Executive Summary

ES.1 Introduction

This document, *Klamath Facilities Removal Environmental Impact Statement/ Environmental Impact Report* (EIS/EIR), has been developed in accordance with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) to analyze the potential impacts to the environment from the proposed removal of four PacifiCorp Dams (J.C. Boyle, Copco 1, Copco 2, and Iron Gate, collectively referred to herein as the Four Facilities) on the Klamath River under the Klamath Hydroelectric Settlement Agreement (KHSA). The KHSA is one part of a basin-wide approach to address continuing unresolved problems resulting from over-stressed water supplies and water quality concerns in the Klamath Basin, including impacts to basin fisheries.

Since 2001, the Federal Government has faced events and taken unprecedented and extraordinary actions in the Klamath Basin largely because of these unresolved problems. The following are examples of some of these events and actions:

- In spring of 2001, the Federal Government announced there would be no deliveries of water from Upper Klamath Lake or the Klamath River to the Bureau of Reclamation's (Reclamation's) Klamath Project due to the combined effects of severe drought and Federal Endangered Species Act (ESA) concerns - the first time project water deliveries were not made at a Reclamation project (very limited deliveries occurred later in the summer).
- In 2002, there was a major fish die-off in the Klamath River of adult fall-run Chinook salmon (at least 30,000 fish).
- In 2005, public health warnings to avoid contact with water in Iron Gate and Copco Reservoirs due to toxic algae blooms began being posted annually.
- In 2006, low abundance of Klamath Basin Chinook salmon lead to severe restrictions on commercial and recreational harvest along 700 miles of the California and Oregon coast, as well as major reductions in Klamath River recreational and tribal fisheries.
- In 2010, there was a significant reduction in water deliveries to Reclamation's Klamath Project due to dry hydrologic conditions.
- In 2010, the Klamath Tribes limited their harvest of suckers to ceremonial use for the 25th consecutive year and experienced their 92nd year without access to salmon.

These events and actions demonstrate the need for long-term solutions that address these complex and basin-wide problems. There have been limited and piecemeal approaches that have provided interim relief or some mitigation, but the Klamath Basin faces

substantial, long-term challenges that many believe call for different and more basin-wide approaches. As stated above, the KHSA is one part of a proposed basin-wide approach to resolve these issues.

ES.1.1 Klamath Hydroelectric Settlement Agreement

The KHSA is a negotiated agreement to study the potential removal of four dams on the Klamath River and, should a decision be made to remove these dams, the agreement provides a path forward on undertaking this removal. The KHSA was signed by representatives of 45 organizations including Federal agencies, the States of California and Oregon, PacifiCorp, Indian Tribes, counties, irrigators, and conservation and fishing groups in order to address one of the most economically, environmentally, and culturally devastating water disputes in the western United States. The terms of the KHSA acknowledge, however, that there are many unknown consequences regarding the potential removal of these facilities. Thus the agreement requires that the Secretary of the Interior undertake a series of scientific studies to determine whether dam removal would meet criteria including: being in the public interest and advancing restoration of the salmon fishery. If the Secretary, in cooperation with the Secretary of Commerce and other Federal agencies as appropriate**,** determines that dam removal fulfills these criteria and makes a positive determination(Affirmative Secretarial Determination), the States of Oregon and California will consider whether to concur in that determination.[1] If the governors concur, dam removal will proceed in accordance with the KHSA.

This joint EIS/EIR is intended to provide the required environmental review for both the Secretarial Determination and the gubernatorial concurrences. Consequently, this EIS/EIR has been prepared by the United States Department of the Interior (DOI), as lead NEPA agency, and the California Department of Fish and Game (CDFG), as lead CEQA agency (collectively referred to herein as Lead Agencies). Recognizing that elements of the Proposed Action would occur in California and Oregon, CDFG collaborated with DOI, with input from the State of Oregon, to make a reasonable, good faith effort in disclosing all significant environmental effects of the Proposed Action. Absent certain circumstances, CEQA does not apply to any project or portion thereof located outside of California which will be subject to environmental review pursuant to NEPA (Public Resources Code § 21080(b)(14); CEQA Guidelines § 15277).

ES.1.2 Klamath Basin Restoration Agreement

The Klamath Basin Restoration Agreement (KBRA) is also a negotiated agreement that reflects a basin-wide approach to addressing the current resources challenges. The KBRA was negotiated concurrently with the KHSA and has been signed by most of the parties to the KHSA, but the Federal agencies are not yet parties to the KBRA. The

[1] There are certain conditions that must be met prior to the Secretary making this determination. One such condition is the enactment of Federal law authorizing the KHSA which has not occurred as of this time. There are also other requirements. For a complete list of these requirements, please see http://klamathrestoration.gov/, which has the KHSA posted in its entirety.

KBRA will be signed by Federal agencies when Congress authorizes them to do so.[2] The complete KBRA package entails various commitments and actions that have been or will be proposed and/or undertaken in the basin by Federal, State, local, tribal, and private interests. Some of the KBRA actions could have effects (whether adverse or beneficial) on the same environmental resources that would be affected by dam removal. Some KBRA actions are expressly preconditioned by and therefore hinge upon dam removal, and an Affirmative Secretarial Determination. Some KBRA actions are Federal but are not expressly linked to dam removal, and some actions involve only non-Federal parties.

ES.1.3 NEPA – Specific Analysis

The Federal Lead Agency, the DOI, is analyzing the KBRA as a connected action to the proposed Secretarial Determination under the KHSA. NEPA defines connected actions as those actions that are closely related to or cannot or would not proceed unless other actions are taken previously or simultaneously (40 CFR 1508.25(a)(1)(ii)).[3] Some actions or component elements of the KBRA are independent obligations and thus have independent utility from the KHSA, but the implementation of several significant elements of the KBRA would be different, if the Secretarial Determination under the KHSA is not to pursue full dam removal. Recognizing that implementation of many elements of the KBRA is unknown and not reasonably foreseeable at this time, the connected action analysis under NEPA is being undertaken at a programmatic level. Consequently, appropriate future project-level analysis under NEPA would be completed for the KBRA in the future as project-specific proposals are developed and no Federal action regarding KBRA implementation would be made pursuant to the analysis in this document.

NHPA Section 106 Process

DOI elected to utilize the NEPA process to meet the Federal requirements of Section 106 of the National Historic Preservation Act (NHPA) as allowed under 36 CFR Section 800.8(c). DOI defines the undertaking, for purposes of Section 106 of the NHPA, as the removal of the four PacifiCorp dams which may be a result of the Secretarial Determination. The proposed undertaking has the potential to affect historic properties triggering compliance with Section 106 of the NHPA. The analysis and consultations concerning any effects of the Proposed Action and alternatives on historic properties are integrated into the NEPA review and documentation pursuant to the criteria identified in 36 CFR Section 800.8(c)(1)-(4).

[2] Under the KHSA and KBRA (Agreements) certain agencies of the United States ("Federal Agency Parties") shall become parties to the KBRA upon enactment of authorizing legislation that authorizes and directs them to become parties (KBRA Section 1.1.2).

[3] We acknowledge, however, that the KBRA could also be analyzed as a cumulative or similar action under 40 CFR 1508.25(a)(2) and (3). We note that all three definitions (connected action, cumulative actions, and similar actions) are within the section that provides parameters for the "scope" of the action, which determines both the range of alternatives and the impacts to be considered in an EIS. Ultimately, however, we believe the important point is not the labeling but the analysis and whether the decision (in this case whether to remove four dams) is informed by a EIS that is proper in scope.

For purposes of this analysis, the KBRA, a connected action, is viewed as a whole program even though some of its component parts are currently being implemented (those without a Federal nexus or not subject to environmental review) or could be implemented on an individual basis without dam removal. One of the reasons why the KBRA is treated as a whole for purposes of this EIS/EIR is that the individual activities under the KBRA would be implemented, through adaptive management and in close coordination with committees comprised of stakeholders, in a manner that seeks to attain synergy and optimize benefits through a coordinated, holistic approach to restoration and water management. Implementing those KBRA activities that are not connected to facilities removal on an individual basis without the benefit of adaptive management and stakeholder input would likely not optimize benefits.

ES.1.4 CEQA – Specific Analysis

CDFG, as Lead Agency under CEQA, is also analyzing relevant parts of the KBRA in a programmatic fashion, as described in Section 15168 of the CEQA Guidelines. This decision was made because many of KBRA's component elements have not been specified to a degree where the associated impacts would be reasonably foreseeable for purposes of this environmental analysis. The parties recognize that future project-specific analysis may be required for various components of the KBRA as they become more clearly defined and when a public entity, as defined by CEQA Guidelines Section 15379, identifies a discretionary approval pursuant to CEQA Guidelines Section 15378, which would obligate subsequent review. A program-level document is appropriate when a project consists of a series of smaller projects or phases that may be implemented separately. Under the programmatic EIR approach, future projects or phases may require additional, project-specific environmental analysis. It should also be noted that this EIR makes certain assumptions about the foreseeable effects of KBRA based on existing information, including, among other things, how the fishery and water resources programs may be designed and implemented. CDFG recognizes that subsequent environmental analysis may be required by any California public entity with an approval or permitting obligation if the circumstances specified by CEQA Guidelines Section 15162(a) are triggered.

Importantly, CDFG could have analyzed the associated impacts of the KBRA relative to the KHSA in the indirect and cumulative impacts analysis portion of the KHSA EIR as it is not affirmatively approving or carrying out any one aspect of the KBRA that would be subject to environmental review. CDFG recognizes it is not “approving” any discretionary portion of the KBRA that could alter the physical environment and that by signing the KBRA it has already executed and committed to the agreement itself. Thus, similarly to the EIS, there are no alternatives that consider what a new or revised KBRA might look in the event dams are not removed. Rather, to avoid confusion, duplication, and wasted resources, CDFG has determined that the concurrent and connected nature of the KBRA to the KHSA warrants a clear understanding of its potentially significant impacts and that the approach of programmatic analysis is equally, if not more, sufficient for providing that information to decisionmakers.

Thus, out of an abundance of caution, and to ensure full transparency, CDFG has agreed to consider significance determinations for the KBRA in a programmatic fashion. Recognizing that elements of the Proposed Action would occur in California and Oregon, CDFG collaborated with DOI, with input from the State of Oregon, to make a reasonable, good faith effort in disclosing all significant environmental effects of the Proposed Action. Absent certain circumstances, CEQA does not apply to any project or portion thereof located outside of California which will be subject to environmental review pursuant to NEPA (Public Resources Code § 21080(b)(14); CEQA Guidelines § 15277). CDFG considers the Proposed Actions by California to be implementation of the KHSA and thus has crafted alternatives only for dam removal itself, assuming that absent full or partial facilities removal the relevant elements of the KBRA will no longer be ascertainable. CDFG recognizes that in the event subsequent analysis

Klamath Hydroelectric Project

The Klamath Hydroelectric Project was constructed between 1911 and 1962 and includes eight developments: the East and West Side power facilities, and Keno, J.C. Boyle, Copco 1, Copco 2, Fall Creek, and Iron Gate Dams. Located at the upstream boundary of the Klamath Hydroelectric Project, Link River Dam and Upper Klamath Lake are not part of the project.

All of the dams, excluding Link River Dam, are owned by PacifiCorp. Link River Dam was constructed to enhance hydroelectric production at the East and Westside power plants as well as control the storage and timing of water releases downstream to better control future power production at the lower river dams. The dam is owned by Reclamation, but operated by PacifiCorp under Reclamation's direction for regulating flows and storing water in Upper Klamath Lake for irrigation use in Reclamation's Klamath Project.

Keno Dam regulates water levels of the Klamath River upstream of the dam. The facility does not include power-generating equipment. PacifiCorp operates the dam under an agreement with Reclamation to maintain stable water levels in Keno Impoundment/Lake Ewauna for consistent water delivery to dependent water users.

The dams on the mainstem of the Klamath River include: J.C. Boyle, Copco 1, Copco 2, and Iron Gate Dams (the Four Facilities), which are currently owned by PacifiCorp. The portion of the Klamath River that includes these four most downstream dams is referred to as the Klamath Hydroelectric Reach. Fall Creek Dam is on a Klamath River tributary that flows into Iron Gate Reservoir.

The purpose of the Klamath Hydroelectric Project is power generation. The installed maximum capacity of the entire project is 169 megawatts and, on average since full installation in 1963, the project produced 82 megawatts, and annually generated 716,800 megawatt hours of electricity.

is deemed appropriate, it will be required to consider any feasible alternatives, mitigation measures, and any other elements required by CEQA as the basis for any approval of such KBRA project or phase in accordance with existing law.

ES.1.5 Oregon Concurrence

The State of Oregon, and more specifically the "Klamath Team" consisting of Oregon Water Resources, Oregon Department of Fish and Wildlife, and Oregon Department of Environmental Quality, will follow a distinct process for determining concurrence with an Affirmative Determination by the Secretary of the Interior (as defined pursuant to Executive Order No. 10-10 by the Governor of Oregon) should such a determination be made.

The Klamath Team will evaluate two questions in order to determine concurrence:

1. Whether significant impacts identified in its environmental review can be avoided or mitigated as provided under State law.

2. Whether the facilities removal will be completed within the State Cost Cap.

The Klamath Team will provide the results of its evaluation in a recommendation to the Governor, for transmittal to the Secretary of the Interior as a concurrence, if appropriate.

ES.2 Background

Figure ES-1 illustrates many of the existing features of the Klamath Basin in southern Oregon and northern California. The Klamath Basin's history, like numerous other river basins throughout the Western United States, is one of fish harvest, dam construction, timber harvest, farming, ranching, water diversion, and corresponding changes in the basin's water quality, hydrology, and natural resources.

ES.2.1 Basin Timeline

Figure ES-2 displays a timeline of some of the events and activities within the basin which have contributed to current conditions related to water supply, fisheries, recreation, and stakeholder negotiations. Water diversions and planning for dam construction in the basin began prior to 1905, when the precursor to the Bureau of Reclamation started construction of Reclamation's Klamath Project. Construction of the Klamath Hydroelectric Project, starting with Copco 1 Dam, began in 1911.

Figure ES-1. The Klamath Basin.

