

Section 1

Introduction

The Klamath Hydroelectric Settlement Agreement (KHSAs), signed in 2010, is a multi-party agreement that, if fully implemented, would result in the removal of four dams within the Klamath Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 2082). Figure 1-1 shows the location of these four dams, which are owned by PacifiCorp: J.C. Boyle, Copco 1, Copco 2, and Iron Gate dams (collectively referred to as the Four Facilities). This report, the *Klamath Dam Removal Overview Report for the Secretary of the Interior: An Assessment of Science and Technical Information* (Overview Report), presents a synthesis of new scientific studies¹ and data collection activities called for in the KHSAs (Section 3.2.4), as well as other relevant existing reports. These new studies which will inform the Secretarial Determination² (see Four Questions Before the Secretary of the Interior on Dam Removal sidebar next page) regarding the removal of the Four Facilities, were done in coordination with signatories to the KHSAs, other groups, and the public, as outlined in Appendix A of the KHSAs. During periodic meetings, these groups provided input on plans for new studies to identify any additional data gaps and data sources, and to discuss the progress of ongoing studies.

Figure 1-1: Klamath River basin map. J.C. Boyle, Copco 1, Copco 2, and Iron Gate dams would be removed under the KHSAs.



¹ Suggested guidance for prioritized new studies and data collection needs, as well as the science process for conducting these studies, is summarized in Section 3.2.4 and Appendices A, I, and J of the KHSAs. Section 3 of this report provides additional information on the science process used for the Secretarial Determination process and how new reports were reviewed.

² The Secretarial Determination is the determination made by the Secretary of the Interior on the removal of the Four Facilities.

Four Questions before the Secretary of the Interior on Dam Removal

The Secretarial Determination process will make a determination on Klamath dam removal addressing the four questions below, using existing and newly developed information (Secretarial Determination). The Determination will be made in coordination with the Secretary of Commerce.

1. Will facilities removal and KBRA implementation advance restoration of salmonid fisheries and other fish species in the Klamath Basin over a 50-year time frame?
2. What would dam removal entail; what mitigation measures may be needed; and what would these actions cost?
3. What are the potential risks and liabilities associated with dam removal to be considered by the entity removing the dams?
4. Is facilities removal and implementation of KBRA in the public interest, which includes but is not limited to consideration of potential effects on local communities and tribes?

Adapted from Appendix I of the KHSA.

Signatories of the KHSA, with the exception of the Federal government and PacifiCorp, also signed an accompanying agreement—the Klamath Basin Restoration Agreement (KBRA). The Federal government is not able to sign the KBRA until Congress passes Federal legislation authorizing the agreement. The KBRA includes interrelated plans and programs intended to benefit fisheries throughout the basin, water and power users in the upper Klamath Basin, counties, Indian tribes, and basin communities. Implementation of the KBRA is also being evaluated in this Overview Report because the KBRA would be implemented if there is an Affirmative Secretarial Determination³ on the KHSA. While some elements of the KBRA may be implemented without an Affirmative Secretarial Determination, a number of the actions and programs described in the KBRA would likely not be implemented, or would be implemented differently, if the Four Facilities remain in place with a Negative Secretarial Determination.

1.1 PURPOSE AND SCOPE OF THIS REPORT

The KHSA identified information needs and specific questions that should be addressed with new studies and analyses prior to a Department of the Interior (DOI) Secretarial Determination on Klamath dam removal (see KHSA Sections 3.2.1, 3.3.1, and 3.3.2). The sidebar on the left summarizes the major information needs and questions identified in the KHSA. These questions were expanded beyond what was originally requested in the KHSA, consistent with Section 3.2.4 and Appendix I, and now include whether dam removal as outlined in KHSA, along with implementation of programs and plans in KBRA, would be in the public interest and would advance salmonid fisheries (salmon, steelhead, and trout), as well as several other native fish populations in the basin. The KBRA programs were included in this analysis because they would proceed if the Four Facilities were removed. The timeframe for the analysis in this report was set at 50 years, 2012 through 2061.

