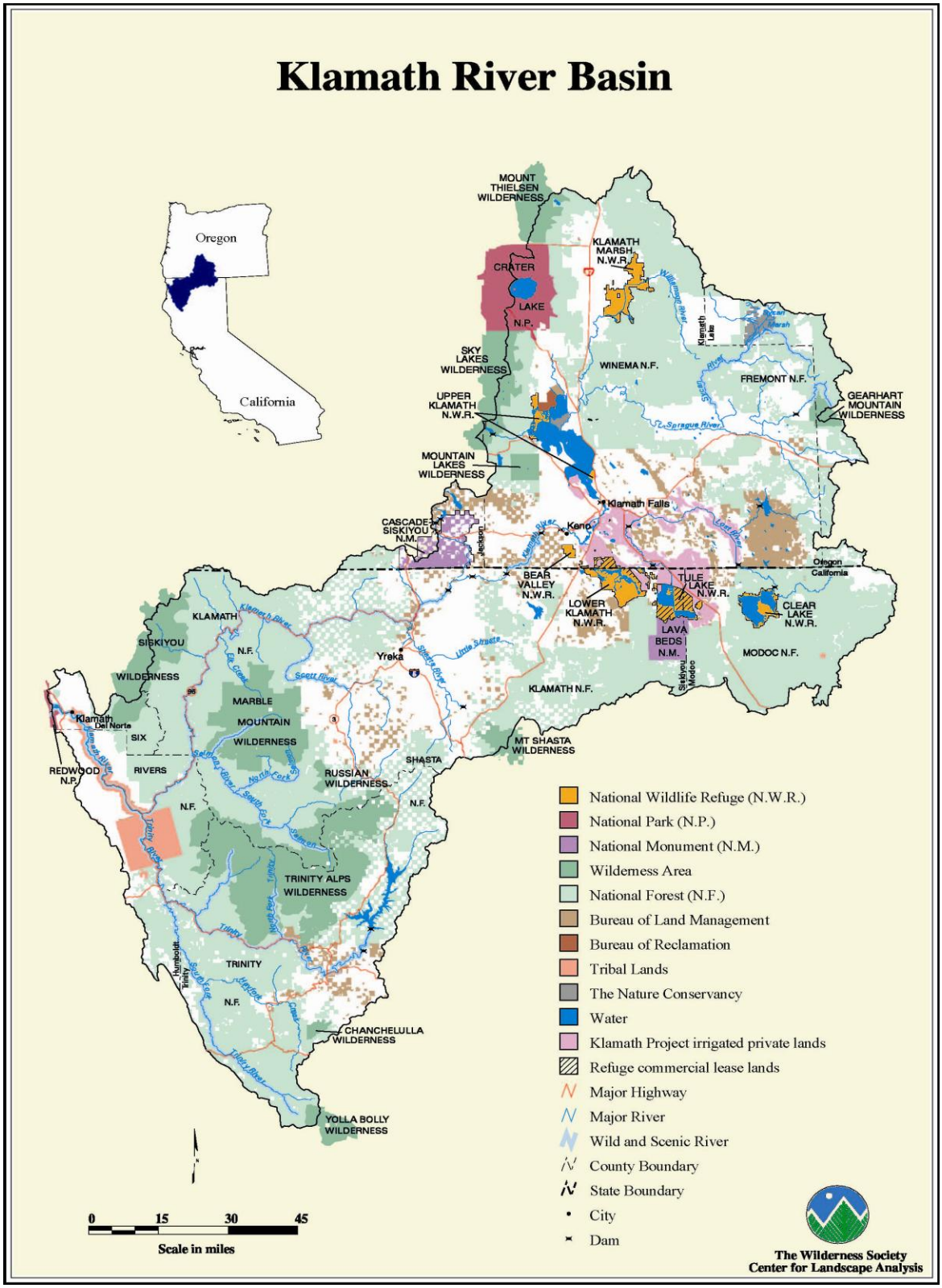

Figure 5. Klamath River Basin land ownership (Source: The Wilderness Society Center for Landscape Analysis)

SECTION 4

Environmental Consequences

4.1 Effects from Proposed Action

4.1.1 Geologic Resources and Geomorphology

Sediment transport downstream of Iron Gate dam is impeded as a result of Project dams and reservoirs being in place. The presence of Project dams and reservoirs will continue to impede the downstream transport of gravel during the period of interim Project operations. This dam-related effect on sediment transport is a current condition that is not expected to change during the permit term and therefore will not result in significant adverse impact. Avoidance of this impact, which would require elimination of the dams and reservoirs, is not practicable under interim operations. However, gravel augmentation actions implemented under the *Coho Salmon Conservation Strategy* (as described under Objective C: Gravel Augmentation in Chapter VI: Conservation Program in the HCP) will mitigate the continuing effect of the Project on gravel transport during the interim period. These actions will increase the supply of gravel in the mainstem Klamath River downstream of Iron Gate by augmenting the supply of gravel.

Summary: NMFS concludes that implementation of the proposed action, issuance of an ITP and implementation of the proposed HCP will not result in significant new impacts to the Klamath River mainstem because the proposed action will not cause an adverse change to current conditions related to dams and sediment transport. NMFS does anticipate there will be improvements during the permit term over baseline sediment conditions in the downstream area below Iron Gate dam with implementation of the HCP. The beneficial impacts of gravel augmentation will help compensate for the effects of Project dams and reservoirs on the reduction in suitable spawning gravel in the reach of the river from Iron Gate dam downstream to the confluence with Cottonwood Creek (at RM 182). The primary beneficial impact of gravel augmentation from implementation of the proposed HCP will likely be limited to this reach. There may be short-term adverse impacts to salmonids during gravel augmentation activities as the placement of gravel could disturb juveniles causing them to relocate temporarily, or could result in the crushing or killing of eggs and fry if the area isn't thoroughly surveyed before the work commences. Additionally, gravel placement could generate a sediment plume in the work area which may disturb or impair redds or juveniles located in the work area. NMFS expects these impacts, should they occur, will be short in duration and are not expected to affect long reaches of streams.

4.1.2 Water Resources

4.1.2.1 Climate and Water Flow

Instream Flows and Flow Variability

As explained in Chapter 3.0 (Affected Environment) PacifiCorp's operation of Project facilities has a minor role in how water is controlled in the basin as Reclamation plays the dominant role in water storage and delivery to upper basin water users.

Actions under the *Coho Salmon Conservation Strategy* (as described under Objective D: Flow in Chapter VI: Conservation Program in the HCP) will provide releases of instream flows from Iron Gate dam that adhere to instream flow commitments contained in the current NMFS Biological Opinion for Reclamation's Annual Operations Plan (NMFS 2010). . Actions under the *Coho Salmon Conservation Strategy* (as described under Objective D: Flow in Chapter VI: Conservation Program in the HCP) also include implementation of a fall/winter flow variability program to further enhance flow releases at Iron Gate dam between October and February of each year of the ITP. The *Coho Salmon Conservation Strategy's* measure under the HCP to help facilitate flow variability downstream of Iron Gate dam enhances Reclamation's ability to implement a flow variability program as directed in the NMFS (2010) BiOp, or future consultations. The flow variability measure commits PacifiCorp to participate in a process with NMFS and Reclamation to implement the Flow Variability Program as outlined in the NMFS (2010) BiOp, and the process and PacifiCorp's commitment are expected to remain under future consultations between Reclamation and NMFS during the permit term. Implementation of a Flow Variability Program will impact the environment by helping to improve water quality conditions downstream of Iron Gate dam, and have the added benefit of better mimicking a natural hydrograph which could aid in the emigration of juvenile salmonids out of poor habitat conditions to more suitable habitat downstream.

Based on information from Stocking and Bartholomew (2007), NMFS (2010) hypothesized that high flow pulses in the fall and winter have the benefit of redistributing adult salmon carcasses downstream that might otherwise become concentrated in the mainstem below Iron Gate dam. NMFS (2010) further hypothesized that static flow conditions combined with nutrient enrichment in the Klamath River reach favor proliferation of periphyton habitat preferred by the polychaete intermediate host of disease pathogens. NMFS believes that an increase in flow variability above required minimum flows would reduce outbreaks of disease in the areas below Iron Gate dam where disease activity is highest via the scour of gravels and the periphyton occurring in these gravels. Such a reduction in disease outbreaks would be a significant benefit to coho and Chinook in the basin. Increased flow variability resulting from this measure will be greatest in the upper Klamath River proximal to Iron Gate dam. Farther down the Klamath River, the accretions from larger tributaries contribute significantly to the volume of water and flow variability characteristics.

Flow Ramping Rates

Actions under the *Coho Salmon Conservation Strategy* (as described under Objective D: Flow in Chapter VI: Conservation Program in the HCP) will ensure flow ramping rates of releases from Iron Gate dam that adhere to commitments contained in the current NMFS BiOp for Reclamation's Annual Operations Plan (NMFS 2010) or future consultations between Reclamation and NMFS. Ramp-down rates below 3,000 cfs are artificially set to

minimize risks of stranding juvenile coho salmon (NMFS 2010). Daily and hourly ramp-down rate requirements are set to meter out the reduction in flow volume and avoid flow and water depth reductions that could harm coho salmon.

NMFS (2010) concludes that these flow ramping rates will protect rearing and migrating coho salmon within the Klamath River downstream from Iron Gate dam. The previous NMFS (2002) BiOp also concludes that the ramp-down rates below 3,000 cfs minimize adverse effects to essential features of coho salmon habitat (e.g., rearing, spawning habitat features). Hardy et al. (2006) concurred with NMFS' conclusion that decreases in flows of 150 cfs or less per 24-hour period and no more than 50 cfs per two-hour period when Iron Gate dam flows are 1,750 cfs or less are not likely to adversely affect juvenile coho salmon critical habitat.

The 2010 BiOp (NMFS 2010) does not contain specific daily or hourly ramp rates when the flow release at Iron Gate dam is greater than 3,000 cfs. The 2010 BiOp (NMFS 2010) recommends that the ramp-down of flows greater than 3,000 cfs should mimic natural hydrologic conditions of the basin upstream of Iron Gate dam. NMFS (2010) expects that habitat effects from these ramping rates will be representative of conditions that would be observed under flow conditions without Project influence. PacifiCorp is currently coordinating with Reclamation to ensure that the ramp-down of flows greater than 3,000 cfs is done to be consistent with natural hydrologic conditions, and that is practicable based upon the physical limitations of the Iron Gate facilities as well as other safety considerations.

Summary: As both the flow variability program and associated ramping down program, in combination, are expected to better mimic a natural, undammed hydrograph, NMFS believes these proposed measures will help to improve habitat and water quality conditions in the Klamath mainstem below Iron Gate dam and will not result in an adverse change to current conditions and, therefore, would not result in a significant new adverse impacts. NMFS does anticipate that improvements in flow variability and rates at which flows are ramped down via coordinated efforts between NMFS, Reclamation, and PacifiCorp will result in improvements to conditions downstream of Iron Gate dam that currently contribute to the development of habitats that lead to outbreaks of fish diseases; therefore, these actions would result in beneficial effects.

4.1.2.2 Water Quality

Water Temperature

The mass of water in the Project reservoirs will continue to cause a "thermal lag" compared to the same location in the Klamath River under a hypothetical "without-dam" or river-only scenario. The natural seasonal trends of warming river temperatures in the spring and cooling temperatures in the fall are expected to be "lagged" about 2 to 4 weeks with the existence of the reservoirs compared to a hypothetical "without-dam" or river-only scenario. The thermal lag is a product of presence of the reservoirs in place. Therefore, avoidance of this impact, which would require elimination of dams and reservoirs, is not practicable under interim operations and NMFS expects this condition to continue throughout the permit term. The proposed action will not change this scenario and therefore would not result in significant impact. However, thermal refugia enhancement actions implemented under the *Coho Salmon Conservation Strategy* (as described under Objective G: Refugia in Chapter VI: Conservation Program in the HCP) will help to mitigate the continuing effect of the Project on water

temperature during the interim period until either dams are removed or FERC relicenses the Project.

The thermal refugia enhancement actions implemented under the *Coho Salmon Conservation Strategy* will improve the quality and carrying capacity of cold water refugia areas along the mainstem Klamath River downstream of Iron Gate. Collectively, refugia-related actions implemented under the *Coho Salmon Conservation Strategy* will enhance and maintain most of the significant refugia areas downstream of Iron Gate dam to the confluence of the Trinity River (RM 43). The proposed maintenance and enhancement of thermal refugia sites from Iron Gate dam to the confluence of the Trinity River extends beyond the distance NMFS believes the PacifiCorp Project adversely affects water temperature in the middle Klamath basin. There could be short-term adverse effects during refugia enhancement actions as juvenile salmonids could be flushed from an existing refugia site while the enhancement work takes place. NMFS anticipates this impact will be short-lived and juveniles will return to the area once the work is complete.

Summary: As the current conditions of dams and reservoirs and the resultant impact on water temperatures in the Klamath mainstem are expected to continue during the permit term, NMFS concludes the proposed action will not result in significant adverse impacts, but actions implemented under the HCP will result in improvements to the protection and enhancement of very important cold-water refuge sites downstream of Iron Gate dam.

Dissolved Oxygen

The NMFS 2007 BiOp (2007a) determined that Project operations, together with naturally occurring factors and the influences of other actions (e.g., agricultural activities and operation of the ~~Klamath Irrigation Project~~ Reclamation's Klamath Project, result in lowered DO levels downstream of Iron Gate dam (especially during the late summer and early fall, and during nighttime hours), which results in limitations to suitable habitat for coho salmon and other fish species. In this EA, NMFS confirms that the causes for low DO levels identified in 2007 are still the same and currently limit~~s~~ suitable fish habitat in the area downstream of Iron Gate dam.

As a result of these concerns, FERC included a recommendation in their EIS that turbine venting be installed at Iron Gate dam immediately upon license reissuance and that DO monitoring be a component of the required changes (FERC 2007). The proposed HCP carries forward this measure and turbine venting will be implemented under the *Coho Salmon Conservation Strategy* (as described under Objective E: Water Quality in Chapter VI: Conservation Program in the HCP) to enhance DO conditions in releases from Iron Gate during the interim period. Turbine venting increases DO by implementing procedures to introduce air into the turbines at Iron Gate dam.

Testing of turbine venting at Iron Gate dam was conducted by PacifiCorp in 2008 and the results of the tests showed a positive improvement in DO concentration measured in the Klamath River below Iron Gate powerhouse. Dissolved oxygen levels increased by up to 2.5 mg/L and 20 percent saturation as a result of full air admission through the existing turbine vent valve design at turbine flows of 1,000 to 1,500 cfs; the range of flows expected in late summer and early fall. The increases in DO from turbine venting were seen throughout the reach of the river for a distance of approximately 6 miles below the Iron Gate powerhouse. Although the 2008 tests indicate that turbine venting can provide enhancement of DO levels,

the test results suggest that the amount of enhancement can vary depending on time of year (as indicated by the differences between August and October test results) or river flow amount (as indicated by the differences between flow levels during the August test).

PacifiCorp performed additional turbine venting/blower testing in 2010. These tests, which examined the effects of a new blower system to provide additional aeration to discharges, found that DO saturation rose by 14.9 percentage points, and average DO concentration rose by 1.8 mg./L (a 33 percent improvement) as compared to no treatment of powerhouse discharge (PacifiCorp 2011b). These more recent tests demonstrated that increases in DO concentrations could be detected at a distance of six miles downstream of Iron Gate dam (PacifiCorp 2011b). In addition, measurements indicated that turbine venting produces a negligible increase in total dissolved gas in turbine discharges to the river. In all cases, total dissolved gas measurements taken during the tests were below 110 percent, which is the criterion established by the USEPA to prevent fish harm from potential gas bubble disease (USEPA 1976).

Turbine venting at Iron Gate dam during the summer and early fall period (when DO levels below Iron Gate dam can be stressful to coho salmon) is expected to improve DO concentrations in the outflow from Iron Gate dam ~~to at least the~~ consistent with NCRWQCB ~~proposed criteria of 85 percent saturation~~ standards during the summer and early fall period when DO levels below Iron Gate dam can be stressful to juvenile coho salmon. This was demonstrated by turbine venting testing conducted in 2008. NMFS also estimates that turbine venting would contribute to increased DO levels in outflow water from Iron Gate dam when operated (NMFS 2007a). No adverse effects from increased DO concentrations are expected.

Summary: NMFS expects that the proposed action will result in substantial improvement compared to current conditions in DO concentrations in the mainstem Klamath River downstream of Iron Gate dam for approximately six miles. NMFS expects that the improvements in DO concentrations will help to improve water quality conditions in this reach and does not expect any significant adverse impacts as a result of the proposed action.

4.1.3 Biological Resources

4.1.3.1 Upper Klamath River System (Above Iron Gate Dam and Reservoir)

This geographic area includes Keno, J.C. Boyle, and the Copco Reservoirs. Some of the following information is derived from the 2008 USFWS BiOp for the Bureau of Reclamation's Proposed Klamath Project Operations from 2008 to 2018.

In the Upper Klamath basin adult suckers must find suitable spawning habitats, avoid adverse water quality, and find food resources. Most sucker larvae drift downstream from riverine habitats where they were born to lake habitats where they rear. Juvenile suckers relocate themselves to find suitable habitats, avoid predators, and reduce competition. Most of the successful reproduction of both the endangered suckers occurs upstream of Keno Reservoir in lakes located in the upper portions of the watershed. NMFS' proposed action will not change any of the existing factors that make the Upper Klamath basin suitable for sucker viability. NMFS does not expect that during the permit term, the variable flow and ramping rate programs will affect habitat suitability of Upper Klamath Lake for the two listed sucker species in a manner substantially different than exists under current conditions.

For the other aquatic species identified in Chapter 3 of this EA and present above Iron Gate dam, such as rainbow trout, NMFS also does not expect that the variable flow and ramp rate programs will adversely impact aquatic species above Iron Gate dam as conditions are expected to remain essentially unchanged.

Summary: Because all the conservation measures proposed in the HCP occur downstream of Iron Gate dam, except for flow measures that will not affect habitat suitability in a manner substantially different than exists under current conditions, NMFS does not believe the proposed action will significantly adversely impact listed sucker populations or other aquatic biota occurring in the Klamath River above Iron Gate dam.

4.1.3.2 Keno, J.C. Boyle, and Copco Reservoirs

It is believed that the few listed sucker adults and larvae that have been collected in Keno, J.C. Boyle, and Copco reservoirs in the past are washed down from upper lakes. However, because these reservoirs contain little in the way of shallow shoreline habitat for growth and development of larvae and juveniles, maintain a well-established predatory assemblage (e.g., largemouth bass), experience poor water quality in the summertime, and do not possess suitable accessible riverine spawning habitat, it is believed that the fish that do end up in Keno, J.C. Boyle, and Copco reservoirs are essentially losses to the overall population. NMFS' proposed action will not change any of these existing factors that make Keno, J.C. Boyle, and Copco reservoirs unsuitable for sucker viability. NMFS does not expect that during the permit term, the variable flow and ramping rate programs will affect habitat suitability of Keno, J.C. Boyle, and Copco reservoirs for the two listed sucker species in a manner substantially different than exists under current conditions.

For the other aquatic species identified in Chapter 3 of this EA and present in Keno, J.C. Boyle, and Copco reservoirs, such as yellow perch and largemouth bass, NMFS also does not expect that the variable flow and ramp rate programs will adversely impact reservoir biota as reservoir conditions are expected to remain essentially unchanged with slight variations in reservoir surface elevations during the flow variability program compared to conditions that currently exist.

Summary: The variable flow and ramp rate programs are not expected to affect aquatic biota in Keno, J.C. Boyle, and Copco reservoirs in a manner substantially different than Project operations under current conditions. Otherwise, all the conservation measures proposed in the HCP occur or have effects downstream of Iron Gate dam. Therefore, NMFS does not believe the proposed action will adversely impact listed sucker populations or other aquatic biota found in Keno, J.C. Boyle, and Copco reservoirs. Similarly, NMFS does not believe implementation of the conservation measures will impact fish-eating birds that inhabit areas near the Keno, J.C. Boyle, and Copco reservoirs as NMFS does not anticipate the conservation measures will have any impact on fish utilizing habitats above Iron Gate Reservoir.

4.1.3.3 Iron Gate Reservoir

Lost River and Shortnose Suckers and Other Species

Some of the following information is derived from the 2008 USFWS BiOp for the Bureau of Reclamation's Proposed Klamath Project Operations from 2008 to 2018.

Adult suckers must find suitable spawning habitats, avoid adverse water quality, and find food resources. Most sucker larvae drift downstream from riverine habitats where they were born to lake habitats where they rear. Juvenile suckers relocate themselves to find suitable habitats, avoid predators, and reduce competition. Most of the successful reproduction of both the endangered suckers occurs upstream of Keno Reservoir in lakes of the Upper Klamath basin. It is believed that the few adults and larvae that have been collected in Iron Gate Reservoir in the past, are washed down from upper lakes. However, because the reservoir contains little in the way of shallow shoreline habitat for growth and development of larvae and juveniles, maintains a well-established predatory assemblage (e.g. largemouth bass), experiences poor water quality in the summertime, and does not possess suitable accessible riverine spawning habitat, it is believed that the fish that do end up in Iron Gate Reservoir are essentially losses to the overall population. NMFS' proposed action will not change any of these existing factors that make Iron Gate Reservoir unsuitable for sucker viability. NMFS does not expect that during the permit term, the variable flow and ramping rate programs will affect habitat suitability of Iron Gate Reservoir for the two listed sucker species in a manner substantially different than exists under current conditions.

For the other aquatic species identified in Chapter 3 of this EA and present in Iron Gate Reservoir such as yellow perch and largemouth bass, NMFS also does not expect that the variable flow and ramp rate programs will adversely impact reservoir biota as reservoir conditions are expected to remain essentially unchanged with slight variations in reservoir surface elevations during the flow variability program compared to conditions that currently exist.

Summary: NMFS does not expect that implementation of the variable flow program and ramping rate changes will result in impacts to suitable habitat for listed suckers or other aquatic species in Iron Gate Reservoir and NMFS does not believe the proposed action will adversely impact listed sucker populations or other aquatic biota found in Iron Gate Reservoir. Similarly, NMFS does not believe implementation of the conservation measures will impact fish-eating birds that inhabit areas near Iron Gate Reservoir as NMFS does not anticipate the conservation measures will have any impact on fish utilizing Iron Gate Reservoir.

4.1.3.4 Klamath River Downstream of Iron Gate Dam

Effects from Near-Term Operational Improvements

Turbine Venting and Flow Variability and Ramping Program

Anadromous Species (Coho, Chinook, and Steelhead). The NMFS 2007 BiOp (2007a) indicates that low DO conditions likely limit the nightly period during which juvenile fish leave refugia habitat to forage within the mainstem Klamath River. NMFS (2007a) also suggests that higher nighttime DO concentrations should afford juvenile coho salmon greater foraging opportunities outside the confines of the existing thermal refugia areas, ultimately resulting in higher survival rates for juvenile coho salmon that rear between Iron Gate dam and Seiad Valley each summer.

Throughout the permit term, with actions implemented under the *Coho Salmon Conservation Strategy* (as described under Objective E: Water Quality in Chapter VI: Conservation Program in the HCP), the increase in DO concentrations is expected to increase the over-summer survival rate for juvenile coho salmon because higher nighttime DO

concentrations allow for greater foraging opportunities. Similar benefits are likely for other fish in the area downstream of Iron Gate dam, including Chinook salmon and steelhead. These benefits are expected to increase the viability of SONCC coho salmon as compared to current conditions, by increasing juvenile-to-adult survival rates. Individual juveniles in the downstream reaches with improved DO concentrations are likely to benefit from better water quality conditions enhancing their probabilities of survival to smoltification, and increases in smolt survival may increase adult abundance given favorable ocean conditions upon ocean entry. These improvements would be expected for Chinook and steelhead as well.

The changes to flow variability below Iron Gate dam with actions implemented under the *Coho Salmon Conservation Strategy* (as described under Objective D: Flow in Chapter VI: Conservation Program in the HCP) will provide a more natural hydrograph and beneficially influence fall redistribution of juvenile coho salmon in the upper reach of the Klamath River (i.e., below Iron Gate dam) (NMFS 2010). Increased fall flow variability will enhance transitory habitat for juvenile coho salmon by providing more side-channel and margin habitat areas preferred by juvenile coho salmon (NMFS 2010). NMFS (2010) concludes that this action will enhance the fitness and overwintering survival of juvenile coho salmon in the mainstem Klamath River, particularly in the reach from Iron Gate dam to the Scott River.

NMFS (2010) concludes that their recommended management of flow releases from Iron Gate dam, including both instream flow and flow variability components, will avoid the likelihood of jeopardizing the continued existence of listed SONCC coho salmon and avoid the destruction or adverse modification of its designated critical habitat. These flows are expected to promote an increase in the natural hydrologic function of the mainstem Klamath River and result in essential features of critical habitat for juvenile coho salmon that will improve the fitness of juvenile coho salmon individuals. NMFS (2010) concludes that these flows will ensure juvenile coho salmon benefit from higher spring flows and increased fall flow variability, which will result in improvements to the overall viability of three Klamath River Basin coho salmon population units.

NMFS (2010) concludes that this measure will provide ecological benefits that will contribute to minimizing and mitigating the impact of any potential take resulting from interim Project operations. Such beneficial effects in in-stream conditions can also have a positive effect on juvenile steelhead and Chinook.

Other Anadromous Species

Green Sturgeon: As green sturgeon occur in the Klamath River mainstem far downstream of the expected area of improved DO concentrations and therefore are unlikely to be exposed to improved DO conditions, NMFS does not expect that turbine venting will have any impact on green sturgeon. Similarly, the flow variability and ramping rate program is not likely to affect green sturgeon to any degree that is different than existing conditions as green sturgeon are likely to occur far downstream of the terminal point where changes in river flow from implementation of variable flows are expected. Where green sturgeon occur in the Klamath mainstem is heavily influenced by upstream tributary flows as compared to the improved flows coming from Iron Gate dam via flow variability implementation.

Pacific Lamprey: Based upon limited current understanding of DO requirements for the growth and survival Pacific lamprey, NMFS anticipates that any improvement in DO concentrations toward levels considered unimpaired for an aquatic system will be likely to

have a beneficial effect on lamprey occurring in the mainstem reach six miles below Iron Gate dam. Implementation of the flow variability and ramping rate program is not expected to result in impacts greatly different than current conditions on Pacific lamprey. There may be some beneficial impact if expansion of side channel habitats results in increases in riverine food webs that could result in an indirect benefit to lamprey occurring in the mainstem directly below Iron Gate dam.

Eulachon: As eulachon distribution is currently understood to be generally below Weitchpec in the lower Klamath River, NMFS does not anticipate that improvements in DO concentrations from the turbine venting program, variable flows, or ramping rate changes will reach areas occupied by eulachon, and therefore NMFS anticipates no effects to eulachon.

Coastal Cutthroat Trout and Other Anadromous Fish: Coastal cutthroat trout are known to occur in the lower 22 miles of the Klamath River far downstream from expected improvements in DO concentrations and influence of the variable flow program. NMFS does not expect turbine venting, variable flows, or ramping rate changes below Iron Gate will affect this species. For other anadromous species such as chum salmon, white sturgeon, and American shad, NMFS expects that white sturgeon, like green sturgeon, will not be exposed to improved DO concentrations from turbine venting or be affected by variable flows and ramping rates, and chum salmon if they migrate to areas near Iron Gate dam are likely to receive benefits from improved DO conditions, variable flow and ramping rate changes in a fashion similar to other salmonids. American shad are not expected to be exposed to improved DO concentrations and variable flows as they are not known to occur in the Upper Klamath River.

Other Non-Anadromous Fish. Other fish species that occur near Iron Gate dam are expected to benefit from improved DO concentrations and variable flows in a similar fashion to salmonids described previously. Some of these species may prey upon juvenile salmonids, however, NMFS assumes increases in predator and prey would result in an overall neutral effect.

Beaver. NMFS does not expect that the turbine venting, flow variability or ramping rate program will have an effect on beaver populations downstream of Iron Gate dam any different than current conditions. NMFS does not expect beaver will be affected by improved DO concentrations downstream of Iron Gate dam as they are mammals (air breathers). The flow variability program could result in inundation of tributary beaver dens, but NMFS expects these inundation events to be infrequent during the permit term as beaver are more likely to build dens in tributaries away from the Klamath mainstem to avoid normal flooding events. Should river levels rise to such a degree that they do inundate a den, NMFS believes the inundation will be for a short period of time with a gradual ramping down of flows limiting the potential to damage beaver dens in the process. NMFS believes any damage to a den would likely be quickly repaired by the affected beaver after flows have subsided. As fish are not a component of beaver diets (they are primarily herbivores), NMFS does not expect that improvements in fish populations will benefit beaver.

Fish-Eating Birds. NMFS anticipates the turbine venting, flow variability, and ramping rate program will have an indirect beneficial effect on bald eagle and osprey during the permit term. NMFS expects beneficial effects to come in the form of improved fish populations

downstream of Iron Gate dam with implementation of the HCP. Improvements in habitat conditions that enhance the viability of fish such as coho, and steelhead, indirectly benefit bald eagle and osprey in that more prey items may become available over the permit term. NMFS does not expect any other effects (adverse or improved) from the turbine venting, flow variability and ramping rate program on bald eagle and osprey.

Summary: NMFS believes implementation of the turbine venting and flow variability and ramping programs will provide direct beneficial effects to coho and Chinook salmon, steelhead, Pacific lamprey and possibly chum salmon if they occur near Iron Gate dam. NMFS anticipates turbine venting and flow variability and ramping rate programs will have no effect on green and white sturgeon, eulachon, coastal cutthroat trout, American shad, and other anadromous species found long distances from Iron Gate dam. NMFS anticipates there will be some beneficial effect to non-anadromous fish species occurring near Iron Gate dam from improved water quality conditions. NMFS expects there will no effect on beaver from these conservation measures, but there could be a beneficial effect for fish-eating birds because the conservation measures are expected to result in increased fish abundance which serve as prey.

Large Woody Debris (LWD) Conservation Measures

Anadromous Species (Coho, Chinook, and Steelhead). The reduced in-river transport of LWD is a product of presence of the dams. Therefore, avoidance of this impact, which would require elimination of the dams and reservoirs, is not practicable during the permit term. Actions implemented under the *Coho Salmon Conservation Strategy* (as described under Objective I: LWD in Chapter VI: Conservation Program in the HCP) will minimize and mitigate the continuing effect of the Project on LWD transport on coho salmon and other anadromous species by increasing the abundance of LWD in the mainstem Klamath River downstream of Iron Gate dam by ensuring that available LWD pieces (greater than 16 inches in diameter and 15 feet in length) trapped at Project dams are released downstream (or alternatively made available for potential use in downstream habitat enhancement projects).

In-stream woody debris provides a fundamental habitat component for salmonids in the Pacific Northwest. The role of woody debris in forming habitat for salmonids is well documented (e.g., Spence et al. 1996). Large pieces of wood provide many habitat functions. These include:

- *Storage and routing of sediment.* Individual pieces and accumulations of wood act as check dams that moderate the delivery of sediment to downstream reaches. This helps to preserve downstream habitat features such as pools which might be wiped out with large, relatively instantaneous delivery of sediment. In steeper reaches, the storage of sediment behind debris jams may provide spawning habitat.

- *Pool scour.* Woody debris provides stable roughness elements in a channel where pools form, resulting in juvenile rearing and adult holding habitat.

- *Cover.* Pieces and jams provide cover from predation and high water velocities.