Indian Tribe use of Klamath Basin since time immemorial

1855 Klamath River Reservation established (Yurok)

1864 Land for Hoopa Valley Indian Reservation set aside by Congress.

1864 Klamath Indian Reservation established (The Klamath Tribes)

1876 Boundaries of the Hoopa Valley Indian Reservation established by Executive Order

1905 Reclamation's Klamath Project Authorized by the Secretary of the Interior (May 15)

1906 Work on Reclamation's Klamath Project begins

1907 A-Canal completed

1908 President Theodore Roosevelt forms Lower Klamath Lake National Wildlife Refuge, the first in the nation

1910 Clear Lake Dam completed

1911 Clear Lake National Wildlife Refuge established

1912 Lost River Diversion Channel completed

1912 Wilson Diversion Channel completed

1917 Connection of Lower Klamath Lake to Klamath River blocked by a railroad embankment

1918 Copco 1 Dam completed; passage of salmon and steelhead to the Upper Basin blocked; harvest opportunities for Klamath tribes ends

1921 Anderson-Rose Dam on Lost River completed

1921 Link River Dam completed

1922 Copco 2 construction begins in order to meet additional electricity demand of timber industry and reregulate flows from Copco 1

1923 Malone Diversion Dam on Lost River completed

1924 Miller Diversion Dam on Miller Creek completed

1925 Copco 2 completed

1925 Gerber Dam completed

1928 Tule Lake (39,116 acres) and Upper Klamath Lake (15,000 acres) National Wildlife Refuges established

1930 Lost River Diversion Channel enlarged

1931 Keno Regulating Dam completed

1938 Land purchased for Resighini Rancheria

1939 Quartz Valley Indian Reservation established

1941 D-Pumping Plant completed

1941 Construction of Klamath Straits Drain which provided hydrologic connection between Lost River basin and Klamath River

1950 Lost River Diversion Channel enlarged

1954 Klamath Tribes' (Modoc, Klamath, and Yahooskins) federal recognition terminated

1956 FERC Relicensing for PacifiCorp or predecessor

1957 Klamath River Basin Compact ratified by California and Oregon "to facilitate …the orderly …development, use, conservation, and control" of Basin water for domestic and agricultural uses, as well as protection and enhancement of wildlife, fish, and recreational resources. To ensure equitable distribution and use of water between the two states and the Federal Government

1958 J.C. Boyle Dam completed, providing peaking power

1962 Iron Gate Dam completed

1966 Keno Dam replaced

1967 Lost River sucker listed as "Rare" by State of CA

1971 Shortnose sucker listed as "Rare" by State of CA

1971 Lost River and shortnose sucker identified as species of concern under the CESA

1975 Klamath Basin adjudication proceedings for State of Oregon begin

1975 North Coast Regional Water Quality Control Board adopts basin plan for the Klamath River Basin, including designation beneficial uses for the river

1979 Karuk Tribe becomes federally recognized

1981 Portion of the Lower Klamath River designated as a "Wild and Scenic" river

1984 Trinity River Restoration Program initiated

1986 Klamath Tribes reinstated as federally recognized tribes and close their sucker fisheries for conservation purposes. Hundreds of adult suckers are observed in a summer-time die-off in Upper Klamath Lake

1986 20 Year "Klamath River Basin Fishery Resources Restoration Act" - Public Law 99-552 (100 Stat. 3081, October 27, 1986), as amended by P.L. 100-580. Task Force Formed

1988 Lost River and shortnose sucker listed as endangered under ESA

1988 Hoopa-Yurok Act establishes an independent Yurok Reservation and Tribal government

1990 State of Oregon refuses to issue a permit for the federally-licensed Salt Caves Hydroelectric Project

1991 Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program completed by U.S. Fish and Wildlife Service

1993 Federal Government sets the Klamath tribal fishing to 50% of total available harvest for Fall Chinook

1994 Klamath River from J.C. Boyle Powerhouse to the California-Oregon state line designated "Wild and Scenic" river

1995 Adoption of the Klamath, Six Rivers, and Shasta-Trinity National Land and Resource Management Plans that included findings from the 1993 Forest Ecosystem Management Team and 1994 Record of Decision for the Northwest Forest Plan for the Aquatic Conservation Strategy that mandated watershed restoration, identified key watersheds as strongholds for salmon recovery, and standards and guidelines to protect and restore watershed conditions

Figure ES-2a. Klamath Basin Timeline.

Figure ES-2b. Klamath Basin Timeline.

ES.2.2 Activities Leading to the Development of the KHSA and the KBRA

While the construction and operation of reservoirs and dams on the Klamath River facilitated development, growth, and expansion of an agricultural economy in the region, it also contributed to declines in fisheries and water quality, as well as impacts on tribal resources and culture.

As described above, construction of the dams along the mainstem of the Klamath River resulted in fisheries declines. The construction of Copco 1 Dam resulted in decimation of the Klamath Tribes' anadromous fisheries by blocking fish passage to the Upper Basin. The 1980s and 1990s witnessed declining populations and closure of Lost River and shortnose sucker fisheries as well as the Federal listing under the Endangered Species Act of both sucker species and coho salmon.

In 2008 and 2010, the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, respectively, issued biological opinions on Reclamation's Klamath Project operations to better protect listed species. Project operations are now conducted in accordance with both opinions.

The Klamath Basin faced substantial, long-term challenges, such as the decline of fish species, posting of health advisories due to poor water quality conditions, the water delivery curtailments and other unresolved natural resource issues described under Section ES.1 and Figure ES-2. The likelihood that similar hardships would continue to occur, coupled with upcoming changes PacifiCorp would need to make in order to continue operating their hydroelectric project, led basin stakeholders to begin negotiation of a mutually beneficial agreement to try to provide enduring solutions to these longstanding challenges.

While stakeholders began efforts to reach agreement on the multifaceted problems of the basin in the 1990s, the water-related farming and fisheries crises experienced in 2001 and 2002, and expiration of PacifiCorp's licenses for its hydroelectric project on the Klamath River, provided additional impetus to reach a negotiated settlement, as discussed further below. Official negotiations leading to the KHSA and KBRA began in 2005. The KHSA grew directly out of the Federal Energy Regulatory Commission's (FERC) Alternative Dispute Resolution Procedures (18 C.F.R. 385.601, et seq.) wherein the parties, including PacifiCorp, elected to negotiate a settlement that comteplates the potential removal of PacifiCorp's hydroelectric facilities on the Klamath River as an alternative to relicensing those facilities. As stated in Section 1.2 of the KHSA, many of the parties to the settlement maintain that facilities removal will help restore basin resources and all signatory parties agree that settlement will help reduce conflicts among Klamath Basin communities. The draft KBRA was released in January 2008. The agreements were negotiated and written to be executed together and are referred to herein as the Klamath Settlement.

ES.2.2.1 FERC Relicensing

The KHSA and KBRA negotiations thus coincided with PacifiCorp's 2004 FERC relicensing application for the Klamath Hydroelectric Project. The company's original 1956 license expired in March 2006. The 1956 PacifiCorp license pre-dated many environmental laws, and did not include prescriptions (Section 18 of the Federal Power Act (FPA) [16 USC 811]) for fish passage over or around the dams. Currently, only J.C. Boyle and Keno Dams have fish passage facilities, but these fishways do not meet current passage criteria.

PacifiCorp filed an application with FERC for a new operating license for the Klamath Hydroelectric Project in 2004. The NOAA Fisheries Service recommended to FERC removal of the Four Facilities as the best alternative to contribute to restoration of all fish species of concern in the Klamath watershed under FPA Section 10(a). Concurrently, under Section 18 authority of the FPA, the NOAA Fisheries Service (the Secretary of Commerce's authority under the FPA has been delegated to the NOAA Fisheries Service and DOI prescribed mandatory fishways and passage at each mainstem dam. Flows were conditioned from J.C. Boyle Dam downstream for riparian habitat, whitewater recreation, and fisheries by DOI under Section 4(e) authority. See the text box below that describes these sections of the FPA.

The fishway prescriptions by the NOAA Fisheries Service and DOI were supported by basin tribes, fishing interests, and conservation groups to address declining fish harvests in the lower Klamath River and to reopen blocked habitat. The fishway prescriptions and DOI's mandatory conditions were challenged by PacifiCorp and others under the Energy Policy Act of 2005, in a trial-type hearing that considered disputed issues of material fact relating to the prescriptions and conditions. The resulting Administrative Law Judge decision (*In the Matter of: Klamath Hydroelectric Project, Docket* Number 2006-NMFS-0001, September 27, 2006) found that PacifiCorp failed to meet its burden of proof regarding most of the factual issues in dispute. FERC conducted environmental analysis of the proposed project, including the mandatory terms and conditions and prescriptions in 2007. The dams have been operating under an annual license since March 2006, when the original license expired.

Before FERC may issue any new license for the Klamath Hydroelectric Project, the States of Oregon and California must also separately issue water quality certifications under Section 401 of the Clean Water Act (CWA). The California State Water Resources Control Board (SWRCB) cannot issue certification until environmental documentation consistent with the requirements of CEQA, is completed. The certification proceedings are currently being held in abeyance as requested in Section 6.5 of the KHSA. In a February 2009 letter from SWRCB addressing the CEQA Notice of Preparation for an EIR for 401 water quality certification of the Klamath Hydroelectric project, it was noted that failing to process the water quality certification in a timely manner risks a FERC determination that the SWRCB has waived certification (SWRCB 2009). The State of California would then have no regulatory authority to address water quality issues associated with the Klamath Hydroelectric Project during the FERC relicensing.

The Federal Power Act

The Federal Power Act (FPA) authorizes the Federal Energy Regulatory Commission (FERC) to license hydroelectric projects in the United States.

Section 18 of the FPA states in pertinent part:

FERC "shall require the construction, maintenance, and operation by a licensee at its own expense of…such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate"

What is a fishway? Congress has defined fishways for the safe and timely upstream and downstream passage of fish to be limited to 'physical structures, facilities or devices necessary to maintain all life stages of such fish, and project operations and measures related to such structures, facilities, or devices which are necessary to ensure the effectiveness of such structures, facilities, or devices for such fish." 1992 Energy Policy Act Pub. L. 102-486, Title XVII, Section 1701(b), 106 Stat. 3008.

Section 4(e) of the FPA provides that FERC may issue a license within a reservation (as defined in the FPA) only after finding that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired and such license shall be subject to and contain such conditions that the Federal agency with jurisdiction over the reservation deems necessary for the adequate protection and utilization of the reservation.

Section 10(a) of the FPA requires, in relevant part, that: "[i]n order to ensure that the project adopted will be best adapted to the comprehensive plan ..., the Commission shall consider each of the following:

(2)(A) The extent to which the project is consistent with a comprehensive plan (where one exists) for improving, developing, or conserving a waterway or waterways affected by the project that is prepared by i) an agency established pursuant to Federal law that has authority to prepare such a plan; or ii) the State in which the facility is or will be located.

(2)(B) The recommendations of Federal and State agencies exercising administration over flood control, navigation, irrigation, recreation, cultural and other relevant resources of the State in which the project is located, and the recommendations (including fish and wildlife recommendations) of Indian tribes affected by the project."

Section 10(j) of the FPA requires FERC to include conditions to adequately and equitably protect, mitigate damages to, and enhance fish and wildlife affected by the development, operation, and management of a project, based on recommendations received pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) from the Department of Commerce's National Marine Fisheries Service, the Fish and Wildlife Service and State fish and wildlife agencies. If FERC believes a recommendation to be inconsistent with the FPA or other applicable law, it must attempt to resolve the inconsistency with the agency through a process defined in the FPA.

The mandatory prescriptions and conditions along with FERC's required conditions would result in significant operational changes to the hydroelectric project, substantially reducing power generation capacity (about 20 megawatts, or 24 percent of annual generation) and causing the Klamath Hydroelectric Project to operate at a net annual loss (FERC 2007). PacifiCorp estimates that it would incur relicensing capital costs in excess of $400 million (with the majority of costs resulting from implementation of aquatic resource protection, mitigation, and enhancement measures) and $60 million in operations and maintenance costs over a 40-year license term (Oregon Public Utilities Commission [OPUC] 2010). PacifiCorp would be allowed to recover these costs through customer charges, if approved through future Public Utilities Commission actions.

Reclamation's Klamath Project

In addition to the Klamath Basin's distinctive setting, biological resources, and cultural history, the basin is the site of one of the first developments authorized under the 1902 Reclamation Act. Development and construction of what is today known as Reclamation's Klamath Project took place between 1905 and 1966, with major features of the project completed by the early 1940s. As the largest water management effort in the Upper Klamath Basin, its features include a system of reservoirs, dams, canals, and pumps (Figure 1-4). Reclamation's Klamath Project was originally authorized for the purpose of providing irrigation water to farms at a time when the frontier of the American west was still developing and increasing numbers of farmers were drawn to the fertile land in northern California and southern Oregon. Link River Dam, completed in 1921, is a major feature of Reclamation's Klamath Project. This dam is owned by Reclamation, but is operated by PacifiCorp under agreement with Reclamation.

The KHSA sets a cost cap of $450 million for removal of the Four Facilities. Of this, an amount not to exceed $200 million would come from additional charges to PacifiCorp ratepayers residing in California and Oregon, and up to $250 million would come from the sale of bonds in California or other appropriate financing mechanisms to cover removal costs in excess of the rate-payer contributions. The United States government would not be responsible for the costs of facilities removal.

ES.2.2.2 The Four Facilities and PacifiCorp Involvement in the KHSA/KBRA

PacifiCorp's decision to enter into the KHSA, which provides for the possible removal of the Four Facilities, reflects its assessment of a combination of regulatory requirements, including the cost and liability associated with meeting CWA Section 401 certification in California and in Oregon for renewal of FERC license P-2082, the estimated construction and operation costs to provide fishways at the Four Facilities, reductions in peaking power and overall hydropower generation, and the resulting increase to their operational costs for providing power from the Four Facilities. PacifiCorp's evaluation of the costs and risks associated with meeting those requirements under a new license lead to an assessment that the KHSA was in the best interest of its customers as compared to continuing the process of relicensing the Four Facilities (PacifiCorp 2012). As described below in Section ES.4.2, PacifiCorp is not a direct signatory of the KBRA.

Table ES-1 summarizes data about the Four Facilities. Figures ES-3 through ES-6 show the four dams and associated hydropower facilities.

Table ES-1. Hydroelectric Dams (Four Facilities) on the Mainstem Klamath River

Dam	Year Operational	Maximum Power Generation Capacity (megawatts)	Annual Average Generation Rate (megawatts)	Dam Height (feet)
J.C. Boyle	1958	98	38	68
Copco 1	1918	20	12	126
Copco 2	1925	27	15	33
Iron Gate	1962	18	13	194
Total	--	**163**	**78**[1]	--

Source: FERC 2007
Notes: [1] This annual average generation rate is only for the Four Facilities and does not include the Fall Creek or East and West Side Facilities. Under the agencies' mandatory prescriptions and conditions, along with FERC's required conditions, average annual generation for the entire project would drop by approximately 20 megawatts.

Figure ES-3. J.C. Boyle Dam and Powerhouse.

Figure ES-4. Copco 1 Dam and Powerhouse.