This report provides a single, convenient, peer-reviewed summary of key findings from the Federal technical studies that were undertaken to address each of the four questions on the left, and to summarize findings from other reports and data sources relevant to these questions. This report was developed by CDM Smith (a private consulting, engineering, and science company), in coordination with the Technical Management Team (see Section 3.1) under contract with the Bureau of Reclamation, on behalf of the Department of the Interior. This report also provides findings and conclusions at a level that is understandable to readers not familiar with each of the technical disciplines (e.g., biology, engineering, and economics). Consequently, this report is not written in a standard science reporting format with a full technical description of study assumptions, methods used, data sources, and uncertainties. Its focus is on summarizing findings and conclusions from many reports and information sources, and in some cases, drawing some new, overarching conclusions. Readers wanting detailed technical discussions on the various study topics summarized in this report are directed to the cited Federal studies available on KlamathRestoration.gov. The intended audience for this report is broad,

³ A determination made by the Secretary of the Interior that removal of the Four Facilities should proceed (see KHSA Section 1.4)

including the Secretary of the Interior, other government agency officials, stakeholders in the basin, the general public, and any parties interested in a concise, accessible summary of a detailed plan for Klamath dam removal and the likely effects on Klamath Basin resources and communities.

The scope of this report primarily addresses the four KHSA-derived questions. Consequently, this report should not be viewed as a comprehensive synthesis of all the literature available on the Klamath Basin. This report does, however, draw conclusions regarding (1) the likely effects of dam removal and KBRA implementation on salmonid fisheries and other fish species; (2) a detailed plan for removing the Four Facilities, mitigation actions that may be needed, and a range of costs for these actions; and (3) the risks and liabilities associated with dam removal. This report does not draw conclusions regarding whether dam removal is in the public interest; that determination will be made by the Secretary of the Interior in the Record of Decision, in coordination with the Secretary of Commerce.

An evaluation of the extent to which dam removal and implementing the KBRA is in the public interest will be informed by the information presented in Section 4.4, Analysis of Information to Inform a Decision on Whether Dam Removal and KBRA are in the Public Interest. This information includes an economic analysis of the proposed action relative to not implementing KHSA and KBRA. This analysis presents information on national net economic benefits as well as regional economic impacts. The national net economic benefits analysis includes both use and non-use values, and is based on both revealed preference and stated preference methods, as discussed in more detail in Section 4.4. This section also presents information about the likely effects of implementing the KHSA and KBRA on tribal communities, cultural resources, national wildlife refuges, Wild and Scenic River values, water quality, recreational opportunities, real-estate values, greenhouse gas emissions, and PacifiCorp customers if FERC relicensing of the Four Facilities resumed (based on an analysis by PacifiCorp). This section also provides some indicators of individuals' and households' view related to protecting declining fish populations in the Klamath Basin and whether KHSA and KBRA should be implemented. These views were obtained with surveys results collected at a national level, a two-state area (Oregon and California), and in a 12-county region in northern California and southern Oregon, as well as two advisory votes in Siskiyou County, California, and Klamath County, Oregon, that were on the November 2, 2010 ballots. The results of all the different types of analyses presented in Section 4.4 will help to inform the Secretarial Determination.

1.2 BACKGROUND

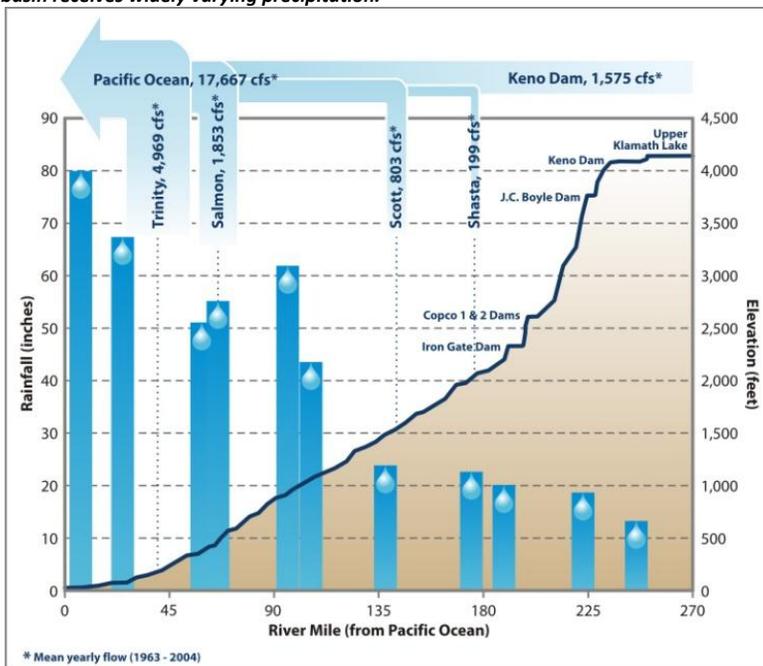
The multifaceted issues in the Klamath River Basin include water scarcity, environmental degradation, and declining fish populations, each of which adversely affect endangered species, agricultural and fishery communities, and their respective economies, as well as the way of life and health of tribal communities. These issues reached a crisis point in the early 2000s, with drastic reductions in irrigation water deliveries to farms in the upper Klamath Basin in 2001, and a major salmon die-off in the lower Klamath River in 2002 due in part