These functions of LWD are not as significant in large mainstem corridors, like the Klamath, as LWD is more transitory than LWD in smaller tributary reaches. The power of mainstem flows in the Klamath is likely to move released Project LWD much faster than occurs in

tributaries. However, this expected movement of LWD does not mean it will not provide some benefit to developing juvenile salmonids, particularly providing cover from predation and slowing of high water velocities which may provide for areas of deeper mainstem pools, thus providing areas of relief from thermal stress. An increase in pool quantity and quality described above can contribute to rearing habitat and cover available for juvenile salmonids, particularly juvenile coho salmon which depend on pools as the principal habitat type for rearing (Meehan and Bjornn 1991, Tschaplinski and Hartman 1983). Greater amounts of large wood often equate to more frequent and larger pools, which in turn, results in a greater number of juvenile coho per channel length (Roni and Quinn 2001). Such improvements could help reduce juvenile competitive pressures and improve juvenile-to-smolt survival rates. The LWD conservation measures considered in the proposed action are likely to have beneficial effects on salmonids in the mainstem of the Klamath River, primarily coho who utilize LWD habitats for over-winter and summer rearing survival.

Other Anadromous Species. NMFS does not anticipate that the LWD conservation measures will have any effect on green sturgeon, Pacific Lamprey, eulachon, American shad, or white sturgeon. Most of these anadromous species spend a relatively short amount of their life-span in riverine environments and are not as dependent on LWD for growth and survival as are coho, Chinook, and steelhead. Coastal cutthroat trout and chum salmon, however may experience some benefit from increased abundance of LWD in the system.

Other Non-Anadromous Fish. As other fish species in the Klamath River could find some benefit associated with increased levels of LWD in the system via the introduction of increased available cover habitat and food resources (periphyton and invertebrates) that LWD can provide, NMFS anticipates that the addition of LWD into the Klamath mainstem could provide some benefit to non-anadromous fish in the Klamath River.

Beaver. NMFS believes beaver can benefit from the addition of LWD in that more woody material may become available in the Klamath River for beaver to utilize for dam and den building. NMFS is uncertain as to whether increased wood available for den building would result in an increase in the beaver population over the permit term.

Fish-Eating Birds. As with improvements in DO and flow variability, NMFS believes the input of LWD into the Klamath mainstem may have an indirect beneficial effect for fish-eating birds if the conservation activity results in an increase in juvenile-to-smolt survival rates. Such increases in survival rates may result in more fish being available for consumption by bald eagle and osprey. An increase in available food resources may contribute to an expansion of territories and increases in species abundance over the permit term.

Summary: NMFS anticipates implementation of the LWD conservation measures will result in direct benefits to coho, Chinook, steelhead, chum salmon, and coastal cutthroat trout occurring in the Klamath River mainstem. All of these species utilize LWD during the freshwater phase of their life-cycle for protection, the formation of deeper pools for cool water refugia, and sources of food and nutrients. NMFS expects indirect benefits from the addition of LWD to the mainstem Klamath River could occur for other non-anadromous fish, beaver, and fish-eating birds.

Effects from Long-Term Planning and Management Investments

Fish Disease Research

Anadromous Species (Coho, Chinook, and Steelhead). Disease is a factor affecting the survival and fitness of coho salmon in the Klamath River basin. Disease-related research and studies conducted under the *Coho Salmon Conservation Strategy* (as described under objective *F: Disease* in chapter *VI: Conservation Program* in the HCP) will identify actions that would reduce the incidence of fish disease in Klamath River coho salmon, and indirectly, other salmonids such as Chinook and steelhead as well. The Klamath River Fish Disease Research Fund provides the mechanism for funding the research and studies to inform management actions in the river to reduce the incidence of fish disease.

Disease-related research and studies conducted under the *Coho Salmon Conservation Strategy* are aimed at the causes and control of fish disease in the Klamath River system, primarily resulting from the myxozoan parasites *C. shasta* and *P. minibicornis*. The infection rate in coho salmon is known to be high, yet the relationships and conditions responsible for the incidence of disease are poorly understood (NMFS 2010). Klamath River Fish Disease Research Fund actions will address this uncertainty by funding research and studies that will inform and improve management actions to reduce the effects of disease.

PacifiCorp has already initiated the fund and solicitation of research proposals. Research projects are now underway that are investigating management actions to reduce the abundance of the intermediate polychaete host (*M. speciosa*) for disease pathogens *C. shasta* and *P. minibicornis* in the Klamath River through sediment scour and/or flow manipulations. Gaining a better understanding of factors that influence severity of the disease and the host species will inform resource management decisions, including future coho salmon recovery plan efforts in the Klamath River. It is not possible, however, to describe potential effects of specific actions funded by the Research Fund because those actions have not been completely determined yet. Individual research projects selected for funding will need to be analyzed to determine if those specific actions have any environmental consequences, and third parties implementing those specific actions will need to comply with any applicable laws and regulations. It is assumed, however, that these research actions would have no significant adverse effect as research is currently being conducted on hatchery-reared fish and not wild fish. Future management actions that may result from research findings would have a beneficial effect in contributing to disease reduction. Should researchers desire to take listed wild species in the conduct of their research, they would need to obtain a permit from NMFS under ESA Section 10(a)(1)(A), and NMFS would be required to perform an environmental analysis at that time on the impacts of the proposed research project before deciding on whether to issue the permit.

NMFS anticipates that although there may be little direct benefit from the proposed Fish Disease Research component of the HCP conservation strategy, indirect benefits will be experienced by better understanding the mechanisms for disease outbreaks in the Klamath River, and most importantly, how management actions can help to reduce the extent and magnitude of outbreaks. As disease outbreaks are having a significant impact on the Upper Klamath River coho population, and to a lesser extent the Chinook salmon and steelhead population in the area, having the ability to better understand how disease conditions form, and how to better control these disease-forming conditions by changes in water management strategies, will help to improve the viability of the coho population during the permit

duration. This benefit can extend beyond the permit term until conditions which may contribute to disease outbreaks have been ameliorated (e.g. via dam removal).

Other Anadromous Species. NMFS anticipates that benefits to other anadromous species will likely be limited to chum salmon if they occur in the Klamath basin at a time when disease outbreak is occurring. If chum salmon are infected and susceptible to disease mechanisms in a manner similar to coho and Chinook, then benefits derived from the study of disease on the listed and commercially important salmonids should benefit chum salmon as well. NMFS is not aware that the disease-causing organisms that impact salmonids in the Upper and Middle Klamath adversely affect species such as sturgeon, Pacific lamprey, and eulachon. Coastal cutthroat trout occur far downstream of high infection areas, and thus NMFS does not expect disease research will benefit this salmonid species in the permit area.

Other Non-Anadromous Fish and Beaver. NMFS is not aware that the disease organisms and vector pathways that adversely affect coho and Chinook, adversely affect non-anadromous fish or beaver in the Klamath River downstream of Iron Gate dam. Therefore, NMFS does not anticipate that the Fish Disease Research Conservation program contemplated in the HCP will have an impact on non-anadromous fish species or beaver.

Fish-Eating Birds. NMFS anticipates there will be indirect benefits to fish-eating birds from implementation of the disease research program. Research that leads to implementation of management actions that in turn reduces the extent and magnitude of disease outbreaks can have the beneficial effect of lowering disease-related mortality events in Klamath River salmonids. A reduction in mortality events would help to increase the abundance and distribution of salmonids in the Klamath mainstem providing additional food resources for birds such as Bald eagle and osprey. An increase in available food resources may contribute to an expansion of territories and increases in species abundance over the permit term.

Summary: NMFS anticipates indirect effects of disease research that leads to implementation of management actions that reduces the extent of severity of disease outbreaks in the Klamath River mainstem. This will have benefits to coho and Chinook, and possibly steelhead and chum salmon. NMFS does not expect this conservation measure will have impacts on non-anadromous fish and beaver, but does anticipate indirect benefits to fish-eating birds should mortality events for salmonids be reduced over the permit term thereby increasing available prey items.

Improvements to Hatchery Management

Objective B: Hatchery Production of the HCP is based on one target; release at least 75,000 coho smolts each year from Iron Gate Hatchery under an approved Hatchery and Genetic Management Plan. Iron Gate Hatchery was originally constructed as mitigation for blocked habitat between Iron Gate and Copco No. 1 dams. The hatchery will continue operations throughout the permit duration. Actions under the HCP *Coho Salmon Conservation Strategy* include implementation of a Hatchery and Genetic Management Plan (HGMP) and related ESA Section 10(a)(1)(A) enhancement permit covering hatchery operations.

The HGMP contains measures to ensure hatchery operations are consistent with the most current plans for species conservation and reintroduction efforts. Although Iron Gate Hatchery is operated as a mitigation hatchery to compensate for habitat blocked between

Iron Gate dam and the Copco developments, a conservation focus for the coho program has been deemed necessary to protect the remaining genetic resources of the Upper Klamath coho population unit. Recent adult coho returns to this population (and to the entire Klamath River) have been decreasing over time to the point where currently fewer than 60 fish returned to the hatchery and the largest tributary in this population unit (Bogus Creek) in 2009.

The HGMP program will operate in support of the Klamath River basin's coho salmon recovery efforts by conserving a full range of the existing genetic, phenotypic, behavioral and ecological diversity of the run. The program's conservation measures, including genetic analysis, broodstock management, and rearing and release techniques, are expected to maximize fitness and reduce straying of hatchery fish to natural spawning areas. Active broodstock management, based on real-time genetic analysis, is expected to reduce the rate of inbreeding that has occurred in the hatchery population over time. Additionally, the increase in the proportion of natural-origin fish in the total hatchery spawning population is expected to increase population diversity and fitness. Hatchery culture practices under the HGMP program are expected to increase egg-to-smolt survival rates by increasing survival during egg incubation and covering raceways with netting to reduce bird predation.

Summary: NMFS believes implementation of the HGMP will result in benefits to coho, but does not anticipate the HGMP program will result in impacts, beneficial or adverse, to Chinook and steelhead. The HGMP target of releasing 75,000 coho smolts annually is slightly less than the 10-year average (2000-2009) of 82,945 juveniles released from Iron Gate Hatchery (CDFG 2011b). Important objectives of the HGMP will be to preserve genetic resources of the small number of wild coho left in the Klamath Basin, and improve the smolt-to-adult survival rates of hatchery reared coho. These rates are currently believed to be quite low. Because there are millions of hatchery-reared Chinook released from Iron Gate Hatchery annually, NMFS does not believe the number of coho smolts released through the HGMP will have a significant adverse effect on Chinook juveniles rearing in the Lower Klamath River as it is unlikely the coho smolts will prey on a significant proportion of the Chinook population. NMFS does not anticipate the released coho smolts will prey on any significant proportion of the more abundant steelhead juveniles as well. Additionally, although hatchery-released coho smolts have the potential to prey on or outcompete wild coho juveniles, NMFS anticipates the predation will be minimal because of the large expanse of habitat hatchery and wild juveniles will have access to limiting the potential to concentrate hatchery and wild fish and therefore will not result in significant mortality of wild coho. NMFS believes improvements in the production of coho smolts at the hatchery may help to improve smolt-to-adult survival and improve their long-term viability. For other biological resources NMFS anticipates increases in smolt survival would have a beneficial impact on fish-eating birds that would have more prey available for consumption. NMFS anticipates no effect on non-anadromous fish or beaver from the HGMP program.

4.1.3.5 Coho Enhancement Fund

Improvement to Habitat Conditions and Access

Anadromous Species (Coho, Chinook, and Steelhead)

Thermal Refugia: Thermal refugia are considered critical to growth and survival of juvenile coho salmon (and other salmonid species) in the Klamath River. Objective G: Refugia, of the

HCP has two targets, (1) Improve habitat cover and complexity (~~to~~ by about 30 to 50 percent of the total existing cover) or maintain habitat cover and complexity (if already suitable) at 28 coldwater refugia sites along the mainstem Klamath River, and (2) Increase the extent and/or duration (by about 30 to 50 percent of the total existing extent and/or duration) of nine coldwater refugia sites along the mainstem Klamath River. The maintenance and enhancement of these refugia sites, as contemplated in the proposed HCP, is critical to the conservation of the Klamath River coho populations and should also provide benefits to Chinook and steelhead populations which need cool water for juvenile rearing in the hot summer months. Chinook juveniles migrate to the Klamath River estuary relatively quickly after redd emergence so the benefit of this activity will not be as great as the benefits to coho and steelhead. Protection of the very limited thermal refugia sites in the Klamath River mainstem should help improve juvenile-to-smolt survival rates which will aid in improving viability for coho and other salmonids during the permit duration.

Improvements to Habitat Access: Actions under the *Coho Salmon Conservation Strategy* (as described under Objective A: Fish Passage in Chapter VI: Conservation Program in the HCP) will include specific projects to create, maintain, or improve access by coho salmon to habitats downstream of Iron Gate dam. These projects will serve to increase the distribution of coho salmon and improve the spatial structure of the population. Increasing available habitat below Iron Gate dam will help ensure that coho salmon populations remain stable and improve while parallel actions are taken to address volitional fish passage issues in the longer term.

The specific access-related projects implemented under the *Coho Salmon Conservation Strategy* (as described under Objective A: Fish Passage in Chapter VI: Conservation Program in the HCP) will collectively over a 10-year period, improve and maintain access to suitable habitat in approximately 60 miles of tributary habitat. Specific barrier removal projects also will be implemented over the permit duration to create permanent access for spawning and rearing in at least another mile of currently inaccessible habitat. These efforts will help to expand currently inaccessible habitat to coho, mitigating for the blocked habitat caused by Project dams. By the end of 2020, NMFS anticipates that the habitat currently blocked by Project dams will become accessible either through dam removal or the implementation of volitional fish passage. The habitat access improvement program contemplated in the HCP for coho habitat improvement should also provide benefits to Chinook and steelhead where these species co-occur with coho in Klamath River tributaries and are also blocked from accessing suitable spawning and rearing habitat.

Improvements to Habitat Conditions: The *Coho Salmon Conservation Strategy* includes several measures (as described in Chapter VI: Conservation Program in the HCP) that will enhance coho salmon habitat in the Klamath River and tributaries downstream of Iron Gate dam. These measures are targeted to provide mitigation for habitat-related effects resulting from the continued presence and operations of Project dams and reservoirs during the interim period (see Table 4 in Chapter VI: Conservation Program in the HCP). These include the effects as described previously for actions related to water flows, water quality, and gravel augmentation, which are important factors related to the suitability of habitat conditions in the Klamath River basin.

In addition to actions related to water flows, water quality, and gravel augmentation, the *Coho Salmon Conservation Strategy* includes additional measures for enhancement of habitat conditions. Actions under the *Coho Salmon Conservation Strategy* (as described under Objective J: Connectivity and Objective K: Tributary Rearing Habitat Enhancement in Chapter VI: Conservation Program in the HCP) will enhance flow and habitat conditions in important habitat for coho salmon in tributaries of the Klamath River. For example, Objective J is based on two targets, (1) Restore connectivity in 10 stream reaches of juvenile rearing habitat in tributaries of the Upper Klamath, Scott and Shasta Rivers, and (2) Fund a water transaction program to provide flow augmentation in key reaches used for coho spawning and juvenile rearing in these same watersheds. Objective K of the HCP (~~Mainstem~~ Tributary Rearing Habitat Enhancement) will enhance rearing habitat in key rearing tributaries in the same watersheds as well as protect 10 miles of important summer rearing habitat. These actions will provide additional mitigation for potential indirect effects of the Project on the suitability of habitat for coho salmon in the Klamath River mainstem corridor downstream of Iron Gate dam. Although the habitat conditions in the Scott and Shasta Rivers are not affected by the Project, the current degraded conditions of these highly important tributary habitats for spawning and rearing can act to limit their use by coho, Chinook, and steelhead which results in higher utilization of the mainstem Klamath River than would otherwise occur if these tributaries provided year-round suitable habitat conditions (Chesney and Yokel 2003). The target watersheds currently experience low water conditions in the summer that strand juvenile salmonids, or concentrate juveniles into limited rearing habitat which can result in over-crowding adversely affecting juvenile growth and survival. Additionally, Objective H of the HCP (Mainstem Rearing Habitat Enhancement) is based on the target of enhancing rearing habitat in two key ~~tributaries~~ sites of the mainstem Klamath River corridor. Funds from PacifiCorp will be used to increase the amount of or quality of habitat conditions in Klamath River mainstem coho rearing habitat. Improvements could include channel realignment, alcove or pond deepening, riparian planting, and other actions. Rearing habitat is currently very limited in the Upper and Middle Klamath River, so any actions that protect and enhance existing or potential rearing habitat will help to aid the viability of coho populations in the permit duration. Improvements to rearing habitat could also provide benefits to juvenile steelhead and Chinook as well.

Improvements to Disease-Forming Conditions and Spawning Habitat: Objective C: Gravel Augmentation of the HCP is based on one target; provide 500 cubic yards of gravel augmentation either annually or 3,500 yards over the term of the ITP downstream from Iron Gate dam. Gravel augmentation is planned to serve two purposes, improve or create suitable coho spawning habitat, and aid in the reduction of disease outbreaks via gravel scour. The augmentation of gravel in the river downstream from Iron Gate dam will enhance conditions for coho and Chinook salmon spawning in the river during fall, and also will enhance gravel-related scour of the disease host *M. speciosa*, particularly during runoff events. Implementation of a gravel augmentation plan is expected to provide some improvement in the viability of the Upper Klamath coho population by increasing their abundance, productivity, and survival. Viability improvements are expected via expansion of potential suitable spawning areas and reduction in disease outbreaks that cause mortality in juvenile coho and Chinook salmon. Improving viability will help conserve coho salmon during the permit duration prior to potential dam removal as specified in the KHSA ~~Settlement Agreement~~ or other long-term mitigation and enhancement measures for gravel addressed

under a new FERC license. Steelhead may also benefit from a reduction in disease-forming conditions, but are not found to be as susceptible to the known disease pathogens as coho and Chinook.

Summary: NMFS anticipates that projects funded through the Coho Enhancement Fund will result in long-term improved habitat conditions and access to habitat and will result in beneficial impacts to coho primarily, and indirectly Chinook and steelhead as well. Although implementation of restoration projects can result in the potential for short-term adverse effects (e.g. juvenile displacement from work sites, temporary increase in turbidity levels downstream from worksites), NMFS believes such adverse effects will be short-lived while the benefits from the projects NMFS anticipates will be long-term and far outweigh the short-term impacts associated with implementation of projects.

Other Anadromous Species

Thermal Refugia: NMFS anticipates that protection and maintenance of thermal refugia sites in the Klamath River mainstem will provide indirect benefits to other anadromous species such as chum salmon, and coastal cutthroat trout which utilize cold water habitats. Species like white and green sturgeon, eulachon, and Pacific lamprey are not as dependent on cold water habitats as are salmonids, and therefore NMFS expects protection and maintenance of thermal refugia sites will have no effect on their growth or survival in the freshwater environment.

Improvements to Habitat Access: NMFS anticipates implementation of the habitat access improvement program may provide some benefit to chum salmon that spawn in the lowermost portion of tributaries where habitat improvement projects are implemented. Such improvements could result in the improvement of chum spawning grounds. NMFS does not anticipate benefits to coastal cutthroat trout as most improvement projects are likely to occur far upriver from where cutthroat trout occur. However, should habitat improvement projects occur in downstream areas where this species is known to occur, NMFS anticipates beneficial impacts to the species by improving habitat access to suitable spawning tributaries. NMFS does not anticipate any impacts to eulachon, Pacific lamprey, or white or green sturgeon as these species are mostly mainstem spawners.

Improvement to Habitat Conditions: NMFS anticipates implementation of projects that improve water quality, water flow, and spawning habitats may result in beneficial impacts to chum salmon which may spawn in the reaches improved for coho. Since the targeted watersheds for these conservation measures are the Upper Klamath, Scott, and Shasta Rivers, NMFS does not anticipate impacts to other anadromous species such as eulachon, Pacific lamprey, cutthroat trout, or white or green sturgeon. These species spend most of their freshwater life history phase in the Klamath River mainstem far removed from these upper reaches, and therefore will not be affected by projects designed to benefit coho. Some indirect benefit to these species may be achieved if habitat condition projects result in some improvement to Klamath River water quality, but NMFS expects any such improvements are likely to be small in scope and would not result in any measurable water quality improvements to the entire Klamath River mainstem.

Improvements to Disease-Forming Conditions and Spawning Habitat: NMFS anticipates the gravel augmentation program envisioned in the HCP is unlikely to affect other anadromous species besides coho, steelhead, and Chinook. The program will be specifically targeted to

improve spawning habitat for coho, and aid in the reduction of disease outbreaks in the Upper Klamath River below Iron Gate dam. Species such as sturgeon, eulachon, and Pacific lamprey are either unlikely to occur where these projects will occur or are not known to be susceptible to the same disease pathogens that result in mortality events on coho, steelhead, and Chinook.

Summary: NMFS anticipates implementation of projects designed to improve habitat access and habitat conditions for coho salmon will result in benefits for other anadromous species such as chum salmon and coastal cutthroat trout ~~who~~ which utilize similar habitats for growth and survival during the freshwater phase of their life cycles. Where these two species co-occur in a watershed targeted for coho improvement, they are most likely to benefit from the improvement to habitat conditions, or access to habitat. Although implementation of restoration projects can result in the potential for short-term adverse effects (e.g. juvenile displacement from work sites, temporary increase in turbidity levels downstream from worksites), NMFS believes such adverse effects will be short-lived. Other species such as eulachon, sturgeon, and Pacific lamprey will not be affected by the coho projects as the projects are likely to occur far upriver from where these primarily mainstem species reside.

Other Non-Anadromous Fish and Beaver

The projects designed to improve habitat access and conditions for coho salmon are unlikely to impact other non-anadromous fish in the basin, as habitat access and conditions are not known to be limiting the growth and survival for species such as brown trout and largemouth bass. NMFS does not anticipate the coho habitat projects are likely to have an effect on beaver unless the targeted projects result in the modification or destruction of beaver dams. NMFS does not anticipate this is likely however, as beaver activity in salmonid streams is generally considered beneficial to salmonids growth and survival.

Fish-Eating Birds

NMFS anticipates the habitat access and improvement projects could result in an increase in the abundance and distribution of coho, Chinook, and steelhead. An increase in these species during the permit duration may result in an increase in available food resources for fish-eating birds which may contribute to an expansion of territories and increases in bird abundance over the permit term.

4.1.4 Socioeconomics and Environmental Justice

This EA examines the proposed action and its potential impacts to socioeconomic and environmental justice issues in the Klamath basin. Some of these issues were previously identified in the FERC FEIS and the reader is directed to that document for further detail on general socioeconomic considerations in the Klamath basin.

4.1.4.1 Recreation

In the upstream subregion, the Klamath River and its reservoirs support a number of recreational pursuits, including whitewater boating (private and commercial), sport fishing (private and commercial), camping, and waterskiing. Whitewater boating and river based fishing are recreational activities that may be affected by implementation of the HCP, specifically with regard to flow variability. For example, generally April through October is considered the peak water sport recreation season in the Klamath River, however fishing for

steelhead is highest in winter months to coincide with the steelhead run. It is not practicable to estimate how increasing flow variability downstream of Iron Gate dam in the fall and early winter might translate into actual impact on recreational activity days. NMFS anticipates there may be some instances where flow releases in the early winter may coincide with steelhead migration and recreational fishing for steelhead may be interrupted or impaired during the increased flow periods. NMFS believes this effect will likely be minor and not result in a significant reduction in fishable conditions for steelhead over the season.

Flow variability might slightly overlap the whitewater boating season for a short period of time (September/October), but variance in flows is not anticipated to significantly impact this recreational activity due to most of the whitewater activity occurring above Copco Reservoir, or near Happy Camp far downstream of Iron Gate Reservoir. However, development and implementation of a plan to increase flow variability below Iron Gate Dam would likely take whitewater boating safety below Iron Gate into consideration. Impacts to this activity are difficult to determine, as increasing river flows can either draw more whitewater boaters who prefer more challenging river conditions, or reduce whitewater boaters who prefer more tranquil river conditions. Which type of boater could be impacted by variable flows is difficult to determine, but NMFS anticipates the impacts on whitewater boating are likely to be neutral. Additionally, NMFS does not anticipate implementation of the HCP would result in any impact on camping or waterskiing opportunities as implementation of the conservation measures would have no effect on either of these two recreational activities.

4.1.4.2 Commercial Fishing

In recent history, commercial fishing has been characterized by downward trends in market prices, poor ocean condition cycles, and adverse habitat alterations for all regions along the west coast of North America (FERC, 2007). Such trends have led to a substantial decrease in income and jobs in economies that rely on fisheries (salmon and steelhead). Tribes have also been greatly affected as their commercial catch of Chinook salmon has been severely curtailed since the 1990's. Implementation of the HCP as a condition of the ITP is anticipated to lead to an increase in fishing overall if implementation of conservation measures result in increased freshwater survival and adult returns for Chinook and steelhead, as an indirect benefit of coho based projects. Disease reduction would potentially increase fish populations benefiting recreation and commercial fishing as a result of the Fish Disease Research Fund.

4.1.4.3 Environmental Justice

Minority or low income populations will not be disproportionally adversely impacted by the proposed action. A potential beneficial impact is anticipated for tribes in the area. Potential positive impacts on harvest quotas available to the tribes to enhance their commercial and subsistence salmon harvest are anticipated due to the required HCP and associated beneficial impacts to salmonid populations. Increased salmon populations and harvests would allow access to a more traditional diet and lifestyle resulting in improved physical, cultural, and spiritual health. It is anticipated tribal fisheries restoration programs in the Klamath basin, such as those of the Karuk and Yurok tribes, will be instrumental in implementing habitat protection and improvement projects considered in the HCP. This collaboration between these programs and the Coho Enhancement Fund provide the opportunity to provide jobs to tribal and non-tribal members involved in restoration projects, a positive benefit of the ITP.

It is not anticipated that issuance of a 10-year ITP for the Project will negatively impact any of the socioeconomic resources in and around the entire permit area and more specifically downstream of the Iron Gate Dam. The ITP and associated HCP conservation mitigation measures would support the economies (e.g., employment and income) as a result of stream restoration activities leading to projects that would utilize local resources (e.g., contractors and suppliers).

Summary: NMFS anticipates minor beneficial effect to socioeconomic and environmental justice concerns with implementation of the HCP. NMFS makes this determination based upon the assumption that an important minority population (tribes) will benefit from funding for restorative projects when this population is a part of the implementation and monitoring of these projects. Additionally, NMFS anticipates there may be some reductions to fishable steelhead days during implementation of the flow variability program in the winter, but does not anticipate this impact will be significant. There may be some improvement to recreational opportunities should implementation of the HCP result in an increase in adult returns of Chinook and steelhead during the permit duration, allowing for stable and perhaps increasing adult returns available for capture. NMFS anticipates no impacts to camping opportunities. Although impacts to whitewater boating from flow variability may be neutral, there may be adverse impacts limited to short periods and limited area of overlap, but no significant adverse impacts to whitewater boating are expected.

4.1.5 Land Use

NMFS does not anticipate implementation of the HCP will lead to any significant impacts on land use. Most of the conservation measures outlined in the HCP will be limited to instream projects (e.g. culvert removals, thermal refugia enhancement, gravel augmentation, etc…). In the Scott and Shasta River basins conservation measures that are designed to keep or get more water into river mainstem or tributary habitat could result in the conversion of some irrigated agricultural lands to other land uses with a lower water demand (e.g. livestock grazing). NMFS cannot predict with any certainty however whether and how such land uses change would occur. NMFS does not anticipate such conversions would be significant in these two basins during the permit term however.

4.2 Effects from No Action ~~(No ITP and no Implementation of the HCP Including the Coho Salmon Conservation Strategy)~~

4.2.1 Geologic Resources and Geomorphology

Without implementation of the conservation measures outlined in the HCP, the presence of Project dams and reservoirs would continue to impede the downstream transport of gravel during the interim period without any mitigating actions. The dams in the basin ~~significantly~~ impede the transport of gravel downstream of Iron Gate dam which results in the reduction of spawning habitat and scouring potential from flow events which results in the development of more favorable habitat conditions for the disease host *M. speciosa*. Under the No Action Alternative, these effects would be expected to continue throughout the permit duration and

gravel augmentation efforts to create more spawning habitat for coho and efforts to reduce the development of conditions that lead to disease outbreaks would not occur.

Summary: NMFS expects the No Action alternative would result in continued unfavorable sediment transport conditions and result in continued development of disease-forming conditions and limited availability of coho spawning gravels downstream of Iron Gate dam without mitigating actions to limit the impacts of these conditions over the next 10 years.

4.2.2 Water Resources

4.2.2.1 Climate and Water Flow

Instream Flows and Flow Variability

While PacifiCorp operates their facilities and controls the flows at their facilities on the Klamath River, ~~operations do not determine or control the availability of flows released from Iron Gate dam as flows are determined by~~ Reclamation ~~which consults with NMFS on the effects of these flows~~, is responsible for providing a sufficient volume of water to PacifiCorp facilities to enable PacifiCorp to make water releases from Iron Gate Dam that will meet biological opinion requirements for Reclamation's operations. This occurs through consultation on the effects of Reclamation's Klamath Project operations. If the HCP were not implemented as would be the case under the No Action alternative, ~~the loss of effective coordination to implement flow variability as a strategy to mitigate for the presence of dams in the basin, which has resulted in~~ the altered natural hydrology would continue to adversely affect coho and likely Chinook and steelhead during the permit term without effective coordination to implement flow variability as a strategy to mitigate for the presence of dams in the basin. Thus, the No Action alternative may result in ~~adverse effects to~~ continued poor habitat quality and ~~could~~ impaired salmonid migration and rearing opportunities.

NMFS (2010) indicates that the current and post-dam building flow regimes may interfere with environmental cues that initiate the redistribution of juvenile coho salmon in the river and potentially other important ecological functions. The loss of these important life history patterns (juvenile redistribution) may prevent juvenile coho from leaving poor over-wintering habitat in the upper Klamath River when they should seek more favorable overwintering habitat downstream. Failure to redistribute to more suitable habitat can result in lower overwinter juvenile survival. Failing to implement a coordinated variable flow program, as may occur under a No Action alternative, might also reduce the amount of short-term (i.e., transitory and refugial) rearing habitat that would become available during artificially induced flow events. NMFS believes this impairment to the natural (undammed) flow regimes and distribution pattern of juvenile coho and other salmonids can negatively influence the fitness and overwintering survival of juvenile salmonids in the mainstem Klamath River, particularly in the reach from Iron Gate dam to the Scott River (NMFS 2010). NMFS (2010) also indicates the loss of flow variability in the spring may result in habitat reductions for juvenile coho salmon in portions of the Upper Klamath River reaches (R-Ranch to Trees of Heaven). Impediments to smolt outmigration timing with a concurrent reduction in smolt size appear to be related to smallscale habitat variability (Weitkamp et. al 1995) including mainstem river flows. Additionally, NMFS believes modifications in controllable fall/early winter flows may reduce disease risks from *P. minibicornis* and *C. shasta* on juvenile coho salmon in the upper reach of the Klamath River.

Flow Ramping Rates

Under a No Action alternative, PacifiCorp would likely continue to follow ramping rates below Iron Gate dam as specified in Reclamation's Operations Plan for ~~the Klamath Irrigation Project~~ Reclamation's Klamath Project (Reclamation 2010) in accordance with the 2010 NMFS BiOp (NMFS 2010), or conditions established in future consultations between Reclamation and NMFS. However, the No Action alternative may result in PacifiCorp not having the ability to cooperatively participate in a ramping rate strategy that provides the most achievable benefit for juvenile coho and other salmonids in the Klamath mainstem while taking into consideration other important factors such as operational and human safety. Failure to cooperatively participate in a flow ramping program could result in greater potential for ramped down flows to result in stranding of juvenile coho below Iron Gate dam, as well as reduce habitat made available for juvenile cover and growth during implementation of controlled higher flow events.