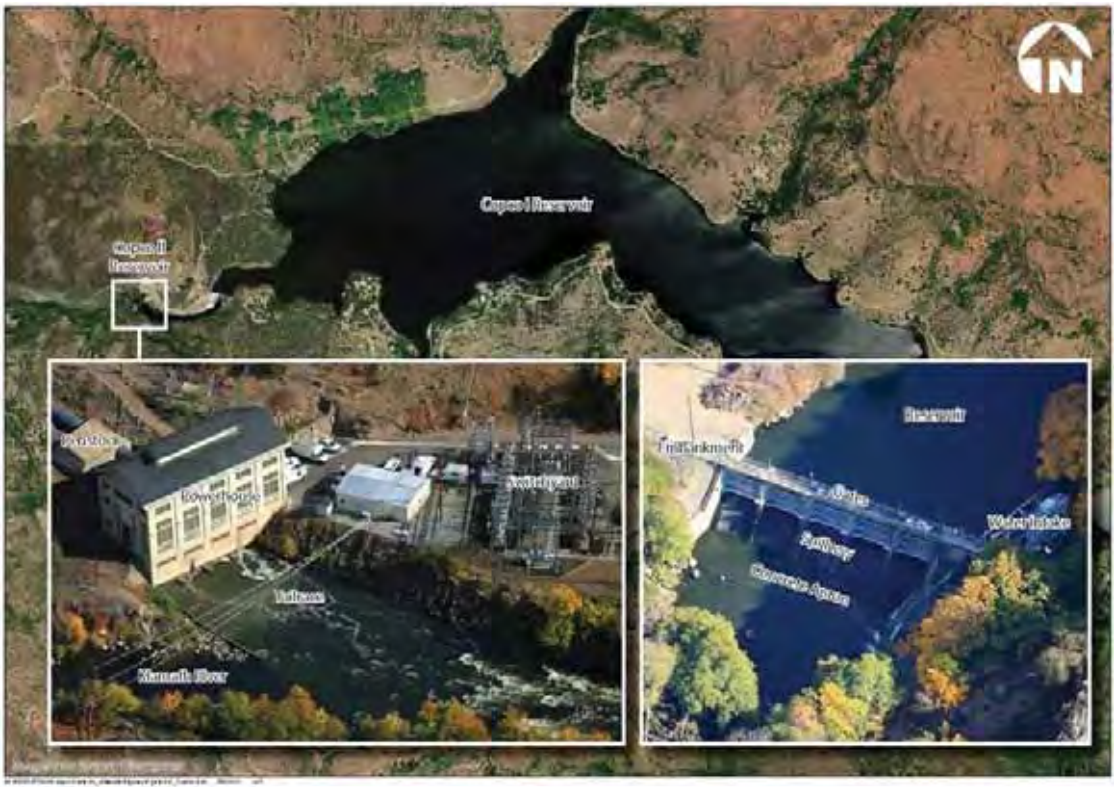

Figure ES-5. Copco 2 Powerhouse (left photo) and Dam.

Figure ES-6. Iron Gate Dam, Reservoir, and Power Generating Facilities.

ES.3 Environmental Review

As described above, this EIS/EIR is being prepared in compliance with NEPA and CEQA. The DOI is Lead Agency under NEPA, and the CDFG is Lead Agency under CEQA. DOI and the CDFG are referred to together in this EIS/EIR as the Lead Agencies. The Purpose and Need for the Proposed Action (NEPA) and the Project Objectives (CEQA) are described below, and together form the basis for alternatives development and impact analysis considered in this EIS/EIR.

NEPA Purpose and Need

The need for the Proposed Action is to advance restoration of the salmonid fisheries in the Klamath Basin consistent with the KHSA and the connected KBRA. The purpose is to achieve a free flowing river condition and full volitional fish passage as well as other goals expressed in the KHSA and KBRA. By the terms of the KHSA, the Secretary will determine whether the Proposed Action is appropriate and should proceed. In making this determination, the Secretary will consider whether removal of the Four Facilities will advance the restoration of the salmonid fisheries of the Klamath Basin, and is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and Tribes.

CEQA Project Objectives

As required by CEQA, a Lead Agency must identify the objectives sought by the proposed project. For this project, CDFG as Lead Agency has identified the following objectives:

1. Advance restoration of the salmonid fisheries in the Klamath Basin.
2. Restore and sustain natural production of fish species throughout the Klamath Basin in part by restoring access to habitat currently upstream of impassable dams.
3. Provide for full participation in harvest opportunities for sport, commercial, and tribal fisheries.
4. Establish reliable water and power supplies, which sustain agricultural uses and communities and NWRs.
5. Improve long-term water quality conditions consistent with designated beneficial uses.
6. Contribute to the public welfare and the sustainability of Klamath Basin communities.
7. To be consistent with the goals and objectives of KHSA and KBRA.

ES.4 Klamath Settlement Agreements

ES.4.1 Klamath Hydroelectric Settlement Agreement

The KHSA establishes the process for additional studies, the development of a Detailed Plan for dam removal and environmental review to support the Secretary's Determination[4] as to whether removal of the Four Facilities on the Klamath River that are owned by PacifiCorp will accomplish the following two goals: 1) to advance restoration of the salmonid fisheries of the basin, and 2) be in the public interest, which includes, but is not limited to, consideration of the potential impacts on affected local communities and Indian Tribes.

The KHSA also includes provisions for the interim operation of the Four Facilities by PacifiCorp and the process to transfer, decommission, and remove the dams in the event of an Affirmative Determination.

ES.4.2 Klamath Basin Restoration Agreement

Concurrently with the signing of the KHSA, the same Parties, with the exception of the Federal Government and PacifiCorp, signed an accompanying agreement—the KBRA. The KBRA includes interrelated plans and programs intended to benefit fisheries throughout the basin,

Secretarial Determination and Connected Actions

If the Secretary publishes an Affirmative Determination, and the Governors of Oregon and California concur, the process for facilities removal will proceed. The Secretary will also concurrently designate the dam removal entity. The dam removal entity, once identified, would refine the Detailed Plan to create a Definite Plan for Facilities Removal including the methods for removal and estimated costs.

In addition to the decommissioning and removal of the four hydroelectric dams, actions connected to an Affirmative Determination would include the transfer of Keno Dam ownership from PacifiCorp to DOI, Eastside/Westside Facilities, and the KBRA.

An Affirmative Secretarial Determination and Federal authorizing legislation are two early key milestones towards full implementation of the KBRA.

A Negative Determination would be a potential termination event for the KHSA and facilities removal would likely not proceed as per the KHSA. The FERC relicensing process would continue.

[4] As defined in the KHSA, there are two different determinations on removal of the Four Facilities that the Secretary could reach: 1) Affirmative Determination: A determination by the Secretary under Section 3 of the KHSA that Facilities Removal should proceed; and, 2) Negative Determination: A determination by the Secretary under Section 3 of the KHSA that Facilities Removal should not proceed. The Secretary bases his determination on whether the conditions of Section 3.3.4 of the KHSA have been met and whether, in his judgment, Facilities Removal will accomplish the two goals stated above in Section ES.2.1. In the event of an Affirmative Determination, California and Oregon each shall provide Notice to the Secretary and other Parties as to whether the State concurs with the Affirmative Determination. In its concurrence, each State shall consider whether: 1) significant impacts identified in its environmental review can be avoided or mitigated as provided under State law; and 2) Facilities Removal will be completed within the State Cost Cap (KHSA Section 3.3.5A). If the Secretary determines not to proceed with Facilities Removal, the KHSA terminates unless the Parties agree to a cure for this potential termination event (KHSA Section 3.3.5B).

water and power users in the Upper Klamath Basin, counties, Indian Tribes, and basin communities. The KBRA brought many parties together to support one another's efforts to restore fisheries in the Klamath Basin and provide for sustainable communities and National Wildlife Refuges.

Implementation of the KBRA is intended to accomplish the following:

1. Restore and sustain natural fish production and provide for full participation in ocean and river harvest opportunities of these fish.

2. Establish reliable water and power supplies for agricultural uses, communities, and National Wildlife Refuges (NWRs).

3. Contribute to public welfare and sustainability of all communities through reliable water supply; affordable electricity; programs to offset potential property tax losses and address economic development issues in counties; and efforts to support tribal fishing and long-term economic self-sufficiency.

The key negotiated outcomes of the KBRA include reciprocal agreements under which the Klamath, Karuk, and Yurok Tribes would not exercise water right claims that would conflict with water deliveries to Reclamation's Klamath Project water users; and project water users accept a limitation on diversions from Upper Klamath Lake and Klamath River and develop a program that will allow them to operate within those limitations through the use of other supplies, efficiency measures, voluntary reductions in demand, and other measures. As a result, there would be more support for fisheries restoration programs, greater certainty about water deliveries at the beginning of each growing season, and agreement and assurances that certain of the parties will work collaboratively to resolve outstanding water-right contests pending in the Oregon Klamath Basin Adjudication. In addition, the KBRA includes an Off-Project voluntary Water Use Retirement Program in the Upper Klamath Basin(the portion of the Klamath Basin located upstream of Iron Gate Dam) three restoration projects intended to increase the amount of water storage in the Upper Klamath Basin, regulatory assurances, county and tribal economic development programs, and tribal resource management programs.

Copies of the KHSA and KBRA in their entirety are available electronically at: http://klamathrestoration.gov/.

ES.5 Alternatives Development

As part of the environmental review process, the Lead Agencies developed a full range of alternatives. A detailed description of this process can be found in this EIS/EIR, Appendix A, titled Final Alternatives Report.

ES.5.1 Public Scoping and Alternatives Identification

The Lead Agencies held seven public scoping meetings in locations around the Klamath Basin to receive input on alternatives and concerns regarding the project purpose, needs and objectives. Written and verbal comments were accepted at each meeting and comments were also received by mail and electronically throughout the scoping period of June 14, 2010, through July 21, 2010. A Scoping Report that summarizes all comments received through July 21, 2010, was published in September 2010 and is available on the project Web site (http://klamathrestoration.gov/) (DOI 2010).

Following the scoping process, the Lead Agencies, along with the cooperating and responsible agencies, identified a wide range of alternatives that represent diverse viewpoints and needs, including alternatives suggested during the EIS/EIR public scoping process. This resulted in a set of 18 potential alternatives to be considered for detailed analysis (the initial list of action alternatives is described in Appendix A, Final Alternatives Report). The Lead Agencies applied a screening process to the 18 potential alternatives to determine which alternatives should move forward for further analysis. In order to determine which alternatives met all or most of the purpose and need/ project objectives, and were potentially feasible, specific screening considerations were created based on NEPA (40 CFR Part 1502.14(a)) and CEQA guidance (CEQA Guidelines, §15126.6 (a)). Under CEQA, alternatives do not need to meet all of the project objectives; alternatives should be included if they can meet most of the objectives and avoid or substantially lessen significant environmental impacts of the project. Figure ES-7 illustrates the process that the Lead Agencies conducted to identify and screen alternatives and to select alternatives for more detailed analysis.

Figure ES-7. Alternatives Development and Screening Process.

After the process of initial alternative screening, four action alternatives in addition to the No Action/No Project Alternative (Alternative 1) were selected to move forward for more detailed analysis in the EIS/EIR. Alternatives 2 and 3, the Proposed Action and Partial Facilities Removal, both fully meet the purpose and need/project objectives. While Alternative 4, Fish Passage at Four Dams and Alternative 5, Remove Copco 1 and Iron Gate Dams, Construct Fish Passage at J.C. Boyle and Copco 2 Dams, do not fully meet the purpose and need/project objectives, both alternatives were moved forward to the EIS/EIR for further review because at the time of developing a reasonable range of alternatives the Lead Agencies recognized the potential for Alternatives 4 and 5 to have fewer short-term adverse environmental impacts than the Proposed Action. Consideration of these alternatives would give the Secretary a reasonable range of alternatives to inform a Secretarial Determination. Analysis of these alternatives will

provide the Secretary with information needed to make a decision, and potentially to mix and match elements of the alternatives, if needed, to create an alternative that would reduce environmental impacts and increase environmental benefits.

ES.6 Alternatives Receiving Full Analysis in the EIS/EIR

The EIS/EIR analyzes five alternatives in detail, including the No Action/No Project Alternative.

ES.6.1 Alternative 1 - No Action/No Project Alternative

NEPA requires an EIS to "include the alternative of no action" (40 CFR Part 1502.14(d)). CEQA requires an EIR to include a No Project Alternative. CEQA Guidelines Section 15126.6(e)(2) states that "The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." For the Klamath Facilities Removal EIS/EIR, NEPA's No Action Alternative and CEQA's No Project Alternative describe the same conditions, and this alternative is referred to as the No Action/No Project Alternative.

The No Action/No Project Alternative represents the state of the environment without the Proposed Action or any of the alternatives. For the purposes of this analysis, the No Action/No Project Alternative will continue current operations with the Four Facilities remaining in place and PacifiCorp operating under the current annual license. The existing license has no requirements for additional fish passage or implementation of the agencies' mandatory prescriptions and conditions that are currently before FERC in the relicensing process. PacifiCorp would continue to coordinate with Reclamation to operate the Klamath Hydroelectric Project in compliance with the existing NOAA Fisheries Service and USFWS biological opinions issued for Reclamation's Klamath Project Operation Plan. PacifiCorp would also continue to fund the operation of the Iron Gate Hatchery under its current operations.

The KBRA is not included in the No Action/No Project Alternative. However, the No Action/No Project Alternative would include the ongoing resource management activities (these actions are described in further detail in Chapter 2 of this EIS/EIR). These resource management actions were started or were under consideration before the KBRA was developed and will move forward at some level even without the KBRA.

The No Action/No Project Alternative also includes "reasonably foreseeable actions" that are independent of FERC licensing and are expected to occur throughout the period of analysis (2012 to 2061). Reasonably foreseeable actions include full implementation of the Total Maximum Daily Load (TMDL) provision of the Clean Water Act (Section 303(d)) issued by the Oregon Department of Environmental Quality (ODEQ) and

California North Coast Regional Water Quality Control Board (CNCRWQCB) for impaired water bodies. There are currently nine TMDLs established in the Klamath Basin (see Section 3.2.2.4). Under the No Action/No Project Alternative, full attainment of these TMDLs would result in long-term water quality improvements in the basin; however, implementation mechanisms, funding, and timing are currently unknown

The ongoing resource management activities, TMDLs, Interim Measures, biological opinions, and other regulatory conditions described for this alternative would also occur under Alternatives 2, 3, 4, and 5.