to reduced river flows that would have supported anadromous fish species. Weak Klamath River stocks resulted in the closure of commercial salmon fishing in 2006 in the Klamath Management Zone (KMZ) on the California coast, and severely curtailed commercial fishing seasons along the Oregon coast. This combination of circumstances led to the realization that the status quo was unacceptable and that the only sustainable option for solving the basin's problems would be a collaborative and mutually beneficial agreement among willing stakeholders. This realization culminated in the 2010 signing of the KHSA and KBRA in Salem, Oregon, after years of negotiation.

1.2.1 Hydrologic Setting

The headwaters of the Klamath River, unlike most other watersheds in the Pacific Northwest, originate in relatively flat open valleys before descending into a steep river canyon that intercepts inputs from multiple groundwater inflows in the upper basin⁴ and the Shasta, Scott, Salmon, and Trinity Rivers, among others, in the lower basin prior to emptying into the Pacific Ocean. The upper basin contains large, porous aquifers that store precipitation falling throughout the year and steadily release cool water into stream channels. Consequently, seasonal stream flow fluctuations in upper basin streams are relatively small. In contrast, the lower basin does not contain large, porous aquifers that temporarily store precipitation. As a result, precipitation tends to runoff more quickly in the lower basin, creating relatively "flashy" streams.

Figure 1-2: The Klamath River is a unique river system with a flat topography as its headwater with a steeper downstream portion beginning near the dams. In addition the basin receives widely varying precipitation.



Source: Western Regional Climate Center 2011, Reclamation 2011e, FERC 2007

Precipitation in the watershed varies widely, ranging from an annual average of 13 inches in the open valleys in the headwaters, which are in the rain shadow of mountains to the west, to approximately 80 inches of rainfall at the river's mouth. Consequently, the amount of water running off from the upper basin, even though it is nearly equal in size to the lower basin, is relatively small, averaging less than 20 percent of the total on an annual basis, as illustrated in Figure 1-2. The steadier groundwater discharge from the upper basin, however, does provide an important source of water for the lower basin, and for fish during the dry summer and early fall months, when flows in the lower basin tributaries are low.

At its higher elevations (above 5,000 feet), the upper Klamath Basin receives rain and snow during the late fall, winter, and spring. Peak stream flows in the upper basin generally occur during snowmelt runoff in late spring and early summer. Peak runoff events in the lower basin tend to occur from

⁴ This report subdivides the Klamath Basin into upper and lower basins at Iron Gate Dam. The portion of the river and its tributaries upstream of Iron Gate Dam fall within the upper Klamath Basin and the portion downstream of the dam falls within the lower Klamath Basin.

November through March, when rainfall is highest, or when rain-on-snow events occur.

1.2.2 Historical Changes

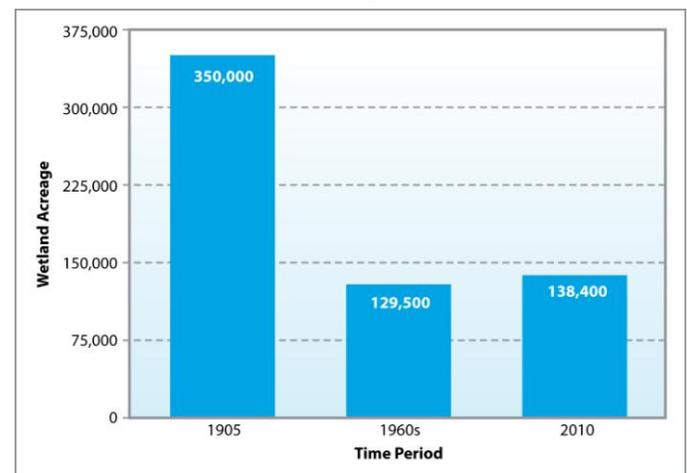
Prior to the 1800s, the upper Klamath Basin featured a vast complex of 350,000 acres of lakes and wetlands, interconnected by sloughs and river channels. The rivers and wetlands of the Klamath Basin supported large and diverse fish populations and were an important stopover point for migratory birds and waterfowl. For thousands of years, these fish, birds, wildlife, vegetation, and other natural resources sustained many American Indian tribes in the Klamath Basin.