Summary: NMFS believes that the No Action alternative, ~~in which PacifiCorp would not be included in cooperative effective implementation of a flow variability and ramp rate program~~ is likely to result in continued adverse impacts to coho salmon populations in the Klamath River without PacifiCorp being included in cooperative, effective implementation of a flow variability and ramp rate program to mitigate these impacts. These impacts include flow-related interference with environmental cues that cause juvenile coho to leave unfavorable overwintering habitat to more favorable habitat, potential stranding of juvenile coho during ramp down flows that have not adequately taken into consideration the distribution of coho in the upper basin. ~~As a result, t~~These ~~No Action~~ conditions may lead to not only mortality of individual coho, but can also reduce ~~adequate~~ growth and survival of juvenile coho, leading to poor juvenile-to-smolt survival rates or poor smolt-to-adult survival rates continuing the existing trend of declining coho populations in the Klamath River. Similar impacts could occur to juvenile steelhead, but are likely not as severe as impacts to coho. As Chinook migrate towards the Klamath River estuary upon redd emergence and do not overwinter in mainstem waters, they are not as susceptible to the same threats and limitations as coho and steelhead. As such, NMFS does not expect the No Action alternative, as it relates to the Project's limited control over water flow, would affect Chinook.

4.2.2.2 Water Quality

Water Temperature

Water temperature patterns below Iron Gate dam would be similar under a No Action alternative, as compared to the Proposed Action during the proposed permit term, most notably meaning there would be little change in late summer/early fall water temperatures in the upper Klamath River mainstem below Iron Gate. Project reservoirs will continue to cause a "thermal lag" and this lag could affect the timing (or periodicity) of coho salmon life stages below Iron Gate dam, or affect coho salmon egg pre-spawn viability and juvenile growth (bioenergetics), foraging, and fitness.

A No Action alternative would not provide for any mitigation of these thermal impacts however on juvenile salmonids. Under a No Action alternative, the measures to enhance or maintain thermal refugia ~~enhanced or maintained~~ as outlined in the HCP, would not be implemented. ~~The effect of this may result in a continuance of~~ Poor habitat conditions for juvenile salmonids in the late summer/early fall would continue without any mitigating

actions, which may result in impaired ~~whose~~ growth and survival of juvenile salmonids to smolt stage, ~~may be impaired~~ due to a lack of access to cold water refugia sites. ~~Such access to cold water refugia~~ NMFS considers such access to cold water refugia beneficial to the growth and survival of coho in the upper Klamath.

Dissolved Oxygen

The No Action alternative would result in the turbine venting strategy at Iron Gate dam not being implemented during the proposed permit term of the Proposed Action. The substantial improvement expected in DO concentrations downstream of Iron Gate dam via turbine venting would not occur and the current ~~state~~ conditions of poor DO habitat conditions ~~for at least 6 river miles~~ downstream of Iron Gate would continue for the next 10 years. NMFS (2007a) believes that these low DO conditions would continue to limit the nightly period during which juvenile fish leave refugia habitat to forage within the mainstem Klamath River. Continuation of these impairments to distribution and foraging opportunities would likely continue the declining trend of coho populations in the Upper Klamath River below Iron Gate dam. This coho population is most at risk to the effects from Project operations and would continue to be exposed to stressful habitat conditions for the next 10 years.

Summary: ~~In regards to the No Action alternative and effects on water temperature and water quality~~, NMFS anticipates the No Action alternative would result in continued poor ~~stress on coho populations as well as other salmonids occurring in the vicinity of Iron Gate dam, and would not result in improvements to~~ water quality downstream of Iron Gate for the next 10 years without mitigation or improvements in water temperature and water quality, which, in turn, would result in continued stress on coho populations as well as other salmonids occurring in the vicinity of Iron Gate dam. Without the benefits associated with protection and enhancement of in-river thermal refugia sites, and improvements to DO levels, these conditions would be likely to contribute to further declines in the Upper Klamath River coho population, and thus the resiliency of the entire Klamath River coho population would remain at risk.

4.2.3 Biological Resources

4.2.3.1 Upper Klamath River System (Above Iron Gate Reservoir)

Shortnose and Lost River Suckers and Other Fish Species

Under the No Action alternative, NMFS anticipates there would be no change from any effects of current conditions on SNS, LRS, or other fish species identified in Chapter 3 of this EA. As the No Action alternative would result in no implementation of the PacifiCorp HCP, current conditions in the Upper Klamath River system would remain. As mentioned under the proposed action Upper Klamath Lake supports a trophy-sized trout fishery and NMFS anticipates this would continue under the No Action alternative. NMFS anticipates the distribution and abundance of SNS and LRS in Keno, J.C. Boyle and Copco reservoirs would remain the same under the No Action alternative.

4.2.3.2 Iron Gate Reservoir

Lost River and Shortnose Suckers and Other Species

The No Action Alternative would not implement the flow variability program described in the HCP, however, as described under the Proposed Action NMFS does not anticipate the

variable flow program, even if implemented, would affect habitat suitability of Iron Gate Reservoir for the two listed sucker species in a manner substantially different than exists under current conditions. As such, NMFS does not believe implementation of the No Action alternative would result in any changes to any impacts from current conditions to these two species. For the same reasoning, NMFS expects there would be no changes to any impact from current conditions to other aquatic species present in Iron Gate Reservoir from the No Action alternative.

4.2.3.3 Klamath River Downstream of Iron Gate Dam

No Turbine Venting, Flow Variability and Ramping Programs

Anadromous Species (Coho, Chinook, and Steelhead)

As mentioned above, the No Action alternative would not implement the turbine venting, flow variability, and ramping rate programs outlined in the HCP. Thus the No Action alternative ~~Failing to implement these programs~~ would likely result in ~~continued adverse effects on Upper Klamath River coho populations, as well steelhead and Chinook occurring in the Upper Klamath River. These adverse effects are the~~ continued occurrence of low DO conditions below Iron Gate dam without the improvements to DO from the proposed action described above, lack of flows which mimic natural flows in the basin, and ramp down rates that do not fully consider the needs of juvenile salmon located in reaches subject to the effects from ramp down events. The benefits anticipated from mitigating actions outlined in the HCP (improvements in DO concentrations, improvements in foraging opportunities, providing access to additional suitable overwintering habitat, etc...) would not occur leaving coho, Chinook, and steelhead susceptible to the unfavorable mainstem habitat conditions described above for the next 10 years. NMFS believes such conditions ~~a scenario~~ would result in continued ~~further adversely impact~~ declining coho populations in the basin. NMFS also believes the No Action alternative would ~~adversely impact~~ result in continued declines in Chinook and steelhead populations as well, as these species can also be limited by poor habitat conditions in the Klamath River mainstem.

Other Anadromous Species

Under a No Action alternative the potential benefits contemplated under the proposed action for Pacific lamprey and chum salmon, which may occupy areas downstream of Iron Gate dam on occasion, would not be realized. Lamprey that may utilize mainstem habitat below Iron Gate dam would not be exposed to improved DO conditions, nor would they benefit from variable flows that could result in improved side-channel habitats which may result in improvement to food resources downstream of Iron Gate. ~~Should current poor water quality conditions in the mainstem of the Klamath River be~~ The No Action alternative is likely to result in continued poor water quality conditions in the mainstem of the Klamath River below Iron Gate dam, which may be a factor in the decline of lamprey in the Klamath River, without the improvements from the proposed action described above. ~~the No Action alternative is likely to have an adverse impact on this species~~. For other anadromous species such as white and green sturgeon, eulachon, and coastal cutthroat trout NMFS anticipates the No Action alternative ~~which would not implement turbine venting, flow variability, and ramping programs~~, would result in no effect to these species. As noted previously, these species are generally found below mainstem habitat that NMFS expects will be influenced by either the water resources components of the Proposed Action or No Action alternatives.

Other Non-Anadromous Fish

Implementation of the No Action alternative would not improve water quality conditions in reaches immediately downstream of Iron Gate dam. NMFS anticipates that the No Action alternative would have no impact related to water quality conditions on other non-anadromous fish species found downstream of Iron Gate dam.

Beaver

NMFS expects implementation of the No Action alternative would not affect beaver in the Klamath River basin. Failing to implement a program to improve DO levels near Iron Gate dam, or artificially induced seasonal variable flows in the Klamath River mainstem would not affect beaver as they are air breathers and do not eat fish. ~~which could increase in numbers over the permit term by implementation of the HCP.~~ Thus, beaver would likely not benefit from improved DO levels near Iron Gate dam or artificially induced seasonal variable flows in the Klamath River mainstem under the proposed action. In summary, beaver do not appear to be limited in the Klamath River by poor water quality conditions or river flows.

Fish-Eating Birds

Implementation of the No Action alternative would result in ~~could affect fish-eating birds in that~~ continuation of current poor water quality conditions and flows with limited variability below Iron Gate dam, which may lead to further declines of salmonids in Klamath River for the next 10 years. Continued declines in Klamath River fish abundance can indirectly impact fish-eating bird species such as bald eagle and osprey that depend on fish as the major component of their diets. Continued reductions in coho and steelhead abundance could result in a corresponding reduction in the numbers of fish-eating birds that inhabit the Klamath River mainstem corridor.

No Large Woody Debris Improvement

Anadromous Species (Coho, Chinook, and Steelhead)

The No Action alternative would mean PacifiCorp would not implement a program to transport large woody debris caught at project facilities to areas downstream of Iron Gate dam. Additionally, PacifiCorp would not provide this LWD for restoration projects that intend to use this material for the construction of complex wood jams in Klamath River tributaries. As described previously in this EA, large woody debris plays a crucial role in the growth and survival of salmonids including providing cover from predators, slowing of high velocity waters, and can lead to the development of deeper pools which can provide food resources as well as areas of thermal refugia. Under current conditions, the Project dams can trap the movement of large woody debris down the Klamath River mainstem effectively removing the important ecological role this debris provides throughout the mainstem to the estuary. ~~NMFS believes the No Action alternative, which would result in no LWD being transported downstream of Iron Gate dam or made available to build suitable habitat structures, would result in adverse effects to coho, Chinook, and steelhead. The adverse effect would be~~ The continued low levels of LWD ~~transported down~~ in the Klamath mainstem, particularly near Iron Gate dam, would result in continued limited areas ~~resulting in fewer areas~~ for fish cover, protection, and food resources for coho, Chinook and steelhead, without improvements that would result from the LWD program of the proposed action. ~~Basin~~ These salmonids ~~who~~ benefit from the presence of LWD in mainstem channels even if it is transitory in nature.

Other Anadromous Species

As with coho, Chinook, and steelhead, chum salmon and coastal cutthroat trout in the Klamath River could benefit from the addition of LWD to the mainstem system. NMFS expects the No Action alternative would ~~not~~ result in continued low levels of ~~additional~~ LWD being available to these two species that derive the same benefit from LWD as other salmonids. NMFS expects no effect from the No Action alternative on white and green sturgeon, eulachon, and Pacific lamprey as these species are not as dependent on the presence of LWD in mainstem habitats and tributaries for their adequate growth and survival during the freshwater phase of their life-cycles.

Other Non-Anadromous Fish

~~Implementation of~~ The No Action alternative could result in continued low levels of LWD in the Klamath River mainstem, particularly near Iron Gate dam, without improvements that would result from the LWD program of the proposed action. ~~the removal of some of the benefits~~ LWD can provide benefits to non-anadromous fish including cover and food resources. Although NMFS believes the role LWD plays for non-anadromous fish is relatively minor, nonetheless, it does provide ecological services to other non-anadromous fish ~~species~~ including surface area for periphyton and invertebrates which can serve as food resources to other non-anadromous fish. ~~NMFS believes~~ Thus, the No Action alternative would continue to result in limitations to these benefits from LWD for ~~not affect~~ other non-anadromous fish in the Klamath River mainstem.

Beaver

The No Action alternative ~~w~~could result in continued low levels of LWD in the Klamath River mainstem that ~~not benefit beaver in the Klamath River as pieces of LWD~~ can be utilized by beaver for den construction. From a bioenergetics standpoint, beaver could benefit from wood being available in river habitat for den building, saving the energy expended to physically cut down trees and reserving this energy for feeding and other activities. Generally, as organisms are able to conserve energy for feeding and reproduction, their populations tend to be more robust and resilient to environmental changes. ~~NMFS believes the No Action alternative would have a negative impact on beaver in the Klamath mainstem corridor as they would not experience the presence of more wood pieces available for den building.~~

Fish-Eating Birds

NMFS believes that implementation of the No Action alternative could continue low LWD levels in the Klamath mainstem, which could continue indirect ~~negatively~~ effects to fish-eating birds. ~~in that failing to improve LWD levels in the Klamath mainstem and important tributaries through the construction of complex wood jams,~~ As described above, the continued low LWD levels without improvements that would result from the LWD program of the proposed action could lead to ~~further~~ continued declines of coho and steelhead in the Klamath River for the next 10 years. Continued ~~reductions~~ declines in coho and steelhead abundance could result in a corresponding ~~reduction~~ decline in the numbers of fish-eating birds that inhabit the Klamath River mainstem corridor.

No Fish Disease Research

Anadromous Species (Coho, Chinook, and Steelhead)

Even though PacifiCorp has previously provided funding for disease research, the No Action Alternative would mean PacifiCorp would not be required to fund research examining the physical and biological processes that occur in the Klamath River that lead to disease outbreaks as they would under the proposed action. These disease outbreaks are negatively affecting the survival and fitness of coho in the Klamath River, and to a lesser extent Chinook and steelhead as well. The importance of research on disease processes is that it can lead to changes in river management that could lessen the extent or duration of disease-forming conditions, and thus result in improvements to the populations of the three salmonids. For example, increasing flows in the winter below Iron Gate dam could scour riverbed habitat and dislodge sediment that currently is believed to be the origins of the disease-forming conditions. Implementing the No Action alternative may mean further research on disease mechanisms may be limited, and the response to changes in river management may not be well understood resulting in continued threats to salmonids from disease.

Other Anadromous Species

Chum salmon might be affected by the same disease pathogens as the effects described above for coho, Chinook, and Steelhead. Implementation of the No Action alternative may mean further research on disease mechanisms may be limited, and the response to changes in river management may not be well understood, which may result in continued threats from disease to chum salmon as described above for coho, Chinook, and Steelhead. ~~would mean one other anadromous species, chum salmon, which might be affected by the same disease pathogens that affect coho, Chinook, and steelhead would not benefit from the findings and management changes that fish disease research may bring to the Klamath mainstem.~~

Other Non-Anadromous Fish and Beaver

As NMFS is not aware that disease pathogens affecting salmonids also adversely affect other non-anadromous fish and beaver, NMFS anticipates the No Action alternative would have no disease-related effects on non-anadromous fish or beaver in the Klamath River basin.

Fish-Eating Birds

NMFS believes that implementation of the No Action alternative could indirectly negatively affect fish-eating birds in that ~~failing to control and reduce~~ disease outbreaks and the impacts disease has on salmonid populations would continue without disease research that can lead to changes in river management that could lessen the extent or duration of these disease-forming conditions. In turn, the disease outbreaks and disease impacts could lead to further declines of coho, Chinook, and to a lesser extent steelhead in the Klamath River for the next 10 years. These continued reductions in salmonid abundance could result in a corresponding reduction in the numbers of fish-eating birds that inhabit the Klamath River mainstem corridor.

No Coho Enhancement Fund and Hatchery Genetic Management Plan

Anadromous Species (Coho, Chinook, and Steelhead)

The No Action alternative would mean PacifiCorp would not be required to provide resources for the Coho Enhancement Fund (CEF) to fund projects that improve habitat conditions for coho salmon (e.g. improving thermal refugia, improving fish passage, gravel

augmentation, etc…) for the next 10 years. ~~Failing to take~~ Continued poor habitat conditions without actions that improve habitat conditions for coho salmon in the Klamath River basin would likely lead to further declines in the Klamath River coho population for the next decade, as significant other factors that are exacerbated by Project operations and that have led to their decline will continue at or near existing conditions in this timeframe (e.g., poor water quality and high water temperatures below Iron Gate dam). The No Action alternative would result in the lack of improvement in conditions for the adequate growth and survival of coho in the basin because PacifiCorp may forego fully implementing additional mitigation for impacts attributable to Project operations associated with HCP *Coho Salmon Conservation Strategy*. ~~Failing to take~~ Continued poor habitat conditions without measures that increase juvenile-to-smolt survival ~~is~~ are likely to lead to continued trends of poor adult returns. Similarly, because coho often utilize habitats shared by steelhead and Chinook, these two species would experience continued poor habitat conditions as well as under a No Action alternative, ~~the benefits of restorative projects would not be realized for these two species under a No Action alternative as well~~ which may result in further declines in their abundance, diversity, or spatial structure without the benefits of restorative projects under the proposed action.

Under the No Action alternative the HGMP for coho at Iron Gate hatchery may not be implemented, or may be delayed as PacifiCorp would not be required to provide full funding for implementing the HGMP. ~~Failure to implement~~ Continued operations without the HGMP would likely lead to further impacts on the genetic conservation goals for coho remaining in the river basin, and would not result in the target of releasing at least 75,000 coho smolts each year from the hatchery under improved hatchery management practices. NMFS is concerned that without this program coho in the Klamath River basin would be adversely affected because of genetic bottlenecks and potential inbreeding from low population dynamics. Similar to the proposed action, NMFS does not anticipate that ~~failing to implement~~ continued operations without a coho HGMP under the No Action alternative would have impacts on Chinook, or steelhead.

Other Anadromous Species

~~NMFS believes~~ The No Action alternative would result in continued poor habitat conditions without actions that would improve habitat conditions for coho salmon in the Klamath River basin under the proposed action. NMFS believes the improvement to habitat conditions for coho salmon would have ~~no~~ indirect benefits ~~from restorative projects for coho being realized by~~ for other anadromous species such as chum salmon, and coastal cutthroat trout. These two species could benefit from the protection and enhancement of habitats utilized by coho (e.g. thermal refugia, removal of passage barriers) and failing to implement projects that improve habitat where coho and chum salmon, or coastal cutthroat trout co-occur, will not aid in improving the abundance or spatial diversity of these other anadromous species.

Other Non-Anadromous Fish and Beaver

NMFS does not expect implementation of the No Action alternative, which would result in coho-based restoration projects not being implemented, would have an effect on non-anadromous fish or beaver in the Klamath River basin.

Fish-Eating Birds

NMFS believes that implementation of the No Action alternative could indirectly negatively affect fish-eating birds in that ~~failing to~~ continued poor habitat conditions without implementing projects designed to increase the abundance and diversity of coho in the Klamath River downstream or Iron Gate dam could lead to further declines of coho in the Klamath River for the next 10 years. Continued reductions in salmonid abundance could result in a corresponding reduction in the numbers of fish-eating birds that inhabit the Klamath River mainstem corridor.

4.2.4 Socioeconomics and Environmental Justice

NMFS anticipates implementation of the No Action alternative would result in no change in any effects from current conditions for ~~not affect~~ whitewater boating, camping, and waterskiing opportunities ~~as nothing would change beyond current conditions~~. NMFS does expect that the No Action alternative could result in continued negative impacts to recreational and commercial fishing opportunities for salmonids over the next 10 years without habitat improvements that would occur under the proposed action. Continued poor habitat conditions without ~~Failing to implement~~ actions that improve habitat conditions for coho, which would have an indirect benefit for Chinook and steelhead (e.g. habitat access improvement, thermal refugia enhancement, etc…), could result in further years of poor rates of survival to the adult life stage for Chinook, and to a lesser degree steelhead, leading to reductions in available harvest for both commercial and recreational fishers. ~~Failing to improve current~~ Continued poor conditions for freshwater survival in the Klamath River mainstem could lead to declines in both Chinook and steelhead runs over the next decade. In recent years, the curtailment of Chinook fishing opportunities implemented by fishery managers has had significant impacts on local economies and employment resulting in the need for federal fishery disaster relief funds.

Additionally, ~~failing to implement~~ continued poor habitat conditions without actions that improve poor conditions for salmonid survival in mainstem and tributary waters could result in fewer fish being available for tribal commercial and subsistence harvest. Further impacts to tribes in the Klamath basin could occur under the No Action alternative as funding set aside for coho enhancement projects would not be available for tribes to access and implement restoration projects. Not implementing these projects may mean fewer employment opportunities for tribal and non-tribal people in the basin as NMFS anticipates this source of funding for the next 10 years will provide employment to biologists, contractors, heavy equipment operators, project managers, and other personnel.

Summary: NMFS anticipates the No Action alternative will have no change in any effects from current conditions on whitewater boating, camping, or waterskiing opportunities within the area analyzed. NMFS does anticipate the No Action alternative could lead to continued poor habitat conditions that result in adverse effects to commercial, recreational, and tribal fishing opportunities without habitat improvements that would occur under the proposed action, and could ~~adversely affect~~ mean fewer employment opportunities for tribes and other members of the public that could be employed in stream restoration actions under the proposed action~~. The adverse effects would be the potential for continued declines in commercial and recreational fisheries, as fish populations would be subjected to continued poor habitat conditions without any mitigating actions taken to improve habitat conditions.~~

NMFS expects that continued poor habitat conditions under the No Action alternative without any actions to improve habitat conditions over the next decade, ~~NMFS expects~~ would result in further declines in species abundance, making fewer fish available for harvest or capture, which would result in the potential for continued declines in commercial and recreational fisheries.

4.2.5 Land Use

NMFS anticipates the No Action alternative would have no change from any effects on land use within the basin, because there would be no change in how land is currently being managed and used.

SECTION 5

Cumulative Effects

This chapter describes what NMFS believes are cumulative impacts occurring in the Klamath River basin. ~~NMFS has not included future dam removal or the establishment of volitional fish passage above Iron Gate dam as a cumulative effect consideration as such actions would occur beyond the permit term this EA analyzes.~~

5.1 Sediment Supply

Project dams limit the transport of sediment throughout the basin, particularly below Iron Gate dam. Segments of the Klamath River upstream of Iron Gate dam are naturally "sediment starved" when looking at the basin as a whole due to naturally low levels of sediment upstream of Iron Gate dam. This condition is exacerbated by the presence of Iron Gate dam, which inhibits sediment transport and delivery in the Klamath River immediately downstream of Iron Gate dam until sediment supply to the river increases from tributaries below Iron Gate dam. However, there are other land management activities in the basin such as livestock grazing, and timber harvest activities on steep terrain, that can add sediment to the aquatic system at rates above normal background levels. For instance, road building associated with timber harvest or livestock grazing can result in road failures (landslides) and hydrologically connected road segments that deliver coarse and fine-grained sediment to adjacent watercourses.

Over the period of time of European settlement in the Klamath basin, these activities have resulted in localized areas of an oversupply of sediment which has impacted salmonid habitat by, among other things, smothering redds and widening channels making them too shallow and too warm for successful salmonid spawning and rearing. Historical gold mining in the region has also resulted in severe alterations of the natural sediment bedload characteristics in watersheds such as the Scott River. Gold mining within the Klamath and Scott watersheds was the primary resource for extraction from the mid-1850s through the 1930s. Mining was very destructive to fish habitat in the lower Klamath basin in the 1800s (NRC 2004). Hydraulic mining diverted creeks to supply water to high pressure nozzles that leveled entire hillsides and rearranged much of the riparian areas in the basin. Waterborne soil, rocks, minerals, and debris were directed into sluices containing mercury which extracted the gold. Sluicing and hydraulic mining operations increased turbidity and siltation, which adversely affected benthic invertebrates, smothered salmon redds, destroyed riparian areas, and filled pools with sediment. Deforestation associated with mining destabilized hillslopes, increased erosion, flooding, and fires. Miners also directly impacted aquatic resources through overfishing, damming, and stream diversions (Malouf and Findlay 1986). Taft and Shapovalov (1935) identified severe damage to fish habitat caused by Yuba dredges, which usually left the coarsest boulders on the surface of the streambed, armoring the finer sediments underneath (NRC 2004). Ditches that intercepted tributary flows were also constructed throughout the valley to support mining operations and early agricultural irrigation (NRC 2004). These past activities that have altered the natural rate of sediment

supply and transport out of the system have resulted in degraded habitat conditions in many areas since the 1930's which has impacted salmonid populations.

As land management practices have improved over the last several decades and have resulted in less impact to stream environments, improvements to stream health has occurred and many streams are recovering and becoming more suitable for salmonid spawning and juvenile rearing. NMFS anticipates these stream systems will continue to recover with careful land management practices, but does not expect significant improvement over the next decade as recovery from severe habitat degradation generally occurs over several decades.

Within the last 10 years or so both federal and private timber management plans have improved harvesting practices and NMFS anticipates this to occur into the future. For example, significant acreage of private timberland in the Klamath basin is already or is likely to soon become managed under Habitat Conservation Plans (HCP) approved by NMFS and the USFWS. These HCPs, along with improved forest practices on federal and other private lands, will result in improved aquatic habitat conditions for salmonids over the next decade. In addition to improved timber management practices, NMFS anticipates that impacts associated with private and federal timber activities in the basin will decline compared to historical trends as timber harvest levels have been lower than rates of harvest in the last few decades due to the current economic recession and impact to the U.S. and global housing markets. The current economic conditions and depressed housing market, which began in 2006-7, have led to a significant drop in timber prices making the profit margin for harvested timber much smaller than it historically has been.

5.2 Water Quality and Quantity

Some of the following discussion on cumulative effects concerning water quality is taken from the FERC FEIS (FERC, 2007) and readers are encouraged to review the FEIS for more details on cumulative water quality effects in the basin.

Construction of the project dams resulted in areas of the river where the physical processes that control water quality have experienced a shift, as the processes in lakes are markedly different relative to the river environment. Although at times water quality meets applicable state water quality objectives (typically during the winter, high flow months) the water quality within some of the project impoundments (i.e., Keno, Copco, and Iron Gate reservoirs) has evolved to mimic highly productive lakes, which experience algal blooms and complex nutrient cycling and loading processes. Diversion of water for hydroelectric generation has substantially altered flow and temperature regimes in the bypassed reaches; however, under the existing hypereutrophic conditions, diversion of water from the J.C. Boyle bypassed reach has resulted in an improvement to that reach's water quality.

Implementation of the TMDL for Upper Klamath Lake and the subsequent reduction in phosphorous loading to the lake should, over time, improve water quality within the lake and in releases to the Link River, in addition to releases to ~~the Klamath Irrigation Project~~ Reclamation's Klamath Project through the A canal. Development of the TMDL for the Klamath River will build on the existing TMDL for Upper Klamath Lake and allocate acceptable nutrient loads to the Klamath River from point and non-point sources throughout the Upper Klamath Basin. Once loads have been established, NPDES permit holders and

agricultural land owners would become eligible to apply for funding to implement measures to reduce the nutrient loads leaving their properties and entering the Klamath River. This program would provide benefits to water quality throughout the Klamath River. NMFS anticipates the TMDL program will lead to improvements in water quality over the duration of the permit term.

Water demands in other tributary watersheds to the Klamath River (e.g. Scott River) can put an additional strain on the resources that rely on a healthy Klamath River. The California State Water Project controls releases from the Trinity River to the Klamath through diversions to the Central Valley, which, depending on the water year type, can have a substantial effect on flows in the lower Klamath River. Diversions of water result in reduced volume entering the Klamath River, exacerbating high temperatures, especially during low flow years, and further stressing anadromous fish. The headwaters of the Trinity are largely undeveloped resulting in good water quality that, before the California State Water Project, would help dilute the naturally high nutrient loads within the Klamath River and buffer temperature extremes. Historical and continued demand for these tributary water sources limits the ability of the natural system to provide protection to the biological resources that rely on it.

An unknown number of permanent and temporary water withdrawal facilities exist within the Klamath River basin. These include diversions for urban, agricultural, commercial, and residential use, along with temporary diversions, such as drafting for dust abatement. Approximately 81,070 acre feet of water is diverted from the Scott River annually (Van Kirk and Naman 2008). Numerous other water diversions in the systems that feed the Klamath River decrease the quantity of mainstem flows on the Klamath River mostly during the summer months. Increasing numbers and extent of stream and spring diversions for the propagation and growth of medicinal and non-medicinal marijuana crops is also a growing concern, as a substantial number of these growing operations occur on Forest Service lands, or within other forested terrains where water that feeds suitable salmonid spawning and rearing habitat is being removed. Many of these activities occur without proper state or local permits.

In the fall of 2009, the CDFG released a Final Environmental Impact Report (FEIR) on the Scott River Watershed-Wide Permitting Program (WWPP) which accompanied a process by which agricultural operators in the Scott River watershed could receive incidental take coverage for coho salmon under state law if the operator diverts water from a stream by means of an active diversion for an agricultural purpose, or is involved in an agricultural operation on property in the WWPP area through which or adjacent to which a stream flows (CDFG, 2009). The WWPP also implements certain stream restoration projects in the Scott River watershed identified in the California Fish and Game Commission's (Commission) *Recovery Strategy for California Coho Salmon* (CDFG, 2004b) as key coho recovery projects. One of DFG's objectives for this program is to eliminate unauthorized take of coho salmon caused by water diversions in the Scott River watershed and avoid, minimize, and fully mitigate take of coho salmon incidental to diverting water with a valid water right, recovery actions, and other lawful activities. Among other general ITP conditions, improvements to water management and water rights, fish screen improvements, targeted priority fish passage improvements, and stream crossing improvements are all a part of the program designed to both provide take coverage for landowners as well as implement a

longer-term strategy to improve habitat conditions for coho in the Scott River. The term of the WWPP is 10 years from date of issuance. In 2011 the WWPP was challenged in a court action and is currently temporarily suspended. NMFS anticipates the program may be reinstated within the next 10 years and efforts to minimize impacts to salmonids in the Scott River from agricultural diversions will occur.

Given the complexities of the regulatory programs aimed at reducing instream impacts associated with water use, it is possible more landowners will transition from instream diversion for their water needs, to off channel wells and pumps. Although there would be a benefit to salmonids from ending instream pumping and diversions such as entrapment and impingement of younger salmonid life stages within pump systems, there is currently a poor understanding of how groundwater withdrawals could affect near stream surface flows. A greater reliance on groundwater withdrawals could lead to similar reductions in streamflows which results in localized dewatering of reaches and depleted flows necessary for migration, spawning, rearing, flushing of sediment from the spawning gravels, gravel recruitment, and transport of LWD.

5.3 Biological Resources

5.3.1 Iron Gate Reservoir

The following information on cumulative effects on Shortnose and Lost River Suckers is derived from the FERC FEIS (FERC, 2007).

5.3.1.1 Shortnose and Lost River Suckers

Habitat conditions for the two federally listed sucker species have been degraded over the past 150 years by agriculture, grazing, forestry, and to a smaller degree, urbanization (USFWS, 2002). Nearly all streams and rivers in the Klamath basin have been degraded, some seriously, by the loss of riparian vegetation, geomorphic changes, introduction of return flows from agricultural drainage ditches and water pumped from drained wetlands, stream channelization, dams, and flow reductions from agricultural and hydroelectric diversions. Wetland losses have been especially harmful for sucker populations, since wetlands provide habitat for larval and juvenile suckers and have important water quality functions. Along the perimeter of Upper Klamath Lake, about 40,000 acres of wetlands have been diked and drained for agriculture, and extensive amounts of wetland have been drained elsewhere in the basin. Lower Klamath and Tule lakes no longer support suckers or have been reduced to a few hundred acres of suitable habitat.

The Klamath Hydroelectric Project may cause mortality to suckers that are entrained through turbines at the mainstem developments downstream from Keno dam. Upstream migration of suckers is blocked by Iron Gate and the Copco dams, which do not have fish ladders, and the ladders at J.C. Boyle and Keno dam do not meet criteria for sucker passage. As mentioned earlier in this EA, the few instances where larval suckers have been found in Iron Gate Reservoir are thought to be individuals washed down from suitable upstream habitats and are essentially considered “lost” to the sucker populations. However, prior to the construction of the Klamath Hydroelectric Project, the Klamath River downstream of Lake Ewauna did not include any lake or reservoir habitat suitable to support rearing of these species. Based on

their limited swimming ability compared to salmonid species, it is unlikely that any suckers that moved downstream past the high gradient rapids in the Keno and J.C. Boyle peaking reaches would be able to return upstream to suitable rearing habitat, and they too were probably lost from the spawning population.