ES.6.2 Alternative 2 - Full Facilities Removal of Four Dams (Proposed Action)

The Full Facilities Removal of Four Dams Alternative (the Proposed Action) includes the removal of the Four Facilities during a 20-month period which includes an 8-month period of site preparation and partial drawdown at Copco 1 and a 12-month period for full reservoir drawdown and removal of the Four Facilities. This alternative would include the complete removal of the dams, power generation facilities, water intake structures, canals, pipelines, ancillary buildings, and dam foundations to create a free-flowing river. Preparation for dam removal would begin in May 2019 for Iron Gate Dam and June 2019 for Copco 1 Dam. Deconstruction efforts for the J.C. Boyle and Copco 2 Facilities would commence after January 1, 2020, and all four dams would be completely removed by December 31, 2020. This alternative would include implementation of the KBRA and the transfer of Keno Dam to DOI as connected actions. Figure ES-8 illustrates what full facilities removal would look like at Iron Gate Dam.

Figure ES-8. Simulation of Iron Gate Dam Before and After Full Facilities Removal.

ES.6.2.1 KBRA

The KBRA is being analyzed in this EIS/EIR as a connected action to the Proposed Action. Full implementation of the KBRA and the KHSA is dependent on an Affirmative Determination.

Table ES-2 provides a summary of KBRA programs. The programs with sufficient detail to investigate for potential environmental effects are analyzed in this EIS/EIR. These programs include the following (a more detailed description of the approach to analysis of the KBRA is in Section 3.1 of this EIS/EIR):

ES.6.2.1.1 Fisheries Program

The Fisheries Program includes habitat restoration throughout the basin; a fisheries reintroduction and management plan; a fisheries monitoring plan; and actions intended to improve flow conditions and water quality for fish. Full attainment of the TMDLs described under the No Action/No Project Alternative would result in long-term water quality improvements in the basin and implementation of the KBRA is anticipated to accelerate these TMDLs.

ES.6.2.1.2 Water and Power Programs

The Water and Power Programs include an

Table ES-2. KBRA Program Summary

Fisheries Program:
Fish Habitat Restoration Activities[1]
Fisheries Restoration Phase I Plan
Fisheries Restoration Phase II Plan
Fisheries Reintroduction Plan – Phase I, Oregon
Fisheries Reintroduction Plan – Phase II, Oregon
Fisheries Reintroduction Plan – California
Fisheries Monitoring Plan
Additional Water Storage Projects:
Williamson River Delta Project
Agency Lake and Barnes Ranches Project
Wood River Wetland Restoration Project
Future Storage Opportunities[2]
Water and Power Programs:
Water Diversion Allocations for Reclamation's Klamath Project and National Wildlife Refuges[3]
Groundwater Technical Investigations
On-Project Plan
Water Use Retirement Program
Off-Project Water Settlement
Off-Project Reliance Program
Power for Water Management Program
Drought Plan
Emergency Response Plan
Climate Change Assessment
Environmental Water Management[4]
Interim Flow and Lake Level Program
Regulatory Assurances Programs:
Fish Entrainment Reduction
General Conservation Plan or Habitat Conservation Plan
County and Tribal Programs:
Klamath County Economic Development Plan
California Water Bond (Siskiyou County Economic Development Funding)
Tribal Programs Fisheries and Conservation Management
Tribal Programs Economic Revitalization
Mazama Forest Project
Klamath Tribes Interim Fishing Site

Notes:

1. While on-going fish habitat restoration activities are not part of the Proposed Action because they are conducted under current authorities and funding levels, the scope of these activities would be increased in magnitude and accelerated through implementation of the KBRA. Habitat restoration under the Proposed Action would be guided by the Fisheries Restoration Plan to be developed under the KBRA.
2. Development of additional storage is also intended to restore habitats for endangered suckers, and would occur with implementation of KBRA and associated funding.
3. During the Interim Period, water diversion limitations to Reclamation's Klamath Project water users would conform to the limits described in the Diversion Limitations section as closely as possible. However, before full implementation of the On-Project Plan, it might not be possible to fully comply with the diversion limitations in all years.
4. The Environmental Water Management program would support the development and implementation of TMDLs on the Klamath River and actions that protect water quality generally (KBRA Section 20.5.4).

agreement regarding limitations on water diversions to Reclamation's Klamath Project, and delivery commitments for Tule Lake and Lower Klamath Lake NWRs. The programs also include a voluntary Water Use Retirement Program in the Upper Basin to increase inflow into Upper Klamath Lake and to provide a basis for further efforts among certain parties to work collaboratively for more reliable sources of water for fish harvests and agriculture. Additionally, there are agreements and assurances to resolve outstanding water right contests in the Oregon Klamath Basin Adjudication process.

ES.6.2.1.3 County and Tribal Programs

County and tribal programs include economic development for local governments and tribes; regulatory assurances that adverse impacts on local communities would be minimized; and tribal fisheries and natural resource conservation.

ES.6.3 Alternative 3 - Partial Facilities Removal of Four Dams

The Partial Facilities Removal of Four Dams Alternative would include removal of enough of each dam to allow free-flowing river conditions and volitional fish passage for all Klamath River anadromous species at all times. Under this alternative, portions of each dam facility would remain in place, including ancillary buildings and structures such as powerhouses, foundations, tunnels, and pipes. Some of these remaining features would require perpetual maintenance and security measures to prevent unauthorized entry and safety hazards. All tunnel openings would be sealed and all potentially hazardous materials found in powerhouses and machinery would be removed prior to final decommissioning and securing of buildings.

The schedule for Partial Facilities Removal of Four Dams would be the same as for the Proposed Action (the Full Facilities Removal of Four Dams Alternative). The Partial Facilities Removal of Four Dams Alternative also includes the connected actions of the transfer of Keno Dam to DOI and implementation of the KBRA (as in the Proposed Action).

Under Alternative 3, full attainment of the TMDLs, as described under the Proposed Action would result in long-term water quality improvements in the basin; implementation of the KBRA is anticipated to accelerate these TMDLs through the provision of environmental water (KBRA Section 20.5.4) and other KBRA programs.

ES.6.4 Alternative 4 - Fish Passage at Four Dams

The Fish Passage at Four Dams Alternative would include construction of fish passage facilities at each of the Four Facilities. This alternative would retain all hydropower generating facilities and operations; although it is assumed that operations would change in response to DOI mandatory flow conditions and the NOAA Fisheries Service and DOI fishway prescriptions. The Lead Agencies used the prescriptions developed during the FERC relicensing process to describe the facilities needed to achieve fish passage and required flow conditions. The prescriptions also included flow and operational requirements that are included in this alternative. For the purposes of analysis in this

EIS/EIR, however, Alternative 4 has been developed with some assumptions regarding details and feature designs for purposes of this analysis that are not included or not yet determined for the fishway prescriptions and do not reflect any final decision by NOAA Fisheries Service or USFWS regarding any differences from the express text of the fishway prescriptions or how any decision may be made under the terms of the fishway prescriptions. Figure ES-9 shows an example of a cast-in-place pool and weir fish ladder that is similar to that proposed for upstream fish passage at all four dams under this alternative. Typical downstream passage would include screening the fish away from the intake structures for the power generation facilities and the spillway modifications (if they are unsuitable for downstream passage).

Figure ES-9. Example of Cast-In-Place Pool and Weir Fish Ladder.

Implementation of this alternative would require licensure of the project by FERC to a Hydropower Licensee including 401 certifications. To meet essential flows in the bypass reaches, less water would pass through the power generating facilities than under current conditions, reducing power production. In addition, this alternative would result in restricted project ramping rates and would only allow peaking one day per week.

The Fish Passage at Four Dams Alternative would not satisfy the conditions in the KHSA. Consequently, it is assumed that the KBRA and the Keno Dam Transfer would not be fully implemented. For the purposes of this analysis, alternatives that would not result in full implementation of the KHSA do not include the KBRA as a connected action to the alternative. Additionally, the transfer Keno Dam to DOI would not move forward as a connected action.

This alternative would follow the schedule prescribed in the FERC relicensing process. The prescriptions include a schedule for implementation and prescribe that downstream facilities be installed prior to upstream passage facilities (DOI and NOAA Fisheries Service 2007). Table ES-3 shows the schedule for construction of the fish passage facilities at each dam, based on these constraints.

Under Alternative 4, full attainment of the TMDLs described under the No Action/No Project Alternative would result in long-term water quality improvements in the basin; but, the pace of achieving these improvements and the implementation mechanisms are unknown.

Table ES-3. Timetable for Fish Passage Improvements at each Dam from Date of FERC License Renewal

Dam	Upstream Fish Passage	Spillway Modifications[1]	Tailrace Barrier[1]	Screens and Bypass
J.C. Boyle	4 years	4 years	4 years	4 years
Copco 1	6 years	6 years	8 years	6 years
Copco 2	6 years	6 years	8 years	6 years
Iron Gate	5 years	5 years	N/A	5 years

Key:
N/A: Not Applicable
Notes:
1. The prescriptions require studies to determine the need for and design of spillway modifications and tailrace barriers. The modified prescriptions provide that the applicant is allowed to perform site-specific studies to determine if spillway modifications and tailrace barriers are necessary at the developments where these are prescribed. However, the modified prescriptions provide that spillway modifications and tailrace barriers shall be constructed and operated unless and until USFWS and NOAA Fisheries Service determine based on any such site-specific studies that any prescribed spillway modifications or tailrace barriers are unnecessary.

ES.6.5 Alternative 5 - Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate

The Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative includes the full removal of the Iron Gate and Copco 1 facilities and installation of upstream and downstream fish passage facilities at both the J.C. Boyle and Copco 2 Dams. Implementation of this alternative would provide fish passage while retaining some hydropower generation capacity, and would improve water quality (specifically, dissolved oxygen, water temperatures, and algal toxins) through removal of the two largest reservoirs. To meet essential flows in the bypass reaches, less water would pass through the power generating facilities at the J.C. Boyle and Copco 2 developments and power production would be reduced as compared to current conditions.

Similar to the Fish Passage at Four Dams Alternative, the Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would incorporate most of the DOI and NOAA Fisheries Service prescriptions from the FERC relicensing process related to fish passage at J.C. Boyle and Copco 2 Dams (see Attachment B of Appendix A for a list of conditions and prescriptions). Alternative 5 would not incorporate the conditions and prescriptions related to peaking power at J.C. Boyle and recreation releases. In Alternative 5, Copco 2 Dam would be the only dam remaining downstream from J.C. Boyle Dam. Copco 2 Reservoir is very small, and does not have adequate capacity to reregulate flows associated with peaking operations so that they are suitable for fish downstream. Therefore, Alternative 5 would not include peaking operations or recreation releases on any days at J.C. Boyle Dam.

Implementation of this alternative would require licensure by FERC, including 401 certifications, for the facilities that will continue to generate power. The Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would not satisfy the purposes of the KHSA to restore free flowing river conditions. Consequently, it is

assumed in this analysis that the KBRA and Keno Dam Transfer would not be fully implemented. This alternative would follow a schedule similar to that of the Proposed Action, and could be completed by December 2020.

Under Alternative 5, full attainment of these TMDLs would result in long-term water quality improvements in the basin; but, the pace of achieving these improvements and the implementation mechanisms are unknown.

ES.7 Effects of the No Action/No Project, Proposed Action, and Action Alternatives

This section describes the significant and unavoidable adverse impacts under NEPA and CEQA; provides a comparison of the beneficial effects under each of the alternatives; presents the environmentally preferable/superior alternative; and, summarizes the major controversies and issues raised by agencies and the public.

ES.7.1 Significant Environmental Effects that Cannot be Avoided

Significant environmental effects that cannot be avoided by redesigning the project, changing the nature of the project, or implementing mitigation measures must be disclosed in an EIS/EIR. CEQA Guidelines (Section 15126.2 (b)) require discussion of significant environmental effects that cannot be avoided, as well as significant environmental effects that can be mitigated but not reduced to an insignificant level. NEPA regulations also require a discussion of any adverse impacts that cannot be avoided as a result of the Proposed Action (40 Code of Federal Regulations Part 1502.16). By satisfying the CEQA requirements on discussion of significant environmental effects that cannot be avoided, the NEPA requirement to disclose adverse impacts is also met. These impacts are summarized in Table ES-4 for the purposes of NEPA and CEQA.

Several categories of resources discussed in this EIS/EIR are analyzed pursuant only to NEPA. The adverse environmental effects specific only to NEPA that cannot be avoided as a result of the Proposed Action are summarized in Table ES-5.[5]

A full listing of all impacts, including those that can be reduced to a less than significant level, is presented in Chapter 5 of this EIS/EIR.

The specific approach used to evaluate environmental effects of each alternative relative to each environmental resource is explained in Section 3.1 and in the resource sections throughout Chapter 3.

[5] Effects relative to tribal trust resources are not displayed in this table given that no new adverse effects were identified relative to the alternatives analyzed in this EIS/EIR. Section 3.12, Tribal Trust, of this EIS/EIR does, however, summarize the existing and ongoing tribal trust impacts present in the Klamath Basin.

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.2 Water Quality				
Suspended Sediments				
Upper Klamath Basin (in the Hydroelectric Reach)				
Draining the reservoirs and release of sediment could cause short-term increases in suspended material in the Hydroelectric Reach downstream from J.C. Boyle Dam.	2, 3, 5	S (short term[1])	None	S (short term)
Lower Klamath Basin				
Draining the reservoirs and release of sediment could cause short-term increases in suspended material in the Lower Klamath River and the Klamath Estuary.	2, 3, 5	S (short term)	None	S (short term)
Dissolved Oxygen				
Upper Klamath Basin				
Draining the reservoirs and release of sediment could cause short-term increases in oxygen demand (Immediate Oxygen Demand [IOD] and Biological Oxygen Demand [BOD]) and reductions in dissolved oxygen in the Hydroelectric Reach downstream from J.C. Boyle Reservoir.	2, 3, 5	S (short term)	None	S (short term)
Lower Klamath Basin				
Dam removal and sediment release could cause short-term increases in oxygen demand (Immediate Oxygen Demand [IOD] and Biological Oxygen Demand [BOD]) and reductions in dissolved oxygen in the lower Klamath River, the Klamath Estuary, and the marine nearshore environment.	2, 3, 5	S (short term) lower Klamath River from Iron Gate Dam to Clear Creek	None	S (short term) lower Klamath River from Iron Gate Dam to Clear Creek

[1] Short term is defined as <2 years.