Settlers that moved to the western US in the 1800s and 1900s found many of these wetlands and upland areas to be attractive for farming if drained and/or if they could be supplied with irrigation water. The construction of the Bureau of Reclamation's (Reclamation's) Klamath Project began in the early 1900s to facilitate farming. Reclamation's Klamath Project, the largest water delivery system in the basin, now includes Link River and 6 other dams, 18 canals, 45 pumping facilities, and more than 500 miles of ditches that supply irrigation water to more than 200,000 acres of agricultural lands. Farms and ranches upstream from Upper Klamath Lake, on tributaries downstream of Upper Klamath Lake, and in the lower Klamath River (e.g., Scott, Shasta, and Trinity Rivers) use surface water supplies that are not part of Reclamation's Klamath Project. Some of these agricultural areas also rely on groundwater supplies.

In total, about 80 percent of the wetlands in the upper Klamath Basin and Reclamation's Klamath Project area were converted to farming and ranching activities (see Figure 1-3). Some of the wetlands were retained through establishment of the Lower Klamath National Wildlife Refuge (NWR) by President Roosevelt in 1908, creating the first waterfowl refuge in the United States and conserving critical habitat for birds along the Pacific Flyway. Other NWRs in the upper basin include Tule Lake NWR and Upper Klamath Lake NWR, both established in 1928.

The Klamath Hydroelectric Project was constructed between 1918 and 1962 and includes the East and West Side power facilities on Link River Dam, and Keno, J.C. Boyle, Copco 1, Copco 2, Iron Gate, and Fall Creek dams (see Figure 1-1)⁵. PacifiCorp⁶ developed all of these dams for the purpose of power generation. Keno Dam, however, was never converted to a hydroelectric facility. Link River dam impounds irrigation water in Upper Klamath Lake for use on Reclamation's Klamath Project. The installed maximum capacity of the entire project is

Figure 1-3: Klamath Basin wetland acreage over time (1905-2011).



Source: Akins 1970, Natural Resources Conservation Service 2007 as referenced in Larson and Brush 2010

⁵ The East and West Side power facilities and Fall Creek Dam locations are not shown on Figure 1-1 due to size constraints. They are shown on maps available from the U.S. Fish and Wildlife Service at <http://www.fws.gov/yreka/HydroMaps.html>.

⁶ PacifiCorp refers to the current utility and all previous owners/names.

163 megawatts (MW) and, on average, the project produces 82 MW (or 716,800 megawatt-hours [MWh] of electricity annually) (FERC 2007).

1.2.3 Existing Biological and Physical Conditions

The rich biological diversity of the Klamath Basin includes drier pine and fir forests in the upper basin and dense redwood forests in the lower basin; these forests together support more than 3,000 known plant species and more than 200 vertebrate species, including amphibians, reptiles, birds, and mammals. The wetlands and forests of the basin are a critical layover for migrating birds in the spring and fall. Nearly 80 percent of the Pacific Flyway's migratory waterfowl, shorebirds, and other waterbirds use the wetlands in the basin.

The Klamath Basin is home to 30 native fish species and is the third-largest producer of salmon in the lower United States (Institute for Fisheries Resources 2006). The basin historically produced large runs of steelhead, Chinook salmon, coho salmon, green sturgeon, eulachon, coastal cutthroat trout, and Pacific lamprey. Runs of these anadromous fish (fish that migrate from salt water to spawn in fresh water) contributed substantially to tribal, commercial, and recreational fisheries (U.S. Fish and Wildlife Service [USFWS] 1986; DOI, Klamath Basin Fisheries Task Force 1991; Gresh et al. 2000).