5.3.2 Klamath River below Iron Gate Dam

5.3.2.1 Coho, Chinook, and Steelhead

The following information on cumulative effects on coho, Chinook, and steelhead is derived from the FERC FEIS (FERC, 2007).

The settlement and development of the Klamath River Basin has caused substantial adverse cumulative effects on the habitat and population size of coho salmon. Although also adversely affected from development in the basin, Chinook and steelhead have not suffered as significant declines as coho. In addition to the gold mining, timber harvest and grazing impacts previously discussed, starting around 1905, construction and operation of facilities associated with Reclamation's Klamath ~~Irrigation~~ Project resulted in extensive draining of wetlands, increased agricultural diversions, increased nutrient loading, and reduced dissolved oxygen levels. In the 1920s, the water resources in the Shasta and Scott Rivers were developed to support irrigated agriculture, and the construction of Dwinnell dam blocked access for salmonids to the southern headwaters. Agricultural diversions in these tributaries and in the tributaries to Upper Klamath Lake have reduced flows, increased water temperatures, and increased nutrient inputs. Construction of Copco No. 1 dam in 1918 blocked Chinook salmon from accessing more than 350 miles of habitat upstream of Upper Klamath Lake and 55.7 miles of mainstem habitat between Copco No. 1 dam and Upper Klamath Lake. Construction of Iron Gate dam in 1962 blocked access to additional mainstem habitat and tributaries including Fall and Jenny creeks. Diversion of up to 80 percent of the flow from the Trinity River basin to support agriculture in the Sacramento River Basin started in 1964 with the completion of Trinity and Lewiston dams.

Overfishing also contributed to the decline of coho salmon in the basin, although NMFS (2002) believes that fishing mortality has been reduced substantially since the retention of naturally produced coho salmon south of Cape Falcon, Oregon, was prohibited in 1994. Competition with Chinook and coho salmon produced at Iron Gate and the Trinity River hatcheries has also adversely affected wild runs of coho salmon and possibly Chinook. NMFS (2002) reports that approximately 95 percent of the coho salmon run in the Trinity River above Willow Creek and about 65 percent of the coho salmon run in the Klamath River above Weitchpec consist of hatchery fish. Prior to the construction of Iron Gate dam in 1962, peaking operations at the Copco developments adversely affected anadromous fish by causing large daily fluctuations in flow, which likely resulted in extensive fish stranding. The Klamath Hydroelectric Project contributes to adverse cumulative effects on coho salmon by blocking access to tributary habitats upstream of Iron Gate dam and contributing to poor water quality below Iron Gate dam.

Periodic changes in Pacific currents, winds, and upwelling regimes have substantial effects on the primary and secondary productivity of the northeast Pacific Ocean (Brown et al., 1994; Mantua et al., 1997). These oceanic events, described as El Niño/Southern Oscillation (ENSO) and Pacific decadal oscillation (PDO) are associated with declines and increases in

ocean survival and decreases and increases in size of coho and Chinook salmon (Johnson, 1988; Spence et al., 1996; Tschaplinski, 1999; Cole, 2000; Ryding and Skalski, 1999; and Koslow et al., 2002). Steelhead appear to be more resilient to fluctuating ocean conditions. Substantial changes in salmonid ocean survival associated with these cyclical oceanic oscillations can make it difficult to isolate and determine the effects of both long- and short-term changes in the condition of freshwater spawning and rearing habitats, and of conditions in the migration corridor downstream of Iron Gate dam. Despite the role ocean conditions play in returns of adult salmonids to the Klamath River, NMFS considers poor freshwater survival a significant threat to the long-term conservation of naturally produced salmonids in the basin.

5.3.2.2 Other Anadromous Species

Pacific Lamprey

The overall distribution and abundance of Pacific lamprey on the Pacific Coast has been severely reduced due to effects associated with hydropower development. The construction of numerous mainstem and tributary dams has reduced the amount of habitat that is accessible for freshwater spawning and rearing of this species over most of its range. Although a substantial amount of habitat suitable for lampreys remains accessible in the Klamath River Basin, accounts given by tribal elders indicate that the number of lampreys in the river has declined precipitously from historic levels (Larson and Belchik, 1998). The decline in the number of Pacific lamprey returning to the Klamath River may be an outcome of the overall coast-wide decline of the species. The Klamath Hydroelectric Project contributes to adverse cumulative effects on Pacific lamprey by blocking access to potential habitat upstream of Iron Gate dam.

Sturgeon

It is not believed white and green sturgeon occurred above Iron Gate dam except for a few sturgeon planted in Upper Klamath Lake. The principal threats to sturgeon on the West Coast are water diversions and the associated impacts of reduced flows, changed flow regime, increased temperatures, and reduced oxygen concentrations. Other major impacts result from land use practices that can lead to increased sedimentation. The Klamath River has the only major in-river harvest of green sturgeon (Yurok and Hoopa tribal harvest in the Klamath-Trinity River system). However, ocean and estuarine green sturgeon harvest was considered a species-wide threat, and current total harvest of green sturgeon has been significantly reduced compared to harvest levels of the 1980's.

Chum Salmon, Eulachon, and Coastal Cutthroat Trout

Threats to chum salmon are similar to that of other widely-ranging salmonids. Although their populations are quite sizable in Alaska, populations south of Alaska in the U.S. have seen declines due to dam building as well as other habitat altering projects. In the Klamath River, these species are not known to have occurred above Iron Gate dam. Threats to eulachon include major habitat altering activities such as dam building which interrupts the natural flow of cool spring waters to lower portions of rivers where eulachon spawn. Other threats include climate change which may be changing the timing and volume of spring flows in the northwest and altering eulachon's spawning patterns and prey base. Historical commercial and recreational harvest of eulachon and high rates of sediment loading into suitable spawning grounds may have also contributed to their current depressed status. Regional

declines in eulachon led to NMFS listing it as a threatened species in 2010. The species is listed from the Mad River in Humboldt County, north to the Canadian border. Threats to coastal cutthroat trout are similar to that of other salmonids, most notable habitat degradation and poor freshwater survival. Coastal cutthroat trout can spend more than 2 years in the freshwater lifecycle phase making them more susceptible to land use changes than a species like Chinook salmon. California coastal cutthroat trout are managed by the USFWS and are not currently listed as endangered or threatened under the ESA.

Non-Anadromous Species

NMFS is not aware that any of the non-anadromous fish species found in the Klamath River below Iron Gate dam have experienced adverse cumulative effects.

Beaver and Fish-Eating Birds

Beaver were widely trapped in California and other western states during the fur-trade of the mid-1800's. The fur trade led to the decimation of most beaver populations in California to a point where it was no longer profitable for trappers. In the Klamath River basin they were likely trapped for pelts up until the 1920's. After the fur-trade collapse, beavers were commonly removed from stream systems by fish and game wardens who received complaints from landowners that beaver activity was resulting in flooding events on their property. In recent years the important role beavers play in a healthy riverine system has led to their reintroductions in some areas and allowance of expansion of populations in others. Beaver are now widely recognized in the aquatic conservation community as an important component to healthy salmonid populations. Besides the occasional removal of beavers by private landowners concerned about flooding, NMFS is unaware of any current threats to beaver.

Bald eagle and osprey have made a strong comeback from the mid 1960's and 70's when they were severely impacted by the use of DDT, a widely used pesticide now banned in the United States. DDT caused significant declines in fish-eating birds as the chemical was accumulated by prey and resulted in reproductive failures of the birds. Populations of these species are considered stable and expanding and the bald eagle was removed from the list of endangered and threatened species in the U.S. in 2007. In the Klamath River basin it is believed bald eagles are expanding their numbers and breeding and foraging ranges. Similar trends are observed with the osprey.

5.4 Socioeconomics and Environmental Justice

Employment has grown consistently in the permit area in the past 25 years, but at a pace slower than the Oregon and California averages. Employment growth has been accompanied by a shift in jobs away from the manufacturing sector and into other sectors, including services, retail trade, and government, as well as agriculture in some areas. Historically, communities along the coast were dependent on ocean commercial and recreational sportfishing. Along with commercial fishing, the coastal communities also depended on the packing and processing plants that prepared the fish for market. However, most of the packing and processing plants, whose employment used to be reported as part of the manufacturing sector, have closed. Declines in salmonid abundance since the 1980's has significantly impacted coastal fishing communities as previously described in this EA.

Continued wide fluctuations in Klamath and Sacramento River Chinook stocks are likely to lead to further impacts on local fishing communities and local economies the commercial and recreational fisheries support. Such wide fluctuations make it difficult for fishers to plan for annual income and leads to abandonment of salmon fishing as a reliable source of income.

The tribal communities in the permit area experience significantly higher rates of food insecurity, poverty, and unemployment than non-Indian communities. Additionally, they suffer from substantially higher rates of some diseases, including diabetes and heart disease. These problems are linked to the loss of the tribes' traditional ability to rely on the Klamath River and its resources for their subsistence, culture, spiritual traditions and practices, and economic security. The blockage of salmonids from historical upstream habitat as a result of the project dams and other actions in the Klamath Basin, as well as the degraded water quality resulting from project impoundments, upstream land management practices, and water management in tributary watersheds, have contributed to that loss.

5.5 Land Use

NMFS anticipates land use will not change significantly during the permit term; however expansion of commercial and residential developments is likely to occur particularly in cities such as Yreka, California, and Klamath Falls Oregon. Obviously, European settlement of the basin since the mid-1800's has significantly altered the natural landscape and developed native habitats into land uses such as irrigated agriculture, mining areas, timber production zones, and residential and commercial development. This human development has significantly altered the natural environment including the Klamath River watershed.

5.6 Other Cumulative Effect Considerations

5.6.1 Recreation, Including Hiking, Camping, Fishing, and Hunting

Expected recreation impacts to salmonids include increased turbidity, impacts to water quality, barriers to movement, and changes to habitat structures. Streambanks, riparian vegetation, and spawning redds can be disturbed wherever human use is concentrated. Campgrounds can impair water quality by elevating nutrients in streams. Construction of summer dams to create swimming holes causes turbidity, destroys and degrades habitat, and blocks migration of juveniles between summer habitats. Impacts to salmonid habitat are expected to be localized, mild to moderate, and temporary. Fishing within the permit area, typically for steelhead or Chinook salmon, is expected to continue subject to CDFG regulations. The level of impact to salmonids within the permit area from angling is unknown, but is expected to remain at current levels.

5.6.2 Residential Development and Existing Residential Infrastructure

Human population growth in the permit area is expected to continue. Most of this growth is expected to occur in the valley bottom settings near Yreka and in the Scott and Shasta Valleys. Impacts on water quality related to residential infrastructure would be expected to be regulated under applicable state and local laws.

Once development and associated infrastructure (roads, drainage, water development, etc.) are established, the impacts to aquatic species are expected to be permanent. Anticipated impacts to aquatic resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed. The presence of structures and/or roads near waters may lead to the removal of LWD in order to protect those structures from flood impacts. The anticipated impacts to Pacific salmonids from continued residential development are expected to be sustained and locally intense. Commonly, there are also effects of home pesticide use and roadway runoff of automobile pollutants, introductions of invasive species to nearby streams and ponds, attraction of salmonid predators due to human occupation (e.g., raccoons), increased incidences of poaching, and loss of riparian habitat due to land clearing activities. All of these factors associated with residential development can have negative impacts on salmon populations.

5.6.3 Agricultural Activities

Agricultural activities in the permit area include grazing, dairy farming, and the cultivation of crops. Impacts on water quality would be expected to be regulated under applicable laws. The impacts of this use on aquatic species is anticipated to be locally intense, but the longevity of the impact depends on the degree of grazing pressure on riparian vegetation, both from dairy and beef cattle. Grasses, willows, and other woody species can recover quickly once grazing pressure is reduced or eliminated (Platts 1991) through fencing, seasonal rotations, and other measures. If appropriate measures are not taken to improve practices over time and reduce grazing pressure, impacts to aquatic species are expected to remain static. Grazing impacts include decreased bank stability, loss of shade- and cover-providing riparian vegetation, increased sediment inputs, and elevated nutrient levels.

5.6.4 Chemical Use

NMFS anticipates that chemicals such as pesticides, herbicides, fertilizers, and fire retardants will continue to be used within the permit area. Chemical application is under the jurisdiction of several federal, state, and local agencies and their use is expected to be conducted under applicable laws.

5.6.5 Control of Wildland Fires on Non-Federal Lands

Control of wildland fires may include the removal or modification of vegetation due to the construction of firebreaks or setting of backfires to control the spread of fire. Also, the use of fire retardants may adversely affect salmonid habitat. An undetermined amount of suitable habitat for Pacific salmonids may be removed or modified by these activities.

5.6.6 Climate Change

In summary, climate change poses a high threat to salmonids within the permit area, particularly coho salmon. The impacts of climate change in this region will have the greatest impact on juveniles, smolts, and adults. The current climate in the permit area is generally warm, and long-term modeled regional average temperatures shows a large temperature increase; with average ambient temperatures increasing by as much as 3 ^{o}C in the summer

and by 1^{o} C in the winter, while annual precipitation in this area is predicted to trend downward over the next century. Additionally it is predicted that snowpack in upper elevations of the Klamath basin will decrease with changes ~~in response to changes~~ in temperature and precipitation (California Natural Resources Agency 2009). It is possible that during the Proposed Action permit term (10 years) the Klamath River basin could experience some degree of rising temperatures due to climate change, even though climate models are generally run over long time series such as 50 or 100 years. Rearing and migratory habitat are most at risk to climate change. Increasing water temperatures and changes in the amount and timing of precipitation and snowmelt will impact water quality and hydrologic function in the summer and winter. Adults will also be negatively impacted by ocean acidification and changes in ocean conditions and prey availability (ISAB 2007, Feely et al. 2008, Portner and Knust 2007). Overall, the range and degree of variability in ambient temperature and precipitation are likely to increase in all populations, creating long term threats to the persistence of coho salmon in this area. In our analysis of effects of climate change on coho during the permit term, we have concluded that although long-term trends in climate change are likely to place additional stress on the conservation and recovery of the SONCC coho ESU, during the 10-year permit period, we do not expect that climate change will be significant enough to have a noticeable effect on coho in the Klamath River basin. These predictions further highlight the importance of providing suitable refugia habitat in mainstem tributaries.

5.6.7 Habitat Restoration Projects

NMFS anticipates that, as monitoring information accumulates on past projects, the focus of stream restoration projects will gradually shift toward more effective restoration actions. Because such activities are usually coordinated with one or more of the resource agencies, NMFS anticipates that all applicable laws will be followed. Restoration activities conducted through the CDFG fisheries restoration grant program are covered by an ESA Section 7 consultation with the U.S. Army Corps of Engineers. Restoration activities that are not conducted pursuant to the CDFG grant program may cause temporary increases in turbidity, alter channel dynamics and stability, and injure or scare salmonids if equipment is used in the stream. Properly constructed stream restoration projects may increase habitat complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. These projects often focus on identifying source problems in an area (i.e., roads) and apply corrective measures to eliminate or minimize the adverse effects to aquatic resources.

NMFS does not know how many restoration projects will be completed outside of the CDFG grant program therefore, the effects of these projects cannot be predicted. However, NMFS anticipates many of these projects may still require a Corps permit, and, thus, require consultation with NMFS.

5.6.8 USFWS Issuance of a Permit to PacifiCorp Authorizing the Take of Listed Suckers in the Upper Klamath Basin

NMFS expects that the USFWS will ~~issue~~ determine whether to issue an incidental take permit to PacifiCorp which ~~will~~ would authorize incidental taking of the two listed sucker species in the Upper Klamath basin from PacifiCorp's Project interim operations. ~~Issuance of~~ Application for an ITP will require the development of an HCP. NMFS assumes the HCP

will include conservation measures that avoid, minimize, or mitigate for take of listed suckers from PacifiCorp's maintenance activities and entrainment in Project dams. NMFS cannot predict at this time however, how the HCP would impact the human environment as a draft HCP has not yet been made available for review.

5.6.9 Klamath Hydroelectric Settlement Agreement and Klamath Basin Restoration Agreement

As described in this EA, in February of 2010, the Klamath Hydroelectric Settlement Agreement (KHSA) was signed by multiple parties including but not limited to, NMFS, Department of the Interior, States of Oregon and California, certain Klamath basin tribes, basin irrigators, PacifiCorp, and several not-for-profit environmental organizations. The KHSA provides for a cooperative process by which actions for decommissioning and removal of PacifiCorp dams and hydroelectric facilities would proceed if the Secretary of the Interior makes an affirmative determination regarding dam removal. In addition, the Klamath Basin Restoration Agreement (KBRA), which was signed by multiple parties in February, 2010, is a basin-wide approach to addressing current resources challenges in the Klamath basin. The KBRA entails various commitments and actions that have been or will be proposed and /or undertaken in the Klamath basin by federal, state, local, tribal, and private interests. Some KBRA actions are expressly pre-conditioned by, and therefore hinge upon dam removal, and an affirmative Secretarial Determination, under the KHSA. Some KBRA actions are federal, but are not expressly linked to dam removal, and some actions are completely between private parties. The KBRA would among other things, implement a substantial fisheries restoration program. The effects of implementation of the KHSA and KBRA are being analyzed to the extent possible at this time (DOI/CDFG, 2011); however, the effects of many of the actions involved in implementing the KHSA and KBRA would occur beyond the permit term this EA analyzes. The KHSA does include however, measures which must be undertaken in the "interim" period prior to dam decommissioning and removal as long as the KHSA remains in effect. As described in Section 2.3.1 of this EA, failing to obtain an ITP may prevent PacifiCorp's full implementation of certain conservation measures that would benefit listed coho salmon, including flow variability below Iron Gate dam. Further, PacifiCorp has justified expenditures associated with the interim conservation measures on the basis that it would obtain an ITP from NMFS in a timely manner that provides additional regulatory certainty. Consequently, it is uncertain whether PacifiCorp could continue expenditures on interim conservation measures without issuance of an ITP by NMFS. In addition to the HCP measures described in this EA, the KHSA provided for the following additional interim measures as long as the KHSA remains in effect to be implemented prior to dam decommissioning and removal or establishment of fish passage facilities:

- PacifiCorp funding for the planning, permitting, and implementation of gravel placement or habitat enhancement projects, including related monitoring, in the Klamath River above Copco Reservoir.

- PacifiCorp, working with the Interim Measures Implementation Committee (Committee), will conduct scoping and planning for the removal of the sidecast rock barrier located approximately 3 miles upstream of the J.C. Boyle Powerhouse in the J.C. Boyle bypass reach.
- PacifiCorp funding for the U.S. Geological Survey (USGS) operation of the existing gage below the J.C. Boyle Powerhouse
- PacifiCorp funding to convene a basin-wide technical conference on water quality within one year from the Effective Date of the KHSA. The goal of the conference is to inform participants on water quality conditions in the Klamath River basin and to inform decision-making for Interim Measure No. 11, with a focus on nutrient reduction in the basin including constructed wetlands and other treatment technologies and water quality accounting.
- Interim Measure 11: Interim Water Quality Improvements
  The purpose of interim measure 11 is to improve water quality in the Klamath River with an emphasis on nutrient reduction projects in the watershed to provide water quality improvements in the mainstem Klamath River. Other concerns include addressing water quality, algal and public health issues in Project reservoirs and dissolved oxygen in J.C. Boyle Reservoir. The measure requires PacifiCorp annual funding until the date of the Secretarial Determination to be used for studies or pilot projects developed in consultation with the Implementation Committee regarding the following:

  • Development of a Water Quality Accounting Framework

  • Constructed Treatment Wetlands Pilot Evaluation

  • Assessment of In-Reservoir Water Quality Control Techniques

  • Improvement of J.C. Boyle Reservoir Dissolved Oxygen

  By the date of the Secretarial Determination, PacifiCorp is to develop a priority list of projects in consultation with the Implementation Committee. The priority list will be informed by, among other things, the information gained from the specific studies conducted before the Secretarial Determination and the information generated at the water quality conference specified in Interim Measure 10. Should there be an affirmative determination by the Secretary, PacifiCorp would provide additional substantial funding for project implementation until dam removal occurs.
- PacifiCorp shall install and operate stream gages at the J.C. Boyle Bypass Reach and at Spencer Creek.
- Interim Measure No. 13**:** PacifiCorp will maintain current operations including instream flow releases of 100 cubic feet per second (cfs) from J.C. Boyle Dam to the J.C. Boyle bypass reach and a 9-inch per hour ramp rate below the J.C. Boyle powerhouse prior to transfer of the J.C. Boyle facility.
- Upon approval, PacifiCorp may divert a maximum of 3,000 cfs from the Klamath River at J.C. Boyle dam for purposes of power generation at the J.C. Boyle Facility prior to decommissioning of the facility. Such diversions shall not reduce the

minimum flow releases from J.C. Boyle dam required of PacifiCorp under Interim Measure 13.

- PacifiCorp shall fund long-term baseline water quality monitoring to support dam removal, nutrient removal, and permitting studies, and also will fund blue-green algae (BGA) and BGA toxin monitoring as necessary to protect public health. Funding shall be provided per year until the time the dams are removed. Annual coordination and planning of the monitoring program with stakeholders will be performed through the Klamath Basin Water Quality Group or an entity or entities agreed upon by the Parties and in coordination with the appropriate water quality agencies.
- PacifiCorp shall seek to eliminate three screened diversions (the Lower Shovel Creek Diversion– 7.5 cfs, Claim # S015379; Upper Shovel Creek Diversion – 2.5 cfs, Claim # S015381; and Negro Creek Diversion – 5 cfs, Claim # S015380) from Shovel and Negro Creeks and shall seek to modify its water rights as listed above to move the points of diversion from Shovel and Negro Creeks to the mainstem Klamath River. Should modification of the water rights be feasible, and then successful, PacifiCorp shall remove the screened diversions from Shovel and Negro creeks associated with PacifiCorp's water rights prior to the time that anadromous fish are likely to be present upstream of Copco reservoir following the breach of Iron Gate and Copco dams.
- Within 90 days of the Effective Date and during the Interim Period for the duration of its ownership while the KHSA is in effect, PacifiCorp shall provide a continuous flow release to the Fall Creek bypass reach targeted at 5 cfs.
- Beginning in 2010, PacifiCorp shall fund 100 percent of Iron Gate Hatchery operations and maintenance necessary to fulfill annual mitigation objectives developed by the California Department of Fish and Game in consultation with the National Marine Fisheries Service and consistent with existing FERC license requirements. PacifiCorp shall provide funding of up to $1.25 million dollars per year for operations and maintenance costs, subject to adjustment for inflation as set forth in Section 6.1.5 of the KHSA. These operations and maintenance costs shall include a program for 25 percent fractional marking of Chinook at the Iron Gate Hatchery facilities as well as the current 100 percent marking program for coho and steelhead. PacifiCorp will provide one-time capital funding of $1.35 million for the 25 percent fractional marking program. PacifiCorp is not responsible for funding the possible transition to a 100 percent Chinook marking program in the future.
- Within 6 months of the Effective Date of the KHSA, PacifiCorp will begin a study to evaluate hatchery production options that do not rely on the current Iron Gate Hatchery water supply. The study will assess groundwater and surface water supply options, water reuse technologies or operational changes that could support hatchery production in the absence of Iron Gate Dam. Based on the study results, and within 6 months following an Affirmative Secretarial Determination, PacifiCorp will propose a post-Iron Gate Dam Mitigation Hatchery Plan (Plan) to provide continued hatchery production for eight years after the removal of Iron Gate Dam.
- Finally, beginning in 2010 and continuing until transfer of the J.C. Boyle facility, PacifiCorp shall fund land management activities by the Bureau of Land Management (BLM), as specified in interim measure 21. BLM will provide

PacifiCorp an annual Work Plan for the management measures described in this interim measure for road maintenance, invasive weed management, cultural resource management, and recreation. PacifiCorp will provide funding within 60 days of concurring with the Work Plan.

Summary: While there are a myriad of adverse impacts to the environment, including aquatic species, which have occurred from past Federal and non-Federal actions in the basin, NMFS believes that the proposed action will not contribute to significant adverse cumulative impacts. NMFS believes the proposed action will result in beneficial impacts as PacifiCorp will be taking actions to improve the human environment over the next 10 years until fish passage is established either through dam removal or volitional fish passage. Section 4.1 of this EA details the benefits that will result from the proposed action.

SECTION 6

Summary of Effects

Table 3 summarizes NMFS' analysis of effects from the Proposed Action (Issuance of an ITP and implementation of the PacifiCorp HCP) and No Action (No Issuance of an ITP and no implementation of the PacifiCorp HCP). In summary, the Proposed Action is likely to result in many beneficial effects including improvements to salmonid populations and their habitat in the basin, potential for expanded prey base for fish-eating birds along the Klamath River mainstem, and improvements to employment opportunities for tribal and non-tribal workers in the basin. The No Action alternative would in general not change effects from those under current conditions, but continued degraded conditions in the Klamath River mainstem would occur with no mitigating actions taken to improve these degraded conditions.

Table 3. Comparison of Effects on Resources Associated with the Proposed Action and No Action

Resource	Proposed Action	No Action
Geology and Geomorphology	Beneficial effects in areas immediately downstream of Iron Gate dam via the augmentation of gravels mitigating for blockage of sediment transport from Project dams. Potential for short-term adverse effects during gravel placement (e.g., salmonid displacement and turbidity).	Sediment transport would continue to be blocked by Project dams without any mitigating actions. Impacts below Iron Gate dam from sediment "starvation" would continue.
Water Resources • Climate and Water Flow • Water Quality	**Climate and Water Flow**: Beneficial effect to water flows as flow variability program will better mimic a natural (undammed) flow regime given constraints of Iron Gate facility capacities and safety factors. **Water Quality**: Beneficial effect from the protection and enhancement of cold-water refugia sites downstream of Iron Gate dam. Potential for short-term adverse effect during refugia enhancement actions (e.g., temporary flushing and displacement of juveniles during refugia work). Beneficial effects to current degraded DO conditions downstream of Iron Gate dam. Turbine venting expected to result in achievement of water quality criteria for DO at least six river miles downstream of Iron Gate dam.	**Climate and Water Flow:** Degraded conditions in the Upper and Middle Klamath River reaches would continue without any mitigating actions. Impacts to coho, Chinook, and steelhead would continue without any improvement to water quality and quantity conditions. **Water Quality:** Poor water quality conditions would continue without any mitigating actions unless directed by other regulatory mechanisms (e.g. TMDL implementation plan).
Biological Resources • Upper Klamath River System (Above Iron Gate Reservoir) • Iron Gate Reservoir • Klamath River Downstream of Iron Gate	**Upper Klamath River System (Above Iron Gate Reservoir):** No Substantial change from effects of current conditions **Iron Gate Reservoir:** No substantial change from effects of current conditions **Klamath River Downstream of Iron Gate:** Direct and indirect beneficial effects to coho and Chinook salmon, steelhead, Pacific lamprey, coastal cutthroat trout and possibly chum salmon. Beneficial effect to non-anadromous fish species occurring near Iron Gate dam from improved water quality conditions. Indirect beneficial effect for fish-eating birds as the conservation measures result in increased fish abundance which serve as prey. Generally, no effect on green and white sturgeon, eulachon, and American shad. Potential for short-term adverse effects during thermal refugia enhancement work and gravel augmentation actions (e.g. juvenile displacement from work sites, temporary increase in turbidity levels downstream from worksites).	**Upper Klamath River System (Above Iron Gate Reservoir):** No change from effects of current conditions **Iron Gate Reservoir:** No change from effects of current conditions **Klamath River Downstream of Iron Gate:** Continued degraded habitat conditions, particularly in the Upper and Middle Klamath reaches, without any mitigating actions. Continued declines in Klamath River coho populations would be likely as important projects to improve and protect suitable coho habitat and improve Iron Gate Hatchery operations would not occur. Potential for continued declines in Chinook and steelhead populations as degraded habitat conditions for these two species would persist. No effect on other species. Continued degraded river conditions could result in ecosystem effects (e.g. declining fish could lead to declines or stagnation in fish-eating bird populations).
Socioeconomics and Environmental Justice	Beneficial effect to socioeconomic and environmental justice concerns with implementation of the HCP. Tribal members as well as non-members will likely benefit from funding for restorative projects including implementation and monitoring of these projects. Potential adverse impact to fishable steelhead days during implementation of the flow variability program in the winter. NMFS anticipates this impact, if it occurs, will be of short duration. Beneficial effect to recreational opportunities as implementation of the HCP is expected to result in an increase in adult returns of Chinook and steelhead during the permit duration. Although impacts to whitewater boating from flow variability may be neutral, there may be adverse impacts limited to short periods and limited area of overlap, but no significant adverse impacts to whitewater boating are expected. No effect on camping opportunities.	Continued degradation of habitat could lead to further declines in important subsistence and commercial fish species (e.g. Chinook) which would continue a trend of negative impacts on tribal communities in the Klamath River basin. Significant lack of employment opportunities for minority and non-minority populations in the basin would likely continue without improvement from habitat restoration under the Proposed Action.
Land Use	Possible effect in the Scott and Shasta River basins if conservation measures are implemented that could result in the conversion of some irrigated agricultural lands to other land uses with a lower water demand (e.g. livestock grazing). NMFS does not believe such a conversion would result in a significant impact.	No change from effects of current conditions.

SECTION 7

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SECTION 8

List of Preparers and Organizations Consulted

8.1 Preparers: National Marine Fisheries Service

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8.3 Organizations Consulted

The following organizations were consulted with during preparation of this environmental assessment:

The Yurok Tribe, California
The Hoopa Valley Indian Tribe, California
The U.S. Environmental Protection Agency
The U.S. Bureau of Reclamation
The U.S. Fish and Wildlife Service
The National Oceanic and Atmospheric Administration Restoration Center
California Department of Fish and Game
California Coastal Commission

APPENDIX A- Response to Public Comments Received

On May 4, 2011, NMFS published a Notice of Availability of the draft environmental assessment (DEA), habitat conservation plan (HCP), implementing agreement (IA), and receipt of application for an ITP by PacifiCorp (76 FR 25307). Public comments on the DEA, HCP (PacifiCorp 2011a), and IA were accepted for a period of 60-days until the comment deadline of 5 p.m. Pacific Time, on July 5, 2011. A public meeting on the DEA and HCP was held on June 29, 2011, from 6 p.m. to 9 p.m. at the Hilton Garden Inn, 5050 Bechelli Lane, Redding, CA. At this meeting no comments were provided from members of the public. A total of 11 individual comment letters were received prior to the comment deadline from various private, tribal and public organizations with NMFS identifying 79 individual comments on the DEA, HCP, and IA. Some of the public comments received were directed at the DEA and some were directed at the HCP. As the HCP is PacifiCorp's plan and document, comments specific to the HCP were referred by NMFS to PacifiCorp for their consideration. Comments directed towards the DEA were addressed by NMFS. In this FEA changes in response to public comments received can be observed by strikethrough and underlined text; text that has been deleted is shown as strikethrough and text that has been added has been underlined. Additional changes to text of the FEA were made in response to the need for additional clarification or due to issues raised by the Bureau of Reclamation and U.S. Environmental Protection Agency after the public comment deadline had expired, or to correct grammatical or typological errors. This appendix includes all public comments received prior to the public comment deadline and the responses NMFS and PacifiCorp included in the FEA and final HCP.