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.3 Aquatic Resources				
Critical Habitat				
Reservoir drawdown associated with dam removal could alter the quality of critical habitat.	2, 3, 5	S (short term) for coho	None	S (short term) for coho
Essential Fish Habitat				
Reservoir drawdown associated with dam removal could alter the quality of EFH.	2, 3, 5	S (short term) Chinook and coho	None	S (short term) for Chinook and coho
Species Impacts				
Coho Salmon				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect coho salmon.	2, 3, 5 (would only remove Copco 1 and Iron Gate)	S (short term) Upper Klamath River, Mid-Klamath River, Shasta River, and Scott River population units	AR-1: Protection of mainstem spawning; AR-2: Protection of outmigrating juveniles; AR-3: Fall flow pulses; AR-4: Hatchery management	S (short term) Upper Klamath River, Mid-Klamath River, Shasta River, and Scott River population units
Steelhead				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect steelhead in the short term.	2, 3, 5	S (short term) summer and winter steelhead	AR-1: Protection of mainstem spawning; AR-2: Protection of outmigrating juveniles; AR-3: Fall flow pulses; AR-4: Hatchery management	S (short term) summer and winter steelhead
Pacific Lamprey				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect Pacific lamprey in the short term.	2, 3, 5	S (short term)	AR-2: Protection of Outmigrating Juveniles; AR-5: Pacific lamprey capture and relocation.	S (short term)
Green Sturgeon				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect green sturgeon.	2, 3, 5	S (short term)	AR-3: Fall flow pulses	S (short term)

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
Freshwater mussels				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect freshwater mussels in the short term.	2, 3, 5	S (short term)	AR-7: Freshwater mussel relocation	S (short term)
Benthic Macroinvertebrates				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect macroinvertebrates below Iron Gate.	2, 3, 5	S (short term)	None	S (short term)
3.4 Algae				
Hydroelectric Reach				
Conversion of the reservoir areas to a free-flowing river, and the elimination of hydropower peaking operations could cause long-term increases in nutrient levels and biomass of nuisance periphyton in low-gradient channel margin areas within the Hydroelectric Reach downstream from J.C. Boyle Dam.[2]	2, 3, 5 [3]	S (long term[4])	None	S (long term)

[2] Periphyton are algae that grow attached to rocks and other substrates on a riverbed. Although sometime these species cause nuisance conditions, they are rarely considered toxic. Increased non-toxic periphyton biomass would not lead to increases in algal toxins in the Klamath River. Blooms of phytoplankton (suspended algae) occurring in the calm, lake-like waters are responsible for the production of algal toxins, such as microcystin, in the Klamath River downstream from Iron Gate Dam. Noxious phytoplankton would not thrive in the free flowing river following dam removal.

[3] An editorial clarification was made to this determination for Alternative 5 in Section 3.4, Algae. As indicated by the analysis under the Proposed Action in Section 3.4, Algae, the determination for Alternative 5 in the Hydroelectric Reach from Copco 1 Reservoir to Iron Gate Reservoir should also have been a significant effect.

[4] Long term is defined as 2-50 years.

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.9 Air Quality				
Vehicle exhaust and fugitive dust emissions from dam removal activities could increase emissions of VOC, NOx, CO, SO_2, PM_{10}, and $PM_{2.5}$ to levels that could exceed Siskiyou County's thresholds of significance.	2, 3	S (short term)	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S (short term)
KBRA – Programmatic Measures				
Construction activities associated with the KBRA programs could result in temporary increases in air quality pollutant emissions from vehicle exhaust and fugitive dust.	2, 3	S(short term)	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S[5] (short term)
Operational activities associated with the Fisheries Reintroduction and Management Plan could result in temporary increases in air quality pollutant emissions from vehicle exhaust associated with trap-and-haul activities.	2, 3	S(short term)	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S (short term)
3.10 Greenhouse Gases/Global Climate Change				
Removing or reducing a renewable source of power by removing the dams or developing fish passage could result in increased GHG emissions from possible non-renewable alternate sources of power.	2, 3, 4, 5	S(long term)	CC-1: Market Mechanisms); CC-2: Energy Audit Program; and CC-3: Energy Conservation Plan	S(long term)

[5] While Mitigation Measures AQ-1, 2, and 3 would be implemented to reduce impacts to LTS, emissions from any construction actions completed in the same year as hydroelectric facility removal actions may not be reduced to a less than significant level. Implementation of specific plans and projects described in the KBRA will require future environmental compliance as appropriate.

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.13 Cultural and Historic Resources				
Dam removal and construction of fish passage facilities could result in direct effects/impacts to J.C. Boyle Dam, Copco 1 Dam, Copco 2 Dam, and Iron Gate Dam, their associated hydroelectric facilities, and on the KHHD, which is considered eligible for inclusion on the National Register and California Register.	2, 3, 4, 5	S(long term)	CHR-1: Update the Klamath Hydroelectric Project Request for Determination CHR-2: MOU Under Section 106 and Preparation of Monitoring and Cultural Resources Management Plan CHR-3: Respect and Maintain Confidentiality of Sensitive Information CHR-4:Treatment of Indian Human Remains	S(long term)
KBRA – Programmatic Measures				
Implementation of the KBRA programs including the Phase 1 and 2 Fisheries Restoration Plans, Fisheries Reintroduction and Management Plan, Wood River Wetland Restoration Project, On-Project Plan, Water Use Retirement Program, Fish Entrainment Reduction, Klamath Tribes Interim Fishing Site, and Mazama Forest Project could result in impacts/effects to archaeological and historic sites, TCPs, and cultural landscapes that are eligible for inclusion on the National Register and/or California Register and possibly Indian human remains.	2, 3	S(long term)	CHR-1: Update the Klamath Hydroelectric Project Request for Determination CHR-2: MOU Under Section 106 and Preparation of Monitoring and Cultural Resources Management Plan CHR-3: Respect and Maintain Confidentiality of Sensitive Information CHR-4:Treatment of Indian Human Remains	S[6] (long term)
3.19 Scenic Quality				
Ongoing fish habitat restoration actions could result in short-term impacts on scenic resources.	1	S (short term)	None	S (short term and long term)
The removal of historic structures could result in short and long-term impacts on scenic resources.	2, 3, 5	S(short term and long term)	None	S(long term)

[6] Studies will be conducted to identify cultural resources and reduce significant impacts to these resources. Implementation of specific plans and projects associated with the KBRA will require future environmental compliance as appropriate.

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
Dam removal could result in short and long-term impacts on scenic resources in formerly inundated reservoir areas.	2, 3, 5	S (short term and long term)	None	S (short term and long term)
Deconstruction and restoration activities could result in short-term impacts on scenic resources in the immediate vicinity of the Four Facilities.	2, 3, 5	S (short term)	None	S (short term)
Replacement of the existing wooden Lakeview Bridge just downstream from Iron Gate Dam with a concrete bridge could result in short -term impacts on scenic resources.	2, 3	S (short term)	None	S (short term)
Demolition of existing recreation facilities, such as campgrounds and boat ramps, from the reservoir banks to the new river shoreline would result in short-term impacts on scenic resources.	2, 3	S (short term)	None	S (short term)
Sediment release during dam and reservoir removal could cause temporary changes in water quality and the appearance of the Klamath River in the area of the dams and downstream from Iron Gate Dam.	2, 3, 5	S (short term)	None	S (short term)
Demolition, construction, and restoration activities for the fishways could cause short-term adverse effects on the scenic vistas in the immediate vicinity of the Four Facilities.	4, 5	S (short term)	None	S (short term)
Fishways could cause substantial long-term impacts on scenic resources.	4, 5	S (long term)	SQ-1: Measures to Minimize Scenery Disturbances	S (long term)
City of Yreka Water Supply Pipeline Relocation – Programmatic Measure				
Construction of a new, elevated City of Yreka water supply pipeline and steel pipeline bridge to support the pipe above the Klamath River could result in short and long-term impacts on scenic resources.	2, 3, 5	S (short term and long term)	SQ-1: Measures to Minimize Scenery Disturbances	S (short term and long term)
KBRA – Programmatic Measures				
Construction of fish management structures would introduce new features into the landscape.	2, 3	S (long term)	SQ-1: Measures to Minimize Scenery Disturbances	S (long term)
Trap and Haul – Programmatic Measure				
Construction activities associated with fish collection facilities would introduce new features into the landscape.	4, 5	S (long term)	SQ-1: Measures to Minimize Scenery Disturbances	S (long term)

Table ES-4. Summary of Significant Environmental Effects that Cannot be Avoided Relative to CEQA and NEPA

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.20 Recreation				
Changes in flows could decrease the number of days with acceptable flows for whitewater boating and recreational fishing in the Hells Corner Reach.	2, 3, 4, 5	S (long term) whitewater boating	None	S (long term) whitewater boating
3.23 Noise and Vibration				
Construction and deconstruction activities at the dam sites could cause a temporary increase in noise levels at Copco 1 Dam that could affect residents in the area.	2, 3, 5	S (short term)	NV-1: Noise and Vibration Control Plan	S (short term)
Construction and deconstruction activities at the dam sites could cause a temporary increase in nighttime noise levels at Iron Gate Dam.	2, 3, 5	S (short term)	NV-1: Noise and Vibration Control Plan	S (short term)
Reservoir restoration activities could result in short-term increases in noise levels in the project vicinity.	2, 3, 5	S (short term)	NV-1: Noise and Vibration Control Plan	S (short term)
Blasting activities at Copco 1 Dam could increase vibration levels.	2, 3, 5	S (short term)	NV-1: Noise and Vibration Control Plan	S (short term)
Construction activities at the dam sites could increase short-term vibration levels.	2, 3,5	S (short term)	NV-1: Noise and Vibration Control Plan	S (short term)

Key:
BLM = Bureau of Land Management
BOD = biological oxygen demand
CEQA = California Environmental Quality Act
CO = carbon monoxide
DOC = United States Department of Commerce
DOI = Department of the Interior
DRE = Dam Removal Entity
EFH = Essential Fish Habitat
FERC = Federal Energy Regulatory Commission
GHG = Greenhouse Gases
IOD = immediate oxygen demand
KBRA = Klamath Basin Restoration Agreement
KHHD= Klamath Hydroelectric Historic District
KHP = Klamath Hydroelectric Project
MSAE = Microcystis aeruginosa
NAGPRA = Native American Graves Protection and Repatriation Act
ODEQ = Oregon Department of Environmental Quality
PM_{10} = particulate matter < 10 microns
$PM_{2.5}$ = particulate matter < 2.5 microns
SO_2= sulfur dioxide
SSC = suspended sediment concentrations
TN = Total Nitrogen
TP = Total Phosphorus
USFWS = United States Fish and Wildlife Service
VOC = volatile organic compounds
VRM = Visual Resource Management Methodology
WQ = Water quality
WSR = Wild and Scenic River
Significance:
NCFEC = No Change From Existing Conditions
B = Beneficial
LTS = Less than Significant
S = Significant
N/A = Not Applicable
Alternatives:
1 = No Action/No Project
2 = Full Facilities Removal of Four Dams Alternative (Proposed Action)
3 = Partial Facilities Removal of Four Dams Alternative
4 = Fish Passage at Four Dams Alternative
5 = Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative

Table ES-5. Summary of Adverse Environmental Effects Relative to NEPA

Potential Impact	Alternative(s)	Effect Pursuant to NEPA	Mitigation
3.15 Socioeconomics			
Four Facilities			
Changes in annual O&M expenditures required to continue the operation of the existing facilities could affect employment, labor income, and output in the regional economy.	2, 3, 5	Adverse(long-term)	None
Recreation			
Changes to reservoir recreation expenditures could affect employment, labor income, and output in the regional economy.	2, 3, 5	Adverse (long-term)	None
Changes to whitewater boating opportunities could affect recreational expenditures and employment, labor income, and output in the regional economy.	2, 3, 4, 5	Adverse (long-term)from reduced whitewater boating expenditures in the Upper Klamath River and Hell's Corner Reach	None
Property Values and Local Government Revenues			
Property values surrounding Iron Gate and Copco Reservoirs could change.	2, 3, 5 (around Copco 1 and Iron Gate Reservoirs)	Adverse (short term and long term)	None
Changes in real estate values around Iron Gate and Copco Reservoirs and downstream could affect property tax revenues to Siskiyou County.	2, 3, 5	Adverse (short term); Unknown (long term)[2]	None
Changes in visitation for recreation activities could affect sales tax revenues.	2, 3	Unknown (short term and long term)	None

[1] Effects relative to tribal trust resources are not displayed in this table given that no new adverse effects were identified relative to the alternatives analyzed in this EIS/EIR. Section 3.12, Tribal Trust, of this EIS/EIR does however summarize the existing and ongoing tribal trust impacts present in the Klamath Basin.

[2] Changes in recreation expenditures and associated sales taxes vary by recreation activity. The net effect of changes in recreation expenditures is unknown.

Table ES-5. Summary of Adverse Environmental Effects Relative to NEPA

Potential Impact	Alternative(s)	Effect Pursuant to NEPA	Mitigation
KBRA – Programmatic Measures			
Increases in on-farm pumping costs could affect household income and reduce employment, labor income, and output in the regional economy.	2, 3	Adverse (long term)	None
Water acquisitions via short-term water leasing could decrease farm revenues and reduce employment, labor income, and output in the regional economy.	2, 3	Adverse (short term)	None
3.16 Environmental Justice			
Increased traffic, air quality emissions, and noise associated with construction activities could disproportionately affect county residents and tribal people.	2, 3, 4, 5	Disproportionate Effects (short term)	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks AQ-4: Dust control measures during blasting operations NV-1: Noise and Vibration Control Plan
Release of sediment from reservoirs could cause disproportionate short term impacts on county residents and tribal people.	2, 3, 5	Disproportionate Effect (short term)	None
Changes in county revenues could decrease county funding of social programs used by county residents.	2, 3, 5	Disproportionate Effects	None
Traffic on associated haul roads could disproportionately affect county residents and tribal people.	2, 3, 4, 5	Disproportionate Effects (short term)	TR-1: Relocate Jenny Creek Bridge and Culverts

Table ES-5. Summary of Adverse Environmental Effects Relative to NEPA

Potential Impact	Alternative(s)	Effect Pursuant to NEPA	Mitigation
KBRA – Programmatic Measures			
Implementation of the Water Use Retirement Program, Off-Project Reliance Program, and Interim Flow and Lake Level Program could disproportionately affect low income and minority farm workers.	2, 3	Disproportionate Effects (short term)	None

KEY:
Significance:
NCFEC = No Change From Existing Conditions
B = Beneficial
LTS = Less than Significant
S = Significant
N/A = Not Applicable
Alternatives:
1 = No Action/No Project
2 = Full Facilities Removal of Four Dams Alternative (Proposed Action)
3 = Partial Facilities Removal of Four Dams Alternative
4 = Fish Passage at Four Dams Alternative
5 = Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative

ES.7.2 Synopsis of Major Impacts and Benefits of the Alternatives

This section presents a synopsis of major impacts and benefits for each alternative with a focus on aquatic resources and water quality. (All of the significant adverse impacts that cannot be avoided for all resource categories are listed in Table ES-4 and Table ES-5). This summary section presents impacts and benefits incrementally to illustrate potential key benefits and impacts that may occur under each alternative. Though impacts to all resources will ultimately be considered by the Secretary of the Interior when making the Determination on whether or not the Proposed Action is in the public interest, this summary focuses on restoring fisheries and improving water quality (fishery and water quality benefits are also summarized in Table ES-6). A synthesis of this information is particularly important to address the question of whether and to what degree an alternative may advance the restoration of the salmonid fisheries of the Klamath Basin and to determine which alternative may be environmentally preferable. In addition, the Affected Environment/Existing Conditions is summarized because it is a valuable point of comparison. (For more detail on each alternative and how alternatives were selected refer to ES.5 Alternatives Development and Chapter 2 Proposed Action and Description of Alternatives).