Fish populations in the basin have decreased from the numbers observed in the early 1900s. Steelhead populations that were thought to exceed one million fish prior to the 1900s fell to 400,000 by 1960. Similarly, coho salmon returns declined by 70 percent in the period since the 1960s (National Resource Council [NRC] 2008). Large declines have also been seen in spring and fall-run Chinook, with populations at a fraction of their former size (Moyle et al. 2008). Section 4.1, Expected Effects of Dam Removal and KBRA on Physical, Chemical, and Biological Processes that Support Salmonid and other Fish Populations, focuses on fish populations.

Multiple physical changes in the basin over the past 150 years, including operation of hydroelectric dams, overharvest of fish, wetland draining, water diversion for agricultural uses, ranching operations, mining operations, and timber harvest, have contributed to the decline of fisheries. These activities have created barriers for fish passage to hundreds of miles of streams in the upper Klamath Basin, degraded spawning and rearing habitat, and degraded water quality. The Klamath River is listed as a Clean Water Act (CWA) impaired waterway (on the "303(d)" list) in both California and Oregon due to impaired water temperature, sedimentation, pH, organic enrichment/low dissolved oxygen, nutrients, ammonia, chlorophyll-a, and microcystin (an algal toxin). The river does not currently support its fisheries-related or human health-related beneficial uses. The resulting declines in fisheries have created hardships for Indian tribes and other fishing communities. The Klamath Tribes in the upper basin have been most adversely affected by these changes due to the complete loss of their salmon fishery for over 90 years (because upstream migration has been blocked by the Klamath Hydroelectric Project dams) and the loss of their sucker fishery in Upper Klamath Lake for the past 25 years, except for ceremonial purposes.

1.2.4 Regulatory Conditions

The basin faces many regulatory challenges, including managing species listed under the Federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), and/or Oregon wildlife protection laws; compliance with the CWA Total Maximum Daily Loads (TMDLs); compliance with Wild and Scenic River Act; and an ongoing Oregon adjudication process to settle water right claims.

1.2.4.1 Endangered Fish Species

Klamath Basin fish species listed under the ESA are coho salmon, bull trout, Lost River sucker, shortnose sucker, green sturgeon, and eulachon. Species listed under the CESA are coho salmon, bull trout, Lost River sucker, shortnose sucker, and longfin smelt. In addition, both the Lost River and shortnose suckers are fully protected under the California Fish and Game Code Section 5515(a)(3)(b)(4) and (6), respectively. The State of Oregon also lists the two sucker species under its endangered species regulations ([ORS 496.171-496.192](#)).

1.2.4.2 TMDLs

There are currently nine TMDLs established in the Klamath Basin. These TMDLs identify the pollutant load reductions that are necessary to meet water quality standards. The California and Oregon Klamath River TMDLs focus on reducing high water temperatures, increasing dissolved oxygen levels, and reducing nutrient concentrations and microcystin⁷ impairments in the mainstem Klamath River (North Coast Regional Water Quality Control Board [NCRWQCB] 2010a, Oregon Department of Environmental Quality [ODEQ] 2010). The Scott, Shasta, and Trinity Rivers, were addressed in separate technical analyses and TMDLs; inputs from these tributaries were included in the modeling effort conducted for the *Action plan for the Klamath River Total Maximum Daily Loads addressing temperature, dissolved oxygen, nutrient, and Microcystin impairments in the Klamath River in California*, and the *Klamath River and Lost River implementation plan* (NCRWQCB 2010a). TMDL implementation are intended to result in improvements to water quality conditions. It could take decades to meet full attainment of TMDLs. (ODEQ 2010, NCRWQCB 2010a)

1.2.4.3 Wild and Scenic River Act

The National Wild and Scenic River (WSR) System was created by Congress through the Wild and Scenic Rivers Act (WSRA) in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The Klamath River contains two components of WSR to preserve natural, cultural, and recreational river values in a free-flowing condition. One stretch is designated in the Hydroelectric Reach below J.C. Boyle Dam to Copco 1 Reservoir and the second stretch is designated below Iron Gate Dam to the Pacific Ocean (see Section 4.4.5, Wild and Scenic River).

What is a TMDL?

A Total Maximum Daily Load (TMDL) is required by the Clean Water Act (CWA) for water bodies if their water quality does not support designated beneficial uses or meet water quality standards. A TMDL is a calculation of the maximum amount (load) of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that load among the various sources of that pollutant.