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LEONARD E. MASTEN JR
CHAIRMAN

June 24, 2011

Dr. Kevin Chu
Deputy Regional Administrator
C/O Lisa Roberts
NMFS, Arcata Area Office
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Arcata, CA 95521

Re: PacifiCorp HCP

Dear Dr. Chu:

Thank you for the opportunity to review the *Habitat Conservation Plan* (HCP) and associated *Draft Environmental Assessment* (EA) for the *PacifiCorp Klamath Hydroelectric Project Interim Operations*. We hope you will fully consider the comments below as you work with your agency to develop a *Final Environmental Assessment*. Overall, we feel the HCP and Draft EA fall short on many levels, described below. The HCP seems to be conceptually limited by the Interim Conservation Plan of November 9, 2008.

1

Indirect Harm vs. Direct Take

Repeatedly throughout both documents, effects from PacifiCorp actions are described as resulting in *indirect harm* when they actually result in a *direct take* (e.g. HCP Table 3, blockage of fish passage).

2

Flows at Iron Gate Dam

On page 73 of the HCP (last paragraph) it is stated: "Reclamation is responsible for management of flows in the upper Klamath River to ensure that flow requirements at Iron Gate dam are met. As such, PacifiCorp's Project operations do not determine or control the availability of flows released from Iron Gate dam." Really this is only half true. The Project has enough storage capacity to adjust timing of flow releases and volume substantially.

3

Additionally, Table 2 of the HCP describes the Current Conditions of the minimum flow releases at Iron Gate Dam, as taken from the 2010 NMFS Biological Opinion. However, current management of flow releases from Iron Gate Dam have departed from the operations described in the Biological Opinion, first morphing into a Water Supply Index method and, most recently, into a Variable Base Flow procedure which has not even been analyzed by NMFS for compliance with the 2010 Biological Opinion. Further, it is understood by the Hoopa Valley Tribe that NMFS anticipates initiating a new consultation with Reclamation to update the entire process altogether later this year. The HCP and Draft EA should described Iron Gate releases in their most contemporary form, reflective of actual flow management.

4

Watershed and River Enhancements Blown Out of Proportion

5 The HCP and Draft EA should be output orientated instead of input oriented; approval should be based on demonstration of the completion of restoration projects and not a promise to fund some miniscule subset of a larger program of watershed restoration in the Basin.

The HCP and Draft EA are largely basing PacifiCorp's success on activities it will fund under the Coho Enhancement Fund, which contributes to the Coho Salmon Conservation Program (e.g. fish passage, habitat improvements, creek mouth alterations, etc). All of these activities are critically important, but PacifiCorp is taking credit for the benefits to be realized for all of these activities when it is only providing a very small sliver of the overall funding. The actual cost estimate the suite of activities described in the HCP and Draft EA would sum to millions more

6 than the negligible amount contributed by PacifiCorp. PacifiCorp is only funding $510,000 annually, of which $100,000 is reserved for emergency water transactions in the Scott and Shasta systems. That leaves a balance of only $410,000 to implement restoration projects annually, including permitting, effectiveness monitoring and base salaries. At best one or two projects will be completed each year, for a ten to twenty project total (out of a list much, much longer with a substantially larger cumulative price tag).

Gravel Augmentation

The HCP and Draft EA would require injecting 500 yd^3 of gravel into the mainstem channel annually below Iron Gate Dam for ten years (i.e., for a total of 3,500 yd^3) to improve spawning habitat. This total volume is insufficient to restore the volume of gravel lost since dam closure (i.e., scoured away from floods and not replaced), nor is the 10-year injection timeline scientifically defensible. Without a significant future gravel supply - with the dams still in - any spawning habitat improvement attributable to gravel injection would not be sustainable. Stillwater Science's (March 2010) *Sediment Delivery in the Klamath Basin* investigation indicates that coarse bedload rates were low prior to the dams. Depending on the assumptions applied to the field data and analyses, this pre-dam coarse annual bedload rate may have been between 500 yd^3/yr and 800 yd^3/yr. Therefore, the 500 yd^3/yr recommendation might be

7 minimally acceptable as an ongoing gravel maintenance rate (i.e., would continue past 10 years), *once* gravel storage has been replenished between Iron Gate Dam and the Shasta River confluence. Gravel and cobble replenishment of lost storage will require a higher injection volume under an accelerated timeframe. Some estimate of the replenishment volume would be needed before this replenishment rate can be recommended. This should be a high management priority. Additionally, the purpose of the coarse bed material injection should also be broadened beyond expecting spawning habitat improvement. A finer channelbed surface composition and more/larger depositional features will improve overall river productivity (creating more productive habitat for benthic macroinvertebrates) and juvenile rearing habitat availability, especially early salmonid fry rearing habitat. This would lead to more and higher-quality juvenile salmonid rearing habitat than generated by streamflows today.

Water Temperature

On pages 118-9 of the HCP, temperature non-compliance is triggered if the water temperature increases more than 4 C (7.2 F) below Iron Gate once water temperatures are at 16.5 C (61.7 F). It is extraordinarily unlikely that water temperatures would ever increase by more than 4 C (7.2 F) in a single week, absent rare and extreme river conditions or circumstances. Thus, this

8 compliance threshold is meaningless. The temperature compliance threshold needs to be rewritten such that it is meaningful. It should also be tied to the temperature requirements for coho (i.e. the temperatures at which coho begin to face jeopardy).

9 The HCP at page 119 is too limited in its range of actions to address temperature violations ("Project-related operations to technical adjustments to modify downstream water terperature …will not be possible during the interim period.") The applicant should be required to develop operations, such as use of the Iron Gage diversion tunnel, or drawing down reservoirs to avoid temperature impacts.

Large Wood

10 PacifiCorp proposes relocating all the wood that gets stuck behind the reservoirs to downstream of Iron Gate (or use it in the habitat projects). While we recognize and fully support the need for large wood to benefit coho (a) we would not expect PacifiCorp to capture very much wood anyway, as flows upstream are too low to cause much mainstem bank erosion. Any wood probably will come from upstream tributaries and (b) this does nothing to mitigate the cumulative loss of large wood downstream of Iron Gate since the construction of the dam in 1962, which is the far greater impact.

Effectiveness Monitoring

11 Under Effectiveness Monitoring (HCP page 130), PacifiCorp states they will summarize everyone else's monitoring, including the efficacy monitoring related to the projects they will fund from their $510,000 annual funding contribution. Because the project implementers are also doing efficacy monitoring, this leaves an even smaller balance to pay direct restoration costs (as discussed above). Since PacifiCorp is not actually doing any of the monitoring directly themselves, this should be omitted from the HCP and the Draft EA or replaced with actual efficacy monitoring conducted by PacifiCorp (in addition to the $510,000 annual payment).

Affected Tribes

12 Adaptive management (HCP page 131) refers to Technical Review Team. On a footnote, it says TRT will consist of agencies and "affected Tribes." For the purpose of the Technical Review Team, is Hoopa considered an affected tribe?

Cultural Fishing

13 Page 3-36 of the Draft EA makes no reference to fishing for cultural or ceremonial purposes. This should be added into the text.

Conservation/Mitigation Measures

14 The Conservation/Mitigation Measures (Draft EA page ES-1 and 2) do not include minimum flows (compliance with 2010 NMFS Biological Opinion) or gravel augmentation and should be included.

Mischaracterization of Trinity River

Page 3-25 in the Draft EA (in reference to spring Chinook) says, "Although data indicate that returns to the hatchery constitute about a third of spring-run Chinook salmon in the Trinity River, NRC (2004) suggests that all of the Trinity River mainstem spawners may be hatchery origin."

15 This is an inaccurate statement. While some spawners may be the progeny of hatchery-origin fish, many Trinity River spawners are indeed natural fish.

Environmental Justice

The Draft EA (page 4-10) says NMFS made the determination that there will be a minor beneficial effect to environmental justice concerns because "an important minority population (tribes) will benefit from funding for restoration projects when this population is a part of the implementation and monitoring of these projects." First, we believe it is inappropriate to assume a measly $510,000 would have a benefit on *any* tribe, which presumes the money would even get funded through a tribal organization in the first place as opposed to a non-tribal organization (e.g. Mid-Klamath Watershed Council or other NGOs). Second, please clarify which tribes are to be on the receiving end of this imaginary minor benefit.

16

Water Quality and TMDLs

On page 5-2 of the Draft EA, the implementation of the TMDL is referenced as improving water quality over time. How would this even be possible if PacifiCorp (one of the largest impacts to water quality) is essentially exempt from the TMDL? All PacifiCorp has to do to comply with the TMDL is submit an implementation plan, as detailed in Resolution No. R1-2010-0026 from the North Coast Water Quality Control Board:

17

> Submit a proposed implementation plan that incorporates timelines and contingencies pursuant to the KHSA. In the event that the KHSA does not move forward, the implementation plan should specify that the Federal Energy Regulatory Commission (FERC) 401 water quality certification process shall resume. Section 6.3.2 of the KHSA describes TMDL implementation to include a timeline for implementing management strategies, water quality-related measures in Appendix D, and Facilities Removal as the final measure. PacifiCorp may propose the use of offsite pollutant reduction measures (i.e. offsets or "trades") to meet the allocations and targets in the context of Interim measures 10 and 11. The implementation plan should identify appropriate intervals whereby PacifiCorp will provide the Regional Water Board updates on the status and progress of the plan, and provide adequate time for review so that select project(s) are ready for construction by the date of the Secretarial Determination. The implementation plan must provide for Regional Water Board review of site specific environmental assessments of dam removal before the Regional Water Board's approval of that approach as a final TMDL compliance measure.

18 PacifiCorp is claiming to be able to achieve improvements in water quality via TMDL implementation when this is not actually the case. This text should be removed or revised to be accurate.

Implementation Agreement

On page 9 of the Implementation Agreement, section 13.2 Monetary Damages says, "no Party shall be liable in damages..." We do not think that NMFS can or should immunize anybody from damages, and this text should be removed.

19

20 Permit extension for the HCP are provided for in the Implementation Agreement. Any proposal to extend the term of this permit ought to receive careful public scrutiny. This is especially pertinent considering extensions could go on indefinitely with likely significant delays in dam removal or FERC relicensing (if KBRA and KHSA are not ultimately authorized).

Thank you for taking the time to consider these comments. Please contact Mike Orcutt, Director of Hoopa Valley Tribal Fisheries, at 530-625-4267 x 13 or via email at director@hoopa-nsn.gov with any follow up questions or clarifications.

Sincerely,

Leonard Masten, Jr.
Chairman

References

Stillwater Sciences. 2010. Sediment Delivery in the Klamath Basin. Prepared for the California Coastal Conservancy.

Responses to Hoopa Valley Tribal Council Comments

1. As PacifiCorp described in the Draft HCP in the Background discussion, the Interim Conservation Plan (ICP) measures, which PacifiCorp developed in November, 2008 through a series of technical discussions with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (collectively "Services"), formed the starting point for development of the HCP. However, there have been revisions to those ICP measures and additional conservation measures added in the HCP that were not included in the ICP as PacifiCorp further worked with NMFS on the development of an HCP specifically for SONCC coho salmon. NMFS responds below to the commenter's specific comments related to how the commenter believes that the Draft EA and Draft HCP "fall short."

2. As PacifiCorp described in the Draft HCP, it is applying to NMFS for a permit under ESA Section 10(a)(1)(B) (16 U.S.C. 1539(a)(1)(B)) for potential incidental take of SONCC coho salmon from its Klamath Hydroelectric Project (Project)operations for a 10-year permit term. The Project is licensed by the Federal Energy Regulatory Commission (FERC). The ESA describes incidental take as taking that "is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." (16 U.S.C. 1539(a)(1)(B)). The Federal ESA defines "take" of ESA-listed species in the following way, to ''harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.''(16 U.S.C. 1532(19)). NMFS clarified that harm in the definition of ''take'' in the Act means an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering (50 CFR 222.102). Neither the ESA nor NMFS' implementing regulations specifically define "indirect harm" or "direct take." To the extent that the HCP refers to "indirect harm" as provided in this comment, NMFS will apply the correct terms and definitions in reviewing the application for an Incidental Take Permit (ITP) and the corresponding HCP. NMFS does not find any use of the phrase "indirect harm" in the draft EA.

3. The commenter is correct to the extent that NMFS must examine the capacity of PacifiCorp's Project to adjust timing and volume of flow releases and the interactions with Reclamation's Klamath Project to manage the effects of timing and volume of flows on SONCC coho. The HCP proposes

to do exactly that in Goal III of the HCP conservation strategy for SONCC coho. As described in the HCP, among other things, PacifiCorp will work directly with a Variable Flow Technical Team, which includes NMFS, during each year of the ITP term to develop a flow variability plan in an ongoing evaluation of how quantity and timing of flows in the Klamath River can be improved to enhance the growth and survival of coho for the next decade. As a reminder to reviewers, PacifiCorp stores comparatively very little water in their Project facilities as compared to the storage of Reclamation facilities. Page 26 of the HCP points out that PacifiCorp facilities store approximately 15 percent of the total water storage, and three (3) percent of active storage, available in the upper Klamath River basin (upstream of Iron Gate dam). The remaining water storage occurs at Reclamation facilities, and thus, PacifiCorp has a small role in the storage and distribution of water above Iron Gate Dam.

4. The commenter is correct that NMFS has entered into early discussions with Reclamation for a new consultation on the effects of Reclamation's Klamath Project operations; however, we do not anticipate that a new consultation will be completed prior to March 2013. In NMFS' 2010 biological opinion, we did not specify operational procedures to implement our RPA, rather we directed Reclamation to develop those operational procedures. We agree with commenter that Reclamation's operational procedures have changed from a Water Supply Index approach to a Variable Based Flow approach; however, our flow requirements in the RPA have not changed. In the HCP, under Goal III of the Coho Salmon Conservation Strategy, PacifiCorp proposes to contribute to implementing flows consistent with Reclamation's responsibility under NMFS' biological opinion(s) for Reclamation's Klamath Project, including continued coordination in implementing flow-related measures under the 2010 biological opinion, or any future consultation requirements. The coordination envisioned in the HCP in order to implement flow-related measures is to be accomplished via PacifiCorp's participation in the Variable Flow Technical Team.

5. The HCP and corresponding Implementing Agreement (IA) do demonstrate that the conservation program for SONCC coho is "output oriented." For example, Table 4 in the HCP outlines clear goals and objectives and corresponding specific quantitative targets to address corresponding adverse effects on SONCC coho salmon resulting from PacifiCorp's Project operations. These goals and objectives are all designed to improve habitat and other factors that are limiting survival for SONCC coho in the Klamath basin. In addition, Chapter VIII. "Monitoring and Adaptive Management" describes how PacifiCorp will monitor

implementation of the various measures in the conservation strategy for both compliance and effectiveness, and it describes the process for determining any adaptive responses necessary based on the monitoring.

6. In addition to the $510,000 annual payment into the Coho Enhancement Fund (CEF), PacifiCorp will also be obligated to expend funds for the other costs to implement the HCP as outlined in Chapter X (Funding). For example, other obligations of PacifiCorp outlined in the HCP include: (1) representatives involved in the Variable Flow Technical Team, (2) funding implementation of a Hatchery and Genetic Management Plan, (3) providing staffing and funding to manage and coordinate the Coho Enhancement Fund, (4) bear the costs associated with turbine venting and monitoring, and (5) funding staff to move Large Woody Debris trapped at Project dams. NMFS believes the obligations of PacifiCorp, including funding the CEF, adequately minimizes and mitigates to the maximum extent practicable Project effects on coho salmon in the Klamath River, and will result in meeting HCP Goals, Objectives, and targets for coho salmon conservation. Additionally, NMFS believes PacifiCorp's obligations are appropriate for this interim period while decisions are made on the fate of Project facilities. In addition, in Chapter VIII (Monitoring and Adaptive Management), the HCP describes how PacifiCorp will convene meetings of a Technical Review Team to review progress and priorities for specific projects and actions and recommend adjustments as necessary. All of the other non-CEF activities required of the HCP are likely to add significant commitment of funds from PacifiCorp. The statement that PacifiCorp is only providing $510,000 annually to implement the HCP is not taking into consideration the other financial obligations required of PacifiCorp and outlined in the HCP.

7. As the commenter points out, pre-dam sediment delivery may have ranged between 500 and 800 cubic yards/year based on recent research. It is important to keep in mind that the conservation actions proposed in the HCP are designed to avoid, minimize, and mitigate for effects of the Covered Activities described in the HCP (i.e., effects of continued Project operations for the term of the proposed ITP). Thus, replacement rates for impairments to gravel recruitment since the dams were constructed would not be appropriate for an ESA Section 10(a)(1)(B) permit. However, the point that there needs to be an evaluation of current conditions of suitable spawning gravel from Iron Gate dam to the confluence of the Shasta River to guide gravel enhancement measures under the HCP will be considered in the development of the gravel augmentation plan as described in the HCP. In regards to the commenter's points about the objective of gravel placement, the commenter's concerns will be considered as a gravel augmentation plan is developed. Although the HCP states objectives related to gravel

augmentation will be spawning habitat enhancement as well as disease reduction related to gravel scour under Goal V of the HCP, the HCP provides that PacifiCorp will develop a gravel augmentation plan, including an evaluation of its intended purposes, for review by NMFS and the California Department of Fish and Game. In addition, Goal VI (Enhance migratory and rearing habitat for coho salmon in the Klamath River mainstem corridor) of the HCP provides for specific measures related to coho salmon rearing habitat.

8. The commenter is concerned with the water temperature surrogate identified in the HCP for indicating whether the authorized level of incidental take is exceeded. As noted in the HCP, this potential increase would be determined from the difference in mean weekly minimum water temperatures (MWMT) as measured at a location in the lower Klamath River outside the influence of the Project. This potential increase would be determined when coho salmon are present and when the MWMT is above 16.5°C (generally summer or early Fall), and can be directly attributable to Project operations. Should it be determined that temperature exceedances are occurring below Iron Gate Dam, and those exceedances are due to Project operations, a process for conferring with NMFS on changes to priorities of HCP actions, which could also include funding for additional actions to reduce temperature effects on coho, will occur.

During the 2007 consultation with FERC, NMFS previously determined that mean daily minimum temperatures below Iron Gate Dam could be up to 4° C higher during late July as a result of the Klamath Hydroelectric Project. In the FERC consultation, NMFS concluded that exceedance of incidental take authorization would occur if the Project elevated MWMT below Iron Gate Dam by more than 4° C (See NMFS, 2007). This conclusion was based upon modeling by Dunsmoor and Huntington (2006). NMFS believes this threshold for Project temperature effects is biologically based and has agreed with PacifiCorp that the 4° C threshold should be used to determine if Project operations are exceeding incidental take authorization for SONCC coho.

It is important to remember that in the interim period of the proposed permit term, while the ultimate fate of Project dams are being evaluated, significant modifications to Project operations are neither reasonable nor feasible given the relatively short permit term and the potential for dam removal at the end of the permit term.

9. The commenter suggests that PacifiCorp be required to develop operations, such as the construction of a diversion tunnel or drawing down reservoirs as an option to combat high water temperatures. Because the causes of high water temperatures below Iron Gate Dam include the entire

mechanics of artificially manipulating the natural flow regime in the Klamath Basin for the purposes of water deliveries for human use (including Reclamation's Klamath Project operations, the effects of which are analyzed in NMFS 2010), and such water temperatures are not solely the direct result of PacifiCorp's Project, NMFS does not conclude that such an alternative is rationally related to the adverse effects on coho salmon caused by PacifiCorp's project for a ten year permit period, and therefore, the suggested alternative is neither reasonable nor feasible in consideration of the requirements of an ESA Section 10(a)(1)(B) permit. Reservoir operations and flows below Iron Gate Dam are intricately linked to operation of Reclamation's Klamath Project. As noted in the HCP and Response No. 3, a Variable Flow Technical Team will include representatives from PacifiCorp who will be engaged in determining how and to what extent flows can be modified from Iron Gate Dam to improve conditions for coho in the Klamath mainstem.

10. As mentioned in Response No. 7 above, the HCP is designed to address impacts from Covered Activities (i.e., effects of continued Project operations for the term of the proposed ITP). The LWD objective in the HCP is designed to minimize and mitigate for effects of the blockage of LWD by the dams for the permit term, not for the interruption of LWD that has occurred since the dams were constructed, which, as the commenter notes, resulted in significant changes to natural river processes. Although the source of potential LWD is not as great as would occur in the middle or lower Klamath River, LWD that is captured at Project dams over the permit duration can nonetheless serve as habitat features downstream of Iron Gate Dam once placed in the mainstem. In addition to the sources of LWD above Iron Gate Dam that are generally limited (i.e., through removal of riparian trees), it is possible that LWD larger than the dbh size prescribed in the HCP could recruit to the Klamath River above Iron Gate Dam via wind driven blow-down events, or landslides that deliver large wood to the system.

11. NMFS believes that the most efficient use of CEF funds will be to require project proponents to evaluate projects funded through the CEF for both compliance and effectiveness. NMFS guidance (see 65 FR 35242, 35253-35254; June 1, 2000) describes how both compliance and effectiveness monitoring should be incorporated into any HCP, and NMFS believes it is most effective for those who know the projects best, and have gained access to any private lands necessary for the implementation of projects, to also be the parties who can monitor for compliance and how effective the projects are at meeting stated objectives. NMFS believes the cost of adding compliance and effectiveness monitoring onto project proposals will likely be minimal, thus leaving more money available for project

implementation than had third parties conducted the required monitoring. As of the 2011 CEF funding cycle, a requirement to integrate compliance and effectiveness monitoring into project proposals is in place. It is important to keep in mind that NMFS and PacifiCorp will review compliance and effectiveness monitoring results for CEF funded projects. Should our assumptions regarding efficacy in monitoring become problematic, NMFS and PacifiCorp can develop a new strategy to conduct compliance and effectiveness monitoring.

12. For the purposes of the CEF Technical Review Team, the Hoopa Valley Tribe is considered an "Affected Tribe."

13. The commenter is correct in that the DEA did not mention cultural or ceremonial tribal fishing. We have included these as other types of purposes for tribal fishing in the Final EA.

14. The commenter notes that the DEA Executive Summary did not include gravel augmentation or minimum flows to comply with the NMFS 2010 Biological Opinion (BiOp) in the section on conservation/mitigation measures. The Executive Summary does include a bullet on PacifiCorp participating in the development of plans to increase flow variability below Iron Gate Dam (Variable Flow Technical Team) which is an important part of the HCP's measures regarding implementation of flows under the NMFS 2010 BiOp and future consultations as further described in the HCP. The commenter is correct the DEA failed to highlight gravel augmentation in the Executive Summary and this has been added in the Final EA.

15. The commenter expresses concern that the DEA may have overstated the presence of hatchery-origin spring-run Chinook in the Trinity River. We have clarified in the Final EA that in addition to the occurrence of natural spawners in the Trinity River, the progeny of hatchery-produced Chinook, if the adults have returned to spawn in the wild, are considered natural fish and not "hatchery" fish.

16. The commenter expresses concern that the DEA may have overstated benefits towards Environmental Justice in the Klamath basin, believing that the $510,000 annual payment to the CEF is not sufficient to provide benefits to tribes when funding projects is a competitive process with other non-tribal organizations. NMFS disagrees. While funding projects by the CEF is a competitive process, NMFS believes tribes in the Klamath basin will receive some benefit from restoration projects through the hiring of tribal members for project implementation, or through purchases of supplies and goods from tribal business owners during project implementation, as well as the potential that tribes or tribal members may apply for and be directly awarded funds

for projects. NMFS expects these benefits to be tangible during the 10-year permit term. In regards to which tribes could be on the receiving end of these benefits, NMFS believes any tribe in the basin could receive these benefits, including being successful in receiving the award of CEF funds to implement projects that meet the HCP's goals and objectives. From NMFS' perspective, any proposed project that fits with the HCP's stated biological goals and objectives related to CEF funded projects will receive serious consideration for funding.

17. The commenter expresses concern that PacifiCorp will be exempt from complying with TMDL's to improve water quality in the Klamath River basin. NMFS does not have jurisdiction over development of TMDLs. However, as the commenter notes, agencies with jurisdiction over development of TMDLs in the Klamath River basin have approved and adopted TMDLs and corresponding plans that apply to Project operations. In respect to the DEA, page 5-2 is a discussion of cumulative effects for water quality and quantity. NMFS describes how Project facilities and operations have contributed to the decline of water quality in the Klamath River. NMFS believes that current and future implementation of plans for compliance with TMDLs in the basin will improve water quality in the Klamath River as amounts of pollutants are reduced over time. NMFS recognizes the process to improve water quality will be a lengthy one as it is not feasible to completely undo in 10 years that which has taken many decades to develop.

18. In regards to TMDL implementation, please refer to Response to Comment No. 17 above.

19. The commenter is concerned with language in the Draft Implementing Agreement (page 9) that states, "No Monetary Damages. No Party shall be liable in damages to any other Party for any breach of this IA, any performance or failure to perform a mandatory or discretionary obligation imposed by this IA or any other cause of action arising from this IA." This language is common for IAs related to HCPs (see USFWS and NMFS Habitat Conservation Planning Handbook, November 1996, Appendix 4 ("Template" Implementing Agreement)) and simply means that neither party will be liable to the other for monetary damages in any cause of action arising under the IA. However, it does not preclude other remedies, and it does not limit enforcement authority under the ESA or other applicable law (see sections 13.3, 13.4, and 16.8 of the IA).

20. The commenter is concerned with the opportunity for public scrutiny in extensions of the permit as the IA provides for extensions of the permit. As noted in Section 6.2 of the IA, NMFS may grant a one-year extension to the permit, should PacifiCorp request it, and NMFS concludes

that such an extension of the ITP would be consistent with all applicable laws and regulations, and that no new material information exists indicating an effect of the action or additional incidental take of Covered Species that was not previously considered. Any proposal to extend the permit for an additional amount of time will require compliance with applicable laws and regulations and may require an amendment of the HCP, ITP and IA, which would include applicable opportunity for public review and comment (see section 15.3 of the IA).

Oregon
John A. Kitzhaber, M.D. Governor

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July 5, 2011

BY ELECTRONIC FILING

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Email: PacifiCorpHCP.SWR@noaa.gov

RE: Comments on Incidental Take Permit and Habitat Conservation Plan for PacifiCorp Klamath Hydroelectric Project Interim Operations; RIN 0648-XA410

Dear Ms. Roberts:

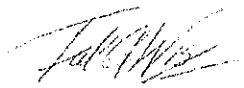
The purpose of this letter is to comment upon the above-referenced application for an interim Endangered Species Act ("ESA") Section 10 Permit filed by PacifiCorp Energy ("PacifiCorp") for the Klamath River Hydroelectric Project. Oregon Department of Fish and Wildlife, (ODFW), offers the following comments in support of this application, and urges the National Marine Fisheries Service ("NMFS") to approve this application. 1

Our organization supports the Klamath River Hydroelectric Settlement Agreement ("KHSA"), and the actions undertaken by PacifiCorp pursuant to this settlement agreement. An important component of the KHSA is the commitment by PacifiCorp to implement interim conservation measures that will improve water quality in the Klamath River, and conserve aquatic resources.

We believe that the conservation actions contained in PacifiCorp's permit application, when implemented during the interim time frame leading up to removal of PacifiCorp's' four hydro-electric facilities as stipulated in the February 18, 2010 KHSA, will help conserve and protect ESA-listed species in the Klamath River, including coho salmon. These conservation actions will contribute to the recovery of coho salmon in the basin. Furthermore, issuance of the ESA Section 10 Permit by NMFS will enable PacifiCorp's full implementation of these interim conservation measures, and it will enable other actions contemplated in the KHSA to proceed in a timely manner. 2 ODFW's support of measures contained in the application is predicated on the "interim" nature of the program leading up to the implementation of the positive actions envisioned in the KHSA. 3

Thank you for the opportunity to provide these comments on the above-referenced application.

Sincerely,



Ted Wise
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High Desert Region Hydropower Program Leader
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Cc: Tim Hemstreet, PacifiCorp Energy

Responses to ODFW Comments

1. The commenter states support for the ITP application and urges NMFS to approve the application. NMFS acknowledges ODFW support for the ITP application and NMFS is continuing to process the ITP application as quickly as practicable.

2. The commenter states their belief that the conservation actions included in the HCP will help to conserve and protect coho salmon over the permit term and will contribute to recovery of coho salmon in the Klamath Basin. The commenter also believes issuance of the ITP will enable implementation of actions under the KHSA in a timely manner. NMFS acknowledges these comments regarding coho salmon and acknowledges the comment regarding implementation of actions under the KHSA to the extent that the ITP application process is described in the KHSA.

3. The commenter notes that their support is predicated on the "interim" nature of the permitted activities which may lead up to implementation of positive actions envisioned in the KHSA. NMFS acknowledges this comment and ODFW's stated reasoning for support of the ITP application.

PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

Please Respond to:

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5 July 2011

Ms. Lisa Roberts, Fisheries Biologist
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Via Email

RE: PCFFA/IFR Comments on Incidental Take Permit and Habitat Conservation Plan for PacifiCorp Klamath Hydroelectric Project Interim Operations; RIN 0648-XA410

Dear Ms. Roberts:

The purpose of this letter is for PCFFA and its sister organization, the Institute for Fisheries Resources (IFR), to comment briefly upon the above-referenced application for an interim Endangered Species Act ("ESA") Section 10 Permit recently filed by PacifiCorp Energy ("PacifiCorp") for the Klamath River Hydroelectric Project ("Project"). We offer the following comments in general support of this application, and urge the National Marine Fisheries Service ("NMFS") to approve this application, with whatever modifications or additional measures the Service believes are necessary in law or in accordance with the science to reasonably mitigate the impacts of the Project on all ESA-listed species, as soon as reasonably possible. We believe that such a Section 10 Permit can be issued on an interim basis, presuming projected PacifiCorp four-dam dam removal by end of 2020.

1

Our organizations fully support the Klamath River Hydroelectric Settlement Agreement ("KHSA"), and the actions undertaken by PacifiCorp pursuant to that settlement agreement. An important component of the KHSA is the commitment by PacifiCorp to implement certain "interim conservation measures" that are intended to protect and improve water quality in the Klamath River, and thus conserve aquatic resources, while dam removal is pending. This also

includes $510,000/year PacifiCorp funding for the Coho Enhancement Fund that is specifically targeted at helping with ESA-listed coho protection and habitat restoration wherever needed in the basin, including outside the relatively limited Hydropower Project areas. These various KHSA "interim conservation measures" are also now being offered by PacifiCorp as part of its proposed HCP/ITP currently before NMFS for analysis and decision.

2 Although obviously four-dam removal as contemplated by the KHSA is by far the best way (and likely the only way) to ultimately eliminate "take" impacts on ESA-listed salmonids resulting from the Project dams, we do believe that the many short-term "interim conservation measures" contained in PacifiCorp's pending HCP/ITP permit application, when implemented, will go a long way toward mitigation by helping to conserve and protect ESA-listed species in the Klamath River, including coho salmon, and will significantly contribute to the survival and recovery of coho salmon during the relatively short (9-year) interim period until dam removal under the KHSA can be fully accomplished, i.e., by end of 2020.

NMFS must, of course, independently determine whether an ESA Sec. 10 Permit as proposed by PacifiCorp meets both the legal standards for mitigation, and also whether its projected mitigation results are likely to contribute to both the survival and recovery of ESA-listed species in the river, in accordance with the best available science.

3 It may be that NMFS will determine that additional mitigation measures would be prudent, particularly in light of the need for consistency with the upcoming NMFS Coho Recovery Plan for the Klamath Basin, as yet unpublished. Any HCP approved should be consistent with, and contribute to, that Coho Recovery Plan. It is also highly likely that such additional measures would be required for any such Permit of any greater duration, or in absence of dam removal.

It should be noted again that this Permit is only intended to be for an "interim period" until end of 2020, *and then only in contemplation of dam removal by end of 2020 under the KHSA*.

4 If the KHSA should for any reason fail, or be repudiated by PacifiCorp, this event should constitute at least a reopener for reconsideration of this Permit in light of changed circumstances.