The structure of the section is as follows:

- Affected Environment/Existing Conditions;
- Alternative 1 (No Action/No Project Alternative);
- Alternative 4 (Fish Passage at Four Dams Alternative);
- Alternative 5 (Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate);
- Alternatives 2 (Full Facilities Removal of Four Dams (Proposed Action)) and 3 (Partial Removal of Four Dams);
- Comparison of Alternative 2 and 3

Under NEPA (40 CFR Part 1502.16, Environmental Consequences), a discussion of the environmental impacts of the alternatives, including the Proposed Action, should be included. A discussion of the potential beneficial effects of the alternatives is also valuable for decisionmakers when comparing and contrasting alternatives and determining the best course of action.

CEQA Guidelines require the balancing, as applicable, of the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve a project (Section 15093 (a)-(c)). If the specific benefits, including region-wide or statewide environmental benefits of a proposed project outweigh the unavoidable adverse environmental effects, the

adverse environmental effects may be considered "acceptable." When a lead agency approves a project which will result in the occurrence of significant effects which are identified, but not avoided or substantially lessened, the lead agency under CEQA shall state in writing the specific reasons to support its action based on the final EIS/EIR or other information in the record. This statement becomes the statement of overriding considerations as required under CEQA.

As illustrated throughout this Executive Summary, many measures agreed upon in the KHSA and KBRA centered on improving and resolving issues of low or declining fish populations and fisheries, inadequate water supplies, and degraded water quality. The primary goal of these agreements is to improve the condition and reliability of these basin resources and thereby benefit the communities who rely on them, or historically depended on them, for a way of life. This includes tribal, fishing, farming, and recreational communities throughout the Klamath Basin.

One example of the inter-relatedness of basin resources and communities can be illustrated by evaluating the impacts and benefits of the alternatives on tribal communities where environmental justice is a concern. Reversing the consequences of barriers to fish passage, degraded fish habitat, and degraded water quality throughout the basin could result in great benefit to tribal communities relying on fish, shellfish, riparian plants, clean water, and other resources for their subsistence, ceremonies, physical health, way of life, and spiritual well-being. While sediment release and other construction related activities during dam removal could cause short-term (1 to 2 years) adverse impacts on fisheries downstream from the Hydroelectric Reach, salmon and other aquatic resources would be expected to return to population levels observed prior to dam removal (in 2010 when the Notice of Preparation was issued) within 5 years, and would provide long-term benefits to Indian Tribes for 50 years and beyond (these effects for Indian Tribes are analyzed in Section 3.16).

Because restoring fisheries, improving water quality, and helping communities are major goals of the Proposed Action and of the action alternatives, the major long-term benefits and impacts of each alternative are summarized below relative to these goals.

ES.7.2.1 Existing Conditions/Affected Environment

The Klamath Basin currently suffers from degraded fisheries, excessive exposure of salmon to disease, degraded habitat quality (including altered flows, water temperatures, river channel structure, and invasive species), blocked access to historical habitat, and degraded water quality (including problems with dissolved oxygen, pH, nutrient enrichment, algal growth, and algal toxins). Major water quality problems exist in Upper Klamath Lake, Keno Impoundment/Lake Ewauna, and the reservoirs in the Hydroelectric Reach, as well as the Lower Klamath Basin downstream from Iron Gate Dam.

Results of these impaired water quality and habitat conditions include fish die-offs, listings under ESA and the California Endangered Species Act (CESA), health advisory postings for algal toxins in Copco 1 and Iron Gate reservoirs since 2005, and commercial fishing closures. Circumstances for salmonid fisheries and threatened and endangered

species in the Klamath Basin are not improving. In addition, basin water supplies are over-allocated and do not meet all user needs; these challenges have been particularly acute in dry years. Water shortages, combined with the need to provide water to address the needs of ESA-listed species (suckers in Upper Klamath Lake and coho salmon in the Klamath River), national wildlife refuges, and farming communities have led to the reduction of irrigation water deliveries to farmers in dry years. In short, existing conditions represent a continued hardship for fishing, farming, tribal, and recreational communities. In particular, the Klamath Tribes have had to bear the hardship of being without salmon in the Upper Basin for nearly 100 years and without harvestable sucker populations for 25 years; these species are fundamental to their diet, their ceremonies, and their cultural well-being.

ES.7.2.2 Alternative 1 (No Action/No Project Alternative)

Alternative 1 (No Action/No Project Alternative) is continued operation of the Klamath Hydroelectric Project under an annual license issued by FERC and would result in the continuation of many of the conditions described under Existing Condition/Affected Environment. This alternative would continue to block anadromous fish access to over 420 miles of historical habitat, including low gradient habitat of critical importance to spawning and rearing under Copco 1 and Iron Gate reservoirs. Also, access to cold water springs (areas of groundwater discharge), particularly in the Upper Basin, would continue to be blocked. These cold water springs offer some protection to aquatic species against the future changes associated with climate change and improve winter growth opportunities for rearing fish. Disease problems associated with crowding of fish below Iron Gate Dam, atypically stable flows, disrupted sediment transport processes, and over-abundance of intermediate hosts for fish disease would persist. Iron Gate hatchery juvenile production as mitigation for 16 miles of habitat loss would continue, but would also exacerbates fish disease. For resident fish in the Hydroelectric Reach, the current adverse effects of peaking and those of entrainment into hydroelectric facilities would continue. Implementation of TMDLs in Oregon and California over the next 50 years would be expected to help alleviate some of basin-wide water quality problems, although the implementation and timing of TMDL-related actions is unknown and effective improvements could take decades to achieve. Furthermore, to date there are no proposed management actions that would achieve the temperature allocations assigned to Copco 1 and Iron Gate reservoirs under the TMDLs. The effects of climate change over the next 50 years could dampen potential benefits from TMDLs, which would continue current conditions responsible for depressed populations of certain species like Chinook or steelhead and would reduce opportunities to improve survival of ESA-listed fish.

As the FERC relicensing process would continue following a Negative Determination on dam removal from the Secretary, Alterative 1 is not likely to continue as the status quo; however, if a new long-term FERC license is issued, it would be contingent on facility operations being compliant with all other applicable laws and regulations, including the Clean Water Act and the Endangered Species Act, making it difficult to predict when a new license might be implemented. For this analysis, the assumption for the next 50 years is that all the dams and the associated reservoirs remain and continue to operate

under annual licenses and without construction of any new fish passage facilities. This would preserve the existing hydroelectric power generation capacity and allow use of reservoirs and peaking flows for recreational purposes (the significance of these effects is analyzed in Sections 3.18 and 3.20, respectively). The recreational value of these reservoirs, however, has been diminished in recent years (since 2005) due to the documented growth of toxic algae in Copco 1 and Iron Gate reservoirs and health advisory postings to that effect, conditions that can be expected to persist in the future without significant progress on nutrient reduction in the reservoirs such as through the TMDL process.

Alternative 1 would not result in the short-term negative impacts related to construction activities or short-term impacts to fish from the downstream transport of sediment during reservoir drawdown. Also Alternative 1 does not include the full implementation of KBRA. The ongoing resource management activities, ongoing Interim Measures, TMDLs, biological opinions, and other regulatory conditions described for this alternative would also occur under Alternatives 2, 3, 4, and 5

ES.7.2.3 Alternative 4 (Fish Passage at Four Dams Alternative)

Alternative 4 would require the long-term licensure of the Hydroelectric Project by FERC to a Hydropower Licensee; although, it is assumed that operations of the Four Facilities would change in response to DOI mandatory flow conditions and NOAA Fisheries Service and DOI fishway prescriptions. Alternative 4 would eventually result in the same benefits to water quality from TMDL implementation as Alternative 1; however the same limitations as Alternative 1 on achieving water quality objectives in the Hydroelectric Reach and downstream would also apply. Specifically, there are no proposed management actions that would achieve the temperature allocations assigned to Copco 1 and Iron Gate reservoirs under the TMDLs, and control of toxic blooms of cyanobacteria would not be expected to diminish in the future without significant progress on nutrient reduction in the reservoirs, which could take decades to achieve. The creation of volitional fish passage for salmonids at each of the Four Facilities under this alternative would provide access to at least 420 miles of historical habitat above Iron Gate Dam to anadromous fish. Consequently, the size and diversity of these populations would increase. Implementation of Alternative 4 and access to Upper Basin habitat would reduce the concentration of fish carcasses which are linked to the transmission of fish disease from adult salmon to juvenile salmon. In addition, fish would gain access to cold water springs, particularly in the Upper Basin, offering some protection against the predicted future changes associated with climate change and improved winter growth opportunities for rearing fish. The adverse effects of peaking would be largely eliminated (only one day a week) and those of entrainment into hydroelectric facilities would be largely eliminated.

Iron Gate Hatchery would continue to mitigate for the loss of production of salmonids from the 16 miles of habitat lost between Iron Gate and Copco 2 dams.

NOAA Fisheries Service and DOI prescriptions include a measure to trap and haul fall-run Chinook salmon upstream and downstream around Keno Impoundment. The

prescriptions call for seasonal trap and haul operations from June 15 to November 15 when water quality conditions are not suitable for fish (dissolved oxygen concentration less than 6 milligrams per liter [mg/L] or temperature above 20 degrees Celsius) (DOI 2007; NOAA Fisheries Service 2007).

Alternative 4 would retain the majority (80%) of hydroelectric power generation capacity and project reservoirs would remain in place and would continue to be used for recreational purposes (the significance of these effects is analyzed in Sections 3.18 and 3.20, respectively) over the next 50 years. Alternative 4 would not result in short-term impacts to fish from downstream transport of sediment during reservoir drawdown and dam removal.

ES.7.2.4 Alternative 5 (Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate)

Alternative 5 would result in the same benefits as Alternative 4 for anadromous fish; however, removal of Copco 1 and Iron Gate Dams would provide additional benefits. Fish would be able to migrate upstream and downstream more efficiently through a greater length of natural river channel and through fewer constructed fish passage facilities to use habitat in the Upper Basin. Alternative 5 would create access to at least 420 miles of historical habitat above Iron Gate Dam for anadromous fish. This would include access to low gradient historical habitat of critical importance to spawning and rearing under Copco 1 and Iron Gate Reservoirs. This additional habitat would facilitate greater dispersion of spawning adult salmonids than under Alternative 4, thereby reducing the incidence of disease. Disease risks to resident fish would be low and the establishment of a disease hot spot for *C. shasta* above the current location of Iron Gate Dam would be unlikely. In addition, fish would gain access to cold water springs, particularly in the Upper Basin, offering improved winter growth opportunities for rearing fish and some protection against future changes associated with climate change. The adverse effect of peaking flows, stranding, and entrainment of fish into hydroelectric facilities would also be eliminated.

The Hydropower Licensee would continue to fund operating Iron Gate Hatchery to meet current mitigation requirements until Iron Gate Dam is removed, after which time the hatchery would not be funded by Hydropower Licensee and is assumed to be closed.

NOAA Fisheries Service and DOI prescriptions would also be applicable to Alternative 5. Therefore, Alternative 4 and 5 include a measure to trap and haul fall-run Chinook salmon upstream and downstream around Keno Impoundment. The prescriptions call for seasonal trap and haul operations from June 15 to November 15 when water quality conditions are not suitable for fish (dissolved oxygen concentration less than 6 mg/Lor temperature above 20 degrees Celsius) (DOI 2007; NOAA Fisheries Service 2007).

By removing the two largest reservoirs in the Hydroelectric Reach, many of the water quality impairments caused by impounding water, including high pH, altered patterns for

water temperatures, elevated water temperatures in the fall, low dissolved oxygen, and the presence of algal toxins, would be largely eliminated within and below the Hydroelectric Reach.

While water quality problems would improve as a result of draining Copco 1 and Iron Gate reservoirs, Alternative 5 would also eliminate recreational uses such as flatwater fishing in these reservoirs and could decrease the value of property with access to, or views of, the reservoirs. Decreased recreational opportunities could have related effects on other resources analyzed in this EIS/EIR (i.e., Socioeconomics and Recreation, analyzed in detail in Sections 3.15 and 3.20, respectively).

The release of sediments stored behind Copco 1 and Iron Gate dams would have negative impacts on fish and water quality in the short term (< 2 years) but would provide longer term benefits in the form of increased habitat complexity and increased movement of larger sediment substrate along the river bed (bedload transport), reductions in fish disease, and the nearly complete elimination of toxic algal blooms in the Hydroelectric Reach and downstream. Some chemicals are present in reservoir sediments at concentrations below critical screening levels for freshwater and marine disposal and do not preclude sediment release downstream.

Removal of Copco 1 and Iron Gate dams and the loss of peaking flows at J.C. Boyle dam would significantly decrease the amount of hydroelectric power generated by the Klamath Hydroelectric Project. However this alternative does maintain reservoir recreation opportunities at J.C. Boyle Reservoir.

ES.7.2.5 Alternatives 2 (Full Facilities Removal of Four Dams (Proposed Action)) and Alternative 3 (Partial Removal of Four Dams)

Alternatives 2 and 3 would have the benefits of Alternatives 4 and 5 for anadromous fish; however, Alternatives 2 and 3 would provide additional fisheries and water quality benefits. Table ES-6 below summarizes the expected major benefits to salmonids and water quality for all five alternatives in this EIS/EIR as compared to existing conditions.