⁷ Microcystin is a toxin produced by the blue-green algal species *Microcystis aeruginosa*.

1.2.4.4 Oregon Water Rights Adjudication

The Klamath Basin Adjudication is the adjudication process for pre-1909 and federal reserved water right claims for the use of surface water within the Klamath Basin. The Klamath Basin proceeding began in 1975. Claims of water use have been gathered and contests have been filed on most of those claims. Administrative law judges have been holding hearings and issuing proposed orders determining the claims and contests. The Oregon Water Resources Department (OWRD) will review those proposed orders, and any proposed settlements of contests, and submit its Findings and Order of Determination to the Klamath Circuit Court in December 2012. Water right claims have been filed by private water users, The Klamath Tribes (see Section 4.4.2, Tribal), Klamath allottees, and the United States (for the Klamath Project and for Indian and other Federal reservations of land). Once OWRD's findings are submitted to court, parties will have an opportunity to file exceptions to those findings. The Klamath Circuit Court will resolve the exceptions and issue a decree. As of July 2010, 97 percent of contests and 92 percent of the claims have reached a proposed resolution, either by issuance of an administrative law judge's proposed order or by a proposed settlement of contests (OWRD 2010).

1.2.5 Conditions Leading to the Development of the KHSA

While construction and operation of reservoirs and dams on the Klamath River facilitated development, growth, and expansion of an agricultural economy in the region and created a locally important source of hydroelectric power, it also contributed to declines in fisheries and water quality, affecting tribal resources and culture and other fishing communities. During the last decade, competing

demands led to unpredictable water deliveries to farms and NWRs, ongoing litigation over water rights, a major salmon die off, closures of commercial fishing, and a requirement for PacifiCorp to undertake an expensive and uncertain FERC relicensing of its Klamath Hydroelectric Project (described in more detail below), led stakeholders from all the affected interests to come together to develop a pair of collaborative and mutually beneficial agreements—the KHSA and the KBRA (see Section 1.2.7, *Klamath Basin Restoration Agreement [KBRA]*).

The Four Facilities have been operating under annual FERC licenses to produce hydropower since the original license expired in 2006. PacifiCorp filed an application with FERC for a new operating license for the Klamath Hydroelectric Project in 2004. During relicensing, several agencies, led by the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries Service) and other agencies, under Section 10(a) authority of

Figure 1-4: Copco 1 Dam, powerhouse, and downstream area of the Klamath River. This facility would be removed under the KHSA.



The Federal Power Act,⁸ recommended to FERC the removal of the Four Facilities as the preferred measure to protect declining Klamath River fisheries. Concurrently, under Section 18 authority of the Federal Power Act, the United States Department of Commerce (DOC) and DOI prescribed mandatory fishways and passage at each mainstem dam. The DOI conditioned increased flows in the largely dewatered reach of the Klamath River downstream of J.C. Boyle Dam to improve riparian habitat, whitewater recreation, and fisheries under Section 4(e) authority.

The DOC and DOI fishway prescriptions were supported by various interest groups to address declining fish harvests in the lower Klamath River and to reopen blocked fish habitat in the upper basin. The fishway prescriptions and DOI's mandatory flow 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-NOAA Fisheries Service-0001, September 27, 2006*) found that the agencies met their 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.

FERC continues to wait for action from the states of California and Oregon regarding PacifiCorp's applications for Water Quality Certification for the hydroelectric project pursuant to Section 401 of the CWA. FERC cannot issue a license decision until the states issue, deny or waive a 401 certification. Requirements for 401 certification remain unresolved for relicensing the Klamath Hydroelectric Project and likely would represent a large fiscal liability and risk to PacifiCorp and its customers.

The agencies' mandatory prescriptions and conditions, requirements for a 401 certification, along with FERC's required conditions, would result in significant operational changes to the Klamath Hydroelectric Project. The prescriptions and conditions would reduce the potential power generation capacity by about 20 percent of annual generation (Scott 2010), decrease peaking operations to only one day a week, and would cause the Klamath Hydroelectric Project to operate at a net annual loss (FERC 2007). PacifiCorp estimates that it would incur relicensing capital costs (in 2010 dollars⁹) 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 additional

Purpose of the Hydroelectric Project Four Facilities

The Four facilities are used exclusively by PacifiCorp for power generation. PacifiCorp allows flat water recreation on three of the reservoirs and whitewater boaters take advantage of consistent flows from the J.C. Boyle powerhouse as secondary benefits. The reservoirs provide no active flood storage however; their removal would slightly alter the peak flood flows for a distance of 18 miles below Iron Gate Dam due to flow attenuation provided by this reservoir (see Section 4.2.1.4). The Four Facilities provide no water supply for either agricultural or domestic purposes.