5 Regardless, we urge NMFS to complete the review process for the PacifiCorp proposed ESA Section 10 Permit as expeditiously as possible, consistent with providing adequate public comment periods. An approved HCP/ITP would support PacifiCorp's full implementation of these various "interim conservation measures," and it will also enable other actions contemplated in the KHSA to proceed in a timely manner.

Thank you for the opportunity to provide these comments on the above-referenced application. Please feel free to contact me at the above address and phone number if there are additional questions about any of the above comments.

Sincerely,

Glen Spain

GHS/lt

Glen H. Spain,
NW Regional Director
PCFFA/IFR

Responses to PCFFA Comments

1. The commenter offers general support for the ITP application including support for modifications or additional measures that NMFS deems necessary to mitigate for impacts of the Project. The commenter believes NMFS can issue a permit for this interim basis, presuming dam removal will occur as proposed in the KHSA by the end of 2020. NMFS acknowledges the commenter's support and NMFS is continuing to process the ITP application as quickly as practicable.

2. The commenter states a belief that the many short-term interim conservation measures included in the HCP/ITP application will help to conserve and protect coho during this interim period until dam removal is proposed to occur under the KHSA by the end of 2020. Although NMFS cannot presume dam removal will occur by the end of 2020 under the KHSA, NMFS does believe these interim actions will contribute towards the conservation of SONCC coho until fish passage can be established for the Project by the end of 2020 via either dam removal as proposed under the KHSA if various conditions are met, or volitional fish passage if the KHSA does not result in dam removal and the Project reverts to the FERC relicensing process.

3. The commenter states that additional mitigation measures for the HCP/ITP may be necessary to provide consistency with NMFS' pending draft SONCC coho recovery plan. The recovery plan for SONCC coho is still in the development stage and is not ready for public comment. However, NMFS believes the conservation actions outlined in the HCP will be consistent with recovery objectives in the pending SONCC coho recovery plan. The ITP and corresponding IA would provide for procedures for any revisions that may be necessary in the HCP/ITP in accordance with the ESA and NMFS' implementing regulations.

4. The commenter believes that the ITP should provide for a reopener for reconsideration of the permit in light of changed circumstances should the KHSA fail for any reason or be repudiated by PacifiCorp. It is important to understand that the permit term (10 years) is for the period of time expected for fish passage to occur through one of two alternative processes. In the IA at Section 9.4 Changes in Anadromous Fish Passage Assumptions, it states, in pertinent part, "As the Plan describes in greater detail, the Parties have determined that it is reasonably certain that anadromous fish passage will occur in the Klamath River upstream of Iron Gate dam for the Project by the end of 2020 under one of two alternative processes: (1) facilities removal as provided under the KHSA; or (2) mandatory fishway prescriptions required under any new FERC license for the Project if facilities removal is not achieved under the KHSA. Thus, the Plan addresses the impact of anticipated

incidental take of Covered Species from interim operations of the Project until such anadromous fish passage occurs." In addition, this section provides a process for revision of the conservation and mitigation measures or termination of the ITP, "In the event NMFS determines that (1) circumstances have changed and it is no longer reasonably certain that anadromous fish passage will occur in the Klamath River upstream of Iron Gate dam for the Project by the end of 2020 as described above, and (2) the potential extension of the ITP under section 6.2.1 of this IA [which provides for a one-year extension of the ITP under limited circumstances] would not apply to these changed circumstances . . . ." Thus, the potential that the KHSA is terminated or is not completely implemented is already essentially addressed in the manner suggested by the commenter.

5. The commenter urges NMFS to complete the review process for the ITP as quickly as possible given consideration of public comments received. NMFS is continuing to process the ITP application as quickly as practicable and is responding here regarding its consideration of public comments it received on the proposed ITP and corresponding DEA.

OREGON WILD
Formerly Oregon Natural Resources Council (ONRC) www.oregonwild.org

July 5, 2011

Dr. Kevin Chu, Deputy Regional Administrator
Lisa Roberts
National Marine Fisheries Service, Arcata Area Office
1655 Heindon Rd
Arcata, CA 95521

Re: Oregon Wild comments on *Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan Coho Salmon, dated April, 2011,* and *PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon, dated March 15 2011.*
Submitted via email: PacifiCorpHCP.SWR@noaa.gov

Dear Administrator Chu and Ms. Roberts:

On behalf of our thousands of members throughout Oregon and the Klamath Basin, Oregon Wild appreciates the opportunity to comment on the Draft Environmental Assessment (DEA), pursuant to NEPA, regarding the assessment of the environmental impacts associated with NMFS proceeding with the issuance of an Incidental Take Permit (ITP) to PacifiCorp Energy (PacifiCorp). Oregon Wild recognizes, as stated in the Review Letter available through the National Marine Fisheries Service (NMFS), that the ITP issued (by NMFS) will allow for the take of one species of anadromous salmon during the course of PacifiCorp's Klamath Hydroelectric Project, located in the Klamath River basin, for a ten year period. The brief comments below reflect on both the PacifiCorp Habitat Conservation Plan (HCP) and the DEA of the ITP.

Introduction
Oregon Wild has worked in the Klamath Basin for over two decades. With staff located in the Klamath Basin and throughout the state, our organization has worked to protect the needs of fish and wildlife, and improve water quality and quantity in the Klamath through outreach and education, tactical legislation, water quality monitoring, upper basin restoration projects, collaboration with regional allies, strategic litigation, and more. The challenges in the basin are many, and while balancing the needs of diverse stakeholders is difficult, Oregon Wild remains committed to bringing demand for water resources in the Klamath Basin back into balance with what the region can naturally provide.

Portland
Eugene
Bend

Oregon Wild originally participated in negotiations in connection with the re-licensing of the Klamath Hydroelectric Project before the Federal Energy Regulatory Commission (FERC). These negotiations are referenced by PacifiCorp in the HCP. Initially, these negotiations were facilitated and managed by the Department. The negotiations, formed around dam relicensing, evolved into negotiations with the Klamath Irrigation Project on unrelated Klamath Basin water, refuge, and power issues that are not typical in FERC negotiations. Over the course of several years, negotiations ultimately resulted in the noted Klamath Hydroelectric Settlement Agreement (KHSA) and the Klamath Basin Restoration Agreement (KBRA).

Though Oregon Wild fully supports the removal of the lower four Klamath River dams, we do not support the KBRA or the KHSA. Some of the reasons for our objection to the agreements are discussed below (see p. 5 and 6). Our concerns regarding the KHSA are relevant given that PacifiCorp acknowledges, in the March 15, 2011 "PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon," that the proposed Habitat Conservation Plan (HCP) (and subsequently the DEA for the ITP) is directly linked to the KHSA. This connection is detailed on pages 1-6 of the HCP. For example, on page 2 of the HCP:

1

> The KHSA provides that Project operations will continue over the interim period until the dams are removed or, should dam removal not proceed, until a new FERC license is issued. The KHSA provides for the abeyance of the FERC relicensing process pending the outcome of the Secretarial Determination. Should the Secretary of the Interior determine that dam removal should not proceed, or the KHSA terminates for other reasons, the FERC relicensing process for the Project would resume. **As the KHSA is closely related to this HCP**, additional discussion on the KHSA process is provided in the following section of this document.

The HCP goes onto suggest (p.4):

> Since submitting the new license application to FERC in 2004, PacifiCorp has worked collaboratively with NMFS to develop "interim conservation measures" for listed coho salmon. … These measures are to be implemented in the interim period until issuance of a new FERC license or Project dam removal as specified in the KHSA (as described above). An Interim Conservation Plan (ICP) describing the interim conservation measures was completed on November 9, 2008, through a series of technical discussions with NMFS and USFWS.
>
> The ICP measures pertaining to coho salmon formed the starting point for development of this HCP, since it was recognized that the implementation of the ICP's conservation measures would conserve coho salmon and minimize potential Project impacts on that species.

Comments

General. Under the KHSA, the Secretary of Interior is to determine whether the removal of the lower four Klamath River hydroelectric dams will advance restoration of the salmonid fisheries of the Klamath Basin and whether it is in the public interest. Section 3.3.1 of the KHSA states that the Secretary shall determine:

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whether, in his judgment, Facilities Removal (i) will advance restoration of the salmonid fisheries of the Klamath Basin, and (ii) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and Tribes.

2 The issues in respect to this determination are much narrower than the issues and alternatives that need to be addressed in the broader environmental review. In respect to a proper evaluation of the KHSA and the KBRA, and the Department should be careful to separate its narrow analyses related to the Secretarial determination required by the KHSA in Section 3.3.1 from the more substantial issues that need to be addressed in the environmental review of the KHSA, the KBRA, and other alternatives. This evaluation includes and applies to the KHSA's interim measures, and subsequently the ITP, and consequently the current HCP under consideration by NMFS.

Oregon Wild believes that a careful analysis of the fish passage and water quality benefits of facilities removal will demonstrate that facilities removal will advance the restoration of salmonids fisheries of the Klamath Basin and is in the public interest. While we believe the delay and uncertainties (regarding dam removal) in the KHSA, as well as its connection to the KBRA and its harmful water, refuge, and subsidy provisions, are not in the public interest and in fact will set back important conservation goals in the basin, these problems are immaterial to the Secretarial determination required by KHSA Section 3.3.1.

3 **Habitat Conservation Measures: Overall.** While Oregon Wild maintains that the timeline and terms identified by the KHSA and the HCP regarding long-term substantive improvements to the Klamath River through a new FERC license or potential dam removal are unreasonable and far too lengthy, we are hopeful that the measures, summarized in Table 4 of the HCP, will be carried out efficiently and effectively to benefit the Klamath River water quality and its fisheries.

4 The action alternatives identified in the DEA for the ITP at 6-1 are unrealistic and assume a greater restoration impact and potential than is realistic in the Klamath River system. This is particularly true as the ITP acknowledges the limited role of PacifiCorp in water quantity management (see 4.2.2 on p.4-21) and furthermore, attributes harm caused to the river (see 5.6.3 on p.5-9) as well as potential opportunities for improvement (see reliance on TMDL on p.6-1) to other sources.

Habitat Conservation Measures: Flows. At several points in both the HCP and the DEA for the ITP, it is suggested that PacifiCorp retains "little control" over flows below Iron Gate dam, as this is managed primarily by the Bureau of Reclamation (BOR). Furthermore, it is suggested

5 that these flows are determined by the 2010 Biological Opinion (BiOp) for coho salmon. Given the limited management control of PacifiCorp in this regard, and the legal requirements of the Endangered Species Act (ESA) to follow the 2010 BiOp, the impact of all conservation activities associated with flow below Iron Gate Dam should be weighted accordingly. PacifiCorp is essentially doing little to nothing to improve flow conditions beyond the legal mandate of the 2010 BiOp. Furthermore, management of Klamath River flows below Iron Gate by BOR has

6 been adjusted significantly since the 2010 BiOp was released. That is, the original terms for flow management under the 2010 BiOp have been altered to accommodate a new BOR flow management plan under the Variable Base Flow Procedure. In addition, recent news from BOR

suggests that additional changes to management of the Klamath River system under the 2010 BiOp and the 2008 Biological Opinion for endangered Lost River and shortnosed suckers will occur in the near future. Both the ITP and the HCP should reflect any BOR management changes and be kept current to reflect additional future procedure changes.

7 **Habitat Conservation Measures: Water Quality and Habitat.** Any reliance, as suggested on p.5-3 of the DEA for the ITP, on the implementation of the Klamath River's Total Daily Maximum Load (TMDL) as a means to improving water quality in the Klamath River is ludicrous. The TMDL is insufficient and has been thus far poorly implemented in the Klamath River, in part as a result of the slow political process associated with the KBRA and KHSA. As such, PacifiCorp is taking no substantive steps to comply with or encourage the TMDL process and therefore the TMDL should not be relied upon as a means to protecting water quality in the Klamath River.

8 Reliance on implementation of Large Woody Debris (LWD) and a single (or 500 cubic yards annually up to 3500 cubic yards) gravel augmentation as the primary means to habitat improvements is insufficient. Additional measures, such as those identified in Objective G regarding refugia, are valuable and should be explored. Overall habitat improvements that result in increased cold water refugia, spawning habitat improvements, water temperature decreases, and increased flows should be evaluated.

9 **Habitat Conservation Measures: Temperature.** Heightened water temperatures in the Klamath River, as stated in both the HCP and the DEA for the ITP, have intense negative impacts on fisheries and their habitat in the Klamath system. As such, the measures identified in the HCP do not sufficiently address this problem. Measures to address disease are primarily duplicates of additional measures (F2 and F3, duplicate efforts in Objectives C and D) or existing basin research (e.g. F1). Furthermore, the thresholds identified on p.118-119, in Table 5 regarding mean weekly minimum water temperatures (MWMT) are unreasonable. Increases of 4°C (approximately 7.2°F) within a week are, while possible, highly unlikely. Though the HCP states that "modeling suggests that…can be up to 4°C higher as a result of the Project," the basis for this increase (4°C) is unclear (e.g.; What modeling? Which model? Over what time period?) and should be reevaluated with consideration of the best available science and the temperature thresholds for coho salmon.

10 The DEA for the ITP as well as the HCP acknowledges the potential for Iron Gate releases to have a significant cooling effect (see p. 50). While the HCP suggests the assistance of this cooling effect to be limited, further evaluation is necessary. This cooling effect is a potentially critical tool in amending water temperatures in the Klamath River and should be further explored.

11 **Habitat Conservation Measures: Climate Change.** The HCP suggests that climate change will not play a major or significant role in the Klamath Basin during the time period under consideration (10 years) for the ITP (see p.136). While climate change often addresses long-term impacts, climate change research for the Pacific Northwest suggests the assumption that impacts will not affect the basin within the ten-year ITP permit period is inaccurate. While certain extreme events are considered by the HCP, climate change impacts in both the long and

short-term should be incorporated and considered. Inclusion of climate change impacts to water quality and quantity in the Klamath River in the HCP should be reflected in any and all actions associated with the "Summary of Effects Addressed by Objectives and Targets Under the Coho Salmon Conservation Strategy."

Habitat Conservation Measures: Questions? Given the degree of uncertainty associated with the KHSA process, how does NMFS expect to address the HCP and ITP issue should FERC deny the Klamath Hydroelectric Project a new license and/or the KHSA be derailed by failed legislation, a negative Secretarial Determination, or any number of other outlets? 12

Regarding activities at Link River Dam and the East Side, West Side canals listed on p. 2-2 and p.2-3 in the DEA for the ITP—are these projected activities current? Recent news and FERC traffic indicates that Link River Dam, and therefore East Side and West Side canals will be decommissioned. Please ensure the HCP is kept current with all PacifiCorp infrastructure activities. 13

Habitat Conservation Plan Measures and Application of Existing Laws. Oregon Wild feels that the overall interim measures identified in the HCP and DEA for the ITP in the KHSA are inadequate. These measures generally allow PacifiCorp to continue to operate for at least the next decade in a manner that will continue to harm salmon. While the placement of gravel, improvements to fish passage, turbine venting, and additional measures, as noted in Table 4 of the HCP, should benefit Klamath fisheries, these measures are insufficient. The KHSA and its accompanying measures, and the noted HCP should require PacifiCorp to immediately implement the non-structural operational requirements that are part of the mandatory conditions for a new FERC license. Instead the HCP and subsequently the ITP essentially grant PacifiCorp what amounts to a new 10 year or longer license with minimal conditions. In addition, PacifiCorp should remain liable and its operations should remain subject to the Clean Water Act and the Endangered Species Act (ESA) in the interim (the KHSA contemplates giving PacifiCorp ESA coverage during the interim). 14 15 16

KHSA Analysis and Alternatives. As noted in the introduction above, Oregon Wild maintains considerable concerns over the KBRA-KHSA package. Any implementation of the KHSA and its associated interim measures must analyze the adverse impacts of the KHSA as well as any potential benefits. Our concerns with the KHSA are summarized below (citations correspond to Public Review Draft KHSA, January 2010): 17

- The KHSA requires signatory parties to also sign the KBRA, linking the KHSA to the harmful water, subsidy, and refuge provisions of the KBRA. KHSA Sec. 2.2.
- The KHSA prohibits the Secretary from electing to remove the Klamath dams until, among other things, a dam removal entity (DRE) is secured and the States and Congress pass legislation to fund removal. KHSA Sec. 3.3.4.
- The KHSA lists eight events that will terminate the dam removal planning process and restart FERC relicensing/dam removal proceedings. These include: the right of California and/or Oregon to veto dam removal if it does not concur in both the Secretarial Determination and the choice of a non-federal DRE; and passage of legislation or the

existence of any regulatory approval conditions that are "materially inconsistent" with the KHSA. KHSA Sec. 8.11.1, 8.11.1.C.

- The KHSA minimizes PacifiCorp's required operational changes until at least 2021, strips FERC of jurisdiction while the agreement remains in place, and also protects the utility from compliance with any other meaningful measures to improve water quality. KHSA Sec. 6.1.1 and 6.3.4.A.
- The KHSA halts State water quality certification proceedings, a critical remaining step before the FERC process would lead to dam removal. KHSA Sec. 6.5. The KHSA demands up to $27 million in extra payments to PacifiCorp if dam removal begins before 2021. KHSA Sec. 7.3.3.

The following aspects of the KHSA should be evaluated in respect to its impact to Klamath Basin fisheries and other resources:

- The linkage of the KHSA to the KBRA and the adverse consequences of the KBRA water deal, subsidies and special contracts to Klamath Project irrigators, and support for the commercial agriculture lease program on the basin's National Wildlife Refuges (See Comment 5 below).
- The long delay before dams are removed and the granting of annual licenses without substantive interim measures, including means to meaningfully improve water quality.
- The suspension of the FERC process, lack of a definite limit on the number of annual licenses granted to the Klamath Hydroelectric Project, and no specific date after which the formal relicensing process should begin again, if dam removal has not yet commenced.
- The need for dam removal funding from the state of California with full consideration of the political infeasibility and environmental impact of the current California Water Bond.

The following restoration alternatives should be evaluated when considering the KHSA and the Secretarial determination process:

- Removing the noted Klamath River dams without linking the KHSA to the KBRA, and/or without implementing the KBRA.
- A shorter timeframe for dam removal and/or stronger interim measures plus consideration of revised operations at Copco I and Iron Gate Reservoirs to include lower pool levels in an effort to reduce toxic algae growth, and minimize temperature increases caused by the reservoirs.
- A Federal Power Act takeover to remove the dams on a faster timeline and without the need for a California bond.

Conclusion

18 As NFMS considers PacifiCorp's application for the ITP and the associated HCP, we encourage NFMS to thoroughly review the aforementioned comments and concerns, particularly as they apply to a lack of substantive improvements by PacifiCorp to water quality, water quantity, and

habitat improvements in the Klamath River, as well as the clear overall need for improved interim measures in the KHSA process.

Thank you for your consideration of Oregon Wild's comments. Please contact me with any questions or concerns.

Sincerely,

Ani Kame'enui
Oregon Wild
Healthy Rivers Campaign Coordinator & D.C. Legislative Coordinator
ak@oregonwild.org
206.226.3376

Responses to Oregon Wild Comments

1. The commenter expresses their concern with the Klamath Basin Restoration Agreement (KBRA) and KHSA and how the KHSA is related to the HCP. NMFS acknowledges there is a connection between the HCP and the KHSA in that the KHSA provides that PacifiCorp will apply for an ITP from NMFS for certain measures that PacifiCorp will implement during the interim period while dam removal is under consideration. However, as the KHSA recognizes, the ITP application and corresponding HCP must stand on their own and meet applicable requirements under ESA section 10(a)(1)(B) and NMFS' implementing regulations related to Incidental Take Permits, just as any other such application would be required to do. NMFS must review and process the ITP application/HCP in accordance with applicable requirements of the ESA and its implementing regulations as well as other applicable law, such as the National Environmental Policy Act. As also noted in the HCP and IA, the proposed ITP and HCP are also intended to cover the requested interim period until it is expected there would be anadromous fish passage at the Project facilities in the event that the KHSA is terminated and the FERC relicensing process resumes.

2. The commenter is referred to the Response to Comment No. 1 above. Regardless of the outcome of the Secretarial Determination process and the analysis of the KHSA and KBRA, NMFS must review the proposed ITP/HCP in accordance with applicable law and regulations and the proposed ITP/HCP need to comply with applicable law and regulations in order for NMFS to issue an ITP. In addition, as NMFS described in the DEA, the Department of the Interior has issued a notice of intent to prepare an Environmental Impact Statement/Environmental Impact Report on the Secretary of the Interior's determination regarding dam removal pursuant to the KHSA. That notice also solicited comments on (1) How other potential actions within the KHSA should be analyzed in that EIS/EIR, and (2) the nature and extent to which the potential environmental impacts of implementing the Klamath Basin Restoration Agreement (KBRA) should be analyzed in that EIS/EIR (75 FR 33634; June 14, 2010). Since publication of the notice of intent to prepare and EIS/EIR, the Department of the Interior and California Department of Fish and Game has released a Draft EIS/EIR for public review. For more information on that review process, see http://klamathrestoration.gov.

3. The commenter is concerned that the timeline and terms identified by the KHSA and the HCP regarding long-term substantive improvements to the Klamath River through a new FERC license or potential dam removal are too long and unreasonable. However, the commenter expresses hope that the measures noted in Table 4 of the HCP (Summary of Effects Addressed by Objectives and Targets Under the Coho

Salmon Conservation Strategy) will be carried out efficiently and effectively to benefit Klamath River water quality and its fisheries. As is described in the HCP and DEA, PacifiCorp is applying to NMFS for a permit under ESA Section 10(a)(1)(B) (16 U.S.C. 1539(a)(1)(B)) for potential incidental take of SONCC coho salmon from its Project operations for an interim 10-year permit term. If NMFS issues the proposed ITP to PacifiCorp, NMFS would be establishing requirements to meet the objectives and targets outlined in Table 4.

4. The commenter is concerned the DEA may have overestimated the potential benefits of the ITP/HCP given the realities in the basin. The commenter notes this is particularly true given NMFS' assessment in the DEA of PacifiCorp's limited role in determining how flow is managed in the basin (given the effects on flows from Reclamation's Klamath Project operations, for which Reclamation consults with NMFS), and how other sources of pollutants (e.g. agricultural) have contributed to poor water quality conditions in the basin (see Cumulative Effects Analysis at Chapter 5). NMFS agrees with the commenter that the source of the basin's water quality problems cannot be solely tied to PacifiCorp, and that restoration of water quality in the basin will require improved land management practices from the entire Klamath River basin community. NMFS acknowledges that degradation of water quality in the basin did not occur over a short time-frame, nor is it reasonable to presume that complete restoration of water quality will occur in a short time-frame. Given this, PacifiCorp has acknowledged their role in how Project operations and facilities are impacting listed coho salmon and has cooperatively worked with NMFS to develop a plan to avoid, minimize, and mitigate for those impacts to SONCC coho salmon to the maximum extent practicable for the interim period of the proposed ITP/HCP. As described in the DEA and FEA, NMFS expects PacifiCorp's efforts will lead to improvement in water quality conditions downstream of Iron Gate Dam, resulting in improvements for biological resources, including coho salmon. NMFS disagrees that we have overestimated the potential benefits of 10 years of efforts to improve river conditions via implementation of the proposed ITP/HCP.

5. The commenter again notes the limited management control of PacifiCorp related to flow management below Iron Gate dam and the requirement to follow the 2010 NMFS BiOp and comments that the conservation activities associated with flow below Iron Gate dam should be weighted accordingly. The HCP includes goals, objectives and measures for flow below Iron Gate dam based on these issues (see Conservation Strategy Goal III (Improve instream flow conditions for coho salmon downstream of Iron Gate dam), Objective D (Flow)). Both the HCP and DEA recognize PacifiCorp's limited control over flow management below Iron

Gate dam and accordingly discuss the effects of the HCP's proposed conservation activities associated with flow in light of this limited control (see HCP Chapters V (Project Effects on Coho Salmon, Degradation and Loss of Habitat, Flows and Habitat Conditions Downstream of Iron Gate Dam) and VI (Conservation Program, Effects of the Coho Salmon Conservation Strategy, Habitat Conditions, Instream Flows and Flow Variability) and DEA Section 4.1.2.1 (Environmental Consequences, Effects from Proposed Action, Water Resources, Climate and Water Flow).

6. Please refer to Response to Hoopa Valley Tribal Council Comments No. 4 for further information on implementation the 2010 NMFS Biological Opinion for Reclamation's Klamath Project and the relationship of the proposed ITP/HCP to that biological opinion.

7. The commenter is concerned NMFS has overestimated the potential benefits TMDL implementation will provide in the basin over the next 10 years (Cumulative Effects Analysis, 5.2 Water Quality and Quantity). As NMFS notes in the analysis, we expect implementation of the TMDL to result in a reduction in phosphorus loading to Upper Klamath Lake, and that water quality improvements should occur over time. TMDL's are enforceable tools to improve water quality, and NMFS expects this regulatory process will indeed result in improved water quality over the next decade. To assume otherwise would indicate a presumption that neither affected states, nor the U.S. EPA, would assert their authorities to improve water quality, which NMFS determines is an unreasonable presumption. For purposes of cumulative water quality effects analysis, NMFS' expectations are also based on PacifiCorp's requirements to comply with TMDLs and the TMDL implementation process as this process moves forward.

8. The commenter states that the LWD and gravel augmentation plan serving as the primary means to habitat improvement is insufficient. NMFS disagrees based on the entire conservation strategy detailed in the HCP, which includes improvements to flow conditions downstream of Iron Gate Dam, and 10 years of restoration project funding and implementation through the CEF as other significant measures to improve habitat in the basin, including but not limited to improving the quality and carrying capacity of thermal refugia under Objective G, which the commenter notes as valuable.

9. The commenter states a belief that the measures in the HCP to address elevated temperatures are insufficient. NMFS disagrees. As described in the HCP, PacifiCorp has limited control on the temperature of water coming into its reservoirs, and PacifiCorp has limited control over how reservoir management is conducted due to effects on flows resulting from Reclamation's Klamath Project operations, for

which Reclamation consults with NMFS. Given these realities, PacifiCorp has agreed to mitigate for elevated temperatures below Iron Gate Dam by funding projects to enhance or restore existing cold-water refugia sites downstream for a 10 year period. Avoidance, minimization, and mitigation measures in HCP's must be technically and economically feasible. Although NMFS is still reviewing the ITP application in order to make a final determination, the HCP explains how PacifiCorp's proposed measures to protect and enhance existing cold-water sites within the basin will address Project impacts on water temperatures during the 10-year time frame while removal of PacifiCorp dams is under evaluation. To clarify how the HCP addresses the impacts of disease, Objective F (Disease) contains three targets: 1) Improve understanding of disease mechanisms to be better able to reduce effects from disease within the term of the ITP; 2) Implement measures under Objective C (Gravel Augmentation) to improve scour of disease host habitat through the strategic placement of coarse sediment annually in the mainstem Klamath River (in consultation with the Klamath River Fish Health Workgroup and consistent with the Klamath River Fish Disease Research Plan); and 3)Implement measures under Objective D (Flow) by facilitating the implementation of fall/winter flow variability. In regards to the MWMT temperature surrogate in the HCP please refer to Responses to Hoopa Valley Tribal Council comment No. 8 for further information.

10. NMFS does not believe releases water from the depths of Iron Gate reservoir will have significant benefits to SONCC coho salmon. Although water near the bottom of Iron Gate Reservoir is cooler than surface waters in summer periods, this water can also have extremely low DO or be anoxic. The benefit to coho from releasing cool, yet potentially lethal water from the reservoir, is not high enough to outweigh significant risks.

11. NMFS does not believe there will be significant trends in climate change at such a local scale within the next decade. Most climate models predict climate trends in very long-term scales (50 to 100 years). Within our biological opinion for the ITP, we have evaluated potential impacts on coho from climate change and concluded that although long-term trends in climate change are likely to place additional stress on the conservation and recovery of the SONCC coho ESU, during the 10-year permit period, we do not expect that climate change will be significant enough to have a noticeable effect on coho in the Klamath River basin. A summary of this evaluation has been added in the Final EA under the discussion of cumulative effects.

12. In regards to the potential contingencies that the commenter raised regarding FERC denying a new license in its licensing process for the Project and/or the KHSA being

terminated, please refer to Response to Pacific Coast Federation of Fisherman's Associations (PCFFA) Comments No. 4.

13. Project facilities including Link River Dam, Keno Dam, and the Eastside and Westside facilities could in fact, be removed from PacifiCorp's Project during the permit term. The commenter is referred to section 11 of the IA which provides information on the agreed upon process between NMFS and PacifiCorp for the transfer or removal of Covered Lands.

14. Although NMFS is still reviewing the ITP application in order to make a final determination, as outlined in Table 4 of the HCP, the HCP explains how measures in the HCP are correlated to avoid, minimize, and mitigate for PacifiCorp Project effects on coho salmon to the maximum extent practicable for the next decade until fish passage is expected to be achieved. As is described in the DEA and FEA, implementing the No Action alternative outlined in the DEA and FEA would allow for further harm to occur to coho salmon from Project operations without any offsetting actions, placing coho at further risk over the next decade. Upon completion of all review required under applicable law, if NMFS finds that PacifiCorp's ITP application meets statutory and regulatory issuance criteria, we must issue the proposed ITP to PacifiCorp.

15. See response No. 14 above.

16. Regardless of the HCP/ITP, PacifiCorp will still be subject to complying with requirements under the Clean Water Act, including TMDL implementation. The proposed ITP would give PacifiCorp authorization under ESA Section 10(a)(1)(B) for incidental take of SONCC coho salmon as a result of Project operations for the next ten years, subject to the conditions of the ITP and associated HCP and IA.

17. NMFS notes Oregon Wild's concerns regarding the KHSA. Please see responses No. 1 and 2 above.

18. NMFS has considered all public comments received on the Draft HCP and DEA. We acknowledge there are organizations, like Oregon Wild, that believe the HCP does not include enough measures to improve habitat conditions in the basin over the next 10 years. Although NMFS is still reviewing the ITP application in order to make a final determination, upon completion of all review required under applicable law, if NMFS finds that PacifiCorp's ITP application meets statutory and regulatory issuance criteria, we must issue the proposed ITP to PacifiCorp.

KLAMATH RIVERKEEPER®
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July 5, 2011

Lisa Roberts
National Marine Fisheries Service, Arcata Area Office
1655 Heindon Rd
Arcata, CA 95521

Re: Pacificorp HCP

Dear Ms. Roberts:

Klamath Riverkeeper submits these comments onto the record in response to the National Marine Fisheries Service (NMFS) Draft Environmental Assessment (DEA) on the proposed ITP/HCP for PacifiCorp's Klamath dam operations for a future 10 years.

Klamath Riverkeeper is a non-profit organization representing hundreds of members and thousands of supporters. Klamath Riverkeeper advocates protection and restoration of water quality and fisheries in the Klamath Watershed. In doing so, we seek to bring vitality and sustainable abundance back to the Klamath River and all its people.

Our organization has been a strong advocate for removal of Iron Gate, Copco II, Copco I and J.C. Boyle dams on the Klamath River, as these four impoundments have had profoundly negative impacts on fish and people who depend on fish and clean, abundant water in the watershed over the past century, many of whom are members and supporters of Klamath Riverkeeper.

These numerous impacts, particularly those to water quality, fish and local communities, are well documented in the FERC DEIS on relicensing these dams, federal terms and conditions for the dams, mainstem Klamath TMDLs and the beginnings of a Clean Water Act Section 401 permitting process for the dams.