All action alternatives would provide access to at least 420 miles of historical habitat above Iron Gate Dam for anadromous fish. Additionally under Alternatives 2 and 3, anadromous fish would access low gradient historical habitat of critical importance to spawning and rearing under Copco 1 and Iron Gate Reservoirs. Consequently, the size and diversity of these populations would increase. Removing all Four Facilities would provide for a free-flowing river below Keno dam and would optimize the efficiency of fish migration to and from the Upper Basin as well as through the entire Hydroelectric Reach. In addition, fish would gain access to cold water springs in the Hydroelectric Reach and the Upper Basin, offering improved winter growth opportunities for rearing and some protection against future changes associated with climate change. The entire river from Keno Dam to the Pacific Ocean would therefore become a well-connected, free-flowing river and would provide new fish habitat in the Hydroelectric Reach. Dam removal would maximize the recruitment of gravel within and below the Hydroelectric Reach, which would benefit fish spawning and rearing. Additionally, Alternatives 2 and

3 would create a more natural flow pattern and more bedload transport. The occurrence of juvenile salmon fish disease is anticipated to be reduced as a result of changes in the overall dispersal of adult salmon carcasses, increases in bedload and sediment transport, and reductions in food resources for the intermediate fish disease host. While there is some uncertainty associated with the cycle of disease in juvenile salmon, a reduction in fish disease is likely and this would create better conditions for fish migration, rearing, and spawning. These alternatives would likely eliminate concentrations of carcasses and disease associated with Iron Gate Hatchery. Similarly to Alternative 5, the adverse effects of peaking and entrainment into hydroelectric facilities would also be eliminated. Disease risks to resident fish would be low and the establishment of a disease hot spot for *C. shasta* above the current location of Iron Gate Dam would be unlikely. Also, Alternatives 2 and 3 include implementation of all Interim Measures funded by PacifiCorp for the period 2012 through 2020 to improve fish habitat, water quality, and to fund monitoring and critical research.

Similarly to Alternative 5, the release of sediments stored behind Copco 1 and Iron Gate dams would have negative impacts on fish and water quality in the short term (< 2 years) but would provide longer term benefits in the form of increased habitat complexity and increased movement of larger sediment substrate along the river bed (bedload transport), reductions in fish disease, and the nearly complete elimination of toxic algal blooms in the Hydroelectric Reach and downstream. Some chemicals are present in reservoir sediments but at concentrations below critical screening levels for freshwater and marine disposal and do not preclude sediment release downstream.

Alternatives 2 and 3 would eliminate the recreational benefits of project reservoirs such as fishing and some white water recreation opportunities related to peaking flows in the Hydroelectric Reach; however partial and full facilities removal would create new recreational benefits along the Hydroelectric Reach including additional river access and rafting opportunities in the bypassed reaches (the significance of these effects is analyzed in Section 3.20). Because of the elimination of the reservoirs and changes to recreational amenities, Alternatives 2 and 3 would decrease the value of properties with access to or views of the reservoirs. Alternatives 2 and 3 eliminate all hydropower production from the Four Facilities beginning in 2020.

Implementation of KBRA projects and programs under Alternatives 2 and 3 would accelerate basin-wide habitat restoration for fish and accelerate improvement of basin-wide water quality. In the Upper Basin, the KBRA would support water quality improvements in Upper Klamath Lake and Keno Reach, which would benefit migrating salmon and steelhead populations and resident sucker populations in Upper Klamath Lake. The KBRA Fisheries Reintroduction and Management Plans could have direct benefits for salmon by accelerating their reintroduction to the Upper Basin and by providing for fish population monitoring to optimize adaptive management of restoration activities.

Within 6 months of an Affirmative Determination by the Secretary of the Interior, PacifiCorp would propose a post Iron Gate Dam Mitigation Hatchery Plan that would

ensure hatchery mitigation goals are met for 8 years following dam removal. After 8 years, continued hatchery operations would depend largely on: 1) realized and projected benefits of restored access to additional habitat above the current location of IGD; 2) the success of habitat restoration efforts through the KBRA; and 3) the success of the reintroduction program identified in the KBRA.

Following dam removal seasonal trap and haul operations, primarily for fall-run Chinook salmon may occur around Keno Dam and Keno Impoundment/Lake Ewauna until water quality conditions are sufficiently improved to allow for safe passage of fish. A variety of release and rearing strategies would be utilized to optimize success; however, the KBRA does not contain specifics on the development nor implementation of these strategies.

Effects downstream from Iron Gate Dam would include increased production of Chinook salmon due to more favorable flows associated with KBRA and improved habitat condition. In particular, these alternatives would also improve survival of smolts emigrating from downstream tributaries, such as the Scott and Shasta rivers, due to improved Klamath River flows and disease conditions. Restoration of runs in these two tributaries is the goal of extensive restoration programs.

Both Alternatives 2 and 3 fulfill three key criteria described in the Purpose and Need (Sections ES.3 and 1.5.2.1):

- Establishes a free-flowing condition on the Klamath River from the Keno Dam (River Mile 240) to the Pacific Ocean.
- Allows for full volitional fish passage from the Upper Basin to the Lower Basin of the Klamath River.
- Leads to implementation of KBRA.

Alternatives 2 and 3 have effectively the same in-river effects (i.e., fisheries, habitat, or water quality); any differences between these alternatives are related to societal aspects (scenic, economic, or recreation), as described in Section ES.7.2.6.

Table ES-6. Summary of Major Long-Term Benefits for Salmonid Restoration and Water Quality

Major long-term benefits of alternatives for water quality and salmonids as compared to existing conditions (baseline)	Alternative 1	Alternatives 2 and 3	Alternative 4	Alternative 5
Water Quality Benefits				
River no longer exceeds OR and CA water temperature, nutrient, dissolved oxygen, pH, and chlorophyll-a TMDL allocations (may not occur by 2061), improving water quality basin wide	**X**[1]	**X**	**X**	**X**
Accelerates when river no longer exceeds OR and CA water temperature, nutrient, dissolved oxygen, pH, and chlorophyll-a TMDL allocations through the KBRA Fisheries Restoration Plan, improving water quality basin wide		**X**		
Largely eliminates in 2020 elevated late summer/fall water temperatures in and below the Hydroelectric Reach by removing the largest reservoirs		**X**		**X**
Largely eliminates 2020 dissolved oxygen and pH problems produced in reservoirs in the Hydroelectric Reach and transported downstream		**X**		**X**
Largely eliminates in 2020 algal toxins produced in the Hydroelectric Reach and transported downstream[3]		**X**		**X**
Salmonid Benefits				
Iron Gate hatchery smolt production as mitigation for 16 miles of habitat loss would continue	**X**		**X**	
Expands access to at least 420 miles of anadromous salmonid habitat and associated smolt production above Iron Gate Dam and development of diverse life histories		**X**	**X**	**X**
Anadromous fish would access low gradient historical habitat of critical importance to spawning and rearing under Copco 1 and Iron Gate Reservoirs		**X**		**X**
Provides fish with access to thermal refuge areas that are buffered from future effects from climate change		**X**	**X**	**X**
Provides for natural recruitment of spawning gravel and river processes within and below the Hydroelectric Reach through dam removal		**X**		**Partial**[2]
Accelerates in 2012 restoration of fish habitat throughout the basin through the KBRA Fisheries Restoration Plan		**X**		
Accelerates the reintroduction of anadromous fish through the KBRA Fisheries Reintroduction Plan and is consistent with the optimal production from habitat for these species		**X**		

Table ES-6. Summary of Major Long-Term Benefits for Salmonid Restoration and Water Quality

Major long-term benefits of alternatives for water quality and salmonids as compared to existing conditions (baseline)	Alternative 1	Alternatives 2 and 3	Alternative 4	Alternative 5
Expands opportunity to create springtime flushing flows (KBRA Environmental Water Program) and to increase flow variability and bed movement (with dam removal), which reduce juvenile salmon disease below the Hydroelectric Reach		**X**		**Partial**
Provides opportunity to reduce juvenile salmon disease by allowing volitional fish passage through the Hydroelectric Reach and decreasing crowding of adult salmon/carcasses		**X**	**X**	**X**
KBRA funding would increase habitat restoration funding, coordination, and monitoring in the Klamath River watershed.		**X**		
Improves survival of smolts emigrating from tributaries downstream from Iron Gate Dam, such as the Scott and Shasta rivers, where extensive investment in restoration is underway and continuing		**X**	**Partial**	**Partial**
Provides volitional fish passage through the Hydroelectric Reach		**X**	**X**	**X**
Provides optimal anadromous fish passage to and from at least 420 miles of historical habitat above Iron Gate Dam by creating a free flowing river in the Hydroelectric Reach in 2020		**X**		
Accelerates the effective use of the Upper Basin by salmonids through the KBRA Fisheries Reintroduction and Management Plan		**X**		
Improves base flows for salmonids, particularly in drought years, through KBRA Water Resources Program		**X**		
Eliminates adverse effects of hydroelectric peaking and stranding of fish in the Hydroelectric Reach		**X**	**Partial**	**X**
Eliminates entrainment mortality of resident fish		**X**	**X**	**X**
Reduces concentration of myxospores associated with carcasses accumulating below hatchery facilities, thus reducing disease		**X**		**X**

Notes:
1 "X" means the alternative provides this benefit.
2 "Partial" means the alternative provides only some of the benefit.
3 Periphyton are algae that grow attached to rocks and other substrates on a riverbed. Although sometime these species cause nuisance conditions, they are rarely considered toxic. Increased non-toxic periphyton biomass would not lead to increases in algal toxins in the Klamath River. Blooms of phytoplankton (suspended algae) occurring in the calm, lake-like waters are responsible for the production of algal toxins, such as microcystin, in the Klamath River downstream from Iron Gate Dam. Noxious phytoplankton would not thrive in the free flowing river following dam removal.

ES.7.2.6 Comparing Alternatives 2 and 3

There are many similarities in the benefits and potential impacts of Alternatives 2 and 3. The main difference between the alternatives is that Alternative 3 would leave some ancillary structures in place, such as powerhouse buildings, pipelines, and penstocks, but both alternatives would create a free-flowing river from Keno Dam to the Pacific Ocean and eliminate any passage barriers to fish on the main stem Klamath River.

Given the fact that fewer structures would be removed under Alternative 3 compared to Alternative 2, there would be fewer short-term environmental impacts associated with construction activities and the use of heavy equipment. Thus, impacts related to the release of greenhouse gases, noise, and ground and land disturbance would be diminished and there would be less likelihood of displacing cultural resources or human remains (impacts to Cultural Resources are analyzed in Section 3.13). However, leaving various ancillary structures in place has the potential to interfere with wildlife movement, aesthetic quality, public safety, and would require some level of long-term maintenance.

Table ES-7 below compares the effect of Alternative 2 and 3 for all resource categories in this EIS/EIR.

Table ES-7. Detailed Comparison of Alternative 2 and Alternative 3

Resource Category:	Alternative 2 (Alt 2) - Full Facilities Removal	Alternative 3 (Alt 3) - Partial Facilities Removal
Water Quality (Section 3.2)	Both Alt 2 and Alt 3 result in a sediment release from reservoir drawdown which will have similar short-term water quality impacts. In the long-term, both Alt 2 and Alt 3 would result in increased spring time water temperatures and changes in daily variation in water temperature. These changes would mean that water temperature patterns in the Klamath River would be restored to normal pre-dam conditions.	
Aquatic Resources (Section 3.3)	Both Alt 2 and Alt 3 result in a sediment release from the drawdown of the reservoir which will have similar short-term aquatic resource impacts. In the long-term, the increase in the total amount of habitat, reestablishment of bedload sediment transport, reduced transmission of disease, and the improvements in water quality condition will benefit aquatic resources.	
Algae (Section 3.4)	Both Alt 2 and Alt 3 result in increased spring time water temperatures and change daily variation in water temperature. These changes would mean that water temperature patterns in the Klamath River Hydroelectric Reach would be restored to more natural conditions. Similarly the dominant algae would shift from noxious, and at times toxic, lake algae to algae found in moving water.	
Terrestrial Resources (Section 3.5)	Short-term construction impacts to terrestrial resources from Alt 2 maybe higher due to effects from more truck trips and reduction in bat habitat.	Reduced impacts to terrestrial plants and wildlife through reduced construction truck trips. Retained structures for use as a bat habitat.
Flood Hydrology (Section 3.6)	Both Alt 2 and Alt 3 result in a small increase in the peak 100 year flood and change in flood timing. However with mitigation this impact is less than significant.	

Table ES-7. Detailed Comparison of Alternative 2 and Alternative 3

Resource Category:	Alternative 2 (Alt 2) - Full Facilities Removal	Alternative 3 (Alt 3) - Partial Facilities Removal
Groundwater (Section 3.7)	The dam removal and drawdown described in both Alt 2 and Alt 3 have a decline in the water table surrounding the reservoirs potentially affecting adjacent wells. However with mitigation this impact is less than significant.	
Water Rights/Water Supply (Section 3.8)	Both Alt 2 and Alt 3 result in a sediment release which has a similar very slight impact on water supply in-takes located in the Klamath River downstream from Iron Gate Dam. However with mitigation this impact is less than significant. Removal of the Four Facilities would also require the relocation of the City of Yreka's water supply pipeline. The programmatic analysis of this action showed that design measures incorporated into the project description reduce the potential effects of this action to a less than significant level. Additional environmental compliance will be required for the pipeline relocation.	
Air Quality (Section 3.9)	Greater emissions from short-term construction activities.	Reduced VOC, NOx, CO, SO2, PM10 and PM2.5 emissions due to shorter duration construction activities.
Greenhouse Gases/Climate Change (Section 3.10)	Greater emissions from short-term construction activities.	Short-term reduction in greenhouse gas emissions due to reduced construction activities.
Geology, Soils, and Geologic Hazards (Section 3.11)	The dam removal and drawdown described in both Alt 2 and Alt 3 could cause instability surrounding the reservoirs. However with mitigation this impact is less than significant.	
Tribal Trust (Section 3.12)	Both Alt 2 and Alt 3 result in benefits to aquatic resources and water quality which benefit Indian Trust Assets.	
Cultural/Historic Resources (Section 3.13)	Greater disturbance to archaeological and historic sites given wider and deeper APE footprint. No retention of historic structures.	Reduced disturbance to archaeological and historic sites given less aerial extent of excavation. Some historic structures at Copco 1(built in 1918) are retained.
Land Use, Agricultural, and Forest Resources (Section 3.14)	Slightly more open space for public use through removal of all facilities; however buried facilities may have some associated access restrictions.	Slightly less open space for public use; retained facilities will be fenced off from public use limiting access to some additional areas.
	Fisheries: Improvements to commercial, recreational and tribal fisheries due to habitat expansion and improvement.	Fisheries: Same as Alt 2.
Socioeconomics (Section 3.15)	Community economic impacts (employment, labor income, output): Positive short- and medium-term impacts due to construction, mitigation and KBRA expenditures. Some long-term negative impacts due to reduced expenditures for reservoir and whitewater recreation and dam operations and maintenance. Some long-term positive impacts due to increased expenditures for commercial and recreational fisheries, irrigated agriculture, and refuge recreation.	Community economic impacts (employment, labor income, output): Same as Alt 2