⁸ The Federal Power Act established the predecessor to FERC to (in addition to regulating interstate activities of power and natural gas industries) coordinate national hydroelectric facilities for all non-Federal hydropower facilities. The Act provides for cooperation between FERC and other Federal agencies, including resource agencies, in licensing and relicensing power projects. A 1986 amendment to the Act mandated that each license include conditions to protect, mitigate, and enhance fish and wildlife affected by the project. These conditions are to be based on recommendations received pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) from the USFWS, NOAA Fisheries Service, state fish and wildlife agencies, and Indian tribes (Federal Power Act Sec. 10(a)) potentially affected by the project.

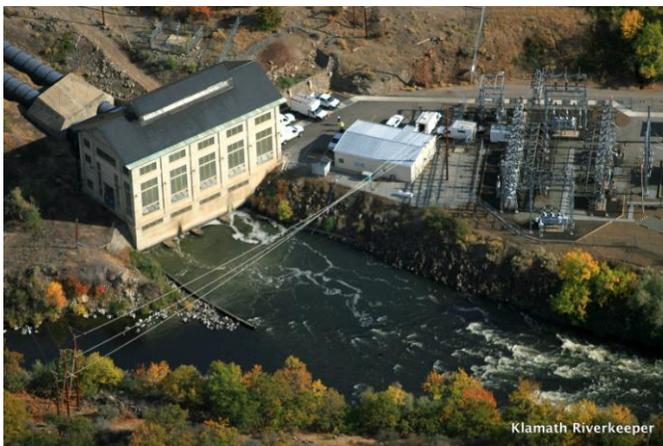
⁹ This phrase indicates that the stated cost is presented as the value of the dollar in that year (in this case year 2010)

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 surcharges, if approved through future Public Utilities Commission (PUC) actions. Alternatively, the KHSA sets a cost cap for PacifiCorp customers in Oregon and California of \$200 million dollars (2020 dollars) for removal of the Four Facilities. Customers in Oregon would be responsible for \$184 million and customers in California would be responsible for \$16 million. The KHSA also specifies that if additional funding for dam removal were needed beyond \$200 million, up to \$250 million (in 2020 dollars) would come from California, either through the issuance of a bond or other appropriate financing mechanism. The United States government would not be responsible for any of the costs of Four Facilities removal, as described in KHSA.

The economic reality of implementing fishways and meeting CWA 401 certification at the Four Facilities, combined with the prospect of an annual loss of power revenue and the protection of prudent and reasonable utility rates for its customers, encouraged PacifiCorp to enter into collaborative discussions with other basin stakeholders to identify ways to improve basin fisheries while limiting costs and liabilities to PacifiCorp customers. PacifiCorp recognized that the terms of the KHSA “provide significant benefits to PacifiCorp’s customers” (California Public Utilities Commission [CPUC] 2011). The cost cap protects customers from the uncertain costs of relicensing, litigation, and possibly dam removal that customers may be responsible for absent the KHSA. Among the benefits of the KHSA, PacifiCorp recognized “cost protection regarding dam removal cost, liability associated with dam removal, FERC relicensing costs, and possible litigation due to controversies in the Klamath Basin region regarding the operation of the dams as benefits of the KHSA” (CPUC 2011).

1.2.6 Public Utilities Commission Rulings on the KHSA

Figure 1-5: The Copco 2 powerhouse. The CPUC approved the rate increases that capped rate payer exposure at \$200 million (in 2020 dollars) as defined in the KHSA.



A prerequisite to PacifiCorp customer surcharges necessary for KHSA implementation and removal of the Four Facilities was concurrence with PacifiCorp that the KHSA was in the best interest of customers from the CPUC and OPUC. PacifiCorp was required to demonstrate to both utility commissions that the incremental ratepayer increases were fair and reasonable.