1 All of the goals and proposed implementation actions contemplated in the HCP are important ones for the health and survival of endangered coho salmon and other fish species in the interim between 2011 and dam removal by 2020. Thus, we support approval of the requested HCP and ITP in the interest of allowing the negotiated dam removal settlement package to move forward, on the condition that the following inaccuracies are addressed and an essential re-opener is explicitly added to these documents in case the dam removal settlement package cannot be implemented, for any reason. (Failure of the Klamath Hydroelectric Settlement Agreement and Klamath Basin Restoration Agreements for any reason constitutes a change of circumstance that must trigger a re-evaluation of the environmental impacts of PacifiCorp's dams on coho salmon, including the question of whether they should be granted approval for an HCP and ITP.)

2 On p. 73, the HCP states that, "PacifiCorp's dams may to some extent influence flow variability." This type of bet hedging (ie: "may", "to some extent"), found routinely throughout the HCP, is not acceptable in a document that must uphold the ESA where incidental take *is* occurring, in part due to sustained water quality and flow problems exacerbated by PacifiCorp's dams.

3 PacifiCorp's claim that nutrient loads will increase following dam removal (p. 77 in the HCP) takes the cited 2010 study by Asarian out of context. To be scientifically sound, the HCP by PacifiCorp and EA by NMFS needs to reflect the conclusions found on pp. 55-56, including the qualifier that, "The method used to make these comparisons does not take into account other changes that would likely accompany the removal of Iron Gate and Copco Reservoirs, such as the elimination of hydropower peaking and the return of full flows to the J.C. Boyle Bypass Reach, which are expected to have a beneficial (i.e.,reducing) effect on river nutrient concentrations."

4 Also, on p. 75 of the HCP, PacifiCorp states that, "Under interim operations, these [water quality] effects are expected to persist at the current extent for another 10 years." Although we stand by our position that technological solutions such as artificial oxygenation mechanisms simply cannot fully mitigate the negative environmental impacts from these hydroelectric facilities (and therefore the only real solution to this problem is to remove the four dams), it is legally indefensible for NMFS to issue a ten-year ITP to an entity that proposes in its HCP to allow water quality and habitat degradation that could lead to coho extinction in the Klamath. Further, this statement is clearly in conflict with *Goal IV* found on page 80 of the same HCP document.

5 On pp. 88-89 of the HCP, PacifiCorp states that it "expects that the planning, coordination, and implementation of variable flow releases at Iron Gate Dam during the permit term will be consistent with the procedures used to develop and implement February 2011 flow releases." However, there is no specification of what those procedures are or reference for where to find them. This makes it very difficult for any HCP reviewer to evaluate whether the flow measures in the HCP will be sufficient to prevent adverse effects on coho. The referenced 2011 flow releases provoked complaint from PacifiCorp, until agencies and other members of the technical team met behind closed doors to resolve PacifiCorp's issues. Future "proceedings" of this technical team will need to be more transparent, however, to comply with environmental and public input laws. The HCP and EA should disclose what, exactly these "expected" procedures are so that the public can comment on them.

6 Objective E, a subset of the HCP's stated *Goal IV*, needs to be changed to be consistent with amended Dissolved Oxygen requirements in the North Coast Regional Water Quality Control Board's mainstem Klamath TMDL (recently approved by Cal EPA). Thus, Objective E on p. 91 of the HCP should read: "*Maintain DO concentrations at or above 85 percent saturation in the Klamath River from the dam to the Iron Gate Hatchery bridge during the period from April 1 to September 30.*

7 Section 2.4.3 of the EA states that, "If the KHSA is terminated, the FERC relicensing proceedings for the Project would resume, and it is anticipated that FERC would issue a new license for the Project including mandatory conditions for volitional fish passage, which would be in place by the

2

end of 2020." This sentence inappropriately presumes that the California Water Quality Control Board would grant 401 certifications required before FERC can relicense operation of PacifiCorp's dams for another 30-50 years. Further, it inappropriately presumes that PacifiCorp's dams could comply with water quality parameters and waste load allocations set forth in the mainstem Klamath TMDL. Most importantly, this sentence presumes to know the outcome of a process that has not yet concluded, and an outcome that is to be concluded by the independent entity that is FERC. Thus, this part of the analysis, (as well as other similar statements throughout the EA and HCP) are pre-decisional in nature. Please change the HCP and EA to be more considerate of the potential for decommissioning and dam removal to result from the FERC process.

Thank you for your careful attention to these comments. If you have any questions or need clarification, please contact me at (530)627-3311 or erica@klamathriver.org

Erica Terence, Conservation Director/Executive Director
Klamath Riverkeeper

Responses to Klamath RiverKeeper Comments

1. NMFS agrees with the commenter that implementation of the HCP is important for the conservation of SONCC coho in the Klamath River basin over the next decade. NMFS acknowledges the commenter's support for approval of the ITP and implementation of the HCP and meeting all of its goals and objectives. In regards to the request for addition of a reopener to the HCP/ITP should the KHSA and KBRA terminate, please refer to Response to Pacific Coast Federation of Fisherman's Associations (PCFFA) Comments No. 4.

2. NMFS notes the commenter's concerns regarding certain phrases in the HCP. However, NMFS must review the ITP application and associated HCP in accordance with applicable statutory and regulatory criteria and conduct its own analyses of impacts as required under applicable law, including the National Environmental Policy Act, ESA Section 7 consultation, and ESA Section 10(a)(1)(B). NMFS will continue to consider this comment in its review of the ITP application and HCP.

3. PacifiCorp examined this comment and disagrees with the certainty of the comment. PacifiCorp therefore, has not made the suggested change to the final HCP. The EA does not rely on the conclusions given in the referenced study to reach conclusions regarding Project effects, and the adequacy of the HCP to mitigate for those effects. NMFS has considered the Asarian (2010) citation in our analysis of environmental effects and has not changed the Final EA in response to the comment.

4. NMFS has determined that issuance of an ITP to PacifiCorp and implementation of the HCP will not result in jeopardizing the continued existence of SONCC coho salmon nor result in the destruction or adverse modification of designated critical habitat during the 10 year permit term. In the HCP, PacifiCorp has proposed minimization and mitigation actions (turbine venting) to address conditions causing low dissolved oxygen concentrations downstream of Iron Gate Dam to the maximum extent practicable given the duration of the permit term. Although NMFS is still reviewing the ITP application in order to make a final determination, upon completion of all review required under applicable law, if NMFS finds that PacifiCorp's ITP application meets statutory and regulatory issuance criteria, we must issue the proposed ITP to PacifiCorp. In regards to continued degraded water quality conditions during the permit term, the commenter refers to page 75 of the HCP. To fully consider the context of PacifiCorp's belief in regards to major factors causing poor water quality in the upper river basin and the role reservoirs play, NMFS also agrees there are many factors causing poor water quality in the basin, with the reservoirs playing an

important, but not primary, role in habitat conditions which lead to algal blooms. The source of the pollutants entering reservoirs is a large factor in water quality impacts that PacifiCorp has little control over. In response to the reference to conflict with Goal IV of the HCP (Improve water quality for coho salmon downstream of the Iron Gate Dam) in the comment, this goal and the corresponding objective are tied to water quality improvements via improvements in DO, and again PacifiCorp has proposed minimization and mitigation actions (turbine venting) to address effects of Project interim operations causing low dissolved oxygen concentrations downstream of Iron Gate Dam to the maximum extent practicable given the duration of the permit term and given the fact that dam removal is being evaluated during the permit term. Although NMFS is still reviewing the ITP application in order to make a final determination, upon completion of all review required under applicable law, if NMFS finds that PacifiCorp's ITP application meets statutory and regulatory issuance criteria, we must issue the proposed ITP to PacifiCorp.

5. In regards to the flow variability program and the relationship of this HCP objective please refer to Response to Hoopa Valley Tribal Council Comments No. 3. Due to the effects of Reclamation's Klamath Project operations on flows in the Klamath River, for which Reclamation consults with NMFS, PacifiCorp will have a limited role in the variable flow program. However, PacifiCorp's coordination and participation will be necessary for Reclamation to implement the Flow Variability Program as it is described in NMFS' 2010 biological opinion for Reclamation's Klamath Project. That 2010 biological opinion describes procedures for development and implementation of the variable flow program in Reasonable and Prudent Alternative element A.1. Information regarding implementation of these procedures in early 2011 is provided in letters between Reclamation and NMFS dated February 4, 2011, which are available at http://klamathrestoration.gov/.

6. In regards to the HCP's DO criteria PacifiCorp has amended their HCP to reflect compliance with current State of California water quality standards for DO downstream of Iron Gate dam. Please refer to pages 93 and 94 of the final HCP for clarification on the DO criteria established in the HCP's *Coho Salmon Conservation Strategy*.

7. In regards to compliance with TMDL's, please refer to Responses to Hoopa Valley Tribal Council Comments No. 17. In regards to the comment on the ultimate outcome of FERC relicensing, NMFS has clarified in the Final EA that reversion to the FERC process for relicensing the Project could result in dam decommissioning and removal.

WATERWATCH

PROTECTING NATURAL FLOWS IN OREGON RIVERS

Lisa Brown
WaterWatch of Oregon
213 SW Ash St., STE 208
Portland, OR 97204

July 5, 2011

Dr. Kevin Chu, Deputy Regional Administrator
Lisa Roberts
National Marine Fisheries Service, Arcata Area Office
1655 Heindon Rd
Arcata, CA 95521

Re: WaterWatch of Oregon's comments on Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan Coho Salmon, dated April, 2011, and PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon, dated March 15 2011.
Sent via: Email to PacifiCorpHCP.SWR@noaa.gov

Dear Administrator Chu and Ms. Roberts:

Thank you for the opportunity to comment on the Draft Environmental Assessment for incidental take and an HCP for interim operations of the PacifiCorp's Klamath Hydroelectric Project.

1 WaterWatch of Oregon ("WaterWatch") finds that the proposed interim measures identified in the HCP and DEA for the ITP are inadequate. WaterWatch urges NMFS to require additional measures from PacifiCorp if it grants any HCP or ITP for PacifiCorp's Klamath Hydroelectric Project. Many appropriate measures can be found in the mandatory FERC relicensing conditions, which were successfully defended by NMFS and others in the 2006 hearing held pursuant to the Energy Policy Act of 2005. While certainly some of the major structural changes may not be appropriate at this juncture, NMFS should require PacifiCorp to implement the identified operational changes as part of any HCP/ITP package. In light of the record regarding these mandatory conditions, it is clear that the modest proposed measures evaluated in the DEA are inadequate for a ten-

year ITP. WaterWatch urges NMFS to require a more robust package of measures that adequately addresses problems previously identified by NMFS and others.

Thank you for considering these comments. Please do not hesitate to contact me with any questions.

Sincerely,

Lisa A. Brown

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WaterWatch of Oregon
213 SW Ash St., STE 208
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Responses to WaterWatch of Oregon Comments

1. In regards to the HCP measures being inadequate, NMFS disagrees. Please refer to Responses to Oregon Wild Comments No. 4 and 18, and Responses to the Klamath Riverkeeper Comments No. 4 for further clarification. In reference to mandatory conditions in the FERC relicensing process, as PacifiCorp described in the Draft HCP, it is applying to NMFS for a permit under ESA Section 10(a)(1)(B) (16 U.S.C. 1539(a)(1)(B)) for potential incidental take of SONCC coho salmon from its Project operations for a 10-year permit term. As is further described in the HCP and EA, the proposed permit term is consistent with the target date for proposed dam removal under the KHSA if various conditions are met or the time anticipated for implementation of volitional fish passage if the KHSA is terminated and the FERC relicensing proceedings resume. The mandatory conditions in the FERC relicensing proceeding were developed for a proposed license for operation of the Project for 50 years and not 10 years as this proposed ITP would cover. Based on these considerations, conditions for improving coho habitat need to be appropriately scaled to the duration of adverse Project effects and the fact that dam removal will be evaluated during the permit term. In addition, the mandatory conditions in the FERC relicensing proceeding were developed under applicable provisions of the Federal Power Act, not Endangered Species Act Section 10(a)(1)(B), which is applicable to this proposed ITP.

From: Salmon River Restoration Council
PO Box 1089
Sawyers Bar, CA 96027

To: Lisa Roberts
National Marine Fisheries Service, Arcata Area Office
1655 Heindon Rd
Arcata, CA 95521

July 5, 2011

Re: Pacificorp HCP

Dear Ms. Roberts:

The Salmon River Restoration Council submits these comments in response to the National Marine Fisheries Service (NMFS) Draft Environmental Assessment (DEA) on the proposed ITP/HCP for PacifiCorp's Klamath dam operations for a future 10 years. The SRRC is a non-profit organization based in the Salmon River and highlights the restoration, maintenance and management of the anadromous fisheries emphasizing spring-run Chinook. We realize that in order for the Salmon River anadromous fisheries to go well it is important that there is a healthy meta-population of spring-run Chinook throughout the Klamath Watershed.

Our organization is a party to the Klamath Basin Restoration Agreement (KBRA) and the Klamath Hydro Seyylement Agreement (KHSA). We have been and still remain a strong advocate for removal of Iron Gate, Copco II, Copco I and J.C. Boyle dams on the Klamath River, as these four impoundments have had profoundly negative impacts on the fish and water resources in the Klamath River Watershed over the past century. The spring-run Chinook have also been negatively affected by these dams in the Klamath River and should receive adequate attention for their recovery.

These numerous impacts, particularly those to water quality, fish and local communities, are well documented in the FERC DEIS on relicensing these dams, federal terms and conditions for the dams, mainstem Klamath TMDLs and the beginnings of a Clean Water Act Section 401 permitting process for the dams.

1 All of the goals and proposed implementation actions contemplated in the HCP are important ones for the health and survival of endangered coho salmon and other fish species in the interim between 2011 and dam removal by 2020. Thus, we support approval of the requested HCP and ITP in the interest of allowing the negotiated dam removal settlement package to move forward. We condition our support pending the modification of the HCP and ITP to more appropriately address the following issues and concerns.

We request a explicit modification to the documents that provides a clear path forward for a re-opener of the HCP and ITP documents in case the dam removal settlement package cannot be implemented, for any reason. (Failure of the Klamath Hydroelectric Settlement Agreement and Klamath Basin Restoration Agreements for any reason constitutes a change of circumstance that must trigger a re-evaluation of the environmental impacts of PacifiCorp's dams on coho salmon, including the question of whether they should be granted approval for an HCP and ITP.)

2 On p. 73, the HCP states that, "PacifiCorp's dams may to some extent influence flow variability." This type of bet hedging (ie: "may", "to some extent"), found routinely throughout the HCP, is not acceptable in a document that must uphold the ESA where incidental take *is* occurring, in part due to sustained water quality and flow problems exacerbated by PacifiCorp's dams.

3 PacifiCorp's claim that nutrient loads will increase following dam removal (p. 77 in the HCP) takes the cited 2010 study by Asarian out of context. To be scientifically sound, the HCP by PacifiCorp and EA by NMFS needs to reflect the conclusions found on pp. 55-56, including the qualifier that, "The method used to make these comparisons does not take into account other changes that would likely accompany the removal of Iron Gate and Copco Reservoirs, such as the elimination of hydropower peaking and the return of full flows to the J.C. Boyle Bypass Reach, which are expected to have a beneficial (i.e.,reducing) effect on river nutrient concentrations."

4 Also, on p. 75 of the HCP, PacifiCorp states that, "Under interim operations, these [water quality] effects are expected to persist at the current extent for another 10 years." Although we stand by our position that technological solutions such as artificial oxygenation mechanisms simply cannot fully mitigate the negative environmental impacts from these hydroelectric facilities (and therefore the only real solution to this problem is to remove the four dams), it is legally indefensible for NMFS to issue a ten-year ITP to an entity that proposes in its HCP to allow water quality and habitat degradation that could lead to coho extinction in the Klamath. Further, this statement is clearly in conflict with *Goal IV* found on page 80 of the same HCP document. In addition the poor water quality associated with Keno dam and the reach above should be addressed within or in a related document.

5 On pp. 88-89 of the HCP, PacifiCorp states that it "expects that the planning, coordination, and implementation of variable flow releases at Iron Gate Dam during the permit term will be consistent with the procedures used to develop and implement February 2011 flow releases." However, there is no specification of what those procedures are or reference for where to find them. This makes it very difficult for any HCP reviewer to evaluate whether the flow measures in the HCP will be sufficient to prevent adverse effects on coho. The referenced 2011 flow releases provoked complaint from PacifiCorp, until agencies and other members of the technical team met behind closed doors to resolve PacifiCorp's future issues. "proceedings" of this technical team will need to be more transparent, however, to comply with environmental and public input laws. The HCP and EA should disclose what, exactly these "expected" procedures are so that the public can comment on them.

6 Objective E, a subset of the HCP's stated *Goal IV*, needs to be changed to be consistent with amended Dissolved Oxygen requirements in the North Coast Regional Water Quality Control Board's mainstem Klamath TMDL (recently approved by Cal EPA). Thus, Objective E on p. 91 of the HCP should read: "*Maintain DO concentrations at or above 85 percent saturation in the Klamath River from the dam to the Iron Gate Hatchery bridge during the period from April 1 to September 30.*

7 Section 2.4.3 of the EA states that, "If the KHSA is terminated, the FERC relicensing proceedings for the Project would resume, and it is anticipated that FERC would issue a new license for the Project including mandatory conditions for volitional fish passage, which would be in place by the end of 2020." This sentence inappropriately presumes that the California Water Quality Control Board would grant 401 certifications required before FERC can relicense operation of PacifiCorp's dams for another 30-50 years. Further, it inappropriately presumes that PacifiCorp's dams could comply with water quality parameters and waste load allocations set forth in the mainstem Klamath TMDL. Most importantly, this sentence presumes to know the outcome of a process that has not yet concluded, and an outcome that is to be concluded by the independent entity that is FERC. Thus, this part of the analysis, (as well as other similar statements throughout the EA and HCP) are pre-decisional in nature. Please change the HCP and EA to be more considerate of the potential for decommissioning and dam removal to result from the FERC process.

Thank you for your careful attention to these comments. If you have any questions or need clarification, please contact me at (530)598 -4229 or pbrucker@srrc.org.

Respectfully,

Petey Brucker – Klamath Coordinator

SALMON RIVER RESTORATION COUNCIL

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Response to Salmon River Restoration Council Comments

1. The commenter notes that the goals and implementation actions of the HCP are important to the health and survival of coho salmon and other fish species during the interim 10 year period. The commenter also supports approval of the ITP with conditions suggesting modifications to the HCP. NMFS acknowledges the commenter's support for the proposed ITP/HCP. In regards to the request for addition of a reopener to the HCP/ITP should the KHSA and KBRA terminate, please refer to Response to Pacific Coast Federation of Fisherman's Associations (PCFFA) Comments No. 4.

2. NMFS notes the commenter's concerns regarding certain phrases in the HCP. However, NMFS must review the ITP application and associated HCP in accordance with applicable statutory and regulatory criteria and conduct its own analyses of impacts as required under applicable law, including the National Environmental Policy Act, ESA Section 7 consultation, and ESA Section 10(a)(1)(B). NMFS will continue to consider this comment in its review of the ITP application and HCP.

3. PacifiCorp examined this comment and disagrees with the certainty of the comment. PacifiCorp therefore, has not made the suggested change to the final HCP. The EA does not rely on the conclusions given in the referenced study to reach conclusions regarding Project effects, and the adequacy of the HCP to mitigate for those effects. NMFS has considered the Asarian (2010) citation in our analysis of environmental effects and has not changed the Final EA in response to the comment.

4. In regards to the commenter's reference to page 75 of the HCP and factors affecting water quality in the basin, please refer to Responses to Klamath RiverKeeper Comments No. 4.

5. In regards to the commenter's reference to pages 88-89 of the HCP and the variable flow planning process, please refer to Responses to Hoopa Valley Tribal Council Comments No. 3, and Responses to Klamath RiverKeeper Comments No. 5 for further clarification.

6. In regards to the HCP's DO criteria PacifiCorp has amended their HCP to reflect compliance with current State of California water quality standards for DO downstream of Iron Gate dam. Please refer to pages 93 and 94 of the final HCP for clarification on the DO criteria established in the HCP's *Coho Salmon Conservation Strategy*.

7. In regards to the potential outcome of a FERC relicensing process should the KHSA be terminated, please refer to Responses the Klamath RiverKeeper Comments No. 7.

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY EDMUND G. BROWN, GOVERNOR

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July 5, 2011

Lisa Roberts
National Marine Fisheries Service
Arcata Area Office
1655 Heindon Rd.
Arcata, CA 95521

Re: Incidental Take Permit for Klamath Hydroelectric Project Interim Operations, Habitat Conservation Plan, Klamath River, northern California (Federal Register May 4, 2011)

Dear Ms. Roberts:

Thank you for the opportunity to comment on the above-referenced Habitat Conservation Plan (HCP)/Incidental Take Permit (ITP) for the interim operations of the PacifiCorp Energy (PacifiCorp) Klamath Hydroelectric Project in northern California and southern Oregon, which is intended to cover interim operations for ten years, pending a decision by the Secretary of Interior over whether up to four dams on the Klamath River will be removed.

1 As you are aware, the California Coastal Commission staff has historically expressed concerns over the continuing and serious adverse effects of the dams on the Klamath River on downcoast fisheries, water quality, and other resources of the California coastal zone. As we have previously stated:

> *... it remains the position of the Commission staff that the existing and continued operations of the Klamath Hydroelectric Project are adversely affecting coastal resources within California's coastal zone, including:*
>
> - *environmentally sensitive salmonid habitat and salmonid populations in the Klamath River basin and estuary;*
> - *overall biological productivity in the Klamath River basin and estuary;*
> - *commercial and recreational salmon fisheries in the Klamath River basin and in the open ocean;*
> - *Klamath River sediments trapped behind project dams which otherwise would contribute to the maintenance and formation of coastal beaches;*
> - *cultural resources and water quality in the lower Klamath River basin and estuary; and*
> - *public recreational resources within the coastal zone.*

We have expressed these concerns in various letters to the Federal Energy Regulatory Commission (FERC), PacifiCorp, the Bureau of Reclamation, and the California Department of Fish and Game, dated July 22, 2004, January 16, 2008, April 3, 2008, and January 21, 2010. For example, our April 3, 2008, letter to PacifiCorps concerning FERC's relicensing of the hydroelectric project stated our intent as follows:

> *The Coastal Commission staff will participate in the California State Water Resources Control Board's Section 401 water quality certification and environmental impact report processes to ensure that maximum protection of coastal zone resources is achieved under the federal Clean Water Act and the California Environmental Quality Act. Additionally, other federal licenses or permits, beyond the subject FERC license, will most likely be required in the future to implement the relicensing of the Klamath Hydroelectric Project, and the Commission will review those federal licenses and/or permits for consistency with the California Coastal Management Program.*

Thus, our historic concerns have included statements that we intend to request permission to review any federal permits associated with retention, removal, or relicensing of the dams. This intent extends to reviewing the upcoming:

2

> *... decision by the Secretary of the Interior "regarding whether removal of four dams owned by PacifiCorp: 1) will advance restoration of the salmonid fisheries of the Klamath Basin, and 2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and tribes.* (Summary, Klamath Hydroelectric Settlement Agreement, January 7, 2010). [1]

3

However, in the subject federal permit (NMFS ITP) situation we are consciously electing at this time not to request permission (from the Office of Ocean and Coastal Resource Management (OCRM)) to review this particular federal permit, as it is intended only to cover the interim period (and not the decision on whether to remove the dams) and with the clear intent for this interim period that the permit will include measures to improve anadromous fisheries habitat by reducing the dams' adverse effects on coastal zone resources. These measures are outlined in the draft HCP and will be included in the accompanying ITP for the interim period, and will include a series of conservation measures to minimize and mitigate the effects of operation of the Hydroelectric Project on potential incidental take of listed coho salmon during the interim period, including:

1. a turbine venting system at Iron Gate Dam;

2. coordinated participation in flow variability and flow ramp rate measures at Iron Gate Dam;

[1] Note: Unlike the other federal *permits* associated with the Hydroelectric Project, this Secretarial decision is a federal agency *activity*, which does not trigger the need for the Coastal Commission to request permission from the Office of Ocean and Coastal Resource Management (OCRM) for permission to review an "unlisted" federally permitted activity.

3. placement of large woody debris downstream of Iron Gate Dam;

4. funding fish disease research to benefit coho salmon; and

5. a fund that would be used to implement various projects designed to benefit coho salmon by enhancing habitat conditions in the Klamath River and tributaries downstream of Iron Gate Dam.

4 We support inclusion of these measures in the ITP and request a copy when they and the permit have been finalized. Please feel free to contact me at (415) 904-5289 or at mdelaplaine@coastal.ca.gov if you have any questions.

Sincerely,

MARK DELAPLAINE
Manager, Energy, Ocean Resources
and Federal Consistency Division

cc: North Coast District
PacifiCorp
Secretary of the Interior
FERC
OCRM
California Resources Secretary
CALFED
SWRCB
California DWR
Bureau of Reclamation
U.S. Army Corps of Engineers, San Francisco District

Responses to California Coastal Commission Comments

1. NMFS acknowledges the California Coastal Commission's concerns regarding the adverse effects Project dams have on resources in the Klamath basin, including those in the California coastal zone.

2. NMFS acknowledges the Coastal Commission's intention to review federal permit processes related to retention, removing or relicensing Project dams, including the Secretarial Determination under the KHSA.

3. NMFS acknowledges that the Coastal Commission will not request permission (from the Office of Ocean and Coastal Resource Management) to review the proposed ITP/HCP as they acknowledge the intent of the proposed ITP/HCP is to include measures to improve fisheries habitat by addressing Project effects during the interim period.

4. NMFS acknowledges the commenter’s support for the measures of the coho conservation strategy outlined in the draft HCP and NMFS acknowledges the request for a copy of the ITP/HCP if and when the ITP is issued.

JS LR

5/24/11

P1 of 1

TO LISA ROBERTS

& MEMBERS OF N.M.F.S.

1 PLEASE RESTORE SALMON & STEELHEAD TO UPPER KLAMATH BASIN.

I AM IN FAVOR OF REMOVING THE 4 KLAMATH RIVER DAMS.

IN FACT WE AS RATE PAYERS and USERS OF PACIFIC POWER ARE ALLREADY PAYING FOR IT

DON'T LET PACIFIC POWER ATTORNEYS CHANGE THE GAME,

SINCERELY

MARK TUMMO
P.O. BOX 412
FORT KLAMATH, OR
97626
541 892 7876

Response to Mark Tunno Comments

1. NMFS acknowledges the commenter's support for restoring salmon and steelhead in the Upper Klamath River basin and removing four Project dams. As PacifiCorp described in the Draft HCP, it is applying to NMFS for a permit under ESA Section 10(a)(1)(B) (16 U.S.C. 1539(a)(1)(B)) for potential incidental take of SONCC coho salmon from its Project operations for a 10-year permit term. As is further described in the HCP and EA, the proposed permit term is consistent with the target date for proposed dam removal under the KHSA if various conditions are met or the time anticipated for implementation of volitional fish passage if the KHSA is terminated and the FERC relicensing proceedings resume.

KLAMATH
Water Users Association

735 Commercial Street, Suite 320
P.O. Box 1497
Klamath Falls, OR 97601
Phone: (541) 883-6100
Fax: (541) 883-8993

July 5, 2011

VIA ELECTRONIC MAIL

Ms. Lisa Roberts, Fisheries Biologist
NMFS Northern California Office
1655 Heindon Road,
Arcata, CA 95521
Facsimile (707) 825-4840
Email: PacifiCorpHCP.SWR@noaa.gov

RE: Comments on Incidental Take Permit and Habitat Conservation Plan for PacifiCorp Klamath Hydroelectric Project Interim Operations; RIN 0648-XA410

Dear Ms. Roberts:

The purpose of this letter is to comment upon the above-referenced application for an interim Endangered Species Act ("ESA") Section 10 Permit filed by PacifiCorp Energy ("PacifiCorp") for the Klamath River Hydroelectric Project. We offer the following comments in support of this application, and urge the National Marine Fisheries Service ("NMFS") to approve this application. 1

The Klamath Water Users Association (KWUA) is a non-profit organization whose members are primarily irrigation districts and similar entities that divert, deliver and use water in the Klamath Reclamation Project and are parties to contracts with the Bureau of Reclamation. Because it is part of the overall Klamath Settlement Agreements (including the Klamath Basin Restoration Agreement), our organization supports the Klamath River Hydroelectric Settlement Agreement ("KHSA"), and the actions undertaken by PacifiCorp pursuant to this settlement agreement. An important component of the KHSA is the commitment by PacifiCorp to implement interim conservation measures that will improve water quality in the Klamath River, and benefit aquatic resources. 2

While we may have concerns with some components of PacifiCorp's application, we believe that overall the conservation actions contained in PacifiCorp's permit application, when implemented, will conserve and protect ESA-listed species in the Klamath River, including coho salmon. These conservation actions should contribute to the recovery of coho salmon in the basin. Furthermore, issuance of the ESA Section 10 Permit by NMFS will enable PacifiCorp's full implementation of these interim conservation measures, and it will enable other actions contemplated in the KHSA to proceed in a timely manner. 3

Thank you for the opportunity to provide these comments on the above-referenced application.

Sincerely,

Greg Addington, Executive Director

Cc: Tim Hemstreet, PacifiCorp Energy

Responses to Klamath Water Users Association Comments

1. NMFS acknowledges the commenter's support for the ITP/HCP and is continuing to process the ITP application and associated HCP as quickly as practicable.

2. NMFS acknowledges the commenter's support for the KHSA and PacifiCorp's commitment to interim conservation measures under the KHSA.

3. NMFS acknowledges the commenter's belief that implementation of the ITP/HCP will help to conserve and protect coho salmon in the Klamath River basin, and that the conservation plan actions should contribute to coho recovery. NMFS acknowledges the comment that issuance of the proposed ITP would enable PacifiCorp's full implementation of interim conservation measures and will enable implementation of other actions under the KHSA in a timely manner to the extent that the ITP application process is described in the KHSA.

Keeping Northwest California wild since 1977

July 5, 2011

Lisa Roberts, Fisheries Biologist
NMFS Northern California Office
1655 Heindon Road
Arcata, CA 95521
Fax: (707) 825-4840
Email: PacifiCorpHCP.SWR@noaa.gov

RE: PacfiCorp Incidental Take Permit for Coho Salmon

REQUEST TO REOPEN THE PUBLIC COMMENT PERIOD

1 The Environmental Protection Information Center ("EPIC") requests that the National Marine Fisheries Service ("NMFS") immediately reopen the public comment period on the proposed Habitat Conservation Plan ("HCP"), Section 10 permit application, DEIS and Implementing Agreement submitted by PacifiCorp Energy ("PacifiCorp") for incidental taking the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (*Oncorhynchus kisutch*). The reopening of the comment period is needed for many reasons.

2 In order for coho salmon advocates, water users, and other stakeholders to fully read and process through recent research and publications for the upcoming determination by the Interior Secretary over dam settlement agreements (KHSA/KBRA), NMFS should reopen the comment period on this draft HCP. Regardless of the Interior Secretary's determination, the Department of Commerce, acting through NMFS, has a statutory obligation to protect salmon as marine fisheries, and is not bound by the Interior Secretary's interpretation.

3 So it would behoove NMFS to accept comment after the forthcoming determination by the Interior Secretary.

4 Furthermore, NMFS should reopen comment on this HCP after NMFS produces the 12-month finding for Klamath and Trinity River Chinook salmon in June of 2012. The Chinook salmon have lost much more because of PacifiCorp's dams through habitat removal than coho salmon. For this reason, any HCP for PacifiCorp dams must include significant changes to recover Chinook salmon, Also missing from the analysis are the dams' impacts on other ESA-listed species, like Green Sturgeon and Klamath and Lost River Suckers, terrestrial species and ESA candidate species.

5 For these reason, not only must NMFS reopen comment, but NMFS must send the draft HCP back to PacifiCorp for a significant reworking.