Table ES-7. Detailed Comparison of Alternative 2 and Alternative 3

Resource Category:	Alternative 2 (Alt 2) - Full Facilities Removal	Alternative 3 (Alt 3) - Partial Facilities Removal
	Tribes: Improvements to tribal fisheries and to cultural practices involving fish or water contact.	Tribes: Same as Alt 2.
	Costs: Most probable estimate of construction and mitigation costs (2020 dollars) = $292 million. Costs to be divided between PacifiCorp ratepayers ($200 million) and State of California. KBRA is connected action which will require Federal funding.	Costs: Most probable estimate of construction, life cycle and mitigation costs (2020 dollars) = $247 million. Life cycle costs pertain to perpetual maintenance and security for ancillary structures that are not removed. Costs to be divided between PacifiCorp ratepayers ($200 million) and State of California. KBRA costs are the same as Alt 2.
Environmental Justice (Section 3.16)	Greater traffic, noise, and vibration could disproportionally effect tribal communities.	Reduced traffic, noise, and vibration could reduce disproportionate effects.
Population & Housing (Section 3.17)	The availability of housing is slightly reduced during construction. However because Alt 2 and Alt 3 have identical peak worker totals the effects are similar.	
Public Utilities (Section 3.18)	Higher volume of construction waste for disposal which would result in greater effects on area landfills.	Lower volume of construction waste for disposal which would result in reduced effects on area landfills.
Public Safety (Section 3.18)	Slightly more short term public safety effects associated with greater traffic. No retained above ground structures improves public safety in the long term.	Reduced traffic would reduce the public safety effects from short-term construction traffic. Under Alt 3 in the long term, there is the risk that facilities that were secured in place could cause an attractive nuisance and public safety effects. Resolving an attractive nuisance issue would fall to the entity ultimately responsible for management of those lands.
Scenic Quality (Section 3.19)	Removal of all structures could improve scenery however some historic properties provide positive scenery attributes.	Retaining some structures could conflict with the surrounding terrain, however some historic properties provide positive scenery* attributes.
Recreation (Section 3.20)	Removal of JC Boyle dam will permanently reduce the number of days with acceptable flows for whitewater boating at Hell's Corner Reach. Both Alt 2 and Alt 3 result in the elimination of reservoir related recreation.	
Toxic/ Hazardous Materials (Section 3.21)	Both Alt 2 and Alt 3 require disposal of a similar amount of hazardous materials.	
Traffic and Transportation (Section 3.22)	Greater traffic and road wear generation.	Reduced traffic and road wear generation due to reduced construction activities
Noise and Vibration (Section 3.23)	Greater noise and vibration generation.	Reduced noise and vibration generation due to reduced construction activities
Color Code Description Key	**Less preferred condition for this resource category**	**Preferred condition for this resource category**

ES.7.3 NEPA Environmentally Preferable/Preferred Alternative

ES.7.3.1 Environmentally Preferable Alternative

NEPA requires that DOI identify the alternative or alternatives that are environmentally preferable in the Record of Decision (ROD) (40 CFR Part 1505.2(b)). The environmentally preferable alternative generally refers to the alternative that would result in the fewest adverse effects to the biological and physical environment. It is also the alternative that would best protect, preserve, and enhance historic, cultural, and natural resources. Although this environmentally preferable alternative must be identified in the ROD, it need not be selected for implementation. For the purposes of NEPA, DOI will identify an Environmentally Preferable Alternative in the ROD associated with this EIS/EIR.

ES.7.3.2 Preferred Alternative

Both Alternative 2 and Alternative 3 include removal of the Four Facilities and implementation of KBRA and both alternatives more fully meet the Purpose and Need (Sections ES.3 and 1.5.2.1). Some key benefits provided by implementation of Alternative 2 and Alternative 3 include (for a full discussion of the Alternatives, see Chapter 3):

- Provides optimal anadromous fish passage to and from at least 420 miles of historical habitat above Iron Gate Dam by creating a free flowing river in the Hydroelectric Reach in 2020
- Anadromous fish would access low gradient historical habitat of critical importance to spawning and rearing under Copco 1 and Iron Gate Reservoirs
- Provides for natural recruitment of spawning gravel and river processes within and below the Hydroelectric Reach through dam removal
- Largely eliminates in 2020 elevated late summer/fall water temperatures in and below the Hydroelectric Reach by removing the largest reservoirs
- Largely eliminates 2020 dissolved oxygen and pH problems produced in reservoirs in the Hydroelectric Reach and transported downstream
- Largely eliminates in 2020 algal toxins produced in the Hydroelectric Reach and transported downstream
- Reduces concentration of myxospores associated with carcasses accumulating below hatchery facilities, thus reducing disease

Removal of the Four Facilities and implementation of KBRA are important components of a durable, long-term solution for local communities and tribes regarding the development, administration, allocation, and advancement of water and native fishery resources of the Klamath Basins. Alternative 2 and Alternative 3 provide a greater opportunity for expanding restoration of salmonids, which, over time would improve harvest opportunities of salmonids, and when compared to the other alternatives, resolve more societal hardships and conflicts that result from over-allocation of scarce natural resources.

Although Alternative 2 and Alternative 3 are similar, Alternative 2 would remove nearly all structures associated with the Four Facilities, while Alternative 3 would allow some structures to remain. By leaving no structures along the shore of the Klamath River, Alterative 2 leads to positive permanent changes in the human environment such as improvements to scenic quality, less long-term maintenance by land-management agencies, and is more protective of public safety. For these reasons Alternative 2 is the preferred alternative.

ES.7.4 CEQA Environmentally Superior Alternative

Section 15126.6(e)(2) of the CEQA Guidelines requires agencies to identify the environmentally superior alternative in a Draft EIR. If the No Project Alternative is the environmentally superior alternative, an additional environmentally superior alternative must be identified among the other alternatives.

CDFG has identified Alternative 3 (Partial Facilities Removal of Four Dams) as the environmentally superior alternative. All of the alternatives evaluated in the EIS/EIR, including for the No Action/No Project Alternative, have significant unavoidable environmental impacts as identified in Section 5.5. Alternative 2 (Full Facilities Removal of Four Dams, the Proposed Action), Alternative 3, and Alternative 5 (Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate) would have the most short-term significant and unavoidable impacts among the alternatives. These impacts would largely be limited to the time frame of direct dam deconstruction actions and sediment release. After dam deconstruction, impacts would include the loss of reservoir recreation and local economic impacts. Alternatives 2, 3, and 5 would significantly improve water temperature, dissolved oxygen, and algal toxins for aquatic resources and reduce the incidence of fish disease in juvenile salmon by removing the two largest reservoirs—Copco I and Iron Gate. Alternatives 4 and 5 would maintain some power production and recreational benefits thereby reducing local economic impacts.

Although the No Action/No Project Alternative will have no change from existing conditions resulting from construction, this alternative is not the environmentally superior alternative when compared to the Proposed Action, which is intended to improve environmental conditions. Alternative 3 is the environmentally superior alternative when compared with the Proposed Action (Alternative 2) because it would:

- Reduce the air quality impacts from emissions of volatile organic compounds (VOCs), nitrogen oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter < 10 microns (PM_{10}), and particulate matter < 2.5 microns ($PM_{2.5}$) from reduced construction activities;
- Reduce the contribution to greenhouse gas emissions from reduced construction activities;
- Reduce noise and vibration from reduced construction activities;
- Reduce impacts to terrestrial plants and wildlife from fewer truck trips;
- Reduce disturbance to archaeological and historic sites from fewer truck trips;

- Retain structures for roosting bats; and
- Retain some historically significant structures at the Four Facilities.

Alternative 3 would provide similar long-term benefits when compared with Alternative 2, but would reduce some short-term and long-term impacts because it involves less construction. In summary, Alternative 3 is considered the environmentally superior alternative among all the alternatives because it provides long-term beneficial environmental effects, while reducing some of the short-term significant effects of the Proposed Action (Alternative 2).

ES.7.5 Controversies and Issues Raised by Agencies and the Public

CEQA requires disclosure of the controversial project issues raised by agencies and the public. Table ES-8 (also Chapter 5, Table 5-4) presents a summary of some of the controversial issues and the timeline or process in which they will be addressed, or the document in which they are addressed. The issues were identified during the scoping period and in other forums for public involvement. These are opinions and issues raised by agencies and members of the public and do not necessarily represent the position of the Lead Agencies. Additionally, Table ES-8 is not a summary of findings or determinations from the analysis in this EIS/EIR. See the Scoping Report (located online at: http://klamathrestoration.gov/) for further information on issues identified by agencies and the public during the public scoping process (DOI 2010).

Table ES-8. Summary of Controversies and Issues Raised by Agencies and the Public[1]

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
Loss of Renewable Power Supply	Loss of the Klamath Hydroelectric Project will result in the loss of renewable power. The specific makeup of new power supplies is not certain and may come from non-renewable sources.	Greenhouse Gases/Global Climate Change (Section 3.10.4.3) Public Health and Safety, Utilities and Public Services, Solid Waste, Power (Section 3.18.4.3)
Regional Economic Impacts	Loss of the Klamath Hydroelectric Project, lost power generation, and impacts to the local real estate market will negatively and disproportionally affect resource-based economies of local communities, many of which are struggling economically.	Socioeconomics (Section 3.15.4.3)
Sediment Impacts from Dam Removal	Sediment release during dam removal will have significant and deleterious effects on the aquatic environment from Iron Gate Dam to the Pacific Ocean during the period of dam removal.	Water Quality (Section 3.2.4.3) Aquatic Resources (Section 3.3.4.3) Appendix C

Table ES-8. Summary of Controversies and Issues Raised by Agencies and the Public[1]

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
Historic Anadromous Fish Distribution in the Upper Klamath Basin	Dam removal would open large areas of the Upper Klamath Basin watershed to anadromous fish. The historical distribution of anadromous fish above the dams has been questioned.	Chapter 1, Introduction Aquatic Resources (Section 3.3.4.3)
KBRA Effects	The KBRA may not produce enough social and economic benefits from implementation.	Socioeconomics (Section 3.15.4.3)
KBRA Effects on Environmental Justice and Federal Trust Responsibilities	The KBRA would result in the "termination" of tribal fishing and water rights and the Federal trust responsibilities for those rights and resources, further exacerbating the environmental justice issues associated with declining anadromous fisheries and water quality in the Klamath Basin that have affected tribal practices, health, and cultural traditions	Water Rights and Water Supply (Section 3.8) Indian Trust Assets(Section 3.16)
Loss of Reservoir Environment	Dam removal will result in a loss of the three largest reservoirs, affecting individuals that live on or near the reservoirs and who value the reservoirs' aesthetic and recreational value.	Land Use, Agricultural, and Forest Resources (Section 3.14.4.3) Scenic Quality (Section 3.19.4.3) Recreation (Section 3.20.4.3)
Flood Risk	Dam removal will increase the incidence and magnitude of flooding to downstream communities.	Flood Hydrology (Section 3.6.4.3)
FERC Relicensing	In the event of a Negative Secretarial Determination, PacifiCorp would continue to seek a new license from FERC for operation of the Klamath Hydroelectric Project. The outcome of this process is not known but could be the continued operation of the dams under a new license that includes the agencies' mandatory conditions and prescriptions.	Chapter 2, Proposed Action and Description of Alternatives
Agriculture and Refuge Management contributes to poor water quality in Keno and Upper Klamath Lake	Runoff from agriculture and refuges results in poor water quality in Keno Impoundment/ Lake Ewauna and in the mainstem Klamath River. This causes fish stress, disease and mortality. Continued farming and ranching in the Tule Lake National Wildlife Refuge and Lower Klamath Lake National	Water Quality (Section 3.2.4.3) Aquatic Resources (Section 3.3.4.3)

Table ES-8. Summary of Controversies and Issues Raised by Agencies and the Public[1]

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
	Wildlife Refuge under the KBRA would inhibit fish species reintroduction and survival.	
Water Quality Conditions in Keno Impoundment and Upper Klamath Lake would not allow sound fish passage	Low levels of dissolved oxygen and high water temperatures during certain times of year would adversely affect passage of fish through Keno Impoundment and Upper Klamath Lake.	Water Quality (Section 3.2.4.3) Aquatic Resources (Section 3.3.4.3)
Changes in Types and Amounts of Whitewater Boating	Peaking flows from operation of the hydroelectric project currently allow for commercial whitewater boating in mid- to late-summer.	Socioeconomics (Section 3.15.4.2) Recreation (Section 3.20.4.3)
Resolution 10-185 of Siskiyou County Board of Supervisors Calling for an Advisory Election with Respect to the Removal of the Dams on the Klamath River on November 2, 2010 (Measure G).	Siskiyou County held an advisory vote on November 2, 2010 regarding dam removal. The ballot asked " Should the Klamath River Dams (Iron Gate, Copco 1, and Copco 2) and associated hydroelectric facilities be removed – Yes or No?" Of the 25,922 registered voters in the County, 17,206 (66.4%) participated in this vote. The results: Of the 17,206 who voted, 13,566 residents (78.84%) voted No to dam removal, while 3,640 (21.86 %) voted Yes.	While this is not an environmental impact issue and is not specifically addressed as part of this EIS/EIR, the Secretary of the Interior will consider this when making his determination.
"Siskiyou County Water Users Association, Inc. v. California Natural Resources Agency, et al." (Other Defendants are Lester Snow, Secretary of California Natural Resources Agency, Governor Schwarzenegger, DFG, DFG's Director, Humboldt County, Tule Lake Irrigation District, and Westside Improvement District).	This case was originally filed in Sacramento Superior Court on August 16, 2010. The original lawsuit asserted that approval of the KHSA and KBRA violated CEQA, and that DFG is the wrong Lead Agency. The trial court ruled that appellant's claims were time barred because a valid Notice of Determination had been filed, and that a challenge to the Lead Agency designation was not ripe for review. That ruling has been appealed to the Third Appellate District Court of Appeal. Siskiyou County Water Users Association's opening brief was filed on February 15, 2012.	This is not an environmental impact issue and is not specifically addressed as part of this EIS/EIR. It is not yet known how the results of this case may affect the overall project.

[1] CEQA requires disclosure of the controversial project issues raised by agencies and the public. Table ES-8 presents a summary of some of the controversial project issues identified during the scoping period, which are addressed in this EIS/EIR. These are opinions and issues raised by agencies and members of the public and do not necessarily represent the position of the Lead Agencies. Additionally, Table ES-8 is not a summary of findings or determinations from the analysis in this EIS/EIR.

ES.8 References

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40 Code of Federal Regulations Part 1502.16. Protection of the Environment. Part 1502: Environmental Impact Statement. 1502.16: Environmental Consequences.