PacifiCorp’s records and testimony before both commissions compared customer’s risk of cost increases under the KHSA to the potential rate increases that could result from relicensing the Four Facilities. Both utilities commissions ruled that implementing the KHSA with customer surcharges resulted in the best financial outcome to PacifiCorp’s customers when compared to the known costs and future risks of relicensing the Four Facilities.

1.2.7 Klamath Basin Restoration Agreement (KBRA)

The signatory parties to the KHSAs recognized that dam removal would not address all of the issues within the basin and as a result, 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, 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 agricultural communities. The KBRA is intended to result in effective and durable solutions that address the limited availability of water to support agricultural, tribal, environmental, and fishery needs in many years and resolve the water conflicts among the many users.

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 NWRs in the upper Klamath Basin.
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 mutually-beneficial agreements that the Klamath, Karuk, and Yurok Indian tribes will not exercise water right claims that would conflict with water deliveries to Reclamation's Klamath Project water users, and for project water users to not challenge reduced water deliveries (see Table 1-1). Mutual support for fisheries restoration and reintroduction programs, greater certainty about water deliveries at the beginning of each growing season, and agreement and assurances that parties will work collaboratively to resolve outstanding water-right contests pending in the Oregon Klamath Basin Adjudication process are the improved status quo. In addition, the KBRA includes a voluntary Water Use Retirement Program in the upper basin, 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.

Table 1-1: List of Major KBRA Programs, Plans, and Commitments

Program, Plans, and Commitments
Fisheries Programs
Fish Habitat Restoration Activities
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
Water Resources Program
Water Diversion Limitations for Reclamation’s Klamath Project Including National Wildlife Refuges
Water Deliveries for National Wildlife Refuges in Klamath Reclamation Project Area
Groundwater Technical Investigations
On-Project (Klamath Project) Plan
Commitments among Klamath Project irrigators, Party Tribes, and the U.S. related to Water Use/Rights
Commitments Related to Finance Issues (§§ 15.4.2., 15.4.4.)
Operation of Klamath Reclamation Project Facilities (Link River and Keno dams)
Water Use Retirement Program
Off-Project Water Settlement
Off-Project Reliance Program
Power for Water Management Program and Plans
Drought Plan
Emergency Response Plan
Climate Change Assessment
Environmental Water Management
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 Legislation (Siskiyou County Economic Development Funding)
Tribal Programs Fisheries and Conservation Management
Tribal Programs Economic Revitalization
Mazama Forest Project (for Klamath Tribes)
Klamath Tribes Interim Fishing Site

The United States will be a party to the KBRA if there is an Affirmative Secretarial Determination under the KHSA and Congressional authorization according to the KBRA terms. Legislation bills have been introduced in both the House (House Bill 3398, sponsored by Congressman Mike Thompson (CA)) and the Senate (Senate Bill 1851, sponsored by Senator Jeff Merkley (OR)) to authorize restoration in the Klamath Basin in accordance with the KHSA and the KBRA.

The KBRA can be viewed in its entirety at KlamathRestoration.gov.

1.2.8 Summary and Path Forward

Given development of the KHSA, the Oregon and California CWA 401 certifications are being held in abeyance pending the Secretarial Determination. The DOI and DOC mandatory prescriptions have not been incorporated as terms of the annually renewed Klamath Hydroelectric Project FERC license. If there is an Affirmative Determination, the KHSA provides for removal of the Four Facilities during a 12-month period. The agreement includes provision for either the full or partial removal of the dams, power generation facilities, water intake structures, canals, pipelines, ancillary buildings, and dam foundations to create a free-flowing river with all four dams removed by December 31, 2020.

The parties to the KHSA recognized that removing the dams alone would not provide for a full restoration of Klamath Basin fisheries. The adjoined KBRA was developed to build on dam removal for advancing fisheries by restoring habitat, increasing water storage, improving flow and water-quality conditions for fish, and implementing a salmon reintroduction program in the upper basin. Moreover, implementation of the KBRA would create new water and power programs, regulatory assurance programs, and programs for tribes and counties, in order to establish a new balance of water uses in the basin and the KBRA parties desire to create a durable solution to avoid continuation of rotating crises over the last decade.

Figure 1-6: Agriculture is one of the many resources in the Klamath Basin that would benefit from more water delivery certainty with the implementation of the KHSA and KBRA.



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