Environmental Protection Information Center
145 G Street, Suite A, Arcata, CA 95521
Tel: (707) 822-7711
Fax: (707) 822-7712
www.wildcalifornia.org

Should, NMFS deny EPIC's request for the reopening of the public comment period, EPIC shall duly note that denial in challenging the validity of the HCP. Furthermore, NMFS must accept comment at any time, concerning any ESA-listed species, and weigh that comment in any subsequent action.

6

Therefore, EPIC submits the following comments on the proposed Habitat Conservation Plan ("HCP"), Section 10 permit application, DEIS and Implementing Agreement submitted by PacifiCorp Energy ("PacifiCorp") for incidental taking the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (*Oncorhynchus kisutch*).

THE PACIFICORP DRAFT HCP VIOLATES THE ESA

EPIC will only be able to support the HCP if it meets the legal standards set forth in the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531 *et seq*., and actually provides for the conservation (i.e. recovery) of the coho salmon. As described in more detail below, we believe that the proposed HCP fails to meet the statutory requirements of the ESA and other applicable statutes. We remain hopeful that this HCP will not resemble other failed HCPs that jeopardize species and destroy critical habitat, and that the proposed HCP will be appropriately modified, and thereby set the standard for the effective long term recovery of imperiled species. We request that NMFS and PacifiCorp make the appropriate changes to the final HCP so as to bring it into conformance with these statutory requirements and turn it into an enforceable plan.

7

SECTION 10(a)(2)(A) REQUIREMENTS

An applicant for an incidental take permit must prepare and submit to NMFS a habitat conservation plan ("HCP"). 16 U.S.C. § 1539(a)(1)(B). An HCP must contain specific measures to "conserve" listed species. At a minimum, the ESA and its implementing regulations require all HCPs to include the following:

1) a complete descriptions of the activity sought to be authorized;
2) names of the species sought to be covered by the permit including the number, age and sex of the species, if known;
3) the impact which will likely result from such taking;
4) what steps the applicant will take to monitor, minimize and mitigate those impacts;
5) the funding that will be available to implement such monitoring, minimization and mitigation activities;
6) the procedures to be used to deal with unforeseen circumstances; and
7) what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized.

19 U.S.C. § 1539(a)(2)(A)(i)-(iv); 50 C.F.R. §§ 17.22, 17.32. NMFS cannot issue an incidental take permit if the HCP does not contain this information. Id. at § 1539(a)(2)(A).

8

THE PACIFICORP DRAFT HCP DOES NOT MEET THE REQUIREMENTS OF SECTION 10(a)(2)(A).

The draft HCP does not meet the requirements set forth in the ESA Section 10(a)(2)(A). First, the HCP does not adequately analyze and disclose the impact that is likely to result from the taking of covered species, primarily because the HCP contains inadequate and incomplete data. Take estimates are likely to be underestimated because the HCP did not require survey data prior to designing the water flow regime. Second, leaving out other flow regime and operations changes and their impacts on salmon is a major hole in the HCP. Furthermore, the applicant did not consider alternatives that would have, for example, shut down the Iron Gate dam and drain its reservoir, or other significant variations on dam operations and water levels.

SECTION 10(a)(2)(B) FINDINGS

Upon reviewing an HCP and before permit issuance, NMFS must find that (i) the taking will be incidental; (ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking; (iii) the applicant will ensure that adequate funding for the plan will be provided; (iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and (v) any other measures NMFS requires will be met. 16 U.S.C. § 1539(a)(2)(B); 50 C.F.R. §§ 17.22, 17.32.

DIRECT TAKE

As it stands now, PacifiCorp and its predecessors have been "taking" coho salmon for many years in the Klamath Basin, being one of the primary drivers of extinction for this and other native fish species. See SONCC Coho Salmon Listing Rule and Biological Opinions for PacfiCorp FERC Relicensing. It is now universally acknowledged that the major impediments to coho (and other native fish) recovery in the Klamath and Trinity River basins are the dams throughout the system. Therefore, it is with great surprise to EPIC that PacifiCorp now asks for permission to keep killing coho. NMFS can only issue a HCP/ITP to a party that proposes "incidental take." Because PacifiCorp is directly taking fish through the blockage of fish passage, NMFS cannot issue an incidental take permit.

9

PACIFICORP DAMS JEOPARDIZE THE CONTINUED EXISTENCE OF COHO SALMON

First and foremost, NMFS must determine if the taking will result in jeopardy, and then, by logical extension, address recovery of the listed species. EPIC alleges that PacifiCorps' dams absolutely "jeopardize" the SONCC ESU of coho salmon by all of the actions listed in the proposed HCP documents. PacifiCorp actions result in "take" to the species, and this analysis is born out in observing present river operations. Specifically, the dams create artificial water conditions harmful to coho salmon, in numerous life stages. Younger fish are more impacted than spawning fish, but these impacts are more difficult to observe and calculate. In addition, NMFS must factor in the major losses to spawning grounds and the adverse conditions for all other SONCC coho salmon spawning populations.

10

Because of the thoroughly searching analysis required by NMFS under the ESA and other statues, it would be another big surprise should NMFS return to PacfiCorp anything other than a jeopardy opinion under the draft HCP.

CONCLUSION

We hope that NMFs immediately reopens the public comment period on this draft HCP and return the flawed draft to PacifiCorp for major changes. Should you have any questions regarding this letter, please contact me at (707) 822-7711.

Sincerely,

Andrew J. Orahoske
Conservation Director

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andrew@wildcalifornia.org

Responses to EPIC Comments

1. The commenter requested NMFS reopen the public comment on the proposed ITP/HCP. Typically, federal agencies would reopen public comment if a requester cites substantial new information that is relevant to the decision-making process (e.g., substantial, relevant new data or new regulatory framework),or cites a substantial reason as to why there was not adequate opportunity provided to review the proposed action and provide public comment (e.g., failure to notify, unreasonably short public comment period based on the length or complexity of the documents subject to review and comment). NMFS does not believe any of these justifications for reopening have occurred, nor does the commenter raise any of these issues. NMFS provided a 60-day public review and comment period for the proposed ITP/HCP, which was adequate under the circumstances (see 65 FR 35242, 35256; June 1, 2000).

2. One reason offered by the commenter in the request for reopening the comment period is related to information that is currently being gathered for the Secretarial Determination process, outlined in the KHSA. For a discussion on the relationship between the KHSA and the proposed ITP/HCP, please refer to Responses to Oregon Wild Comments No. 1 for further information.

3. For a discussion on the relationship between the KHSA and the proposed ITP/HCP, please refer to Responses to Oregon Wild Comments No. 1 for further information. Based on the discussion there and the schedule in the KHSA for the Secretarial Determination by March 31, 2012, NMFS does not plan to reopen public comment on the PacifCorp ITP after conclusion of the Secretarial Determination process as NMFS will need to make a determination on issuance of the proposed ITP before then. In the event that the Secretarial Determination is negative, please refer to Response to Pacific Coast Federation of Fisherman’s Associations (PCFFA) Comments No. 4.

4. The commenter believes the comment period should be reopened once NMFS makes a determination on whether listing Chinook salmon in the Upper Klamath and Trinity Rivers Basin is warranted. On January 28, 2011, the Secretary of Commerce received a petition to list Chinook salmon in the Upper Klamath and Trinity Rivers Basin under the ESA. On April 12, 2011, a notice was published in the Federal Register of NMFS’ 90-day finding under the ESA that the petitioned action may be warranted (76 FR 20302). It is important to consider that the list of Covered Species in any proposed ITP/HCP is at the applicant's discretion. In this case, PacifiCorp has requested an ITP only for SONCC coho salmon, although currently non-listed species can be addressed in an HCP. Should any species under NMFS'

jurisdiction become federally listed during the permit term, PacifiCorp would not have incidental take authorization related to any Project effects on that newly listed species and would need to discuss with NMFS whether incidental take is an issue, and whether the ITP can be amended to include a conservation strategy for the newly listed species (please refer to Section 9.3 of the IA for further clarification regarding listing of new species). This includes any listing of Chinook in the Upper Klamath and Trinity Rivers Basin if NMFS concludes listing is warranted at the end of our 12-month review period and takes further actions necessary to list these Chinook salmon. Any such amendment to the ITP would need to be done in accordance with applicable laws and public review and comment required under applicable laws.

5. In regards to the analysis on impacts to other listed species, an HCP is only required to analyze the impact of the taking on the requested covered species, in this case, SONCC coho salmon. Therefore, the HCP does not include an analysis of Project effects on other listed species. However, the DEA and Final EA do evaluate effects to other listed and unlisted aquatic and terrestrial species from both the Proposed Action (issuance of an ITP), and No Action. This analysis includes effects on species such as Green sturgeon, listed suckers, bald eagle, and Pacific lamprey. The commenter is referred to the DEA and FEA for further information on effects to these species.

6. NMFS will accept and consider information pertinent to the HCP and our environmental analysis at any time during permit implementation if NMFS issues the proposed permit. Most important would be new information that sheds new light on the status of coho, or contains new data or scientific information that would cause us to reconsider our effects determinations.

7. The commenter expresses concern that the ITP/HCP will not provide for the recovery of SONCC coho. NMFS is applying the applicable requirements and criteria to PacifiCorp's application for an incidental take permit under ESA section 10(a)(1)(B), including the statutory criteria that the incidental taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild (see ESA section 10(a)(2)(B)(iv)). Although NMFS is still reviewing the ITP application in order to make a final determination, upon completion of all review required under applicable law, if NMFS finds that PacifiCorp's ITP application meets statutory and regulatory issuance criteria, we must issue the proposed ITP to PacifiCorp. In NMFS' evaluation of proposed issuance of an ITP to PacifiCorp and implementation of the HCP, NMFS has concluded in a biological opinion under ESA Section 7 that issuance of an ITP is not likely to jeopardize the continued existence

of SONCC coho, nor result in the destruction or adverse modification of designated critical habitat. In regards to the statutory requirements of the ESA and other applicable law for the proposed issuance of the ITP, NMFS will continue to consider these requirements in reviewing the ITP application and associated HCP and determining whether to issue the ITP. In regards to enforceability of the HCP, HCP's are enforceable under the terms of the associated ITP and IA.

8. In regards to the HCP's analysis of the impact that is likely to result from the taking of covered species please refer to HCP Chapter V. Project Effects on Coho Salmon, which has a lengthy discussion on the requested covered activities that may impact coho, the extent and type of impact, and how the impact can be avoided, minimized, or addressed through conservation actions. In addition, please refer to Chapter VI. Conservation Program, which includes a discussion of Effects of the Coho Salmon Conservation Strategy on SONCC coho salmon. Reliable, accurate take estimates for individual species of anadromous fish are very difficult to do for multiple year plans. The commenter suggests surveys be performed prior to determining the water flow regime. First, as the HCP discusses, due to the effects of Reclamation's Klamath Project operations, for which Reclamation consults with NMFS, on the Klamath River flow regime, PacifiCorp's role in management of that flow regime is limited (see HCP Chapters V (Project Effects on Coho Salmon, Degradation and Loss of Habitat, Flows and Habitat Conditions Downstream of Iron Gate Dam) and VI (Conservation Program, Effects of the Coho Salmon Conservation Strategy, Habitat Conditions, Instream Flows and Flow Variability)). Therefore, surveys would not be helpful in determining the specific effects of PacifiCorp's Project on the flow regime. Second, it is important to consider that salmonid abundance and spatial distribution can vary year to year, at times significantly. There are many factors that influence yearly salmonid river returns (e.g., predation, ocean conditions, harvest rates). For example, one year's ocean conditions could be very poor (limited primary productivity), but freshwater conditions could be very good (good flow conditions for summer growth and survival, abundant winter refugia habitat, etc.). One could predict that freshwater conditions should result in good adult returns, but poor ocean conditions lead to small in-river returns leading to a false assumption that low returns were due to poor freshwater conditions, potentially assigning causation to in-river flows. For these such reasons, NMFS generally uses habitat conditions as a surrogate for the taking of individuals. NMFS can be confident that long-term negative impacts to freshwater habitat conditions will have a negative effect on long-term in-river survival rates, which ultimately, will reveal their effects in long-term adult trend data. NMFS is most

concerned with improvement to freshwater habitat with long-term correlations to improving adult return trends, given the necessity for periods of good growth and survival during the ocean phase of the salmonid life cycle. Predicting annual adult returns based on in-river survey data would not be a good predictor for the level of take expected in this HCP, and therefore improvements to habitat conditions form the cornerstone of the HCP's biological goals and objectives and will be monitored for impacts as well as improvements. In regards to alternatives considered in the HCP, PacifiCorp did explore alternatives which can be found at Chapter XI. Other Alternative Actions Considered. Under the ESA, ITP alternatives must be considered feasible. Draining Iron Gate reservoir and shutting down Iron Gate dam, or other significant variations in dam operations and water levels, are infeasible at this time for a myriad of reasons, one of which is PacifiCorp's limited control in Klamath River flow management due to the effects on flows from Reclamation's operation of its Klamath Project upriver, for which Reclamation consults with NMFS. In addition, draining Iron Gate reservoir and shutting down the Iron Gate powerhouse facility would have significant financial impact on PacifiCorp which may result in sufficiency of funding for implementation of the coho conservation strategy outlined in the HCP being placed at risk. Furthermore, avoidance, minimization and mitigation measures must be reasonably related to the PacifiCorp's project effects on listed coho salmon during the 10-year term of the proposed ITP. The commenter does not provide any explanation how its proposed alternatives would be reasonably related to the Project's effects on listed coho salmon during the 10-year term of the proposed ITP. Although NMFS is still reviewing the ITP application in order to make a final determination, as outlined in Table 4 of the HCP, the HCP explains how measures in the HCP are correlated to avoid, minimize, and mitigate for PacifiCorp Project effects on coho salmon to the maximum extent practicable for the proposed 10-year ITP term until fish passage is expected to be achieved. For these reasons, NMFS concludes the commenter's proposed alternatives are not reasonable alternatives.

9. As PacifiCorp described in the Draft HCP, it is applying to NMFS for a permit under ESA Section 10(a)(1)(B) (16 U.S.C. 1539(a)(1)(B)) for potential incidental take of SONCC coho salmon from its Project operations for a 10-year permit term. The ESA describes incidental take as taking that "is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." (16 U.S.C. 1539(a)(1)(B)). PacifiCorp's Project operations are licensed by the Federal Energy Regulatory Commission. Thus, its Project operations are an otherwise lawful activity. In addition, the primary purpose of Project operations is hydroelectric power generation, not blockage of fish passage

or any other effect that may result in take of listed SONCC coho salmon. Therefore, although NMFS is still reviewing the ITP application in order to make a final determination on issuance of an ITP, PacifiCorp's project operations may be considered to result in incidental take of SONCC coho salmon based on the manner incidental take is described under ESA Section 10(a)(1)(B).

10. In regards to the comment of the ITP/HCP potentially jeopardizing SONCC coho salmon, please see Responses to EPIC Comments No. 7 above.

Finding of No Significant Impact for Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon

National Marine Fisheries Service

National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with all other criteria. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

Response: Designated essential fish habitat (EFH) for both Chinook and coho salmon occurs in the following five watersheds, which overlap with the Action Area described in the National Marine Fisheries Service (NMFS) Biological Opinion (NMFS 2012b) for the proposed action, which is issuance of an incidental take permit (ITP) to PacifiCorp Energy (PacifiCorp): Upper Klamath River, Middle Klamath River, Shasta River, Scott River, and Lower Klamath River (73 FR 60987; October 15, 2008).

The PacifiCorp Klamath Hydroelectric Project (Project) is located approximately 190 miles upstream from coastal and ocean habitats. PacifiCorp seeks an ITP authorizing incidental take of federally listed Southern Oregon/Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) coho salmon as a result of PacifiCorp's Project. As discussed in the Essential Fish Habitat Assessment for the proposed project in Appendix B of NMFS' Biological Opinion for the proposed project (NMFS 2012b), NMFS believes EFH effects from the Project are principally confined to the Klamath River mainstem above the confluence with the Shasta River. Adverse habitat effects from the Project include continued blockage of significant miles of suitable coho habitat, alterations of the Klamath River natural flow regime, the production of the elevated mainstem water temperatures downstream of Iron Gate dam and powerhouse (Iron Gate dam is the current limit to anadromy in the Klamath River), interruption of spawning and incubation gravel recruitment, contributions to poor water quality leading to infectious disease outbreaks that can affect listed and unlisted salmonids, and the trapping of large woody debris that may otherwise provide functional mainstem habitat features. PacifiCorp has prepared a Habitat Conservation Plan (HCP) that will minimize and mitigate for these Project effects through a coho conservation strategy that addresses critical conservation needs for coho in the upper portions of the basin over a 10-year period. At the end of the 10-year permit duration, NMFS expects that passage for anadromous species at Project facilities will be achieved either

through Project dam removal under the Klamath Hydroelectric Settlement Agreement, or through the construction of volitional fish passage facilities at Project dams under the terms of mandatory prescriptions that NMFS has filed in Federal Energy Regulatory Commission proceedings for relicensing the Project. Chapter 1 of the Final Environmental Assessment (FEA) for the Proposed Action has further detail on the background of the Project and detailed information on the projected timeline for the establishment of volitional fish passage at Project facilities (NMFS 2012a).

Adverse effects from the Project do not affect EFH of the Shasta and Scott Rivers, nor does NMFS believe Project effects extend to the Lower Klamath River reach (see section 4.1.3 of the FEA for a description of the environmental consequences on biological resources found downstream of the last Project facility). NMFS concludes that implementation of the HCP will result in beneficial actions in the Scott and Shasta Rivers and has concluded that Chinook and coho EFH for migration pathways in the Shasta, Scott, and Lower Klamath River will not be adversely affected by the proposed action (see section 4.1.3.5 *Coho Enhancement Fund Improvement to Habitat Conditions and Access* of the FEA).

Chinook and coho salmon are known to spawn in the Klamath River mainstem where suitable spawning habitat exists (e.g., clean and appropriately sized gravels for redd building). Spawning and incubation habitat in the mainstem Klamath River will continue to be adversely affected by the trapping of sediment and spawning gravels behind IGD during the permit term. However, this adverse Project related effect will be mitigated for by gravel augmentation efforts planned in the HCP (see pages 4-16 through 4-17 of the FEA). The HCP conservation measures in combination are expected to improve spawning and incubation habitat above baseline conditions throughout the permit term below IGD. Besides short-term adverse effects to EFH which may occur when gravels are placed in the mainstem (e.g. turbidity), NMFS expects as a result of implementation of the HCP, EFH below IGD will be improved for coho and Chinook spawning and incubation. Additionally, implementation of the HCP would result in primarily beneficial effects from conservation measures carried out in the Scott and Shasta Rivers, therefore, NMFS does not anticipate adverse effects to spawning and incubation EFH habitat in the Scott and Shasta Rivers (see section 4.1.3.5 of the FEA).

Although continued adverse effects from the Project will occur over the 10-year permit period regardless of whether an ITP is issued to PacifiCorp, NMFS anticipates implementation of the HCP will result in overall improvements to stream rearing habitat in the Upper and Middle Klamath mainstem reaches, as well the Scott and Shasta Rivers (see Table 3 of the FEA for a description of anticipated beneficial effects from the proposed action). Implementation of the No Action Alterative described in the FEA would mean deferring or not implementing the additional mitigation measures outlined in the HCP submitted to NMFS. Under a No Action scenario, the Project would continue to operate under the terms and conditions of the existing FERC license in a manner consistent with current operations, which does not include minimization, mitigation, and conservation measures based on Project impacts identified by NMFS (see FEA section 2.2 *No Action*).

Protection, enhancement, and restoration of rearing habitat in the Klamath mainstem and Scott and Shasta Rivers as proposed in the HCP are expected to increase the conservation value of EFH that is currently in conditions that are likely not properly functioning for the conservation of coho and Chinook. Finally, NMFS believes that overall, there will be improvements to smolt migration habitat with implementation of the HCP (see sections 4.1.3.4 and 4.1.3.5 of the FEA).

Most importantly, reducing disease outbreaks in the upper basin is expected to have the most benefits for Chinook and coho smolts utilizing the Klamath mainstem in its upper reaches.

Project related effects (adverse and beneficial from implementation of the HCP) are not expected to affect the Klamath River estuary or nearshore coastal habitat as Project effects will occur more than 100 miles upstream from the estuary of nearshore coastal habitats, therefore, NMFS anticipates no adverse effects to Coastal Pelagics or Groundfish EFH.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: No. NMFS concludes that implementation of the proposed action, issuance of an ITP and implementation of the proposed HCP will not result in significant impacts to the biodiversity or current ecosystem function of the Klamath River basin because the proposed action will not result in new *adverse* impacts to current conditions related to biodiversity, established flow regimes, sediment transport, predator/prey relationships, or other ecosystem functions (see Table 3 of the FEA comparing a summary of anticipated effects of the proposed action versus the no action alternative).

In terms of a cumulative effect analysis of the proposed action, NMFS believes the proposed action will result in some beneficial improvements to the ecosystem function of the Klamath River basin. NMFS believes that there may be some beneficial impacts to biodiversity and ecosystem function from the following aspects of the proposed action: (1) gravel augmentation may increase benthic productivity leading to improvements in prey species, (2) flow variability above required minimum flows will likely reduce outbreaks of disease in the areas below Iron Gate dam, (3) instream restoration projects planned as part of the HCP will improve habitat quality and quantity, increase predator avoidance and escape habitat, increase overall habitat complexity in major and minor tributaries in the basin, and (4) turbine venting will improve water quality conditions in the area immediately downstream of Iron Gate Dam (Table 3 of FEA). Increases in salmonids (particularly coho) abundance and spatial diversity expected with the implementation of the HCP over the proposed permit term, may result in indirect benefits to fish-eating birds in the basin such as bald eagle and osprey that may experience some increase in available prey items (see section 4.1.3.4 of the FEA). These beneficial impacts, although important to maintain the biodiversity of the Klamath basin are not expected to be substantial given the large size of the basin, in relation to the much smaller area affected by the HCP.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Response: No. The proposed action does not concern or address human public health and safety issues.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: NMFS has reviewed the adverse effects of the proposed action on endangered and threatened species and their critical habitat through consultation under Endangered Species Act section 7. This consultation resulted in a biological opinion (Opinion), in which NMFS determined that adverse project effects on SONCC coho salmon and its designated critical habitat will continue to some degree, but the proposed action is not likely to jeopardize the continued existence of the SONCC coho salmon ESU and is not likely to result in the destruction or adverse modification of SONCC coho salmon ESU critical habitat (NMFS 2012b). The No Action alternative (essentially maintaining existing conditions) would continue adverse Project effects on SONCC coho salmon ESU, without any offsetting actions described in the proposed action (see section 4.2.2.3 of the FEA).

The proposed action would authorize incidental take of SONCC ESU coho salmon with continued implementation of the Project, while also minimizing and mitigating take as a result of the Project to the extent practicable via implementation of the HCP (see section 4 of the FEA *Environmental Consequences*). Implementation of the HCP will help to alleviate these effects on the target species, coho, by working to improve water quality conditions, increase habitat access, availability, quantity and quality, and partially restoring the currently altered hydrograph. Beneficial actions to improve the viability of coho over baseline conditions are expected to occur throughout the 10-year permit term. Therefore, while the proposed action will continue to have some adverse effects on the SONCC coho salmon ESU and its critical habitat, these adverse effects will be minimized and mitigated to the maximum extent practicable through the proposed action and will not be significant. In addition, NMFS has concluded in the Opinion for the proposed action (NMFS 2012b) that the proposed action will have no adverse effect or is not likely to adversely affect other listed species and designated critical habitat occurring in the Klamath River basin, as well as listed Southern Resident Killer Whales which rely on Chinook salmon as an important part of their diet. Finally, because all the conservation measures proposed in the HCP occur downstream of Iron Gate dam, except for flow measures that will not affect habitat suitability in a manner substantially different than exists under current conditions, NMFS does not believe the proposed action will result in significant adverse impacts to listed sucker populations or other aquatic biota occurring in the Klamath River above Iron Gate dam (see section 4.1.3 of the EA).

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: No. NMFS anticipates minor beneficial effects to socioeconomic and environmental justice concerns with implementation of the HCP (see section 4.1.4 of the FEA, *Socioeconomics and Environmental Justice).* NMFS makes this determination based upon the assumption that an important minority population (tribes) will benefit from funding for restorative projects when this population is a part of the implementation and monitoring of these projects. Additionally, NMFS anticipates there may be some reductions to fishable steelhead days during implementation of the flow variability program in the winter, but does not anticipate this impact will be significant. There may be some improvement to recreational opportunities should implementation of the HCP result in an increase in adult returns of Chinook and steelhead during the permit duration, allowing for stable and perhaps increasing adult returns available for

capture. NMFS anticipates no impacts to camping opportunities. Although impacts to whitewater boating from flow variability may be neutral, there may be adverse impacts limited to short periods and limited area of overlap, but no significant adverse impacts to whitewater boating are expected.

6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: No. Although the proposed action is controversial in that it is related to larger conservation problems in the Klamath River basin, for example the Klamath Hydroelectric Settlement Agreement and Klamath Basin Restoration Agreement (KHSA/KBRA) which would have effects on the quality of the human environment, the proposed action itself is not thought to be highly controversial. Most public comments received on the proposed action were supportive of ITP issuance and implementation of the HCP as quickly as possible to improve conditions for coho in the Klamath River.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response: No. The proposed action would not impact cultural or historic resources, park land, prime farmlands, wetlands, or ecologically critical areas. The Klamath River is designated as a Wild and Scenic River (WSR) and the proposed action is expected to improve the resources of this WSR with implementation of the HCP as compared to its current state (Table 3 of FEA). Implementation of the HCP is expected to improve conditions for coho viability and will likely benefit Klamath River Chinook as well resulting in improvement to the unique characteristics of the WSR designation. Effects of the proposed action on EFH have been described in #1 above.

Because the Project affects the Klamath River mainstem, and most of the conservation measures proposed in the HCP are likely to occur within active river and stream channels, NMFS believes no historic or cultural properties are at risk (see section 4.1.5 of the FEA). Additionally, future HCP-funded projects will need to undergo their own permitting actions, thus triggering a review of potential cultural or historic resources that may occur within the project area. At this time, the proposed action considers conservation measure projects funded through the coho enhancement fund in the HCP in a general sense, but specific project planning with detailed site plans will need to be developed before these funds will be used to implement projects. When this occurs a review of historic and cultural resources within the potentially affected area may need to occur depending on the circumstances.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: No. Effects on the human environment from the Project are fairly well-known (e.g., contributes to poor water quality, impacts fishery resources indirectly affecting tribal resources, alters the natural flow regime). The restorative actions proposed in the HCP as conservation measures to mitigate for Project impacts on coho are fairly well-known to provide

improvements to salmonid habitat (e.g., addition of LWD, gravel augmentation, protection of cool water refugia).

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: No. The issuance of the ITP will authorize the incidental taking of SONCC coho during PacifiCorp's continued operations of the Project for an interim period of 10 years. Ten years is considered "interim" as the Secretary of the Interior, in coordination with the States of Oregon and California and other federal agencies, determines whether removal of four Project dams will advance restoration of the salmonid fisheries of the Klamath Basin and is in the public interest as provided under the Klamath Hydroelectric Settlement Agreement (Secretarial Determination). If the Secretarial Determination is negative or the Klamath Hydroelectric Settlement Agreement terminates for any other reason, the Project would revert to the Federal Energy Regulatory Commission (FERC) relicensing proceedings for the Project in which NMFS has prescribed mandatory volitional fish passage facilities at Project dams (e.g., fish ladders and screens). In that case, this Proposed Project would cover the ten-year interim period until it is expected that such volitional fish passage facilities would be required under any new FERC license for the Project. Although the proposed ITP is related to the KHSA/KBRA, it is not tiered to this other process exploring longer term options for Project facilities. The proposed action, issuance of an ITP and implementation of the HCP, will stand alone for the permit term, regardless of the outcome of KHSA/KBRA. In the FEA for the proposed action, NMFS concludes the proposed action will not result in individual or cumulative significant impacts to the human environment over the next 10 years until fish passage is established either through dam removal or volitional fish passage facilities. NMFS expects that impacts from the proposed action will be beneficial to the human environment as compared to the No Action alternative (see page 5-14 of the FEA).

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: No. The proposed action would not affect any districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places. Similarly, the issuance of the ITP and implementation of the HCP are not likely to cause any loss or destruction of scientific, cultural or historical resources primarily because the proposed action covered activities and HCP conservation measures will occur within active stream channels, or within existing facilities (Iron Gate Dam and Iron Gate Fish Hatchery).

11) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response: No. The proposed action does not involve the introduction, removal, or movement of any non-indigenous species into or out of the action area. The species involved in the proposed restoration activities are native to the study region (coho), and common handling and movement methods will be used where necessary.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

Response: No. The proposed ITP to PacifiCorp is a singular action considered for the "interim period" while dam removal or fish passage facilities are contemplated for implementation; neither of which will occur during the proposed action permit term. This proposed action is unique to PacifiCorp's Klamath Hydroelectric Project. It is possible that, if there is a similar amount of time before FERC relicensing or related decisions are going to be made for other hydroelectric projects, some aspects of the proposed action could be adopted elsewhere to address listed species needs while relicensing or dam removal is considered, but any such aspects would need to be tailored to the specific circumstances of that project and the listed species affected by that project.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: No. Issuance of an ITP is not expected to result in violations of Federal, state, or local requirements for protection of the environment. NMFS believes the issuance of an ITP to PacifiCorp will be in compliance with all federal, state, or local laws or requirements imposed for the protection of the environment. In response to comments received in the public comment period on the draft HCP and Draft Environmental Assessment for issuance of an ITP, NMFS addressed public comments asserting the proposed action would threaten violation of any laws or requirement imposed for the protection of the environment.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: No. As discussed in response to #4 above, because all the conservation measures proposed in the HCP occur downstream of Iron Gate dam, except for flow measures that will not affect habitat suitability in a manner substantially different than exists under current conditions, NMFS does not believe the proposed action will significantly adversely impact listed sucker populations or other aquatic biota occurring in the Klamath River above Iron Gate dam or result in cumulative adverse impacts to sucker populations or other aquatic biota occurring in the Klamath River above Iron Gate dam. Additionally, as discussed in response to #4 above, while the proposed action will continue to have some adverse effects on the SONCC coho salmon ESU and its critical habitat, these adverse effects will be minimized and mitigated to the maximum extent practicable through the proposed action and will not be significant. In addition, NMFS has concluded in the Opinion for the proposed action (NMFS 2012b) that the proposed action will have no adverse effect or is not likely to adversely affect other listed species and designated critical habitat occurring in the Klamath River basin, as well as listed Southern Resident Killer Whales which rely on Chinook salmon as an important part of their diet. As discussed in response to #9 above, in the FEA for the proposed action, NMFS concludes the proposed action will not result in individual or cumulative significant impacts to the human environment, including target and non-target species, over the next 10 years until fish passage is established either through dam removal or volitional fish passage facilities. NMFS expects that impacts

from the proposed action will be beneficial to the human environment as compared to the No Action alternative (see page 5-14 of the FEA).

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Final Environmental Assessment prepared for issuance of an ITP to PacifiCorp and resultant implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon (PacifiCorp 2012) and the conclusion reached in the NMFS Biological Opinion for the proposed action (NMFS 2012b), it is hereby determined that the issuance of an ITP to PacifiCorp and implementation of the HCP will not significantly impact the quality of the human environment as described above and in the Final Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

FOR _____
Regional Administrator, NMFS

23 February 2012
Date

REFERENCES CITED

National Marine Fisheries Service. 2012a. Final Environmental Assessment: Authorization for Incidental Take and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon

National Marine Fisheries Service. 2012b. Final Biological Opinion on the Proposed Issuance of an Incidental Take Permit to PacifiCorp Energy and Implementation of the PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon.

PacifiCorp. 2012. Final PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon.